UNIVERSITI TEKNOLOGI MARA

UNCOVERING COMMUNITY PHARMACISTS' PRACTICES AND BELIEFS IN PRE-TRAVEL PHARMACIST CONSULTATIONS FOR PROSPECTIVE HAJJ AND UMRAH PILGRIMS IN SELANGOR AND KUALA LUMPUR, MALAYSIA

NORAZLIN BINTI A KADIR

PhD

September 2026

UNIVERSITI TEKNOLOGI MARA

UNCOVERING COMMUNITY PHARMACISTS' PRACTICES AND BELIEFS IN PRE-TRAVEL PHARMACIST CONSULTATIONS FOR PROSPECTIVE HAJJ AND UMRAH PILGRIMS IN SELANGOR AND KUALA LUMPUR, MALAYSIA

NORAZLIN BINTI A KADIR

Thesis submitted in fulfilment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Pharmacy

September 2026

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 5th May 2026 to conduct the final examination of Norazlin binti A Kadir on her Doctor of Philosophy thesis entitled "Uncovering Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims in Selangor and Kuala Lumpur, Malaysia" in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

Ibtisam Abdul Wahab, PhD
Associate Professor
Faculty of Pharmacy
Universiti Teknologi MARA
(Chairperson)

Mathumalar Loganathan, PhD
Associate Professor
Faculty of Pharmacy
Universiti Teknologi MARA
(Internal Examiner)

Noraida Mohamed Shah, PhD
Associate Professor
Faculty of Pharmacy
Universiti Kebangsaan Malaysia
(External Examiner)

PROF DR HJH ZURAEDA IBRAHIM
Dean
Institute of Postgraduate Studies
Universiti Teknologi MARA

Date: 18 September 2026

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Postgraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Norazlin binti A Kadir
Student ID. No.	:	2020297528
Programme	:	Doctor of Philosophy (PH990)
Faculty	:	Pharmacy
Thesis Title	:	Uncovering Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims in Selangor and Kuala Lumpur, Malaysia
Signature of Student	:	……..
Date	:	September 2026

ABSTRACT

Hajj and Umrah pilgrimages are among the world's largest religious mass gatherings. Pilgrims are exposed to multiple health risks, including infectious diseases, exacerbation of chronic diseases, environmental hazards, and medication-related challenges. Community pharmacists (CPs), as accessible healthcare providers, are well-positioned to deliver pre-travel pharmacist consultations to mitigate these risks. However, empirical evidence regarding CPs' involvement, practices, and beliefs in this area remains limited, particularly in Hajj and Umrah contexts. This research aimed to investigate CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in Malaysia, guided by the Theoretical Domains Framework (TDF). The research was conducted in three studies. First, a scoping review synthesised international studies on CPs' involvement in pre-travel health services and mapped barriers and facilitators to TDF domains. Second, a qualitative study using face-to-face semi-structured interviews with 24 CPs in Selangor and Kuala Lumpur explored pre-travel pharmacist consultation activities and belief structures influencing their involvement in the consultations for prospective Hajj and Umrah pilgrims. Findings from these studies generated the development of a survey instrument. Third, a TDF-informed survey instrument was developed and preliminarily validated through expert panel review, cognitive interviews, test-retest reliability, and feasibility testing, followed by a cross-sectional survey conducted between 1st April and 31st August 2024 to assess CPs' practices, beliefs, and factors influencing their involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The scoping review identified 12 studies, with travel health advice being the most frequently reported service. Barriers and facilitators were categorised into 10 out of 14 TDF domains. Qualitative findings revealed seven consultation activities, with travel health education being the most frequently conducted by the participants. Despite being motivated to engage, their practices were largely reactive and encountered several challenges, including limited knowledge of Hajj and Umrah-specific health requirements, time and staffing constraints, and perceived lack of doctors' support. A 47-item TDF-informed survey instrument was developed and validated, comprising 7 practice and 40 belief items. A cross-sectional survey revealed high involvement in dispensing medicines for minor ailments (98.9%), with significant associations observed between involvement and factors such as ethnicity, religion, prior pilgrimage experience, and professional characteristics. CPs expressed positive beliefs regarding the value of the consultations, despite encountering individual and organisational barriers. Multivariable logistic regression analysis identified environmental context and resources as the strongest factor influencing involvement in making recommendations for prospective Hajj and Umrah pilgrims [adjusted odds ratio, (aOR) 6.07; 95% confidence interval (CI) 2.95-12.50]. This research provides novel, theory-informed insights into the factors influencing CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The findings provide an evidence base to inform the development of future interventions aimed at strengthening CPs' involvement in pre-travel pharmacist consultations. Several interventions are proposed, including structured education and training programmes, clear practice guidelines, interprofessional collaborations, increased public awareness and supportive policy frameworks.

ACKNOWLEDGEMENT

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL.

First and foremost, I praise Allah, the Almighty, for granting me countless blessings, knowledge, and opportunities to complete this thesis.

I would like to extend my heartfelt appreciation to my supervisors, Assoc. Prof. Dr. Mohd Shahezwan Abd Wahab, Assoc. Prof. Dr. Azyyati Mohd Suhaimi, and Prof. Dr. Noordin Othman. Their dedication, wisdom, and encouragement have been instrumental in shaping both this thesis and my growth as a researcher. Their guidance, patience, time, and support have continually inspired me, and I am truly honoured to have learned under their supervision.

My sincere thanks also go to Dr Kamaliah Md Saman, as well as the administrative and academic staff of the Faculty of Pharmacy, for their support, efficiency, and kindness in assisting me throughout the course of my studies.

This work could not have been completed without the unwavering love and sacrifices of my family. To my husband, Huzaine Hussin, and my daughter, Siti Marsha Farzana, thank you for your patience, understanding, and constant encouragement. I also dedicate my heartfelt gratitude to the loving memory of my beloved father, Abdul Kadir bin Abd Hamid, my mother, , my parents-in-law, Hussin bin Ismail and , my siblings, Norfariza, Norazli, Norfarhana and the entire family for their continuous prayers and support.

I would also like to acknowledge my friend, Dr Farahwahida Mohd Kasim, for her companionship and encouragement. My sincere thanks also go to my sisters, Nor Aziah Abdullah and Dr Fajaratunnur Abdullah Sani, and to my colleagues, whose support has been invaluable. I am also blessed with wonderful friends, including Rosmaliah, Nur Aini, Norlizawati, Mas Rahayu, Mad Sapri, Luqman, Suhaidi, Nik Ateerah and CBBP 2020 Support Group, who have provided motivation, prayers, and friendship during this journey.

Finally, I wish to thank all research participants and expert panel members for their valuable contributions, without which this study would not have been possible. I am also grateful to the Ministry of Health, Malaysia, and the Ministry of Higher Education for granting me the opportunity and resources to pursue this doctoral degree. To everyone who has contributed, directly or indirectly, I offer my sincerest gratitude. Alhamdulillah.

TABLE OF CONTENTS

		Page
CONFIRMATION BY PANEL OF EXAMINERS		**ii**
AUTHOR'S DECLARATION		**iii**
ABSTRACT		**iv**
ACKNOWLEDGEMENT		**v**
TABLE OF CONTENTS		**vi**
LIST OF TABLES		**xi**
LIST OF FIGURES		**xiii**
LIST OF SYMBOLS		**xiv**
LIST OF ABBREVIATIONS		**xv**
CHAPTER 1 INTRODUCTION		**1**
1.1	Overview	1
1.2	Research Background	1
1.3	Problem Statement	5
1.4	Aims, Research Questions, Research Objectives and Hypotheses	9
1.5	Scope of the Study	12
1.6	Significance of the Study	13
1.7	Definition of Terms	15
1.8	Thesis Outline	17
1.9	Chapter Summary	20
CHAPTER 2 LITERATURE REVIEW		**21**
2.1	Introduction	21
2.2	Overview of Travel Health and the Context of Hajj and Umrah Pilgrimages	21
	2.2.1 Health Risks During Hajj and Umrah	22
	2.2.2 Medication Practices and Challenges among Pilgrims	26
	2.2.3 Importance of Structured Pre-Travel Preparation	31

2.3 Role of Community Pharmacists in Pre-Travel Health Care 33
2.4 Pre-Travel Health Practices by Community Pharmacists 36
2.4.1 Global Landscape 36
2.4.2 Malaysian Context 38
2.5 Factors Influencing Community Pharmacists' Involvement in Pre-Travel Health Services 41
2.6 Theoretical Frameworks Underpinning the Study 48
2.6.1 Behavioural Theories Explaining Health Professional Practice 48
2.6.2 Theoretical Domains Framework 50
2.7 Chapter Summary 53

CHAPTER 3 RESEARCH METHODOLOGY 55
3.1 Introduction 55
3.2 Study 1: Scoping Review of Practices, Barriers and Facilitators to the Delivery of Pre-Travel Health Services by Community Pharmacists Using the Theoretical Domains Framework 56
3.2.1 Search Strategy 57
3.2.2 Study Selection 58
3.2.3 Data Extraction and Analysis 60
3.2.4 Quality Assessment 60
3.3 Study 2: A Qualitative Exploration of Community Pharmacists' Practices and Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 61
3.3.1 Study Design 61
3.3.2 Study Instrument 63
3.3.3 Settings and Participants 63
3.3.4 Sampling of Study Informants 63
3.3.5 Data Collection 65
3.3.6 Interview Data Management 65
3.3.7 Data Analysis 66
3.3.8 Ensuring the Study Process's Trustworthiness 67
3.3.9 Ethical Considerations 70
3.4 Study 3: Assessment of Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah

Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur 70
3.4.1 Phase 1: Development and Validation of the Survey Instrument 71
3.4.2 Phase 2: Cross-Sectional Questionnaire Survey 77
3.4.3 Ethical Considerations 85
3.5 Chapter Summary 85

CHAPTER 4 RESULTS 86
4.1 Introduction 86
4.2 Study 1: Scoping Review of Practices, Barriers and Facilitators to the Delivery of Pre-Travel Health Services by Community Pharmacists Using the Theoretical Domains Framework 86
4.2.1 Search Results 86
4.2.2 Study Characteristics 87
4.2.3 Quality Assessment 88
4.2.4 Practices of Pre-Travel Health Services 89
4.2.5 Barriers and Facilitators in Providing Pre-Travel Health Services 91
4.3 Study 2: A Qualitative Exploration of Community Pharmacists' Practices and Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 100
4.3.1 Characteristics of Community Pharmacists Interviewed 100
4.3.2 Practices of Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 101
4.3.3 Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 105
4.4 Study 3: Assessment of Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur 125
4.4.1 Phase 1: Development and Validation of the Survey Instrument 125
4.4.2 Phase 2: Cross-Sectional Questionnaire Survey 129
4.5 Chapter Summary 176

CHAPTER 5 DISCUSSION **178**
5.1 Introduction 178
5.2 Study 1: Scoping Review of Practices, Barriers and Facilitators to the Delivery of Pre-Travel Health Services by Community Pharmacists Using the Theoretical Domains Framework 178
5.2.1 Practices of Pre-Travel Health Services 178
5.2.2 Barriers and Facilitators in Providing Pre-Travel Health Services 180
5.2.3 Strengths and Limitations 185
5.3 Study 2: A Qualitative Exploration of Community Pharmacists' Practices and Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 187
5.3.1 Practices of Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 187
5.3.2 Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims 187
5.3.3 Strengths and Limitations 191
5.4 Study 3: Assessment of Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur 193
5.4.1 Phase 1: Development and Validation of the Survey Instrument 193
5.4.2 Phase 2: Cross-Sectional Questionnaire Survey 197
5.5 Summary of Research 208
5.5.1 Practices 209
5.5.2 Beliefs 212
5.6 Implications and Future Research 213
5.6.1 Implications for Practice 213
5.6.2 Implications for Training and Professional Development 214
5.6.3 Implications for Policy and System-Level Support 214
5.6.4 Implications for Interprofessional Collaboration 215
5.6.5 Implications for Future Research 215
5.6.6 Stakeholder-Specific Enhancement Strategies 215
5.7 A Proposal of Stakeholder-Driven Strategic Framework for Strengthening Pre-Travel Pharmacist Consultations 220

5.8 Research Limitations 224
5.9 Chapter Summary 228

CHAPTER 6 CONCLUSION 229
6.1 Conclusion 229

REFERENCES 236
APPENDICES 259
AUTHOR'S PROFILE 319

LIST OF TABLES

Tables	Title	Page
Table 1.1	The Research Questions, Research Objectives and Hypotheses	10
Table 2.1	Factors Associated with Pharmacist Involvement in Activities Related to Pre-Travel Health	44
Table 2.2	Theoretical Domains Framework	51
Table 2.3	The TDF Domains Linked to COM-B Components	52
Table 3.1	Summary of Search Terms	58
Table3.2	Eligibility Criteria for the Scoping Review	59
Table 4.1	Quality Assessment of the Included Studies Using the Crowe Critical Appraisal Tool (CCAT)	88
Table 4.2	Pharmacist Activities of Pre-Travel Health Services in Community Pharmacy Practices as Identified in Twelve Studies	89
Table 4.3	Pharmacist-Reported Actual or Potential Barriers and Facilitators in Providing Pre-Travel Health Services that Map to the Theoretical Domains Framework	92
Table 4.4	Demographic Characteristics of the Community Pharmacists Interviewed	101
Table 4.5	Participants' Practices Regarding Pre-Travel Pharmacist Consultation Activities for Prospective Hajj and Umrah Pilgrims	104
Table 4.6	Participants' Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims	106
Table 4.7	Item Content Validity Index (I-CVI) for Item Relevancy Analysis	126
Table 4.8	Summary of Participant Feedback and Identified Issues from the Cognitive Interviews	127
Table 4.9	Summary of Test–Retest Reliability for Practice (Cohen's κ) and Belief (ICC) Items	128

Table 4.10	Summary of the Processes to Develop and Validate the Survey Instrument	129
Table 4.11	Characteristics of respondents (n=323)	130
Table 4.12	Respondents' Involvement in Pre-Travel Pharmacist Consultation Activities for Prospective Hajj Umrah Pilgrims	132
Table 4.13	Respondents' Reporting Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims	135
Table 4.14	Association between Respondents' Characteristics and Their Involvement in Dispensing Medications for Prospective Hajj and Umrah Pilgrims	141
Table 4.15	Association between Respondents' Characteristics and Their Involvement in Making Medication and Health Recommendations for Prospective Hajj and Umrah Pilgrims	146
Table 4.16	Association between Respondents' Characteristics and Their Involvement in Assessing Medications for Prospective Hajj and Umrah Pilgrims	151
Table 4.17	Association between Respondents' Characteristics and Their Involvement in Offering Basic Health Tests for Prospective Hajj and Umrah Pilgrims	156
Table 4.18	Association between Respondents' Characteristics and Their Involvement in Providing Travel Health Education for Prospective Hajj and Umrah Pilgrims	161
Table 4.19	Association between Respondents' Characteristics and Their Involvement in Making Referrals for Prospective Hajj and Umrah Pilgrims	167
Table 4.20	Association between Respondents' Characteristics and Their Involvement in Preparing Medication List for Prospective Hajj and Umrah Pilgrims	173
Table 5.1	Proposed Stakeholder-Specific Enhancement Strategies to Strengthen Community Pharmacists' Involvement in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims	218

LIST OF FIGURES

Figures	Title	Page
Figure 1.1	Overall Research Framework	19
Figure 3.1	Overall Research Flowchart for Study 1, 2 and 3	56
Figure 3.2	Research Flowchart for Study 2	62
Figure 3.3	Research Flowchart for Study 3	71
Figure 4.1	PRISMA Flow Diagram of the Search Results	87
Figure 4.2	The Ten Theoretical Domains Framework (TDF) Identified in Twelve Studies of Pre-Travel Health Services Provided by CPs	94
Figure 4.3	Reported Activities Relevant to Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims as Mentioned by the Participants (* number of mentions)	103
Figure 5.1	Proposal of Strategic Stakeholder-Integrated COM-B Framework for Strengthening Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims	221

LIST OF SYMBOLS

Symbol	
κ	Cohen’s kappa

LIST OF ABBREVIATIONS

Abbreviations

APhA	American Pharmacists Association
CCAT	Crowe Critical Appraisal Tool
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
COM-B	Capability, Opportunity, Motivation - Behaviour
COREQ	Consolidated Criteria for Reporting Qualitative Research
COVID-19	Coronavirus Disease 2019
CPD	Continuing Professional Development
CPhA	Canadian Pharmacist Association
CPs	Community Pharmacists
CTH	Certificate in Travel Health
DTG	German Society for Tropical Medicine and International Health (Deutsche Gesellschaft für Tropenmedizin, Reisemedizin und Globale Gesundheit e.V.)
ECAR	Environmental Context and Resources
ED	Emergency Department
FIP	International Pharmaceutical Federation
GPP	Good Pharmacy Practice
IBM	International Business Machines Corporation
ICC	Intraclass Correlation Coefficient
I-CVI	Item Content Validity Index
ISTM	International Society of Travel Medicine
JBI	Joanna Briggs Institute
KSA	Kingdom of Saudi Arabia

MADP	Memory, Attention, and Decision Processes
MERS-CoV	Middle East Respiratory Syndrome Coronavirus
MeSH	Medical Subject Headings
MOH	Ministry of Health
MYR	Malaysian Ringgit
OCPs	Oral Contraceptive Pills
OR	Odds Ratio
OTC	Over-the-counter
PCC	Population, Concept, and Context
PhD	Doctor of Philosophy
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews
RO	Research Objective
RTIs	Respiratory Tract Infections
SARS	Severe Acute Respiratory Syndrome
SD	Standard Deviation
SOPs	Standard Operating Procedures
SPSS	Statistical Package for the Social Sciences
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
TDF	Theoretical Domains Framework
TPB	Theory of Planned Behaviour
UiTM	Universiti Teknologi MARA
UK	United Kingdom
USA	United States of America
USD	United States Dollar

WHO	World Health Organisation

CHAPTER 1
INTRODUCTION

1.1 Overview

This chapter provides an overview of the thesis. It begins with the research background, outlining the study area. The problem statement and justification of the study are then addressed. The specific aims, research questions, research objectives, and hypotheses are presented, followed by the scope and significance of the study. Subsequently, key definitions relevant to the research are introduced. The chapter concludes with an outline of the thesis structure.

1.2 Research Background

Over the past decade, international travel has increased substantially (World Tourism Organization, 2024), particularly for religious purposes such as Hajj and Umrah pilgrimages. Both pilgrimages are among the world's largest recurring religious mass gatherings, drawing millions of Muslims annually from more than 180 countries to Mecca and Medina in Saudi Arabia. In particular, the Hajj, one of the five pillars of Islam and a mandatory religious obligation for financially and physically able Muslims, is conducted annually during the designated days of Dhu al-Hijjah, the twelfth month of the Islamic lunar calendar. In contrast, Umrah, performed voluntarily, may be undertaken at any time of the year (Parker & Almayahi, 2025). Although differing in scale and duration, both pilgrimages share similar logistical and public health challenges. Hajj annually gathers approximately 2-3 million pilgrims within five to six days, while Umrah contributes to a continuous inflow of tens of millions throughout the year and is projected to reach 30 million by 2030 (Alqahtani et al., 2015; Yezli et al., 2017).

Notably, Malaysia is among the major contributors to this international travel. Muslims constitute approximately 63.5% of the nation's 34.2 million population (Department of Statistics Malaysia, 2025; U.S. Embassy Malaysia, 2025). Between 2022 and 2023, approximately 300,000 Malaysians performed Umrah over an eight-month period (Bernama, 2023), while more than 30,000 Malaysians participated in Hajj in 2026 (Tabung Haji, 2026). The Hajj and Umrah pilgrimages involve religious rituals

performed over an extended period in which most international Umrah pilgrims typically spend around two weeks in Mecca and Medina (General Authority for Statistics, 2022b), whereas the average stay for Hajj pilgrims is approximately 30 days (General Authority for Statistics, 2022a). However, the convergence of large crowds, diverse populations, and extreme climatic conditions creates unique health risks. For instance, pilgrims are exposed to multiple health risks, including infectious disease transmission, heat-related illnesses, chronic disease exacerbations, and accidental injuries (Al-Tawfiq et al., 2014; Alqahtani et al., 2019; Hoang et al., 2020; Yezli et al., 2021a).

Previous studies have shown that chronic diseases are major contributors to morbidity and mortality during Hajj. Cardiovascular diseases have consistently been reported as one of the leading causes of hospitalisation, intensive care unit admission, and death among pilgrims, accounting for approximately 43.0%–66.0% of Hajj-related deaths in several studies (Ahmed et al., 2006; Aldossari et al., 2019). More recent epidemiological evidence has demonstrated that inpatient mortality during Hajj is significantly associated with pre-existing diabetes, hypertension, and cardiovascular diseases (Gaddoury et al., 2024). In addition, heat-related illnesses remain an important concern, particularly among older pilgrims and those with chronic comorbidities. A study of pilgrims with heat-related illnesses during Hajj reported a mortality rate of 6.3% among those diagnosed with heatstroke, with diabetes mellitus identified as a common comorbid condition (Abdelmoety et al., 2018).

In parallel, medication-related practices issues further compounded these risks. Many pilgrims require chronic pharmacotherapy for hypertension, diabetes, and cardiovascular diseases in addition to acute medicines for pain, fever, or respiratory conditions (Siti Fatimah et al., 2017). Medication non-adherence is common, with up to 16.0% of pilgrims with chronic diseases carrying insufficient medication supplies during Hajj, thereby leading to avoidable emergency department visits (BaDawood et al., 2020; Samarkandi et al., 2025). In particular, pilgrims with diabetes often experience interrupted treatment, poor glycaemic control and complications requiring medical intervention (Hasan et al., 2016). Moreover, approximately 77.0% of female pilgrims reported using oral contraceptive pills (OCPs) to postpone menstruation, a practice often associated with adverse effects, such as nausea, headaches, and irregular bleeding (Islam et al., 2019; Rafidah et al., 2021). Building on this, medication safety concerns are further heightened by storage problems, with over 5.0% of pilgrims using

improperly stored medicines and 7.6% continuing use despite reduced efficacy. An example is improper storage of heat-sensitive medicines such as insulin, which poses a serious safety risk (Yezli et al., 2021c).

Vaccination uptake represents another critical aspect of health preparedness. For Malaysian Hajj and Umrah pilgrims, meningococcal ACWY vaccination is mandatory in accordance with Saudi Arabian entry requirements, while additional vaccinations, including seasonal influenza, pneumococcal, and COVID-19 vaccines may be recommended depending on pilgrims' age, comorbidities, and prevailing public health recommendations issued by the Saudi Ministry of Health and Ministry of Health Malaysia (Ministry of Health, Kingdom of Saudi Arabia, 2024; Ministry of Health Malaysia, 2024). While meningococcal vaccination coverage is consistently high due to strict Saudi Arabian entry requirements, uptake of recommended vaccines such as influenza and pneumococcal is comparatively low, with studies reporting coverage of less than one-third of pilgrims (Alqahtani et al., 2019; Goni et al., 2019). Even when vaccination coverage is high, delayed vaccination may reduce optimal immune protection (Yuliasari & Suwanto, 2019). Despite these recommendations, some pilgrims still travel without receiving any vaccination, reflecting persistent gaps in awareness, accessibility, and pre-travel planning (Tobaiqy et al., 2021). These challenges compromise individual safety and increase the risk of cross-border transmission and outbreaks. Consequently, these challenges have drawn heightened attention from international health authorities and healthcare professionals, further underscoring the significance of robust preventive strategies (World Health Organization, 2021a).

Therefore, preparedness for Hajj and Umrah extends beyond physical fitness. It requires sustained engagement with healthcare professionals before travel and encompasses pilgrims' ability to anticipate and manage their health needs through adequate medication provision, timely vaccination, and effective self-care. However, evidence indicates that such preparedness is inadequate, particularly among those with chronic diseases. Consistent with earlier evidence, insufficient medication supply, suboptimal adherence, and limited knowledge of disease management remain common among pilgrims. The clinical importance of preparedness is lies in the consequences, as treatment disruption among pilgrims with chronic conditions, particularly diabetes, has been associated with increased outpatient utilisation, hospitalisation, and referrals to tertiary care (Hasan et al., 2016; Khan et al., 2018b). Meanwhile, pilgrims with

cardiovascular and other chronic diseases frequently refer to emergency services or local pharmacies to replace medicines, incurring unnecessary costs and straining health systems (BaDawood et al., 2020). Furthermore, the preventable use of emergency departments (ED) undermines their critical role in managing acute and life-threatening conditions. At the same time, poorly managed health problems reduce pilgrims' quality of life and their ability to perform religious rituals.

Accordingly, comprehensive pre-travel health services have emerged as a key strategy to mitigate risks associated with pilgrimage. These services comprise early risk assessment, vaccination promotion, medication optimisation, and health education, all of which are essential to safeguarding pilgrims' health (Ministry of Health, Kingdom of Saudi Arabia, 2023, 2024; Ministry of Health Malaysia, 2025). Studies demonstrate that pilgrims who undergo structured pre-travel consultations are more likely to complete vaccinations, adopt preventive behaviours, and experience fewer travel-related illnesses (Alqahtani et al., 2019; Gautret et al., 2019). Conversely, inadequate preparation has been linked to poor disease control, preventable complications, and increased healthcare utilisation during the pilgrimage (Hasan et al., 2016; Khan et al., 2018a).

Community pharmacists (CPs) are well positioned to contribute within this framework. Their accessibility, pharmacotherapy expertise, and expanding public health responsibilities position them as key providers of preventive travel health services. This expanded role was demonstrated during the coronavirus disease 2019 (COVID-19) pandemic, when CPs played a vital role in managing medication supply, disseminating reliable health information, and administering vaccinations (Hurley-Kim et al., 2022). In Malaysia, the community pharmacy sector has undergone a marked transition from a product-oriented to a patient-centred care model, with increasing involvement in chronic disease management and health promotion. This development creates opportunities for CPs to expand their role in pre-travel care, particularly for prospective Hajj and Umrah pilgrims, for whom continuity of care and preventive measures are crucial.

Despite this potential, evidence on CPs' practices in pre-travel health remains limited and fragmented. Although studies conducted globally and in Malaysia offer descriptive insights into CPs' knowledge, beliefs, and service provision, they do not explore the factors underlying their involvement (Kc et al., 2020; Taha & See, 2016). On a similar note, reported levels of knowledge, confidence, and participation vary

widely, further complicating interpretation (Bascom et al., 2015; Heslop et al., 2020; Houle, 2018b). This fragmented understanding hinders the development of targeted interventions. Therefore, a theory-informed approach, such as the Theoretical Domains Framework (TDF) and the Capability, Opportunity, Motivation-Behaviour (COM-B) model is essential to systematically examine the factors influencing CPs' involvement in pre-travel pharmacist consultations. This includes identifying barriers and facilitators and informing strategies to optimise their role in pre-travel consultations.

1.3 Problem Statement

The Hajj and Umrah pilgrimages are among the largest recurrent mass religious gatherings, attracting millions of Muslims worldwide, including a substantial number from Malaysia. Many pilgrims are elderly individuals living with chronic conditions, such as hypertension and diabetes, placing them at increased risk of travel-related complications (Siti Fatimah et al., 2017). However, medication-related challenges, such as non-adherence (BaDawood et al., 2020) and improper storage of heat-sensitive medicines (Alqahtani et al., 2019; Yezli et al., 2021b) remain prevalent. These challenges may lead to preventable emergency department visits, disruption of continuity of care, increased healthcare costs, and reduced ability to perform pilgrimage activities. Similarly, vaccination uptake beyond the compulsory meningococcal requirement is suboptimal, with low uptake of influenza and pneumococcal vaccines due to gaps in awareness, accessibility, and pre-travel planning (Goni et al., 2019; Tan et al., 2020). In essence, these issues demonstrate that many pilgrims are inadequately prepared for the complex health risks throughout the pilgrimage (Aziz et al., 2018).

In response to these challenges, CPs are strategically positioned to address these gaps through their accessibility, pharmacotherapy expertise, and established role in public health. In Malaysia, collaborative initiatives involving professional pharmacy bodies, such as the Malaysian Pharmacists Society, together with Lembaga Tabung Haji and relevant healthcare stakeholders, may further strengthen the implementation of structured pre-travel pharmacist consultation services. This is particularly relevant given that many CPs practise in urban areas such as Selangor and Kuala Lumpur, where substantial numbers of prospective pilgrims reside and seek pre-departure healthcare services (Jared, 2024; Saudi Press Agency, 2023). CPs routinely provide pharmacotherapy advice, over-the-counter (OTC) counselling, and chronic disease

management (Houle, 2018b; World Health Organization, 2021a). In line with this, their accessibility within the community and trusted relationships with patients position them to contribute to pre-travel health preparedness through vaccination advice, medication review, and health education.

However, current evidence indicates that CPs in Malaysia have limited involvement in structured pre-travel pharmacist consultations. Most reported services remain focused on medication supply, health product recommendations, and general travel advice, with little evidence of comprehensive, structured consultations tailored to the specific health needs of prospective Hajj and Umrah pilgrims (Kc et al., 2022; Kc et al., 2020; Taha & See, 2016). This limited involvement may partly reflect the absence of formal remuneration mechanisms for cognitive and preventive pharmacy services within the Malaysian community pharmacy setting. Unlike dispensing or product sales, structured pre-travel consultations require additional time for risk assessment, medication review, vaccination counselling, chronic disease optimisation, patient education, and documentation. However, these activities are not routinely reimbursed under existing pharmacy practice models. Consequently, CPs may face challenges in integrating these labour-intensive services into their routine workflow, particularly in busy retail-oriented community pharmacy settings where service sustainability is closely linked to commercial viability. Similar concerns regarding inadequate remuneration and the financial sustainability of expanded pharmacy services have been reported in Malaysian and international pharmacy practice literature (Hassali et al., 2014; Houle et al., 2019).

Several factors may contribute to the limited involvement of CPs in pre-travel pharmacist consultations. Pharmacy education in Malaysia rarely includes structured training in travel medicine. Although postgraduate programmes and continuing professional development opportunities may exist, travel medicine is not routinely embedded within undergraduate pharmacy curricula (Taha & See, 2016). Furthermore, existing studies have largely focused on CPs' roles in general travel health rather than addressing the specific needs of Hajj and Umrah pilgrims, whose health risks and healthcare requirements differ from those of the general travelling population (Kc et al., 2022; Kc et al., 2020; Parker & Almayahi, 2025; Taha & See, 2016). Evidence regarding the beliefs influencing CPs' engagement in pre-travel pharmacist consultations also remains limited (Kc et al., 2020; Taha & See, 2016). A systematic review by Kc et al. (2023) summarised the types and outcomes of pharmacist-provided

travel health services from the patients' perspective. However, this review did not examine the beliefs, barriers and facilitators influencing pharmacists' provision of these services. Therefore, a comprehensive understanding of CPs' practices, beliefs, barriers and facilitators related to pre-travel consultations remains lacking.

An additional concern is the gap between CPs' positive perceptions of travel health services and their actual involvement in practice. Previous Malaysian studies have shown that CPs recognise the importance of travel health services, express willingness to provide travel-related care, and view such activities as consistent with their professional role (Kc et al., 2020; Taha & See, 2016). Despite these positive perceptions, CPs' involvement remains limited to general travel advice and product-related services, with comparatively little engagement in comprehensive pre-travel consultations. This discrepancy suggests that positive attitudes alone may be insufficient to ensure implementation of structured pre-travel pharmacist consultations.

Instead, CPs' involvement is likely influenced by a complex interplay of behavioural, organisational, and environmental factors. From a behavioural perspective, CPs may vary in their confidence, perceived capability, and decision-making processes related to travel health consultations, particularly in pilgrimage-specific contexts. Organisational factors such as time constraints, staffing shortages, limited consultation space, and workflow demand within community pharmacies may restrict the provision of comprehensive pre-travel services. At the health-system level, the absence of structured national practice guidelines, limited integration of travel health services into routine pharmacy practice, inadequate remuneration, and insufficient interprofessional collaboration may further constrain service development. In addition, perceptions of professional role identity may influence the extent to which CPs view pre-travel consultations as part of their professional responsibilities. However, these factors remain poorly understood within the Malaysian context. Consequently, there is a need to move beyond descriptive assessments of attitudes and perceived roles towards a theory-informed examination of the determinants that facilitate or hinder CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

To address these gaps, theory-informed behavioural frameworks, namely the TDF (Cane et al., 2012) and the COM-B model (Michie et al., 2011), were utilised to systematically explore the beliefs underlying CPs' practices. The TDF is a framework that integrates multiple behavioural theories to identify determinants influencing

behaviour, while the COM-B model conceptualises behaviour as the interaction between capability, opportunity, and motivation. These approaches provide comprehensive insights into factors, enabling the identification of facilitators and barriers to service provision (Atkins et al., 2017; Michie et al., 2014).

Given the heterogeneity of international practice models and the lack of synthesis of CPs' involvement in pre-travel health care for Hajj and Umrah pilgrims, a scoping review was undertaken as the initial phase of this thesis to systematically map the breadth, nature, and conceptual orientation of existing evidence related to CPs' practices, beliefs, barriers, and facilitators of pre-travel health services. This approach enabled the identification of reported practices, barriers, facilitators and theoretical gaps prior to conducting the primary empirical investigation. By establishing the global evidence landscape, the scoping review provided a structured foundation for the subsequent qualitative and quantitative phases of the study. The qualitative study was subsequently conducted to explore the salient experiences, practices, and beliefs of Malaysian CPs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, while also identifying contextually and culturally relevant factors that may influence their involvement in these services. Findings from both phases informed the development of the quantitative survey instrument and enabled a broader assessment of CPs' practices, beliefs, and factors influencing their involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

Furthermore, to the best of our knowledge, no validated, theory-informed instrument currently exists globally to measure CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. This knowledge gap restricts the ability to design targeted interventions, policies, and training. Without such efforts, medication-related risks, inadequate vaccination, and preventable complications will continue to compromise pilgrims' safety and quality of life. Therefore, the present research adopts a theory-informed approach, guided by the TDF and the COM-B model, to systematically examine CPs' practices and beliefs and to develop and validate a survey instrument as an initial step towards future policy and professional development in travel health services.

1.4 Aims, Research Questions, Research Objectives and Hypotheses

This study aims to uncover the practices and beliefs of CPs in the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in Selangor and Kuala Lumpur, Malaysia. To achieve this, multiple studies were undertaken, guided by the TDF. The COM-B model was used as an integrative framework to interpret and synthesise beliefs identified across the study findings. The research was conducted in three studies to meet its aims. The research questions, research objectives, and the hypotheses assessed are outlined in Table 1.1.

Table 1.1
The Research Questions, Research Objectives and Hypotheses

	Research Questions	Research Objectives	Research Hypotheses
		Study 1: Scoping review	
1.	What are the practices of pre-travel health services by community pharmacists?	1. To identify the practices of pre-travel health services by community pharmacists.	-
2.	What are the beliefs, barriers and facilitators influencing the delivery of pre-travel health services by community pharmacists?	2. To identify and describe the beliefs, barriers and facilitators influencing the delivery of pre-travel health services by community pharmacists.	-
		Study 2: Qualitative study	
3.	How do community pharmacists describe their practices in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?	3. To explore community pharmacists' practices in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.	-
4.	How do community pharmacists describe their beliefs in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?	4. To explore community pharmacists' beliefs in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.	-
		Study 3: Quantitative study	
		Part 1: Development and Validation of the Survey Instrument	
5.	What are the contents, validity, and reliability properties of a survey instrument developed to assess community pharmacists' practices and beliefs regarding pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims?	5. To develop and validate a survey instrument to assess community pharmacists' practices and beliefs regarding pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims.	-
		Part 2: Cross-Sectional Questionnaire Survey	
6.	What are the key activities involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists?	6. To determine the key activities involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.	-
7.	What are the key beliefs held by community	7. To determine the key beliefs held by	-

	Research Questions	Research Objectives	Research Hypotheses
	pharmacists regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?	community pharmacists regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.	
8.	What are the sociodemographic factors associated with involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists?	8. To examine the associations between sociodemographic factors and involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.	H1. There are significant associations between sociodemographic factors and involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.
9.	What belief domain mean scores differ between community pharmacists who are involved and those who are not involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?	9. To compare belief domain mean scores between community pharmacists who are involved and those who are not involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.	H2. There are significant differences in belief domain mean scores between community pharmacists who are involved and those who are not involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.
10.	What sociodemographic factors independently predict involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists?	10. To identify sociodemographic factors that independently predict involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.	H3. There are significant sociodemographic factors independently predict involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.
11.	What belief domains independently predict involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists?	11. To identify the belief domains that independently predict involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.	H4. There are significant belief domains independently predict involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among community pharmacists.
12.	What stakeholder-specific strategic framework can be proposed to support and strengthen community pharmacists' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?	12. To propose a stakeholder-specific strategic framework to support and strengthen community pharmacists' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.	-

Note: Hypothesis testing did not apply to the scoping review and the qualitative study, as these studies were exploratory and descriptive, without inferential statistical analysis.

1.5 Scope of the Study

This study focuses on investigating the practices and beliefs of CPs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Multiple studies, guided by the TDF were employed to capture both the depth and breadth of understanding across all study phases. The scope comprised three studies: a scoping review, a qualitative study, and a quantitative study, each designed to address specific research objectives. The scoping review synthesised international evidence on CPs' involvement in pre-travel health services. Relevant literature was identified through systematic searches of PubMed, Scopus, Web of Science, ScienceDirect, Google Scholar, and two travel medicine-focused journals (the Journal of Travel Medicine, and Travel Medicine and Infectious Disease), supplemented by manual searches. The review included publications up to 6th February 2023.

The qualitative study explored CPs' practices and beliefs in Malaysia using semi-structured interviews. Participants were recruited through purposive sampling until data saturation was achieved. Inclusion criteria were Malaysian-registered CPs with at least one year of practice experience, able to communicate in English, and actively engaged in direct patient consultations. Meanwhile, provisionally registered pharmacists and those in managerial or non-consultative roles involving no direct patient care were excluded to ensure data reflected CPs who are directly involved in service delivery. Interviews were guided by the 14 TDF domains to capture factors influencing CPs' involvement.

The quantitative study involved developing, preliminarily validating, and administering a TDF-based survey instrument. The instrument was developed from the findings of the scoping review and the qualitative study, and validated through expert panel review, cognitive interviews, test–retest reliability assessment, and pilot feasibility testing. The validated instrument was then used in a cross-sectional survey conducted between 1st April and 31st August 2024. Data collection was conducted both online and paper-based.

The geographical scope of the qualitative and quantitative studies was confined to Selangor and the Federal Territory of Kuala Lumpur. These areas were selected due to their high concentration of community pharmacies (Tew et al., 2021), large Muslim populations, and their proximity to major departure hubs for Malaysian Hajj and Umrah pilgrims (Jared, 2024; Saudi Press Agency, 2023; Tabung Haji, 2022). Together, these

factors contribute to the number of prospective pilgrims residing in or travelling through these urban regions. Consequently, these locations represent important settings for community pharmacy practice where pilgrims are likely to seek pre-travel healthcare advice, medication-related support, and travel health information prior to departure. Although this urban focus may limit the generalisability of the findings to rural or less densely populated regions where prospective pilgrims and CPs may experience different healthcare access and service delivery challenges, the selected locations provide valuable insights into community pharmacy practice within areas that serve a significant proportion of Malaysia's Hajj and Umrah travelling population.

1.6 Significance of the Study

This study makes significant contributions to multiple stakeholders, including policymakers, professional bodies, academia, the pharmacy industry, and the community. Additionally, the study contributes to methodological advances in pharmacy practice research through the development and validation of a theory-informed survey instrument.

For the government and policymakers, the findings can inform future implementation of the Malaysian National Medicines Policy by providing evidence to support the integration of CPs into structured pre-travel health services for prospective Hajj and Umrah pilgrims. The study provides evidence to support the design of targeted, population-specific interventions that enhance CPs' engagement in providing pre-travel pharmacist consultations.

For professional and educational bodies, the results provide an evidence-base to strengthen travel health education and training. The study underscores the importance of integrating travel medicine content into undergraduate curricula and Continuing Professional Development (CPD) modules and competency frameworks for travel health practice. This may help ensure that CPs are equipped with the competencies necessary to deliver evidence-based pre-travel pharmacist consultations.

For the community and pilgrims, the study identifies key CP practices and beliefs regarding service provision. This knowledge can inform public health campaigns to raise awareness of pre-travel pharmacist consultations. By fostering earlier engagement with healthcare providers, these campaigns may enhance public awareness and trust in community pharmacy-based travel health services, improve

medication management, and increase pilgrims' preparedness for travel.

For the pharmacy industry, the findings highlight opportunities for both independent and chain community pharmacies to diversify service models by incorporating pre-travel health services. Moreover, supporting CPs in this area strengthens the role and visibility of community pharmacies as accessible healthcare providers and community health hubs. It also aligns the profession with national health priorities, including Pillar 3 of the Malaysia National Healthy Agenda, which emphasises personal health empowerment through preventive approaches (Ministry of Health Malaysia, 2021). However, successful integration of pre-travel pharmacist consultation services would require coordinated logistical and organisational support. This includes collaboration between community pharmacies, Lembaga Tabung Haji, travel agencies, private healthcare providers, mosques, and public health authorities to facilitate referral systems, service awareness, and coordinated pre-travel healthcare delivery. In addition, implementation may require supporting infrastructure, including standardised consultation protocols, structured training programmes, accessible educational resources, referral pathways, and public awareness initiatives to improve recognition of CPs' roles in travel health. Establishing these enabling systems may facilitate more consistent engagement between CPs and pilgrims while supporting integration of pre-travel health services into routine community pharmacy practice.

From a methodological perspective, the study delivers two key contributions. First, it develops and preliminarily validates a formative, TDF-based survey instrument specifically tailored to assess CPs' practices and beliefs in the context of Hajj and Umrah pre-travel pharmacist consultations in Malaysia. This instrument provides a structured mechanism for systematically capturing factors in this unique cultural and healthcare setting. Second, the rigorous instrument development process, including expert validation, cognitive interviews, test–retest reliability, and pilot feasibility testing, strengthens the methodological robustness of the instrument and supports its preliminary application within the study context. Although exploratory and confirmatory factor analyses are commonly applied in instrument development, these approaches are more appropriate for reflective measurement models that assume items represent manifestations of an underlying latent construct (Hair et al., 2019; Coltman et al., 2008). In contrast, the present instrument was developed using formative items deductively grounded in the TDF, whereby each item was intended to capture distinct beliefs contributing to CPs' practices rather than reflecting interchangeable indicators

of a single construct (Cane et al., 2012). Consequently, the study prioritised content relevance, conceptual coverage, clarity, stability, and feasibility over latent factor modelling at this preliminary validation stage. Therefore, the instrument also provides a methodological foundation for future refinement and broader psychometric evaluation in larger populations. Concurrently, future researchers can adapt or extend it across other populations, healthcare systems, or mass-gathering contexts, enabling comparative studies, longitudinal monitoring, and policy-relevant research.

Beyond these contributions, the study demonstrates the value of applying a multi-study, theory-informed approach utilising the scoping review, qualitative study, and quantitative study. This research design provides both depth and breadth of understanding, producing evidence that can inform service development, training, and policy integration. From a health system perspective, strengthening the role of CPs in pre-travel pharmacist consultations is expected to reduce preventable health complications, unnecessary emergency visits, and inappropriate healthcare utilisation, while improving the safety and quality of life of pilgrims during their pilgrimage.

The integrated findings generated through these three studies may support stakeholder collaboration in integrating pre-travel pharmacist consultation modules into the national pilgrim preparation framework, thereby enhancing interprofessional collaboration and sustainable implementation at the national level.

1.7 Definition of Terms

To ensure conceptual clarity, the following definitions are adopted in this study:

Practice. In this thesis, *practices* refer to the professional activities undertaken by CPs in delivering pre-travel pharmacist consultations. These activities include assessing medication-related issues, providing tailored health education, advising on vaccination, dispensing medicines, and other service-related behaviours. In addition, this definition adapts the broader concept of practice as "repetition of an act, behaviour, or series of activities" (Atkins et al., 2017) to the context of community pharmacy and pre-travel health care.

Behaviour. *Behaviour* is defined as "anything a person does in response to internal or external events" (Michie et al., 2014). In this study, behaviour refers specifically to CPs' observable and measurable actions during pre-travel pharmacist consultations, such as counselling, risk assessment, or dispensing medicines.

Beliefs. *Beliefs* are defined as "statements that something is true" (Fishbein & Ajzen, 2011). In this study, beliefs refer to CPs' perceptions, attitudes, expectations, and assumptions that shape their willingness or reluctance to provide pre-travel pharmacist consultations, including perceived roles, confidence, and external influences.

Pre-Travel Consultation. *Pre-travel consultation* is defined as a healthcare encounter aimed at assessing travel-related health risks and providing preventive advice and interventions prior to international travel (Chen & Hochberg, 2024). In this thesis, a pre-travel pharmacist consultation refers to pharmacist care activities provided by CPs to prospective travellers within community pharmacy settings. These consultations include assessing medication-related issues, providing tailored health education, dispensing medicines, and other relevant services.

Community Pharmacist (CP). In the Malaysian context, a *CP* is a registered pharmacist holding a Type A licence under the Poisons Act 1952, authorised to supply and sell scheduled poisons by retail, or by both retail and wholesale. These pharmacists practise in community pharmacy settings, providing pharmaceutical services directly to the public (Pharmaceutical Services Division, 2016).

Community Pharmacy. In the Malaysian context, a *community pharmacy* is defined as "a premise with at least one registered pharmacist holding a Type A licence issued under the Poisons Act 1952 who can supply/sell poison either by retail only or by both retail and wholesale" (Pharmaceutical Services Programme, 2025).

Hajj and Umrah. *Hajj and Umrah* are religious pilgrimages to Mecca, Saudi Arabia. According to Islamic teachings, every physically and financially able adult Muslim is required to perform Hajj at least once during their lifetime. In particular, Hajj takes place from the 8th to the 12th or 13th day of the last month of the Islamic year (Dhu al-Hijjah). The timing of Hajj is based on the Islamic lunar calendar. Its dates shift relative to the Gregorian calendar, occurring approximately 11 days earlier each successive year. Conversely, Umrah, (the "minor pilgrimage") may be performed throughout the year and is confined to the Grand Mosque in Mecca. Unlike Hajj, Umrah is not compulsory, yet is highly recommended (Parker & Almayahi, 2025).

Prospective Hajj and Umrah Pilgrims. For this study, *prospective Hajj and Umrah pilgrims* refer to customers who seek consultation from CPs regarding travel-related health needs before departing for Saudi Arabia to perform Hajj or Umrah. In this thesis, "prospective Hajj and Umrah pilgrims" and "pilgrims" are used interchangeably.

Theoretical Domains Framework (TDF). The *TDF* is defined as a comprehensive framework that integrates multiple behaviour change theories to identify determinants influencing healthcare professionals' behaviours (Atkins et al., 2017; Cane et al., 2012; Michie et al., 2005). In this study, the TDF is applied to identify and explore the beliefs and behavioural determinants underpinning CPs' involvement in pre-travel pharmacist consultations (Appendix 1).

Capability, Opportunity, Motivation–Behaviour (COM-B). The COM-B refers to the Capability, Opportunity, Motivation–Behaviour model proposed by Michie et al. (2011), which conceptualises behaviour as the result of interaction between an individual's capability, opportunity, and motivation. In the present study, the COM-B model was used to synthesise and interpret the beliefs and behavioural determinants influencing CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

1.8 Thesis Outline

This thesis is organised into six chapters, structured to systematically present the rationale, methodology, findings, and contributions of the research on CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The study adopted a sequential multi-phase design integrating a scoping review, qualitative study, instrument development and validation, and quantitative cross-sectional survey. Findings from the literature review and Study 1 informed the qualitative exploration in Study 2. Findings from Studies 1 and 2 informed the development and validation of the TDF-informed survey instrument in Study 3. The TDF served as the overarching theoretical framework across all study phases, whereas the COM-B model was used to integrate and interpret the findings to inform the development of the proposed stakeholder-specific strategic framework. Figure 1.1 illustrates the overall research framework.

Chapter 1: Introduction provides the background to the study, outlines the problem statement, and presents the aims, research questions, objectives, and hypotheses. It also clarifies the scope, significance, and key definitions, and introduces the overall structure of the thesis.

Chapter 2: Literature Review critically examines existing evidence on travel health and CPs' involvement in pre-travel consultations, with particular emphasis on

the health needs of Hajj and Umrah pilgrims. It highlights knowledge gaps and justifies the need for a comprehensive, theory-informed investigation. The chapter also introduces the TDF and the COM-B model as the theoretical frameworks underpinning the study.

Chapter 3: Methodology describes the research design and methods employed across three studies: (i) a scoping review of international evidence, (ii) a qualitative study exploring CPs' practices and beliefs, and (iii) the development, validation, and administration of a survey instrument. The rationale for adopting the multiple-study approach is provided and the associated ethical considerations are also presented.

Chapter 4: Results present the findings of all three studies. Results are organised according to the research objectives and are supported by relevant tables, figures, and thematic narratives.

Chapter 5: Discussion interprets the key findings in relation to existing literature and the TDF and integrates findings across all three studies using the COM-B model with critical analysis of their implications for practice, education, and policy. The chapter also discusses the strengths and limitations of the study and outlines recommendations for future research.

Chapter 6: Conclusion summarises the main conclusions and contributions of the research. It highlights the new knowledge generated by the study, conceptual, methodological and practical implications, provides recommendations for service development, and suggests directions for further study.

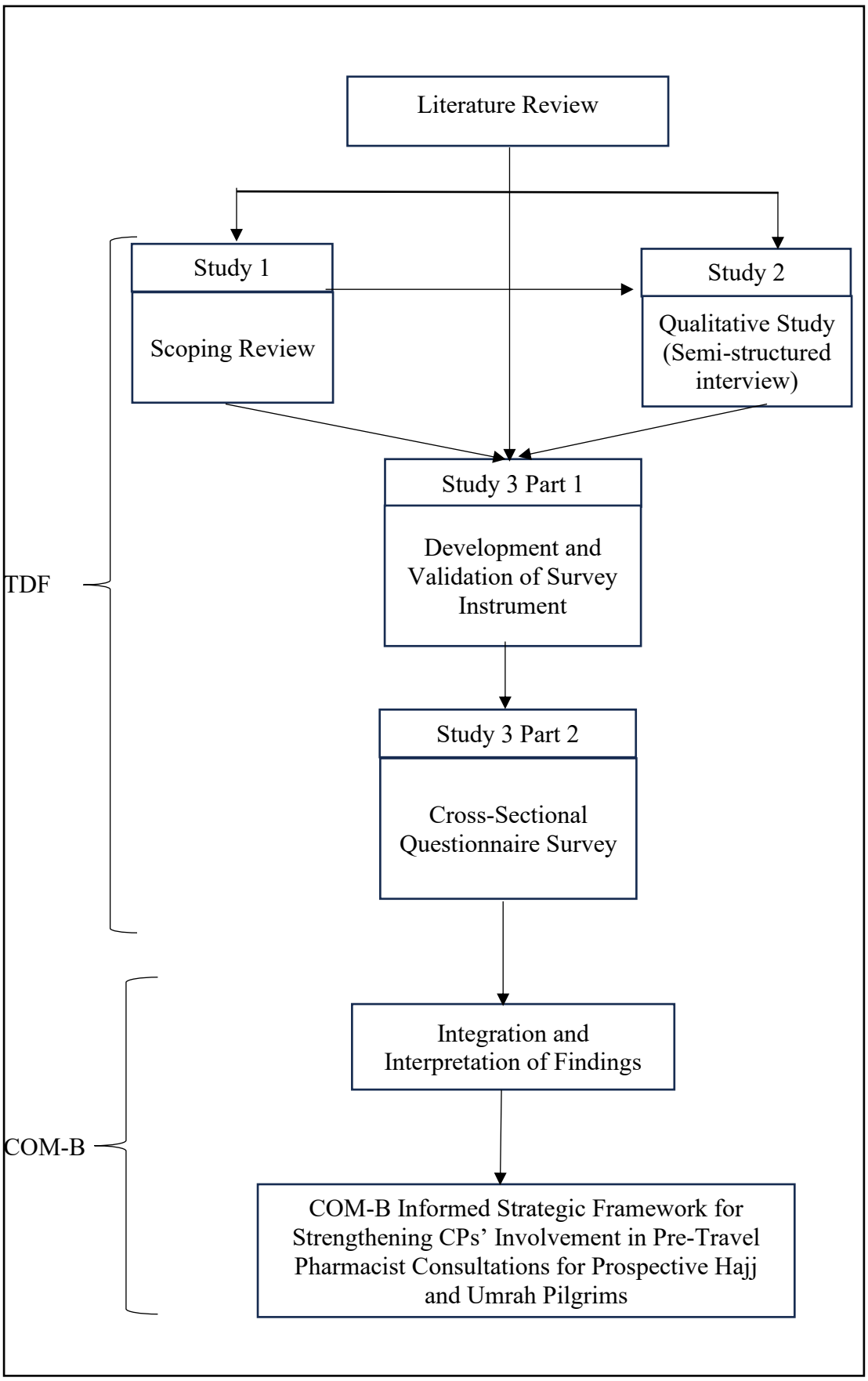


Figure 1.1 Overall Research Framework

1.9 Chapter Summary

This chapter outlined the background for investigating CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. It highlighted the unique health risks associated with pilgrimage, including medication-related challenges, suboptimal vaccination uptake, and inadequate preparedness among individuals with chronic diseases. Collectively, these risks support the need for structured pre-travel health services.

The problem statement established that while CPs are accessible healthcare providers with pharmacotherapy expertise, their involvement in pre-travel consultations remains limited and insufficiently understood. Current evidence is fragmented, largely descriptive, and does not explore the factors underpinning CPs' practices. Moreover, there is a global lack of a validated, theory-informed instrument to systematically assess CPs' practices and beliefs in the context of Hajj and Umrah pilgrimages.

In response to these gaps, this thesis applies multiple studies, guided by the TDF and the COM-B model. It integrates a scoping review, a qualitative study, instrument development and validation, and a cross-sectional questionnaire survey to generate comprehensive insights into CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, and provides evidence to inform policy, education, and service delivery.

The next chapter presents a review of the literature on travel health and the health needs of prospective Hajj and Umrah pilgrims. It also reviews the role of CPs in pre-travel pharmacist consultations, identifies existing gaps in evidence, and provides the theoretical foundations that underpin this study.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical review of the literature on travel health preparedness, the specific health risks faced by prospective Hajj and Umrah pilgrims, and the evolving role of CPs in delivering pre-travel pharmacist consultations. Building upon the rationale outlined in Chapter 1, this chapter synthesises empirical evidence and theoretical perspectives to identify the research gaps that this study aims to address. The review begins by defining the concept of travel health within the unique context of Hajj and Umrah pilgrimages as mass gatherings. It examines evidence regarding pilgrims' health risks, medication practices, and vaccination uptake, followed by an assessment of the need for structured pre-travel preparation and the roles of CPs in pre-travel healthcare. Then the review examines pre-travel health practices undertaken by CPs in both international and Malaysian contexts. Finally, the chapter evaluates the factors influencing CPs' involvement in pre-travel pharmacist consultations and introduces the TDF and the COM-B model as the theoretical frameworks underpinning this research.

2.2 Overview of Travel Health and the Context of Hajj and Umrah Pilgrimages

Travel medicine is defined by the Committee to Advise on Tropical Medicine and Travel (2009) as the field of medicine concerned with the promotion of health and respect for the peoples, cultures and environment of regions being visited in addition to prevention of disease or other adverse health outcomes in the international traveller as well as any impact on the health of the local population. It has evolved into a multidisciplinary speciality encompassing infectious disease, public health, tropical medicine, wilderness medicine and appropriate immunisation. Wilderness medicine refers to the prevention and management of medical conditions occurring in remote or resource-limited environments where immediate access to healthcare services may be limited (Yazdian Anari et al., 2015). In parallel, travel health refers to broader preventive and clinical measures aimed at minimising travel-related risks (World Health Organization, 2021b).

Pre-travel consultations are an essential component of this field, involving an assessment of an individual's medical history, travel itinerary, and destination-specific risks to provide targeted advice, immunisation, and prophylaxis (World Health Organization, 2012). Global guidance recommends that these consultations occur at least four to six weeks prior to departure to ensure optimal protection (Chen & Hochberg, 2024; World Health Organization, 2021b). However, mass gatherings such as Hajj and Umrah intensify health challenges due to overcrowding, extreme temperatures, and the demographic diversity of participants. Furthermore, pilgrims are often older adults with pre-existing chronic conditions, rendering them more susceptible to both communicable and non-communicable diseases (NCDs) (Alqahtani et al., 2015; Memish, 2018).

2.2.1 Health Risks During Hajj and Umrah

Hajj and Umrah pilgrims expose to multiple health risks, including acute infectious diseases, exacerbations of chronic non-communicable diseases, heat-related illnesses, and crowd-related injuries (World Health Organization, 2021a). Among these risks, respiratory tract infections (RTIs) represent the most prevalent acute health problems during Hajj and Umrah pilgrimages, reported in 60.0-92.0% of pilgrims across different study populations (Deris et al., 2010; Hoang et al., 2019a; Memish et al., 2015). High population density, shared accommodation, and sustained close contact facilitate respiratory pathogen transmission (Al-Tawfiq et al., 2016). A prospective cohort study involving pilgrims from 13 countries during 2013 Hajj revealed an overall influenza-like illness prevalence of 61.9% (Memish et al., 2015). This finding is accompanied by a significant post-Hajj increase in viral and bacterial carriage, rising from 7.4% and 15.4% prior to Hajj to 45.4% and 31.0% after Hajj, respectively (Memish et al., 2015). These findings demonstrate the degree of cross-transmission of respiratory pathogens, specifically *Streptococcus pneumoniae*, *Haemophilus influenzae* and prevalent coronaviruses within the restricted pilgrimage environment (Memish et al., 2015).

A prospective cohort study conducted during the 2014-2017 Hajj seasons among 485 French pilgrims corroborated this pattern, indicating that 82.1% of participants suffered from RTIs, primarily characterised by cough, sore throat, and rhinitis (Hoang et al., 2019b). Chronic respiratory illnesses and advanced age were identified as

significant factors increasing susceptibility (Hoang et al., 2019a). Comparable findings have also been noted among Malaysian pilgrims, suggesting that respiratory infection patterns are consistent across diverse pilgrim populations. Microbiological analysis of symptomatic returnees of 2016 Malaysian Hajj pilgrims indicated that 87.3% of sputum specimens contained at least one respiratory infection, with *H. influenzae* comprising 60.0% of isolates, followed by *Klebsiella pneumoniae* (Nik Zuraina et al., 2018). A previous cross-sectional survey among 387 Malaysian Hajj pilgrims in 2007 indicated that 91.5% of Malaysian pilgrims experienced cough, along with elevated rates of runny nose (79.3%), fever (59.2%), and sore throat (40.1%). These findings suggest that existing preventive strategies, including implementation of influenza vaccination and adherence to mask use were inadequate in reducing respiratory symptom prevalence (Deris et al., 2010).

Meningococcal disease has historically been one of the most feared infectious threats during Hajj, and numerous large-scale outbreaks have been documented throughout the 20th century (Hoang et al., 2020). A review of the 1987 outbreak, attributed to serogroup A, resulted in more than 2,000 cases and 200 fatalities among pilgrims (Yezli et al., 2016a; Yezli et al., 2016b). The global spread of the disease was facilitated by subsequent epidemics in 2000 and 2001, attributed to serogroup W-135. Secondary cases were documented in Europe, Asia, and Africa (Yezli et al., 2016a; Yezli et al., 2016b). The outbreaks impacted pilgrims from various nations. In response, Saudi Arabia implemented comprehensive control measures, encompassing mandatory meningococcal vaccination, targeted chemoprophylaxis for pilgrims from the African meningitis belt, and an extensive real-time surveillance system. These measures have demonstrated effectiveness, with no significant meningococcal outbreaks reported among pilgrims since 2002 (Yezli et al., 2016a).

The emergence of novel respiratory infections has transformed the landscape of risk for mass gatherings. The Middle East Respiratory Syndrome Coronavirus (MERS-CoV), first identified in Saudi Arabia in 2012, raised global concern due to its high case fatality rate and epidemic potential. Since its discovery in 2012 to 5th January 2026, 2,635 laboratory-confirmed cases have been reported globally, with 964 MERS deaths, implying a crude case fatality ratio of 37.0% (World Health Organization, 2026). Although sustained outbreaks during Hajj have not been observed, the emergence of MERS-CoV highlighted the susceptibility of mass gatherings to novel respiratory

threats and reinforced the need for strengthened surveillance, infection prevention measures, and robust pre-travel health counselling (World Health Organization, 2026).

While large outbreaks were absent among pilgrims, the COVID-19 pandemic further demonstrated the potential for religious mass gatherings to become super-spreader events (Hoang et al., 2020). Proactive containment measures, including restricting participation to fewer than 1,000 domestic pilgrims in 2020, established a global benchmark for mass-gathering risk governance (Hashim et al., 2021). In 2021, Hajj was limited to approximately 60,000 vaccinated domestic pilgrims with health screening criteria and technology-enabled operational controls. In 2022, Hajj reopened to international pilgrims with a cap of approximately one million, with continued health eligibility requirements, pre-travel COVID-19 clearance, and Ministry of Health protocols, including vaccination mandates and preventive measures (Al-Tawfiq et al., 2022).

Gastrointestinal and heat-related illnesses further exacerbate the disease burden. A review of 58 studies conducted between January 1980 and September 2014 on pilgrims from various countries indicated a mean diarrhoeal prevalence of 2.0% with a maximum frequency of 23.0% seen in a cohort of French pilgrims in 2013 (Gautret et al., 2015). The review highlighted this variation to differences in food hygiene standards, lodging conditions, and adherence to preventive measures such as hand hygiene and the consumption of safe water (Gautret et al., 2015).

Environmental stressors, particularly extreme heat and prolonged physical exertion, pose persistent threats. Ambient temperatures in Mecca frequently exceed 40°C to 45°C, predisposing pilgrims to dehydration, electrolyte imbalance, and acute heat syndromes. Surveillance during recent Hajj seasons has recorded thousands of instances of heat exhaustion and heatstroke (Khan et al., 2018b). For instance, a cross-sectional study during the 2016 Hajj indicated that 29.0% of 267 patients with heat-related illness were diagnosed with heatstroke, with a mortality rate of 6.3%, while the remaining 67.8% experienced heat exhaustion without fatalities (Abdelmoety et al., 2018). Recent climate analysis of the June 2024 Hajj heat event in Mecca reported record-breaking temperatures exceeding 50°C and resulting in over 1,300 heat-related deaths and over 2,700 injuries, and projected that such extreme heat conditions are likely to become more frequent under continued warming scenarios, with comparable extremes occurring every one to two decades later this century (Zittis et al., 2025).

These patterns highlight that environmental susceptibility remains a persistent public health challenge requiring robust pre-travel preparedness.

While communicable diseases remain a major public health concern during Hajj, NCDs account for a substantial proportion of morbidity and mortality among pilgrims. A multinational survey of Saudi and international participants during the 2024 Hajj reported hypertension in 16.0% and diabetes in 11.6% of pilgrims (Samarkandi et al., 2025). Meanwhile, a Malaysian study of Umrah pilgrims during Ramadan in 2014 similarly found that 38.8% presented at least one chronic condition, primarily hypertension (21.5%), diabetes (16.2%), and heart disease (6.8%) (Siti Fatimah et al., 2017), indicating a persistent high cardiometabolic burden among pilgrimage cohorts over time.

Pilgrims with pre-existing NCDs, including cardiovascular, metabolic, and respiratory disorders, encounter significantly elevated health risks due to intense physical exertion, extreme heat, and overcrowded conditions. These factors frequently trigger acute incidents, such as ischaemic heart disease, arrhythmias, hypertensive crises, and exacerbations of heart failure. A comprehensive analysis of Indonesian Hajj cohorts over eight consecutive Hajj seasons from 2004 to 2011 (n=1,729,841 pilgrims) found that cardiovascular and respiratory diseases were the leading cause of death, accounting for 44.9-66.0% and 24.9-33.4% of deaths, respectively (Pane et al., 2019). Cardiovascular diseases were also a primary reason for hospitalisation and intensive care admission among pilgrims. Furthermore, a prospective cohort study involving 453 critically ill pilgrims admitted to intensive care units in hospitals serving the Hajj areas in Mecca during the 2011 Hajj reported that more than one-quarter (26.5%) of critically ill pilgrims were related to cardiovascular diseases, with 16.8% involving myocardial infarction (Mandourah et al., 2012).

Diabetes, chronic respiratory diseases, and renal diseases contribute significantly to morbidity during the pilgrimage. Poor glycaemic control due to irregular meals, dehydration, and missed medication often leads to hyperglycaemia and diabetic foot infections among diabetic pilgrims (Khan et al., 2018a). Simultaneously, respiratory illnesses such as asthma, chronic obstructive pulmonary disease (COPD), and pneumonia are intensified by dust, air pollution, and overcrowding, with infectious diseases, predominantly respiratory infections, accounting for 53.3% of clinical presentations reported during Hajj (Khan et al., 2018a). Renal patients are highly susceptible to acute kidney injury, dehydration, and treatment interruption during the

physically demanding pilgrimage (Khan et al., 2018a). These findings indicate that effective pre-travel health screening, chronic disease optimisation, and on-site medical preparedness are crucial to reducing avoidable morbidity and mortality among NCD pilgrims (Khan et al., 2018a).

2.2.2 Medication Practices and Challenges among Pilgrims

Over the past decade, 18 empirical studies have examined medication practices among Hajj and Umrah pilgrims between 2014 and 2025. Of note, 12 studies were conducted during the Hajj (Alqahtani et al., 2019; Alqathama & Ahmad, 2024; Amer & Almudarra, 2022; Azeem et al., 2014; BaDawood et al., 2020; Hasan et al., 2016; Islam et al., 2019; Rafidah et al., 2021; Yezli et al., 2022; Yezli et al., 2021b; Yezli et al., 2019; Yezli et al., 2020), three focused on Umrah (Siti Fatimah et al., 2017; Tobaiqy et al., 2021; Yuliasari & Suwanto, 2019), and three examined both pilgrimage types or provider perspectives (Alghadeer et al., 2023; Goni et al., 2019; Kc et al., 2020). These studies document prescribing, dispensing (Yezli et al., 2022; Yezli et al., 2020), antibiotic use (Amer & Almudarra, 2022; Azeem et al., 2014; Yezli et al., 2019), adherence to chronic medications (BaDawood et al., 2020), uptake of vaccination and preventive health measures (Alqahtani et al., 2019; Goni et al., 2019; Tobaiqy et al., 2021; Yuliasari & Suwanto, 2019), insulin storage and handling (Yezli et al., 2021b), the use of complementary and alternative medicine (CAM) (Alqathama & Ahmad, 2024), specialised medication practices such as menstrual suppression (Islam et al., 2019; Rafidah et al., 2021), diabetes management (Hasan et al., 2016), and pharmacy service provision (Alghadeer et al., 2023; Kc et al., 2020).

Previous studies have reported several medication-related challenges among Hajj and Umrah pilgrims, particularly among older adults and individuals with chronic diseases. Common issues identified include inadequate medication supply during travel, poor adherence, improper storage of temperature-sensitive medicines, self-medication practices, and limited understanding of medication regimens in physically demanding pilgrimage environments. These challenges may increase the risk of exacerbation of chronic diseases, medication errors, and avoidable healthcare utilisation during pilgrimage.

Understanding medication utilisation patterns is crucial for pharmaceutical supply chain management and public health planning for mass gatherings. Yezli et al.

(2020) investigated drug utilisation patterns via WHO indicators for drug use among outpatients in eight seasonal Holy Sites hospitals in Mecca, Saudi Arabia, during the 2018 Hajj (Yezli et al., 2020) and at 51 primary healthcare centres (PHCCs) during the 2019 Hajj (Yezli et al., 2022). Both studies reported a prescribing frequency ranging from 2.25 medications (SD=0.94) per consultation in primary healthcare centres (Yezli et al., 2022) to 2.6 medications (SD=1.2) per consultation in hospital outpatient clinics (Yezli et al., 2020). Of note, antibiotic prescribing was prevalent in up to 46.9% of cases in outpatient hospitals (Yezli et al., 2020), and analgesics (25.1%), antibacterials for systemic use (16.5%), anti-inflammatory and anti-rheumatic products (16.4%), and cough and cold preparations (11.9%) dominated the 223,964 medications dispensed in the primary healthcare sector in 2019 (Yezli et al., 2022). The relatively low polypharmacy rates (1.3-4.8%) and high medication dispensing rates (90.0-92.7%) suggest generally efficient pharmaceutical services, although the high rate of antibiotic prescribing remains concerning (Yezli et al., 2022; Yezli et al., 2020).

A cross-sectional survey assessed drug use patterns among 785 multinational Hajj pilgrims from eight countries during Hajj 2018 at King Abdul Aziz Airport in Jeddah, Saudi Arabia, before their departure. The findings revealed 70.4% of the pilgrims received medications during their pilgrimage, with 62.4% (345/553) of users relying on supplies brought from their home countries. Painkillers intended primarily for pain management were the most commonly reported medications (79.7%, 275/345), followed by chronic disease medications (59.1%, 204/345), while anti-pyretic medications intended specifically for fever management accounted for 38.8%, (134/345), and gastrointestinal drugs (22.3%, 77/345). Although a higher proportion of pilgrims reportedly received medications during the pilgrimage, many also relied on self-supplied medications brought from home, for both chronic management and symptomatic relief during the mass gathering (Amer & Almudarra, 2022).

Non-compliance with chronic condition treatments significantly strains Emergency Departments (EDs). A cross-sectional survey study in Mecca and Mina during the 2018 Hajj season found that among pilgrims already prescribed treatment for chronic conditions, 6.6% (26/395) carried insufficient supplies, and 6.1% (24/395) failed to bring any medication from their home countries. Forgetfulness (29.2%) was the main reason for not bringing the medications. Approximately 1.3% of the total pilgrim population required emergency care for exacerbated chronic conditions,

translating to an estimated 26,000 to 39,000 ED visits during a normal Hajj season (BaDawood et al., 2020).

Medication-related challenges were further compounded by condition-specific issues. Suboptimal preparedness was evident among diabetic pilgrims. A cross-sectional study among diabetes patients of multiple nationalities admitted to a large tertiary care referral centre in Mecca during Hajj identified insufficient understanding of diabetes self-management and Hajj-specific care as major contributors to poor glycaemic control. Among patients with pre-existing diabetes, 56.0% (25/45) had received diabetes education prior to travelling for Hajj, while 38.0% (17/45) practised self-monitoring of blood glucose (SMBG) and 22.0% (10/45) recognised the need for more frequent SMBG during stress and illness. Additionally, 72.0% (32/45) did not carry a glucometer. Although 82.0% (37/45) of patients brought adequate medications, 94.0% (35/45) of these patients reported adherence to their medication regimen during pilgrimage (Hasan et al., 2016).

Complementary and alternative medicine (CAM) use represents an important but often overlooked aspect of health practices during Hajj. In a cross-sectional survey in several camps and hotels occupied by Hajj pilgrims in Mecca during the 2023 Hajj revealed a prevalence of CAM use of 68.8% among pilgrims. Religious rituals (30.2%) and herbal remedies (12.3%) were the most commonly utilised interventions. 57.8% of pilgrims did not disclose CAM use to healthcare providers, and 76.7% were unaware of potential drug–herb interactions, which may increase the risk of adverse clinical outcomes and treatment toxicity during the mass gathering (Alqathama & Ahmad, 2024).

To date, only a small number of empirical studies have specifically quantified hormonal menstrual suppression practices among female pilgrims. A study among Malaysian female pilgrims during Hajj found that 17.6% (62/347) utilised hormonal suppression, with approximately 53.2% (33/62) using combined oral contraceptive pills (Rafidah et al., 2021). In a multinational study of pilgrims in Mecca, uptake of medication for menstrual suppression was higher at 64.0% (381/594), though the preferred agent was Norethisterone (79.0%, 301/381) (Islam et al., 2019). Despite a high success rate for suppression (93.3%, 356/381), common side effects reported during usage included irregular spotting (31.3%, 25/80) and abdominal pain. Heavy, prolonged bleeding affected 54.0% (47/87) of women after discontinuing the hormones.

However, 78.2% (298/381) of these women remain unaware of the appropriate medical response to complications like breakthrough bleeding (Islam et al., 2019).

Extreme temperatures reaching 50°C compromise medication potency. A cross-sectional descriptive study of diabetic pilgrims conducted during the 2019 Hajj revealed that, although the majority of multinational pilgrims demonstrated above-average knowledge regarding insulin storage requirements (overall mean knowledge score = 0.51; SD = 0.23), only 8.6% were classified as having good knowledge. Furthermore, storage practices were found to fluctuate during the pilgrimage, with a significantly higher proportion of pilgrims opting to store medications with medical missions while at the holy sites of Mina and Arafat (26.4%) compared to their stay in Mecca or Medina (17.9%), likely due to the limited availability of refrigeration in seasonal tent accommodations. Additionally, more than 95.0% of diabetic pilgrims reported carrying their medication from their country of origin. Approximately 32.0% of respondents indicated that they transported their insulin to KSA within their luggage without a cooling case, and the majority (86.3%) disposed of their used insulin syringes (needles) in regular trash (Yezli et al., 2021b). These risks are relevant for heat-sensitive treatments, whereby improper handling of insulins and certain antibiotics in such high-temperature environments can lead to reduced potency, pharmacological degradation, and the formation of toxic byproducts. (Yezli et al., 2021c).

Preventive care challenges remain a significant concern in mass gathering health management. Although uptake of compulsory vaccinations such as the meningococcal ACWY vaccine is generally high due to Saudi Arabian visa requirements, compliance gaps and disparities in uptake across vaccine types persist. Earlier studies among international Hajj pilgrims reported meningococcal vaccination uptake exceeding 90.0%, reflecting strong adherence to mandatory travel regulations and visa-related vaccination requirements (Razavi et al., 2016; Alqahtani et al., 2016). However, uptake of recommended non-mandatory vaccines, particularly influenza and pneumococcal vaccines, remains comparatively lower. Among Malaysian Hajj and Umrah pilgrims, Goni et al. (2019) reported influenza and pneumococcal vaccination rates of only 28.6% (364/1274) and 25.4% (324/1274), respectively. Similarly, Alqahtani et al. (2019) found that although 67.0% (230/344) of Saudi Arabian Hajj pilgrims received influenza vaccination, pneumococcal vaccination uptake remained very low at 8.7% (30/344). The study further demonstrated that concerns about illness during Hajj and confidence in vaccine effectiveness promoted vaccine uptake, whereas lack of awareness regarding

recommended vaccinations represented the major barrier to vaccination (Alqahtani et al., 2019).

More recent evidence suggests gradual improvement in vaccination uptake among pilgrims, although important preventive care gaps remain. A large cross-sectional study involving 5,355 Hajj and Umrah pilgrims during the 2024 pilgrimage season reported overall vaccination uptake of 80.3% for mandatory and recommended vaccines, including meningococcal, influenza, and COVID-19 vaccines (Bulkhi et al., 2025). The study identified healthcare provider recommendations, government vaccination requirements, and individual perceptions of infection risk as important facilitators of vaccine uptake. Nevertheless, barriers such as limited awareness, cultural beliefs, operational difficulties, and inconsistent understanding regarding vaccine recommendations continued to influence compliance. Importantly, the study also highlighted variability in uptake according to education level, occupational background, and pilgrim categories, suggesting that vaccine acceptance is influenced not only by regulatory requirements but also by behavioural, social, and contextual factors.

A cross-sectional survey by Tobaiqy et al. (2021) at King Abdul Aziz International Airports' departure lounge in Jeddah, Saudi Arabia, from February to April 2019, investigated preventive measures among 1,012 Umrah pilgrims representing 41 nationalities. The results indicated that 24.0% (242/1,012) of participants had not obtained any vaccines before travelling. Approximately one-third of pilgrims (30.1%, 305/1,012) indicated that they never wore face masks in crowded areas during Umrah in 2019. An Indonesian cross-sectional study conducted in December 2018 documented that 24.0% (711/2973) of Umrah pilgrims received mandatory meningococcal vaccinations less than 14 days before departure, which may not allow sufficient time for optimal antibody development prior to travel. Most of these pilgrims (19.5%, 139/711) were vaccinated only 5 to 6 days before departure (Yuliasari & Suwanto, 2019). As meningococcal vaccination is recommended at least 10 to 14 days before travel to ensure adequate immune protection, delayed vaccination may reduce the effectiveness of preventive protection during pilgrimage (Ministry of Health, Kingdom of Saudi Arabia 2024).

Pharmacy-based studies provide important insights into the role of CPs as accessible first-line healthcare providers for pilgrims. A cross-sectional survey involving 544 CPs practising in Saudi Arabia reported that 87.9% of CPs were consulted by pilgrims regarding post-ritual Hajj and Umrah health issues, particularly

for symptomatic management involving antidiarrhoeals (96.3%), inhalers (89.4%), and painkillers (87.3%) (Alghadeer et al., 2023). These findings suggest that CPs in Saudi Arabia play a substantial frontline role in managing common pilgrimage-related health concerns. However, despite this involvement, important clinical knowledge gaps were identified. The study further reported that only 33.9% of the CPs were aware of mandatory polio vaccination protocols for travellers originating from at-risk countries, indicating limitations in travel health-specific knowledge despite frequent interaction with pilgrims.

Pharmacy-based observations and patient surveys confirm that while community pharmacies are a primary source for symptomatic relief, many pilgrims attempt pre-departure self-preparedness. In a study of Malaysian Umrah pilgrims during the 2014 Ramadan season, 37.7% of respondents prepared medical kits prior to departure. These kits containing chronic medications for hypertension (19.9%), diabetes (13.6%), common minor ailments such as cough (13.1%) and flu (11.5%) (Siti Fatimah et al., 2017). A cross-sectional survey involving CPs in Selangor, Malaysia from November 2017 to February 2018, indicated that 85.0% of CPs provide travel-related services, including vaccination recommendations and destination-specific counselling for outbound pilgrims. It is also evident that CPs often provide menstrual management counselling and hormonal treatments for female pilgrims to delay their cycles during Hajj and Umrah. Despite this active involvement, these services remain fragmented. Hence, a critical need exists for structured, certified training to professionalise the pharmacist's role in travel health (Kc et al., 2020).

2.2.3 Importance of Structured Pre-Travel Preparation

Hajj and Umrah pilgrims represent a unique travel population with complex healthcare needs. Unlike many leisure travellers, pilgrims are frequently older adults with pre-existing chronic conditions, and are exposed to multiple health risks associated with mass gatherings, including infectious diseases, extreme heat exposure, prolonged physical exertion, medication-related problems, and exacerbation of underlying medical conditions (Memish et al., 2019; Yezli et al., 2021c). The physically demanding nature of pilgrimage rituals, coupled with disruption to daily routines, irregular meal schedules, unfamiliar environments, and challenges in medication management, further increase pilgrims' vulnerability to adverse health outcomes (Hasan et al., 2016).

Collectively, the evidence highlights the importance of comprehensive pre-travel preparation in mitigating health risks among Hajj and Umrah pilgrims. Ensuring adequate medication supply, timely vaccination, and appropriate health education can help reduce travel-related health complications and support safer pilgrimage experiences. These recommendations are further reinforced by international and national guidance issued by the WHO, Saudi MOH, MOH Malaysia, and Tabung Haji, all of which emphasise the importance of early health assessment, preventive measures, and pre-travel health preparation (Ministry of Health, Kingdom of Saudi Arabia, 2024; Ministry of Health Malaysia, 2025; World Health Organization, 2021a).

Diabetic pilgrims of various nationalities admitted to a tertiary referral centre in Mecca during Hajj with insufficient self-management skills frequently experience glycaemic instability (Hasan et al., 2016). Similarly, a prospective study conducted among international Hajj pilgrims presenting with diabetic emergencies in Saudi Arabia during Hajj 2019 reported that 18.0% of those patients experienced hypoglycaemia, 12.4% developed hyperosmolar hyperglycaemic state, and 7.2% presented with diabetic ketoacidosis (Alfadhly et al., 2022). Similarly, individuals who forget or fail to bring necessary medications often seek care in primary healthcare centres (Yezli et al., 2022) and hospital departments (BaDawood et al., 2020), imposing avoidable logistical and financial burdens on both pilgrims and healthcare missions (BaDawood et al., 2020).

Suboptimal vaccination uptake represents another significant gap in preparedness. In a cross-sectional survey among Saudi Arabian Hajj pilgrims, 67.0% reported receiving the seasonal influenza vaccine, whereas only 8.7% had received pneumococcal vaccination, with lack of awareness regarding vaccine availability identified as a major barrier to uptake (Alqahtani et al., 2019). In addition to preventive vaccination gaps, medication management challenges also remain evident during pilgrimage. Improper medication storage practices, particularly among insulin-treated pilgrims, may compromise treatment efficacy under extreme environmental conditions. A multinational study conducted during Hajj 2019 revealed that approximately one-third of insulin-treated pilgrims transported insulin without appropriate cooling devices, exposing the medication to high ambient temperatures that frequently exceed 40°C during pilgrimage rituals. Given that insulin stability is temperature-dependent, such practices may compromise therapeutic effectiveness and contribute to glycaemic instability (Yezli et al., 2021b).

These findings demonstrate that Hajj and Umrah pilgrims have distinct healthcare needs that extend beyond routine travel health advice, due to their heightened exposure to infectious diseases, chronic disease-related complications, medication-management challenges, extreme environmental conditions, and the physical demands associated with pilgrimage rituals. Therefore, effective pre-travel preparation is essential to ensure that pilgrims are adequately equipped to manage their health conditions, maintain medication continuity, prevent travel-related illnesses, and safely perform pilgrimage activities (Memish et al., 2019).

Structured pre-travel pharmacist consultations represent an evidence-based approach to addressing these needs through person-centred medication review, chronic disease optimisation, vaccination counselling, risk assessment, health education, adherence support, and referral when appropriate. Such services may enhance medication safety, improve preventive health measures, support appropriate medication storage and self-management, and empower pilgrims to make informed health decisions before and during travel. Beyond individual health benefits, improved preparedness may reduce preventable health complications and avoidable utilisation of healthcare services during pilgrimage, and enable healthcare missions to allocate resources more effectively to acute and emergency cases.

2.3 Role of Community Pharmacists in Pre-Travel Health Care

Professional standards and guidelines provide a foundational framework that define the professional responsibilities and expected roles of CPs in patient care. In the context of pre-travel health, these standards outline what pharmacists are required to do to support safe, effective, and patient-centred care, particularly for high-risk groups such as Hajj and Umrah pilgrims. International guidance from the WHO and the International Pharmaceutical Federation (FIP), together with national professional standards and travel health guidance, positions CPs as essential contributors to medication management, health promotion, preventive care, and clinical referral (International Society of Travel Medicine, 2023b; Pharmaceutical Services Division, 2016; World Health Organization, 2011). Applied to mass gatherings, these standards underscore the pharmacist's potential to mitigate health risks associated with mass gatherings, environmental stressors, and the high burden of chronic disease among pilgrims.

Although Malaysia does not currently have a dedicated national standard specifically defining CPs' roles in pre-travel care for Hajj and Umrah pilgrims, broader pharmacy practice frameworks and international travel health guidance support pharmacist involvement in medication management, health promotion, travel health advice, chronic disease support, basic screening, and referral activities (Pharmaceutical Services Programme, Ministry of Health Malaysia, 2016; World Health Organization, 2011; International Society of Travel Medicine, 2023a; 2023b). Medication management remains the most established and documented role of pharmacists across global standards. The WHO–FIP Good Pharmacy Practice (GPP) guidelines emphasise the responsibility of pharmacists to ensure safe and appropriate medicine use through dispensing, counselling, adherence support, and the prevention of medication-related problems (World Health Organization, 2011). In pre-travel settings, this role encompasses ensuring the continuity of therapy, advising on medication storage and administration during travel, and minimising risks associated with polypharmacy or inappropriate use. For Hajj and Umrah pilgrims, who are often older and medically complex, medication-related care is particularly critical, reinforcing medication management as the cornerstone of pre-travel pharmacist consultations within standards-based expectations.

Beyond dispensing, professional standards extend the pharmacist's role to include health promotion and disease prevention. WHO–FIP GPP explicitly recognises patient education and preventive counselling as integral components of pharmacy practice (World Health Organization, 2011). This reflects the accessibility of community pharmacies and their public health function. In travel and mass-gathering contexts, health promotion may include advice on hydration, hygiene, the prevention of infection and heat-related illness. Given the crowded and physically demanding nature of the pilgrimage, these standards support pharmacist involvement in preventive education.

Guidance from the International Society of Travel Medicine (ISTM) and professional pharmacy bodies recognises pre-travel health advice as a core element of comprehensive travel health services (International Society of Travel Medicine, 2023b; World Health Organization, 2011). While travel medicine is often physician-led, standards acknowledge that pharmacists can contribute by providing general pre-travel information, raising awareness of destination-specific risks, and supporting informed

decision-making. In the Hajj and Umrah context, this includes advice related to communicable diseases, environmental exposures, and physical strain.

Professional standards highlight the role of pharmacists in supporting patients with chronic or long-term conditions, including continuity of care and safe medicine use (World Health Organization, 2011). FIP competency frameworks further highlight responsibilities related to patient-centred communication and the adaptation of care to meet individual needs. This role is particularly relevant for Hajj and Umrah pilgrims, among whom conditions such as diabetes and cardiovascular disease are prevalent.

Many national and international practice standards recognise basic health screening and monitoring as permissible activities within community pharmacy practice, provided they fall within defined scopes (World Health Organization, 2011). Such services aim to identify potential health risks and support prevention. In pre-travel contexts, screening may help in identifying conditions that require medical assessment before departure. Referral and interprofessional collaboration are core components of GPP, which emphasise recognising professional limits and referring patients when care needs exceed pharmacists' scope (World Health Organization, 2011). Travel health guidance similarly highlights referral for vaccination, medical clearance, or specialist assessment (Chen & Hochberg, 2024). In mass-gathering contexts such as Hajj and Umrah, effective referral is essential for patient safety. Therefore, referral standards are frame as a professional responsibility, providing a clear benchmark for examining pharmacists' decision-making and confidence in pre-travel consultations.

Across all standards, CPs are expected to act ethically, prioritise patient welfare, and maintain professional competence. WHO–FIP guidance and FIP workforce frameworks emphasise accountability, patient-centred care, and continuous professional development (World Health Organization, 2011). In pre-travel care, ethical practice includes providing accurate information, recognising limitations, and acting in the traveller's best interest. For high-risk pilgrims, these principles reinforce the importance of appropriate advice and referral.

In summary, broader pharmacy practice frameworks and international travel health guidance support a wide range of potential roles for CPs in pre-travel care, including medication management, health promotion, travel health advice, chronic disease support, basic screening, and referral activities. In the Malaysian context, these expectations are inferred from frameworks such as the Community Pharmacy Benchmarking Guideline and Good Pharmacy Practice standards rather than from a

dedicated national standard specific to pre-travel health consultations for Hajj and Umrah pilgrims (Pharmaceutical Services Programme, Ministry of Health Malaysia, 2016; World Health Organization, 2011). International travel health guidance also recognises the role of pharmacists in traveller education, preventive care, medication management, and referral activities (International Society of Travel Medicine, 2019). However, while these frameworks outline professional expectations and expanded patient-centred roles, they provide limited evidence regarding how consistently such roles are implemented in actual community pharmacy practice. This gap between expected roles and real-world practice underpins the rationale for the present study, which examines both CPs' practices and the beliefs influencing their involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

2.4 Pre-Travel Health Practices by Community Pharmacists

Pre-travel health practice comprises structured preventive services intended to mitigate infectious, environmental, and medication-related risks among international travellers. Within pharmacy, this service represents a broader professional transition from product-centred dispensing toward patient-centred and public health-oriented care. International frameworks, including the World Health Organisation's Good Pharmacy Practice standards (World Health Organization, 2011) and the International Society of Travel Medicine (ISTM) Pharmacist Professional Guidelines (International Society of Travel Medicine, 2023b) position pharmacists as providers of medication optimisation, tailored health education and promotion. These standards delineate a comprehensive model of practice grounded in systematic risk assessment incorporating destination epidemiology, traveller characteristics, medical history, planned activities, and immunisation status. However, empirical literature suggests that although pharmacists frequently engage in travel-related counselling, the structure, depth, and consistency of consultations vary across jurisdictions. This divergence between guideline expectations and real-world practice raises important questions regarding scope, intensity, and factors influencing pharmacist involvement.

2.4.1 Global Landscape

Globally, the role of pharmacists in travel health has evolved from providing symptom-based advice to delivering comprehensive and clinically integrated travel

health services. Earlier studies primarily described pharmacists' involvement in over-the-counter counselling for travellers' diarrhoea, malaria prevention, and vector-borne disease risk reduction (Kodkani et al., 1999; Teodósio et al., 2006; Toovey, 2006). Although these activities reflected pharmacists' accessibility and pharmacotherapeutic expertise, the services were largely advisory and product-oriented rather than structured consultations incorporating formal travel risk assessment, documentation, and preventive care planning.

More recent developments indicate gradual expansion of pharmacists' roles in travel health, particularly in countries with enabling legislation and extended pharmacy practice frameworks, such as Canada, the United Kingdom (UK), Australia, and the United States (US). In these settings, pharmacists may provide comprehensive travel risk assessments, administer travel vaccines, prescribe prophylactic medications within defined scopes of practice, recommend malaria chemoprophylaxis, and assemble personalised travel health kits tailored to destination-specific risks (Evans, 2018; Heslop et al., 2018; Houle, 2018b; Tran et al., 2015).

In Canada, pharmacists in several provinces are authorised to administer vaccines and prescribe selected travel-related medications. Nevertheless, survey findings from Ontario indicated that although less than one-third of pharmacists reported being actively involved in travel health services, implementation remained variable. Most pharmacists administering fewer than ten travel vaccines monthly, suggesting that integration of travel health into routine community pharmacy practice remained at an early stage (Houle et al., 2019).

In the UK and Australia, pharmacists operating within accredited settings may provide comprehensive travel risk assessments, supply or administer travel vaccines, and recommend malaria chemoprophylaxis under patient group directions or prescribing frameworks (Evans, 2018; Heslop et al., 2018). Despite these international developments, much of the existing literature has focused predominantly on leisure or business travellers, with relatively limited exploration of travel health services within high-risk mass gathering settings such as Hajj and Umrah pilgrimages (Yezli et al., 2017).

Evaluation studies indicate a high level of patient acceptance and satisfaction with pharmacist-led services. A cross-sectional study by Tran et al. (2015) was conducted in Central Virginia, USA, from July 2011 to June 2012, involving adult patients who had consultations with pharmacist for pre-travel health. The study found

that more than 90.0% of patients accepted pharmacist recommendations for vaccines and prophylaxis, with correspondingly high satisfaction ratings. Similarly, a systematic review from 1999 to July 2022 reported that 94.0 to 100.0% of travellers were satisfied or very satisfied with pharmacist-managed travel health services, and overall acceptance rates for recommended interventions frequently exceeded 75.0% (Kc et al., 2023).

2.4.2 Malaysian Context

Malaysia operates a dual healthcare system comprising a heavily subsidised public healthcare sector and a fee-for-service private healthcare sector. The public sector, administered primarily by the Ministry of Health (MOH), delivers healthcare services through hospitals and primary care clinics, whereas the private sector consists of private hospitals and general practitioner (GP) clinics (Hassali et al., 2016). This dual structure has shaped the scope and delivery of pharmacy services and provides important context for understanding CPs' involvement in pre-travel health services.

Pharmacy practice in Malaysia is governed by several legislative frameworks, including the Registration of Pharmacists Act 1951, the Poisons Act 1952, and the Dangerous Drugs Act 1952. Among these, the Poisons Act 1952 serves as the principal legislation regulating the sale, supply, and dispensing of medicines. Under this Act, medical practitioners are authorised to prescribe and dispense medicines, whereas pharmacists are primarily responsible for supplying and dispensing medicines within their legal scope of practice (Hassali et al., 2016; Shafie et al., 2012). These regulations continue to shape pharmacists' professional roles and practice boundaries within the Malaysian healthcare system.

A distinctive feature of Malaysian healthcare is the absence of full dispensing separation within the private healthcare sector. Although prescribing and dispensing functions have been separated in public healthcare facilities since 1952, private medical practitioners continue to retain both prescribing and dispensing rights (Shafie et al., 2012; Tiong et al., 2016). Consequently, most prescription medicines are supplied directly through private clinics rather than community pharmacies. This contrasts with healthcare systems in countries such as Australia, Canada, New Zealand, and the United Kingdom, where CPs play a more extensive role in prescription management and pharmaceutical care.

The absence of dispensing separation has important implications for community pharmacy practice. CPs have traditionally focused on supplying non-prescription medicines, health supplements, self-care advice, and minor ailment management, with comparatively limited involvement in prescription-based pharmaceutical care (Loh et al., 2023). Previous research has identified the lack of dispensing separation as a major barrier to expanding pharmaceutical care services in Malaysian community pharmacies, contributing to limiting opportunities for comprehensive medication management and patient-centred care (Loh et al., 2021).

Within the public healthcare sector, pharmacy services are coordinated through the Pharmaceutical Services Programme under the MOH. Pharmacists undertake a broad range of clinical responsibilities, including medication reconciliation, pharmacotherapy monitoring, patient counselling, and medication safety activities. One notable example is the Medication Therapy Adherence Clinic (MTAC) programme, which enables pharmacists to provide structured pharmaceutical care for patients with chronic diseases through standardised protocols and collaborative practice models (Alrasheedy et al., 2017). The success of MTAC demonstrates the capacity of Malaysian pharmacists to deliver specialised clinical services when supported by appropriate organisational structures, training, and interprofessional collaboration. Similar support mechanisms may be required to facilitate CPs involvement in pre-travel pharmacist consultations for the pilgrims.

Understanding this healthcare and regulatory context is important when examining CPs' involvement in pre-travel pharmacist consultations for Hajj and Umrah pilgrims. Unlike pharmacists in countries where travel health services are well established, Malaysian CPs operate within a healthcare system characterised by restricted prescribing-related responsibilities, fragmented interprofessional collaboration, and limited opportunities for structured pharmaceutical care. These contextual factors may influence both the extent of CPs' involvement and the behavioural determinants underlying their participation in pre-travel pharmacist consultations.

Nevertheless, in recent years, community pharmacy practice in Malaysia has progressively transitioned from a product-centred orientation towards a patient-centred care model, supported by national policies and professional standards. The Community Pharmacy Benchmarking Guideline (Pharmaceutical Services Division, 2016) and the World Health Organisation's Good Pharmacy Practice (GPP) standards emphasise

pharmacists' roles in health promotion, rational medicine use, and preventive healthcare services (World Health Organization, 2011). These frameworks conceptually position CPs as accessible public health providers capable of contributing to pre-travel preparation, particularly in the context of mass gatherings such as Hajj and Umrah.

This role aligns with Pillar 3 of the Malaysia National Healthy Agenda, which emphasises empowering individuals to take responsibility for their own health (Ministry of Health Malaysia, 2021). In the context of pilgrimage, where large-scale population movement and environmental stressors increase health risks, self-management becomes particularly important. Malaysian CPs have demonstrated involvement in supporting this agenda. A cross-sectional study conducted among CPs in Selangor reported that 85.0% of CPs were involved in pre-travel counselling and the provision of essential medical supplies to outbound travellers (Kc et al., 2020). Although the study did not specifically examine formal promotion of travel health services by CPs, the high level of reported involvement suggests that travel-related advisory activities appear to be integrated into routine community pharmacy encounters.

Medication preparedness among Malaysian pilgrims further highlights the relevance of pharmacist involvement. Siti Fatimah et al. (2017) reported that 19.9% of Malaysian pilgrims carried antihypertensive medications and 13.6% carried diabetes treatments from home, reflecting a substantial burden of chronic disease within this population. However, medication management gaps persist. BaDawood et al. (2020) found that approximately 16.0% of pilgrims with chronic illnesses carried an insufficient medication supply for the duration of the pilgrimage. Such inadequacies increase the risk of treatment interruption, destabilisation of chronic conditions, and avoidable healthcare utilisation during Hajj.

These findings suggest that although Malaysian CPs are actively engaged in counselling and medication supply-related support, systematic pre-travel medication optimisation and comprehensive risk assessment may not be consistently implemented. Given the substantial burden of chronic disease among pilgrims and the documented gaps in medication preparedness, greater integration of CPs into structured pre-travel consultation frameworks may enhance medication safety, continuity of care, and adherence to international travel health standards. Therefore, the Malaysian context, reflects both strong professional positioning and identifiable practice gaps, reinforcing the need to systematically evaluate CPs' current practices and the beliefs influencing their involvement in pre-travel pharmacist consultations.

2.5 Factors Influencing Community Pharmacists' Involvement in Pre-Travel Health Services

The reviewed studies identified several factors influencing CPs' involvement in pre-travel health services (Table 2.1). Across seven studies conducted in Portugal, Switzerland, South Africa, Malaysia, Canada, Australia, and Italy, pharmacist-related factors predominantly centred on knowledge, training, confidence, and perceptions of professional role. Knowledge-related factors were the most frequently reported determinants, appearing in six studies (Kodkani et al., 1999; Teodósio et al., 2006; Toovey, 2006; Taha & See, 2016; Bascom et al., 2015; Della Polla et al., 2020). Although pharmacists generally demonstrated adequate knowledge in selected travel health areas, several important knowledge gaps were identified. For example, only 9.0% of Portuguese CPs correctly identified the biting habits of the *Anopheles* mosquito (Teodósio et al., 2006), while 82.0% of Malaysian CPs reported having no formal training in travel medicine (Taha & See, 2016). Similarly, Kc et al. (2020) reported substantial gaps of knowledge relating to global epidemiology and travel-related infectious diseases among Malaysian CPs.

Training-related needs were reported in three studies and emerged as one of the most frequently reported pharmacist-related barriers. Across studies conducted in Malaysia, Australia and Canada, CPs frequently revealed insufficient formal education in travel medicine and expressed a preference for accredited continuing professional development programmes, online learning modules, and certification pathways (Heslop et al., 2018; Kc et al., 2020; Houle et al., 2019). Australian pharmacists indicated a preference for accredited online or blended learning approaches, while Canadian pharmacists expressed interest in obtaining certification through the International Society of Travel Medicine (ISTM) (Heslop et al., 2018; Houle et al., 2019).

Positive professional attitudes and role perceptions were reported across four studies. In Australia, most pharmacists considered travel health services an appropriate extension of community pharmacy practice, and over 70.0% believed consumers would utilise pharmacist-led travel health services if available (Heslop et al., 2018). Similarly, approximately 71.0% of Malaysian pharmacists demonstrated positive attitudes towards travel medicine services (Taha & See, 2016), while 85.0% reported providing travel-related advice despite the absence of structured travel health programmes (Kc et al., 2020).

Environmental and organisational factors emerged as the most frequently reported barriers to service provision. Time constraints, staffing shortages, workflow integration challenges, lack of prescribing authority, restricted access to vaccines, and low public awareness were identified in studies conducted in Australia, Canada, and Malaysia (Heslop et al., 2018; Thidrickson & Goodyer, 2019; Houle et al., 2019; Kc et al., 2020). Approximately 40.0% of Australian pharmacists reported time and staffing limitations as barriers to providing comprehensive travel health consultations (Heslop et al., 2018). In Canada, pharmacists highlighted difficulties integrating travel health services into routine workflow and identified limited prescribing authority as a major constraint affecting service efficiency and revenue generation (Thidrickson & Goodyer, 2019; Houle et al., 2019). Conversely, facilitators included access to up-to-date travel health resources, insurance reimbursement mechanisms, patient convenience, and extended pharmacy operating hours, all of which enhanced service accessibility and uptake.

Although previous studies conducted in different travel health settings have reported that CPs generally demonstrate positive attitudes towards travel health service provision and acknowledge their potential role in pre-travel care, these favourable perceptions do not appear to translate into structured practice involvement. For example, a survey in the Canada found that CPs expressed willingness and perceived readiness to expand their roles in travel medicine (Thidrickson et al., 2021). Similarly, a study in Australia by Heslop et al. (2020) reported positive professional attitudes towards travel health service provision, while research conducted in Malaysia by Taha and See (2016) demonstrated that CPs recognised their potential contribution to travel-related counselling and preventive care. However, despite these encouraging perceptions, CPs' actual involvement was often limited to selected medication-related or advisory activities rather than comprehensive pre-travel consultations.

Existing literature has largely focused on describing CPs' knowledge, attitudes, and self-reported practices without adequately examining the behavioural mechanisms underlying this attitude-behaviour gap. Although CPs reported confidence in providing selected travel-related advice (Bascom et al., 2015), their involvement in more comprehensive activities, such as vaccination counselling, risk assessment, and coordinated pre-travel care remained limited. This inconsistency suggests that positive attitudes and confidence alone may be insufficient to ensure implementation of structured pre-travel health services.

Furthermore, previous studies have predominantly emphasised structural barriers, including lack of time, training, staffing, and resources, with limited exploration of the interplay between behavioural, organisational, professional, and environmental influences interact to shape practice behaviour. Consequently, the underlying reasons explaining why positive professional attitudes do not translate into routine service implementation remain poorly understood. This limitation is particularly important in the context of Hajj and Umrah pilgrims, where pre-travel health needs are complex, multidimensional, and highly dependent on proactive preventive care.

These findings suggest that CPs' involvement in travel health services is influenced by a complex interaction of individual capability, professional identity, organisational support, and broader healthcare system factors. The presence of an attitude–behaviour gap highlights the need for a theory-informed approach capable of examining the behavioural, contextual, and organisational determinants of practice. Therefore, the TDF and COM-B model provide an appropriate framework for comprehensively understanding the factors influencing CPs' involvement in pre-travel pharmacist consultations.

Table 2.1
Factors Associated with Pharmacist Involvement in Activities Related to Pre-Travel Health

Theme	Subtheme	Factors	Findings	Country	References
Pharmacist	Facilitator	Shorter time since graduation linked to better advice	Recently graduated pharmacists demonstrated better accuracy in providing mosquito and malaria-related advice compared to pharmacists who had graduated earlier.	Portugal	Teodósio et al. (2006)
Pharmacist	Knowledge	Spontaneous knowledge of malaria prophylaxis and vaccines	Initial spontaneous accuracy regarding malaria prophylaxis recommendations was low, however, pharmacists' performance improved following use of reference documentation.	Switzerland	Kodkani et al. (1999)
Pharmacist	Knowledge	Correct understanding of malaria transmission	Some CPs did not recognise malaria as a mosquito-borne disease, and only 9.0% correctly identified Anopheles mosquito biting habits	Portugal	Teodósio et al. (2006)
Pharmacist	Knowledge	Correct identification of malaria risk	Many CPs correctly identified the need for malaria prophylaxis and performed better than several European counterparts in risk assessment scenarios.	South Africa	Toovey (2006)
Pharmacist	Knowledge	Level of knowledge in travel medicine	82.0% of CPs reported no formal travel medicine training, while overall knowledge levels were moderate. Foreign-trained CPs demonstrated higher knowledge scores compared to locally trained CPs.	Malaysia	Taha & See (2016)
Pharmacist	Barrier	Overprescribing when not indicated	Some CPs recommended unnecessary malaria prophylaxis for travellers visiting non-endemic areas, indicating inappropriate prescribing-related recommendations.	South Africa	Toovey (2006)
Pharmacist	Confidence	Confidence in unaided advice	21.0% of CPs reported confidence in providing travel health advice without external assistance.	Canada	Bascom et al. (2015)
Pharmacist	Knowledge	Provide travel health advice	CPs with higher self-reported travel health knowledge were more likely to feel confident providing travel health advice independently.	Canada	Bascom et al. (2015)
Pharmacist	Beliefs about role	Perceived appropriateness of role	The majority of pharmacists agreed that travel health services represented an appropriate extension of community pharmacy practice.	Australia	Heslop et al. (2018)

Theme	Subtheme	Factors	Findings	Country	References
Pharmacist	Beliefs about role	Client's interest in pharmacist travel services	More than 70.0% of pharmacists believed consumers would utilise pharmacist-led travel health services if available	Australia	Heslop et al. (2018)
Pharmacist	Beliefs about role	Advice on when to consult a doctor	The majority of pharmacists agreed that pharmacists were able to appropriately advise travellers regarding the need for medical consultation or referral.	Australia	Heslop et al. (2018)
Pharmacist	Barrier	Time and staffing constraints	Approximately 40.0% of pharmacists identified time constraints and staffing limitations as important barriers to providing comprehensive travel health consultations.	Australia	Heslop et al. (2018)
Pharmacist	Barrier	Legal constraints (vaccines/S4 meds)	More than 50.0% of pharmacists disagreed that lack of vaccine authority would prevent implementation of travel health services.	Australia	Heslop et al. (2018)
Pharmacist	Training	Training needs and delivery preference	The majority of pharmacists reported having no formal travel health training and preferred accredited online or hybrid learning approaches.	Australia	Heslop et al. (2018)
Pharmacist	Facilitator	Interested in ISTM certification	Many pharmacists expressed interest in obtaining ISTM certification and expanding travel health services within their practice.	Canada	Houle et al. (2019)
Pharmacist	Knowledge	Knowledge of common travel-related infectious diseases	CPs with prior exposure to travel medicine showed better knowledge	Italy	Della Polla et al. (2020)
Pharmacist	Attitude	Attitude toward travel medicine	Approximately 71.0% of CPs demonstrated positive attitudes towards travel health services and supported expansion of pharmacists' travel health roles.	Malaysia	Taha & See (2016)
Pharmacist	Attitude	Belief that travel medicine is part of the professional role	CPs who believed travel medicine formed part of their professional role were more likely to engage in public travel health activities.	Italy	Della Polla et al. (2020)
Pharmacist	Attitude	Belief they can advise the public	Many CPs believed they possessed adequate capability to advise the public regarding travel health issues and preventive measures.	Italy	Della Polla et al. (2020)

Theme	Subtheme	Factors	Findings	Country	References
Pharmacist	Attitude	Belief in the importance of public information	CPs with higher knowledge and confidence scores demonstrated stronger belief in the importance of providing public travel health information.	Italy	Della Polla et al. (2020)
Pharmacist	Training	Lack of formal training on global epidemiology	Many CPs reported inadequate training related to global epidemiology and identified significant self-perceived knowledge gaps in travel medicine.	Malaysia	Kc et al. (2020)
Pharmacist	Training	Need for certified training programs	CPs frequently requested CPD-based and online certified travel health training programmes tailored to community pharmacy practice.	Malaysia	Kc et al. (2020)
Pharmacist	Perception	CPs believe they are well-positioned to provide advice	CPs perceived themselves as accessible healthcare professionals with adequate medication expertise to provide travel-related advice.	Malaysia	Kc et al. (2020)
Pharmacist	Perception	Positive attitude and willingness to provide services	85.0% of CPs reported involvement in providing travel-related advice and over-the-counter recommendations despite limited structured travel health services.	Malaysia	Kc et al. (2020)
Pharmacist	Barrier	Language and brand recognition challenges	Language barriers and unfamiliarity with foreign medicine brand names were commonly reported challenges affecting travel-related consultations.	Multiple countries	Kc et al. (2022)
Environment	Facilitator	Request for more training materials	Pharmacists requested updated and centralised travel health resources, including seminars, standardised guidelines, and educational materials.	Switzerland	Kodkani et al. (1999)
Environment	Information source	Reliance on WHO/Internet, not educational modules	CPs commonly relied on WHO websites and general internet resources, while formal educational modules were minimally utilised.	Malaysia	Taha & See (2016)
Environment	Barrier	Lack of prescribing authority	CPs identified lack of prescribing authority as an important barrier limiting comprehensive travel health service provision.	Canada	Thidrickson & Goodyer (2019)
Environment	Barrier	Access to public health vaccines	Cost and limited access to public health vaccines were reported as barriers implementation of pharmacist-led vaccination services.	Canada	Thidrickson & Goodyer (2019)

Theme	Subtheme	Factors	Findings	Country	References
Environment	Barrier	Integration into a busy workflow	CPs frequently reported difficulties integrating travel health services into routine pharmacy workflow and existing workload demands.	Canada	Thidrickson & Goodyer (2019)
Environment	Facilitator	Insurance billing and payment facilitation	Direct insurance billing reduced patient out-of-pocket expenses and improved uptake of pharmacist-led travel health services.	Canada	Thidrickson & Goodyer (2019)
Environment	Convenience	One-stop shop delivery model	Patients valued the convenience of receiving assessments, prescriptions, counselling, and injections within a single pharmacy visit.	Canada	Thidrickson & Goodyer (2019)
Environment	Convenience	Flexible scheduling and short-notice appointments	Evening, weekend, and short-notice appointments improved accessibility and convenience for travellers seeking travel health consultation.	Canada	Thidrickson & Goodyer (2019)
Environment	Barrier	Lack of time to integrate the service	CPs reported difficulties incorporating travel health services into routine workload and existing dispensing responsibilities.	Canada	Houle et al. (2019)
Environment	Barrier	Lack of prescribing authority	Inability to prescribe travel-related medications caused delays, reduced service integration, and limited revenue generation opportunities.	Canada	Houle et al. (2019)
Environment	Barrier	Low public awareness	CPs reported that many patients were unaware that pharmacists could provide travel vaccinations or travel health consultations	Canada	Houle et al. (2019)
Environment	Facilitator	Convenience and access for patients	Patients appreciated pharmacy accessibility, extended operating hours, and reduced scheduling barriers compared to traditional healthcare settings.	Canada	Houle et al. (2019)
Environment	Barrier	Currency and financial transaction issues	Currency exchange and payment acceptance issues created barriers affecting access to travel-related healthcare services.	Multiple countries	Kc et al. (2022)

Note. Pharmacist-related factors comprised individual determinants including knowledge, skills, confidence, attitudes, beliefs about professional role, perceptions, and training-related influences. Environmental-related factors comprised external determinants including time availability, staffing, workflow integration, organisational support, prescribing authority, access to vaccines and travel health resources, reimbursement mechanisms, public awareness, and broader healthcare system or regulatory influences affecting travel health service delivery.

2.6 Theoretical Frameworks Underpinning the Study

2.6.1 Behavioural Theories Explaining Health Professional Practice

Several behavioural and implementation theories have been applied to understand healthcare professionals' practices, including the Theory of Planned Behaviour, Social Cognitive Theory, and Self-Determination Theory. The Theory of Planned Behaviour (TPB) proposes that behaviour is influenced by attitudes, subjective norms, and perceived behavioural control, which collectively shape behavioural intention (Ajzen, 1991). Although TPB has been widely applied in pharmacy practice research, its explanatory scope may be limited in the present context because CPs' involvement in pre-travel pharmacist consultations is unlikely to be determined solely by intention. In practice, CPs may express positive attitudes and intentions towards travel health services but remain unable to implement them consistently due to competing workflow demands, organisational constraints, lack of structured protocols, and insufficient environmental support. Consequently, TPB may inadequately account for the broader contextual and system-level influences shaping routine practice behaviour and may insufficiently explain the observed attitude-behaviour gap identified in travel health practice.

Similarly, Social Cognitive Theory (SCT) emphasises the reciprocal interaction between personal factors, environmental influences, and behaviour, with particular focus on self-efficacy as a determinant of behavioural performance (Bandura, 1986). While self-efficacy is relevant to pharmacists' confidence in delivering travel health services, SCT may provide limited explanatory depth regarding organisational routines, professional role boundaries, behavioural regulation, and implementation processes within community pharmacy settings. In the context of Hajj and Umrah pre-travel consultations, behavioural engagement is influenced not only by confidence but also by structural opportunities, interprofessional relationships, workflow integration, and practice environment constraints. Although SCT acknowledges environmental influences, these broader implementation-related determinants are not comprehensively operationalised within the theory alone.

Likewise, Self-Determination Theory (SDT) focuses primarily on motivational processes and proposes that autonomy, competence, and relatedness influence behavioural engagement (Ryan & Deci, 2000). While SDT is useful in understanding CPs' intrinsic motivation and professional willingness to contribute to preventive care,

healthcare implementation research suggests that positive motivation alone is often insufficient to sustain behavioural enactment when organisational and contextual barriers remain unresolved. In the present context, CPs may be highly motivated to provide pre-travel pharmacist consultations yet remain constrained by workload pressures, limited staffing, absence of organisational support, and lack of structured service integration. Thus, SDT may explain motivational aspects of behaviour but may be less suited to examining the wider behavioural, contextual, and environmental determinants influencing implementation of pre-travel pharmacist consultations.

Alternative implementation frameworks, including the Normalisation Process Theory (NPT) and the Consolidated Framework for Implementation Research (CFIR), were also considered. NPT primarily examines how interventions become embedded and routinised within practice settings through collective implementation processes such as coherence, cognitive participation, collective action, and reflexive monitoring (May & Finch, 2009). Similarly, CFIR provides a comprehensive framework for examining multilevel implementation influences, including intervention characteristics, organisational culture, inner and outer settings, and implementation processes (Damschroder et al., 2009). Although both frameworks are highly valuable for implementation research, they are more suited to evaluating the implementation and integration of established interventions or programmes. In contrast, the present study did not aim to evaluate implementation outcomes of a formalised travel health service. Rather, the primary objective was to explore and understand the beliefs and behavioural determinants influencing CPs' involvement in pre-travel pharmacist consultations at the individual practitioner level.

Given the complexity of CPs' involvement in pre-travel pharmacist consultations for Hajj and Umrah pilgrims, relying on a single theory was considered insufficient to comprehensively examine the multiple interacting determinants influencing practice behaviour. CPs' involvement in pre-travel pharmacist consultations may be shaped not only by individual motivation and attitudes, but also by professional role identity, workflow processes, organisational support, environmental resources, social influences, and behavioural regulation strategies. Therefore, a broader integrative framework was required to systematically capture these multidimensional influences.

2.6.2 Theoretical Domains Framework

The TDF was selected because it synthesises 33 behavioural theories and 128 constructs into a single comprehensive framework comprising 14 behavioural domains (Michie et al., 2005; Cane et al., 2012) (Table 2.2). The framework enables systematic exploration of barriers and facilitators influencing healthcare professionals' behaviours across cognitive, social, motivational, and environmental dimensions. Unlike single-theory approaches, the TDF provides a more comprehensive framework and has been widely applied in healthcare implementation research for investigating complex healthcare professional behaviours and service implementation challenges (Atkins et al., 2017).

The TDF has been employed in systematic and scoping reviews as a coding framework to categorise barriers and facilitators influencing healthcare behaviours, including pharmacists' integration into ward-based multidisciplinary care teams (Hatton et al., 2021). Several studies have also demonstrated its utility in understanding and measuring behavioural determinants within pharmacy practice. For example, in Qatar, El Hajj et al. (2022) used a TDF-informed questionnaire to examine factors influencing CPs' participation in adult vaccination services, enabling the identification of key behavioural and environmental determinants associated with service provision. Similarly, a study in Northern Ireland applied the TDF to explore barriers and facilitators affecting CPs' provision of medication adherence support for older adults, demonstrating the framework's usefulness in systematically investigating pharmacist behaviours related to patient-centred services (Patton et al., 2021). Similarly, in Türkiye, Ucar Yaman et al. (2025) developed and psychometrically evaluated a TDF-based questionnaire assessing CPs' provision of pharmaceutical care services for breastfeeding women, providing evidence that TDF domains can be successfully operationalised into valid and reliable measurement instruments within pharmacy settings.

Further study supports the predictive utility of TDF-based instruments in pharmacy practice. A mixed-methods study involving 240 pharmacy professionals working in community drug retail outlets in Addis Ababa, Ethiopia demonstrated that TDF-derived behavioural determinants explained 62.0% of the variance in antimicrobial dispensing behaviour. Domains related to professional role and identity, behavioural regulation, emotions, and social influences, emerged as significant

predictors of dispensing practices, indicating that TDF constructs can explain actual professional behaviour beyond merely describing attitudes or perceived barriers (Muhammed et al., 2025).

These studies provide empirical support for the application of the TDF across diverse pharmacy services, including vaccination services, medication adherence support, pharmaceutical care, and antimicrobial stewardship. Moreover, the studies indicate that TDF-based instruments can be translated into measurable constructs with acceptable psychometric properties and, in some cases, predictive capability. Therefore, the TDF was considered particularly appropriate for the present study, as it offers comprehensive theoretical coverage of behavioural determinants and provides a robust foundation for the development and preliminary validation of a theory-informed instrument to assess CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

Table 2.2
Theoretical Domains Framework

TDF Domain	Definition
Knowledge	Awareness of the existence of something
Skills	An ability or proficiency acquired through practice
Social/professional role and identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting
Belief about capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put into constructive use
Optimism	The confidence that things will happen for the best or that desired goals will be obtained
Belief about consequences	Acceptance of truth, reality, or validity about outcomes of behaviour in a given situation
Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and given stimuli
Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way
Goals	Mental representations of outcomes or end-state that an individual wants to achieve
Memory, attention, and decision processes	The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives
Environmental context and resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour
Social influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviour
Emotions	A complex reaction pattern, involving experiential, behavioural, and physiological elements by which the individual attempts to deal with a personally significant matter or event
Behavioural regulation	Anything aimed at managing or changing objectively observed or measured actions

Note/Source: Adapted from Atkins et al. (2017)

The COM-B model complements the TDF by categorising the 14 TDF domains into three components: Capability, Opportunity, and Motivation (Cane et al., 2012; Michie et al., 2011). Each TDF domain maps directly onto one of these components, enabling a systematic exploration of the psychological, social, and environmental factors of behaviour (Table 2.3). Both frameworks have been widely validated and applied in pharmacy research. This includes studies on naloxone dispensing (Varisco et al., 2020) and information exchange during over-the-counter consultations in community pharmacy (Seubert et al., 2017). Applying both frameworks ensures theoretical rigour, explanatory depth, and bridges the gap between descriptive findings and actionable behavioural insights (Public Health England, 2020).

The COM-B model was selected because it provides a simplified and practical behavioural structure that facilitates interpretation of the detailed TDF findings and supports translation of behavioural determinants into intervention and implementation strategies. Within this study, the TDF domains were conceptually mapped onto the COM-B components, enabling integration of detailed behavioural exploration with broader behavioural interpretation. Therefore, the combined use of TDF and COM-B was considered appropriate for this study because it allowed comprehensive identification of behavioural determinants while simultaneously providing an overarching framework to understand how these determinants collectively influence CPs' involvement in pre-travel pharmacist consultations for Hajj and Umrah pilgrims. This integrated approach strengthened the theoretical coherence of the study and supported development of theory-informed recommendations and the proposed stakeholder-informed framework.

Table 2.3
The TDF Domains Linked to COM-B Components

COM-B component		TDF domain[a]
Capability "The individual's psychological and physical capacity (including necessary knowledge and skills) to engage in the activity concerned"	*Psychological* Knowledge or psychological skills, strength or stamina to engage in the necessary mental processes	Knowledge Skills Memory, Attention, and Decision Processes Behavioural regulation
	Physical Physical skill, strength, or stamina	Skills
Opportunity "All the factors that lie outside the individual that make the behaviour possible or prompt it"	*Social* Opportunity afforded by interpersonal influences, social cues, and cultural norms that influence the way that we think about things, for example, the	Social Influences

COM-B component		TDF domain[a]
	words and concepts that make up our language	
	Physical Opportunity afforded by the environment involving time, resources, locations, cues, and physical 'affordance'	Environmental Context and Resources
Motivation "All those brain processes that energise and direct behaviour, including habitual processes, emotional responding, and analytic decision-making"	*Reflective* Reflective processes involving plans (self-conscious intentions) and evaluations (beliefs about what is good and bad)	Social/Professional Role and Identity Beliefs about Capabilities Optimism Beliefs about Consequences Intentions Goals
	Automatic Automatic processes involving emotional reactions, desires (wants and needs), impulses, inhibitions, drive states, and reflex responses	Social, Professional Role, and Identity Optimism Reinforcement Emotion

Notes/Sources: Adapted from Cane et al. (2012) and Michie et al. (2014).

2.7 Chapter Summary

This chapter has critically synthesised the existing literature regarding travel health and CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The review established that while the health risks and medication-related challenges faced by pilgrims are well documented, the structured pre-travel services required to mitigate these risks are underdeveloped. Specifically, within the Malaysian context, CPs' involvement in supporting pilgrims' travel health is currently limited and fragmented.

While international research highlights the expanding roles of CPs in vaccination and travel health services, these practices have not yet been systematically developed or evaluated for the unique requirements of the Hajj and Umrah pilgrimages. Furthermore, the existing studies are mainly descriptive and lack a theoretical foundation to explain the beliefs and factors influencing CPs' engagement. To date, no Malaysian study has applied a theory-informed framework such as the TDF or the COM-B model to elucidate the factors underpinning CP involvement in these consultations.

These gaps informed the design of the present research, which uses a multiple study approach underpinned by the TDF. Study 1 (scoping review) identifies existing evidence and theoretical domains related to CPs' practices and beliefs in pre-travel health services. Study 2 (qualitative study) explores Malaysian CPs' practices and

beliefs in pre-travel pharmacist consultations for the pilgrims. Study 3 (quantitative study) develops, validates, and administers a survey instrument to assess key practices, beliefs and factors that influence these practices across a broader population of CPs. Collectively, these studies address the empirical knowledge gaps identified in this review. The next chapter discusses the research methodology involved across the three studies.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design and methodological approaches used to uncover the practices and beliefs of CPs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. To achieve a comprehensive understanding, this research utilised the TDF across three studies. Study 1 was a scoping review that analysed current practices and factors (barriers and facilitators) influencing pre-travel health services; Study 2 comprised a qualitative study exploring CPs' practices and salient beliefs concerning consultations for pilgrims; and Study 3 comprised the development and validation of a survey instrument, followed by a cross-sectional survey to assess the practices and beliefs of CPs regarding these constructs in a larger population. By integrating both qualitative and quantitative methodologies, this research combined the respective strengths of qualitative and quantitative methodologies to provide a more thorough, theoretically informed understanding of the research problem. Guided by the TDF and the COM-B model, these multiple studies ensure theoretical coherence across the entire research process. Essentially, the scoping review established the evidence-base, the qualitative study explored underlying beliefs, and the quantitative study operationalised these beliefs into measurable constructs, thereby providing both depth and breadth of insight (Figure 3.1).

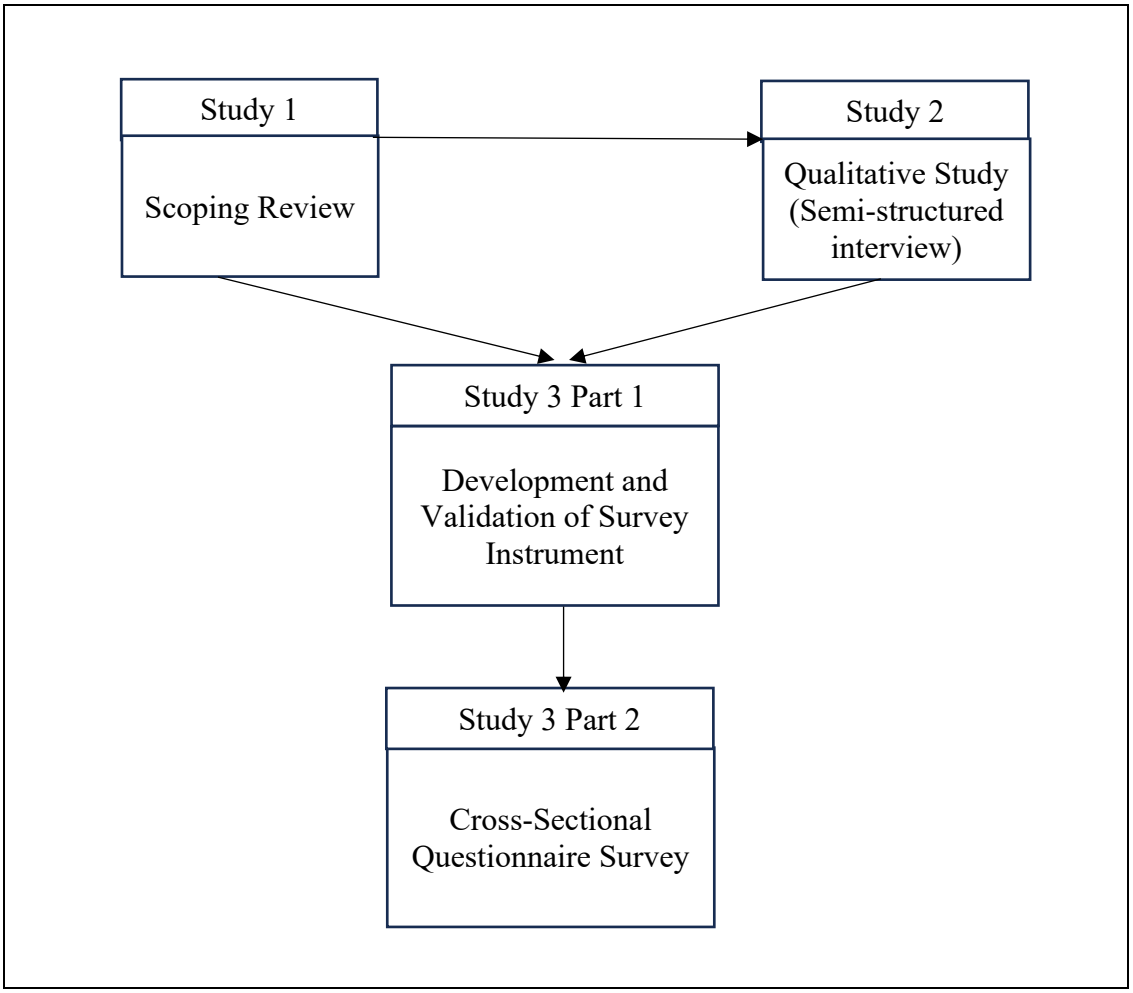


Figure 3.1 Overall Research Flowchart for Study 1, 2 and 3

3.2 Study 1: Scoping Review of Practices, Barriers and Facilitators to the Delivery of Pre-Travel Health Services by Community Pharmacists Using the Theoretical Domains Framework

Study 1 involved a scoping review examining international evidence on pre-travel health services provided by CPs and was not restricted specifically to services for Hajj or Umrah pilgrims. The broader travel health literature was reviewed to identify existing evidence regarding CPs' practices, beliefs, barriers, and facilitators related to pre-travel healthcare provision. This broader evidence base subsequently informed the exploration of the Hajj and Umrah pilgrimage context in the later phases of the study. This review followed the five-stage methodological framework for conducting a scoping review proposed by Arksey and O'Malley (2005) as well as the recommendations of Levac et al. (2010). This approach is suitable when the objective

is to explore the extent, range, and nature of the evidence, identify gaps, or clarify key concepts, rather than assess study quality or provide a narrow answer to a focused research question. Furthermore, to enhance the rigour and transparency of the original framework, several recommendations were adapted from Levac et al. (2010). These recommendations included refining the research question, using a team-based approach for study selection, and balancing comprehensiveness with feasibility. In addition, the review procedures were informed by the Joanna Briggs Institute (JBI) guidance for scoping reviews (Peters et al., 2020), which provides detailed recommendations for developing eligibility criteria, constructing comprehensive search strategies, conducting systematic study selection, charting data, and synthesising evidence transparently. The JBI guidance further emphasises alignment between the review objectives, review questions, inclusion criteria, and evidence mapping process to ensure methodological consistency throughout the review.

The first stage involved identifying the research question. The research question guiding this review was "What are the practices, barriers and facilitators influencing CPs' provision of pre-travel health services?" Stages two and three involved searching for and identifying relevant studies. Stages four and five involved qualitative synthesis, including piloting, conducting data extraction, and collating the study data. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist was used to assist in the reporting of this study (Appendix 2) (Tricco et al., 2018). In this study, the scoping review was selected as the research approach to identify the current contexts and concepts in studies reporting CP-provided pre-travel health services, as well as the conduct of those studies (Munn et al., 2018). This would allow the identification of knowledge gaps in the area and, consequently, inform the need for future studies.

3.2.1 Search Strategy

The relevant primary studies were identified using an adapted JBI three-step search strategy for systematic reviews (Peters et al., 2015). An initial search strategy was employed using a single medical database, PubMed. A list of relevant articles, the index terms, and Medical Subject Headings (MeSH) was identified (Table 3.1). Then, the JBI mnemonic (Population, Concept, and Context (PCC)) was utilised to finalise the search strategy for the review.

Table 3.1
Summary of Search Terms

	Keywords (MeSH terms and text words)
Population	Pharmacists
Concept	Travel health, travel medicine, pre-travel, travel-related illness
Context	Community pharmacy

Subsequently, a systematic search of peer-reviewed articles was conducted across four electronic databases: PubMed, Science Direct, Scopus, and Web of Science, from inception to 6th February 2023. The complete electronic search strategies are presented in Appendix 3. The database search was limited to original research articles published in English, regardless of the study design. Additional papers were sought using Google Scholar. The first 20 pages of search results (200 references) ranked by relevance were reviewed (Haddaway et al., 2015). In addition, a manual search of two travel medicine-focused journals, the Journal of Travel Medicine (Oxford University Press, 2023), and Travel Medicine and Infectious Disease (Elsevier B.V., 2023) was conducted. The two journals were selected as they are the top two travel medicine journals based on their impact factors according to the Journal Citation Reports. Moreover, these two journals represent travel medicine organisations, i.e., ISTM, Latin America Society for Travel Medicine, and Travel Medicine and Global Health (DTG) (LaRocque & Jentes, 2011). The reference list of each full-text article included in this study was screened manually. When the reference lists of these articles contained review articles, studies included in the reviews were also screened.

3.2.2 Study Selection

The study screening was conducted in two sequential stages, initially assessing titles and abstracts. Subsequently, the review of the full texts was based on the inclusion and exclusion criteria. The PCC framework served as an eligibility criterion, and the most pertinent papers were selected by screening them using the scoping review's research question (Peters et al., 2015).

The inclusion and exclusion criteria are presented in Table 3.2. Studies were eligible for inclusion if they reported one or more aspects related to CPs' involvement in pre-travel health services, including practices, beliefs, barriers, facilitators, perceptions, or experiences. Information on pre-travel health services provided by CPs, including pre-travel health assessments, vaccinations, prescription dispensing, and the

provision of patient education and advice, was extracted and synthesised. Studies focusing exclusively on non-pharmacist healthcare professionals, non-travel-related healthcare services, or unrelated pharmacy practice settings were excluded from the review. All references were stored in EndNote 20™, which was used as the reference manager software to remove duplicate search results. In the first stage of the screening process, the titles and abstracts were screened independently by the primary researcher (NAK) and an independent research assistant with a master's degree to enhance screening consistency and minimise selection bias.

Studies that did not meet the eligibility criteria, such as those discussing unrelated topics or written in languages other than English, were excluded. Although scoping reviews may include broader evidence sources such as grey literature, theses, and expert opinion papers, the present review focused on peer-reviewed primary research articles to ensure methodological consistency, sufficient empirical detail, and comparability of findings across studies. Review articles were excluded because the objective of the review was to synthesise original empirical evidence rather than secondary interpretations of existing literature. Study protocols, editorials, and expert opinion papers were excluded because they did not provide complete empirical findings relevant to the review objectives. Any uncertainty regarding article exclusion was resolved through discussion and consensus among the research team members. Following this, the full texts of all included papers were retrieved and examined against the pre-determined eligibility criteria. A manual search for publications that met the inclusion criteria was then conducted in Google Scholar, including the identified articles' bibliographies, and articles from the aforementioned travel medical journals. The PRISMA flow chart (Figure 4.1) illustrates the study selection procedure.

Table 3.2
Eligibility Criteria for the Scoping Review

	Inclusion	Exclusion
Population	CPs conducted pre-travel health services	Pre-travel health services were conducted by individuals other than CPs
Concept	Practices description, barriers, and facilitators to provide pre-travel health services reported by CPs	Practices, barriers, and facilitators to provide pre-travel health services reported by patients, doctors, nurses, or other health professionals
Context	Community pharmacy providing pre-travel health services	Inpatient pharmacy services and pre-travel health services conducted in non-community pharmacy settings
Sources of evidence	Year of publication: All years Language: English Type of publication: Research articles	Study protocols, grey literature, theses, review articles, editorials, expert opinion papers

3.2.3 Data Extraction and Analysis

A standardised data charting form was developed in Microsoft Excel 2021™. Prior to the application of the data charting form, it was piloted with five research articles to test for its usability. Using the form, the following data were extracted: authors, year of publication, country of origin, study objectives, study design, data collection methods, sampling, study population, and key findings. Correspondingly, the barriers and facilitators were mapped to the 14 domains of the TDF (Appendix 4). When needed, changes were made to the charting tool. Data from the remaining studies were extracted by the primary reviewer and cross-checked by a second reviewer.

3.2.4 Quality Assessment

The Crowe Critical Appraisal Tool (CCAT), version 1.4 (Crowe & Sheppard, 2011) was used to assess the quality of the included studies. The CCAT has been demonstrated to have good reliability (Crowe et al., 2012) and construct validity (Crowe & Sheppard, 2011) and has been reported as suitable for appraising a variety of research study designs (Crowe et al., 2011). Furthermore, the CCAT was selected due to its applicability, comprehensive scope, ease of use and free access. It was selected ahead of other tools such as Critical Appraisal Skills Programme (CASP) Checklists, and Mixed Methods Appraisal Tool (MMAT), which are suited to study design-specific evaluations rather than heterogeneous study designs as in this scoping review study. The tool evaluated eight categories for every paper: preliminaries, introduction, research design, sampling, data collection, ethical matters, results, and discussion. Subsequently, item descriptions that are classified as present, absent, or not applicable make up each category.

The assessment involved scoring each category objectively (tick boxes) and subjectively (on a scale from 0 [not evident] to 5 [most evident]). The total score for each study (ranging from 0 to 40) is presented as a percentage (0.0–100.0%). For example, a score of 60.0% (24 out of 40) represents a moderate level of methodological quality or reporting, suggesting that while several key features were present, they were not comprehensively addressed. Conversely, a score of 80.0% (32 out of 40) denotes a high level of quality, indicating that the majority of the criteria were met and well demonstrated. Scores approaching 100.0% reflect strong methodological rigour and comprehensive reporting, whereas lower scores (e.g., below 50.0%) indicate limited

coverage or weaker evidence. This scoring framework offers a systematic and standardised approach for evaluating and comparing the overall quality and robustness of the included studies. The quality assessment was conducted independently by an independent researcher. Any disagreements between the reviewers regarding the scoring results were resolved and discussed with another researcher (the supervisor) to reach a consensus. In this review, the quality assessment of studies aimed to evaluate the quality of existing papers in the area and was not used as a criterion for selecting articles for the review.

3.3 Study 2: A Qualitative Exploration of Community Pharmacists' Practices and Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

3.3.1 Study Design

A qualitative study was conducted using semi-structured interviews to explore CPs' practices in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, as well as their beliefs. In particular, this study applied the TDF to formulate the research questions, develop the interview guide, and analyse the data. The TDF served as the coding and interpretive framework, ensuring alignment between theoretical constructs and emergent qualitative themes. The study was conducted in line with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines, and the findings are reported accordingly (Tong et al., 2007) (Appendix 5). Semi-structured interviews were analysed using a hybrid content analysis approach integrating inductive coding and deductive mapping to the TDF. Figure 3.2 displays the research flowchart for Study 2.

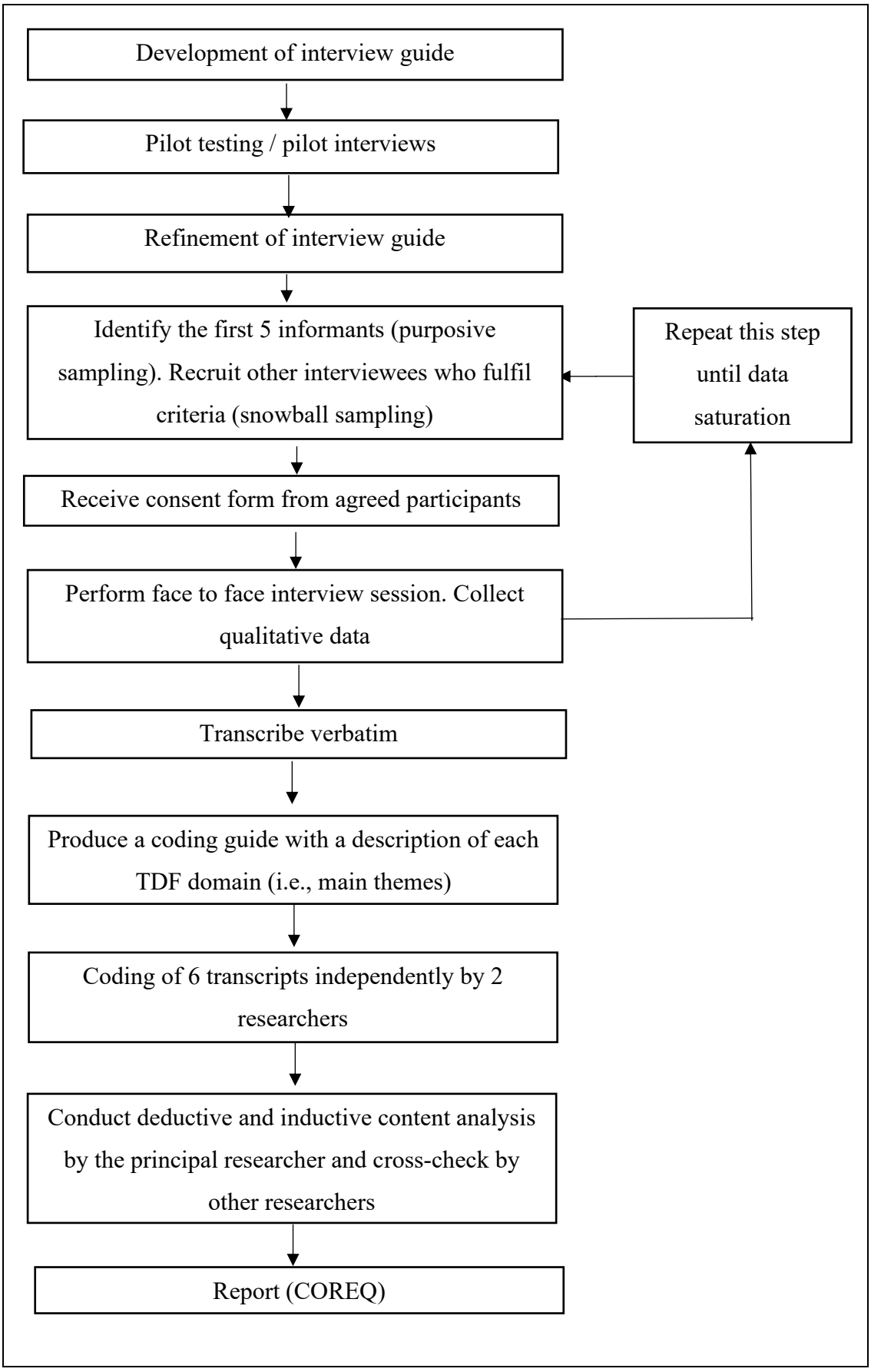


Figure 3.2 Research Flowchart for Study 2

3.3.2 Study Instrument

A semi-structured interview guide and interview protocol were developed using multiple sources to ensure content relevance, comprehensiveness, and methodological rigour. Development of the guide was informed by the literature review, findings from the researchers' scoping review, existing travel health literature, and the TDF. The interview guide was designed to explore CPs' experiences, beliefs, perceived barriers, facilitators, and practices related to pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Additionally, participants completed a demographic profile form to provide necessary demographic data. The interview topic guide was reviewed by two academicians specialising in travel medicine and psychology (Castillo-Montoya, 2016). Following this, the interview topic guide (Appendix 6) underwent a pilot test with five CPs who met the same inclusion criteria as those in the actual study. The purpose of this pilot test was to evaluate the clarity of the questions, the duration of the interviews, and to identify any potential additional probing questions within the guide. However, the data from this pilot sample were not included in the main study analysis. Subsequently, based on the insights gained from the pilot study, necessary revisions were made to refine the interview topic guide.

3.3.3 Settings and Participants

In this study, Selangor and Kuala Lumpur were selected due to their high density of community pharmacies compared to other Malaysian states (Tew et al., 2021) and their large Muslim populations and substantial numbers of prospective Hajj and Umrah pilgrims seeking pre-travel healthcare services. These urban regions represent important community pharmacy practice settings where pilgrims are likely to obtain medications, health advice, and other pre-travel healthcare support. In addition, pilgrims residing outside Selangor and Kuala Lumpur may also access healthcare services within these urban centres during pilgrimage preparation. Consequently, these settings provided a suitable context for examining CPs' involvement in pre-travel pharmacist consultations.

3.3.4 Sampling of Study Informants

CPs were recruited between June and December 2022 using purposive sampling (Atkins et al., 2017), followed by snowball sampling. Purposive sampling was

employed to recruit CPs who were considered capable of providing information-rich insights, who fulfilled predefined inclusion criteria and possessed relevant professional experience aligned with the study objectives. This approach was selected because qualitative inquiry prioritises depth and relevance of information rather than representativeness or random selection. Unlike convenience sampling, which primarily recruits readily accessible individuals, purposive sampling enabled intentional selection of CPs who were actively involved in community pharmacy practice and direct patient consultation, thereby facilitating in-depth exploration of practices and beliefs related to pre-travel pharmacist consultations.

Snowball sampling was subsequently used to complement purposive recruitment by facilitating access to additional eligible participants through professional networks, who may not be easily reached through formal channels. The recruitment process aimed to achieve maximum variation among participants, considering factors such as age, gender, years of experience in the community pharmacy setting, and type of pharmacy (independent or chain). Specifically, the study included full-time registered CPs who actively engaged in direct consultation with pharmacy customers, had at least one year of experience, were proficient in either English or Malay and operated in community pharmacies in Selangor and Kuala Lumpur. Locum and provisionally registered CPs were excluded from the study.

Initially, five participants were purposively selected from the researchers' professional networks to facilitate the identification of eligible CPs with experience in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Purposive sampling was employed to recruit information-rich participants who could provide relevant insights into the phenomenon under investigation. Subsequently, these participants were requested to nominate additional CPs who met the inclusion criteria, consistent with a snowball sampling approach. This combination of purposive and snowball sampling enabled the recruitment of participants with relevant experience while extending recruitment beyond the researchers' immediate professional networks. To enhance the diversity of perspectives, efforts were made to recruit CPs with varying demographic and practice characteristics, including differences in age, years of practice experience, and pharmacy settings. Nevertheless, the recruitment strategy may have resulted in greater participation from CPs who were more professionally engaged or interested in travel health services, and this potential source of selection bias should be considered when interpreting the findings.

Participants were invited to participate in the interview process via telephone, emails, or face-to-face invitations. Upon expressing their willingness to participate, participants received further information regarding the study before providing informed consent. Consequently, interview appointments were scheduled at mutually convenient locations with the interviewer. The data collection process concluded upon reaching data saturation. In this qualitative study, the sample size was not determined using quantitative estimation methods or power calculations, as such approaches do not apply to qualitative research. Instead, the number of CP informants was guided by the principle of data saturation. Recruitment of study informants continued until data redundancy was observed and the research questions were sufficiently addressed. At this stage of data collection, it was evident that additional interviews were unlikely to yield new or meaningful insights (Guest et al., 2006).

3.3.5 Data Collection

The interviews were conducted face-to-face from July to December 2022 at the CP's workplace in their consultation or meeting room. Prior to the interview sessions, all CPs provided written, informed consent, and agreed to the audio recording of the interviews. The interviews, which lasted between 25 and 93 minutes, were conducted in English or Malay, according to each informant's preferred language, and were conducted in a single session without any repeat interviews. Field notes were taken during the interviews to capture the informants' ideas and facilitate appropriate probing during the interview. To acknowledge their participation, participants were offered an honorarium of MYR 50 (~ USD 10.5) to offset related expenses. The qualitative interviews were conducted by a researcher who is a practising pharmacist and has received training in qualitative interviewing and data analysis.

3.3.6 Interview Data Management

Following the interviews, the audio recordings were transcribed verbatim and subsequently anonymised, and the transcriptions were cross-referenced with the original audio recordings to ensure accuracy. Transcripts were returned to informants for comment or correction. Correspondingly, the transcripts were uploaded to NVivo™ version 12 (QSR International Pty Ltd) to facilitate data management during analysis. At the same time, qualitative content analysis was employed to analyse the data.

3.3.7 Data Analysis

The qualitative content analysis process involved repeatedly listening to the audio recordings and reviewing the interview transcripts multiple times to enable the researcher to get familiarised with the content. Following the recommended data analysis procedures described by Elo and Kyngäs (2008), Mayring (2014), and Zhang and Wildemuth (2009), a hybrid content analysis approach integrating inductive and deductive approaches was employed. To ensure coding consistency, a code book was developed and maintained throughout the analysis process (Appendix 7).

Initially, inductive content analysis was conducted to identify and classify CPs' practices and beliefs related to pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Meaningful text segments were identified and assigned preliminary codes. Similar codes were subsequently grouped into categories and subcategories to generate broader patterns within the data. In parallel, beliefs relating to pre-travel pharmacist consultations were analysed deductively using the TDF. Emergent codes and categories were systematically mapped to the most relevant TDF domains based on their conceptual definitions.

To enhance coding consistency and analytical rigour, two researchers independently coded and analysed six interview transcripts (25.0%, 6/24). The decision to double-code 25.0% of the transcripts was considered methodologically appropriate and consistent with recommendations in qualitative research, where independent coding of a subset of transcripts is commonly used to assess coding consistency and maintaining analytical feasibility (Miles & Huberman, 1994; Campbell et al., 2013). Coding discrepancies were reviewed and resolved through discussion and consensus. The inter-coder reliability, assessed using percentage agreement was 90.0%, indicating acceptable coding consistency (Miles & Huberman, 1994). Following refinement of the coding framework, the remaining transcripts were analysed using the agreed coding guide. Frequency counts were subsequently conducted to summarise the occurrence of each identified practice and belief across participants.

The coding process followed an iterative progression from raw data to codes, categories, and TDF domains. For example, participant statements describing uncertainty regarding Hajj and Umrah travel health recommendations (e.g., "I'm not aware of any specific guideline at the moment") were initially coded as lack of guideline awareness. Similar codes were grouped under the category travel health knowledge

gaps, which was subsequently mapped to the TDF domain Knowledge. Likewise, statements describing uncertainty regarding travel medication regulations were coded as uncertainty regarding medication regulations, grouped under the category regulatory confidence issues, and mapped to the TDF domain Beliefs about Capabilities. This iterative process ensured that the findings remained grounded in participants' narratives while facilitating theory-informed interpretation of behavioural determinants. A code book was developed and maintained as part of the audit trail to enhance transparency, dependability, and external appraisal of the analytical process (Appendix 7).

Although Cohen's kappa is frequently recommended as a measure of inter-rater reliability because it accounts for chance agreement, percentage agreement was considered more appropriate for the present study due to the interpretive nature of the qualitative analysis. The coding process involved both inductive identification of emerging concepts and deductive mapping of data to the TDF, allowing multiple codes to be assigned to the same text segment where appropriate. Such overlapping and context-dependent coding structures may limit the suitability of statistical measures designed primarily for mutually exclusive categorical data (O'Connor & Joffe, 2020). Furthermore, the primary objective of double-coding was not to establish statistical reliability but to enhance coding consistency, refine code definitions, and improve analytical transparency.

3.3.8 Ensuring the Study Process's Trustworthiness

According to Lincoln and Guba (1985), trustworthiness in qualitative research can be achieved through four primary criteria: credibility, dependability, confirmability, and transferability. Credibility refers to the degree of confidence in the accuracy and authenticity of the data and its interpretations. In this study, credibility was established through prolonged engagement with participants and member checking. Dependability refers to the stability and consistency of the research process over time and was addressed through the maintenance of a comprehensive audit trail documenting methodological decisions, interview procedures, coding activities, and analytical processes, thereby enabling transparency and external appraisal of the study's procedural consistency.

Member checking was conducted to enhance the credibility of the qualitative findings. Following transcription, interview transcripts were returned to all 24

participants via email and messaging platforms to review, comment, and correction to ensure that their views and experiences had been accurately captured. Six participants responded to the member-checking process. Those who responded generally confirmed that the transcripts accurately reflected their views and experiences. Minor amendments were made to several transcripts, primarily involving clarification of wording, grammatical expressions, and profession-specific terminology. No major factual disagreements or requests for substantial modification or removal of content were reported.

Although the response rate for member checking was limited, this is not uncommon in qualitative studies involving practising healthcare professionals with demanding work commitments. Importantly, the feedback received supported the accuracy of the transcripts and the credibility of the interpretations. Trustworthiness was further strengthened through reflexive journaling, supervisory debriefing, iterative review of coding decisions, maintenance of an audit trail, and prolonged engagement with the data throughout the analytical process. Formal participant validation of the final thematic interpretations was not conducted. Nevertheless, member checking contributed to ensuring that the interview data reasonably reflected participants' intended perspectives and experiences.

Confirmability refers to the extent to which research findings are grounded in participants' accounts rather than influenced by researcher bias. In this study, confirmability was enhanced through reflexive journaling, supervisory review, and maintenance of an audit trail. Reflexive journaling provided a systematic record of methodological decisions, analytic reflections, evolving interpretations, personal assumptions, emotional responses, and potential sources of bias throughout participant recruitment, data collection, and analysis.

Reflexivity was undertaken throughout the study to acknowledge and manage the researcher's potential influence on the research process and interpretation of findings. As the principal researcher was a practising pharmacist with experience in pharmacy practice and an interest in travel health services, it was recognised that prior knowledge, professional experiences, and assumptions could influence data collection and analysis. Therefore, the researcher occupied an insider position relative to the participants. While this insider status facilitated rapport, trust, and contextual understanding of pharmacy practice, it also introduced the potential for researcher bias. Shared professional experiences and familiarity with pharmacy practice contexts could

lead to assumptions regarding participants' meanings, reduce opportunities for clarification of similar concepts, or influence interview probing. For example, some participants used profession-specific terminology or described routine pharmacy practices with limited elaboration, assuming a shared understanding with the interviewer. To minimise these influences, reflexive journaling was used to identify and challenge assumptions and to encourage clarification and deeper exploration of participants' perspectives during interviews.

The researcher also considered the possibility of social desirability bias, particularly when participants discussed professional responsibilities, adherence to guidelines, or perceived limitations in practice. Participants may have modified their responses to align with perceived professional expectations when discussing their practices with a fellow pharmacist. To address this possibility, efforts were made to maintain a neutral interviewing approach, minimise judgmental verbal and non-verbal responses, and encourage open discussion of both positive and challenging experiences.

During data analysis, reflexive journaling facilitated critical reflection on how the researcher's professional experiences, values, and assumptions might influence the interpretation of participants' narratives, particularly those relating to workload pressures, organisational constraints, and professional role expectations. Maintaining awareness of these influences was important during the transition from inductive coding to deductive mapping using the TDF. Consistent with Lincoln and Guba's (1985) concept of confirmability, reflexive journaling, maintenance of an audit trail, supervisory review of coding decisions, and regular discussions within the research team were undertaken to ensure that interpretations remained grounded in participants' accounts rather than the researcher's preconceptions.

Transferability refers to the extent to which findings may be applicable to other contexts. Although qualitative research does not seek statistical generalisation, transferability was supported through thick descriptions of the study setting, participant characteristics, and data collection procedures. These contextual details enable readers to determine the relevance of the findings to comparable professional, organisational, or cultural settings.

3.3.9 Ethical Considerations

The study underwent review and approval by the Research Ethics Committee at the Faculty of Pharmacy, Universiti Teknologi MARA, Malaysia (REC/02/2022 (PG/MR/12) (Appendix 8) and was registered with the National Medical Research Register (NMRR ID-22-01207-MLA).

All participants received a detailed participant information sheet describing the study purpose, confidentiality, and the voluntary nature of participation. In line with this, written informed consent was obtained prior to data collection, and participants were assured of their right to withdraw at any time without penalty.

All digital recordings, transcripts, and related documents were securely stored in a password-protected, access-restricted computer. Access was restricted to the principal researcher and supervisory team only. Importantly, data will be retained for five years after the completion of the study in accordance with institutional data management policy.

3.4 Study 3: Assessment of Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur

This study applied a quantitative method to address its objectives. Study 3 comprised two phases: instrument development and validation, and cross-sectional questionnaire survey, allowing progression from theoretical construct development to empirical measurement. Figure 3.3 illustrates the overview of the study design.

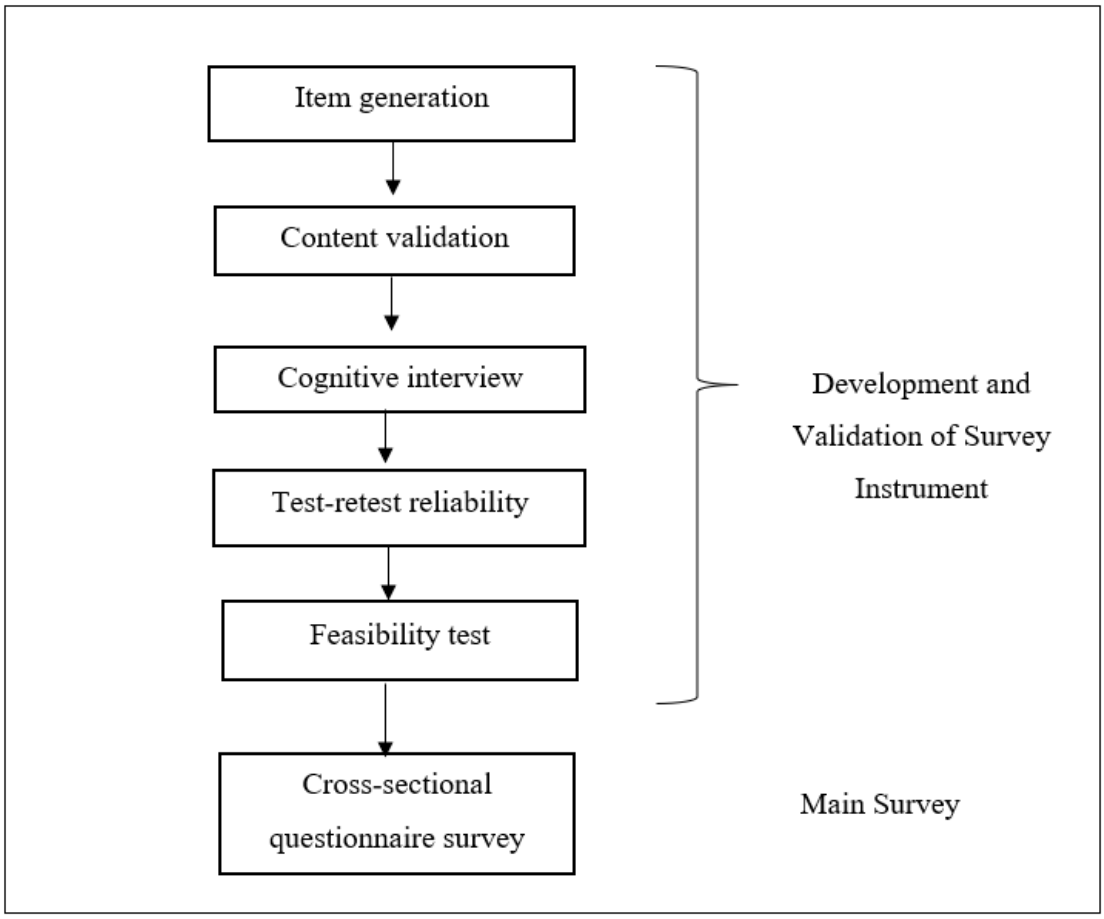


Figure 3.3 Research Flowchart for Study 3

3.4.1 Phase 1: Development and Validation of the Survey Instrument

The development and validation of the survey instrument followed a structured, multi-phase process adapted from an established guideline (Boateng et al., 2018). This process comprised five key steps: (1) item generation, (2) content validation, (3) cognitive interviews, (4) reliability testing, and (5) feasibility testing. In particular, item generation (Step 1) was conducted by the research team. Meanwhile, content validation (Step 2) involved a panel of purposively selected subject matter experts. CPs who were proficient in English and had at least one year of experience practicing community pharmacy were the subjects of cognitive interviews (Step 3), reliability testing (Step 4), and the feasibility test (Step 5). However, pharmacists with provisional registration or those in managerial roles without direct patient care were excluded. The eligibility criteria for Steps 3 - 5 were intentionally aligned with those planned for the main cross-sectional survey.

3.4.1.1 Step 1: Item Generation

Item generation was conducted by the research team. It was informed by findings of the scoping review i.e., Study 1 (Abdul Kadir et al., 2023) and the qualitative phase of the present study i.e., Study 2 (Kadir et al., 2025), which explored CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, complemented by theoretical considerations of the TDF (Atkins et al., 2017; Cane et al., 2012; Huijg et al., 2014). The use of qualitative data aimed to ensure that the items were contextually salient, grounded in real-world practice, and reflective of CPs' actual experiences and perspectives.

In this study, pre-travel pharmacist consultation was defined as pharmacist care activities provided by CPs during consultations with prospective travellers in community pharmacy settings, including assessing medication-related issues, providing tailored health education, dispensing medications, and other relevant services. This operational definition was informed by broader concepts of pre-travel consultation and travel medicine described by Chen & Hochberg (2024) and existing travel health literature, which emphasise risk assessment, preventive care, medication management, and traveller education as key components of pre-travel healthcare.

Prospective Hajj and Umrah pilgrims were defined as customers who seek consultation from CPs for travel-related health needs prior to their departure to Saudi Arabia to perform Hajj or Umrah. This definition was operationally defined for the purpose of the present study to reflect the target population relevant to pilgrimage-related pre-travel pharmacist consultations (Ministry of Health, Kingdom of Saudi Arabia, 2024; World Health Organization, 2012).

The newly developed survey instrument comprised two sections: (i) practices related to the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, and (ii) beliefs informed by domains from the TDF. Both sections were designed using a formative measurement model, in which each item contributes uniquely to the overall construct. In this approach, the items are not expected to exhibit internal consistency, as each represents a distinct facet of the construct rather than reflecting a single underlying latent variable (Diamantopoulos & Siguaw, 2006).

(a) Part 1. Practices Related to the Provision of Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Seven key consultation activities identified from the qualitative study and supported by findings from the scoping review, formed the basis of the practice domain. The qualitative study provided context-specific insights regarding the consultation practices performed by Malaysian CPs, while the scoping review contributed broader evidence regarding internationally reported travel health activities, barriers, and facilitators relevant to community pharmacy practice. Integration of findings from both study phases ensured that the instrument captured both locally contextualised practices and evidence-informed travel health service components. The response format for this section consisted of a binary (Yes/No) format to capture the presence or absence of these practices.

(b) Part 2. Beliefs Informed by Domains from the TDF

The belief items were developed deductively from the TDF and informed by salient themes identified in the qualitative study. To support theory-informed questionnaire development and subsequent behavioural interpretation, the TDF domains underpinning the belief items were also mapped to the COM-B model, which conceptualises behaviour as the interaction between capability, opportunity, and motivation (Michie et al., 2011). This dual-framework approach enabled systematic organisation and behavioural interpretation of determinants influencing CPs' involvement in pre-travel pharmacist consultations and supported interpretation of barriers and facilitators identified across the study phases. Furthermore, each belief item was constructed as a statement and rated using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

3.4.1.2 Step 2: Content Validity

Questionnaire development typically involves several sequential steps, including item generation, content validation, face validation or cognitive interviewing, construct validation, reliability assessment, and feasibility or pilot testing (Boateng et al., 2018). In the present study, emphasis was placed on establishing content relevance,

clarity, stability, and feasibility during this preliminary phase of instrument development.

Construct validity using exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) was not prioritised in the present study because the instrument was developed as a formative, theory-informed measure grounded deductively in the TDF. Unlike reflective measurement models, formative items are intended to capture distinct items contributing to a construct and are not assumed to represent interchangeable manifestations of an underlying latent variable (Coltman et al., 2008). Consequently, traditional latent variable modelling approaches such as EFA and CFA may be less appropriate for evaluating formative constructs (Hair et al., 2019). Instead, the present study prioritised expert review, cognitive interviewing, test–retest reliability, and feasibility assessment to ensure conceptual relevance, content coverage, item clarity, and temporal stability prior to broader psychometric evaluation in future studies.

The initial items were reviewed by a panel of experts to establish content validity, defined as the extent to which a measure adequately represents the intended domain (Boateng et al., 2018). This study employed the Item Content Validity Index (I-CVI) to evaluate the relevance of individual items based on expert judgement (Yusoff, 2019). Established guidelines suggest involving between 3 and 10 (Lynn, 1986) or 5 and 10 experts (Zamanzadeh et al., 2015) to ensure sufficient control over chance agreement. Specifically, expert selection was guided by criteria such as willingness to participate, content expertise, heterogeneity, and years of experience (Polit & Beck, 2006; Powell, 2003).

Eleven experts were invited to participate in the review process, of whom eight completed the evaluation. The panel comprised five academicians specialising in pharmacy practice, community pharmacy, or survey instrument methodology; one academic researcher with expertise in implementation science and TDF studies; and two full-time CPs. This diverse composition ensured the heterogeneity necessary for robust content validation, incorporating both theoretical and practical perspectives.

Accordingly, experts rated the relevance of each item using a 4-point scale: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, and 4 = highly relevant. The I-CVI for each item was calculated by dividing the number of experts who rated the item as “3” or “4” (indicating relevance) by the total number of experts (Polit & Beck, 2006). Generally, an I-CVI score of ≥0.78 was considered acceptable for the eight experts

involved as per established standards (Lynn, 1986). In contrast, items scoring below this threshold were revised or removed based on expert feedback. Scale-level content validity index (S-CVI) was also calculated to evaluate the overall content validity of the instrument. The S-CVI was determined by using the average approach (S-CVI/Ave), calculated as the average of all I-CVI values for the practice and belief domains. An S-CVI/Ave exceeding 0.90, indicate excellent overall content validity and strong agreement among the expert panel (Polit & Beck, 2006). In addition to relevance ratings, experts were also requested to provide qualitative feedback on item clarity and wording through open-ended responses. These insights were used to guide further refinements, ensuring that the items were conceptually appropriate, clearly phrased and easily interpretable by the target population.

3.4.1.3 Step 3: Cognitive Interviews

Cognitive interviews are a qualitative method used to evaluate survey instruments by exploring how respondents understand and respond to individual items (Collins, 2003). They are commonly used to identify issues such as unclear wording, ambiguity, or misinterpretation that may affect the validity of an instrument (Willis, 2004). In addition, two main approaches are typically employed: the think-aloud protocol and verbal probing, with the latter involving follow-up questions to assess participants' comprehension and reasoning (Beatty & Willis, 2007).

In this study, the verbal probing technique was employed. The draft survey instrument was administered to a group of CPs, who were subsequently interviewed by the researcher. Participants were asked to reflect on their understanding of each questionnaire item, and additional probing questions were used to explore the rationale behind their responses and identify any issues related to wording, interpretation, or relevance. Following this, feedback obtained through this process informed the refinement of survey items to enhance clarity, contextual appropriateness, and alignment with the study objectives. As such, a sample size of 10 to 30 participants is commonly recommended for face validation exercises (Yusoff, 2019) and was therefore considered acceptable for this study.

3.4.1.4 Step 4: Reliability Test

Reliability refers to the extent to which an instrument produces consistent and stable results under comparable conditions (Bolarinwa, 2015). It is a fundamental aspect of psychometric evaluation that contributes to the overall robustness of a measurement tool. Common reliability assessments include internal consistency (e.g., Cronbach's alpha), inter-rater reliability, and test-retest reliability. While Cronbach's alpha assesses the degree of correlation among items within a scale, it is appropriate only for reflective measurement models, where items are assumed to represent manifestations of a single underlying construct.

In this study, both the practices and beliefs sections of the instrument were designed using a formative measurement model, in which each item captures a unique and essential component of the construct. Accordingly, internal consistency measures such as Cronbach's alpha were not considered appropriate, as inter-item correlations are neither expected nor required. Instead, test-retest reliability was used to assess the instrument's temporal stability, which is considered more suitable for evaluating the consistency of responses to formative constructs over time.

Test-retest reliability was evaluated by administering the survey instrument to a purposive sample of 30 CPs. A sample size of 30 or more participants is considered sufficient for estimating stability and reliability coefficients (Koo & Li, 2016), supporting the adequacy of the sample used in this study. Correspondingly, the survey was completed at two time points, one week apart. Participants involved in the test–retest reliability assessment were informed during recruitment and consent procedures that the questionnaire would be administered again after a one-week interval to assess response stability over time. A one-week interval was selected to minimise recall bias while reducing the likelihood of genuine changes in participants' beliefs or practices supported by previous research indicating that reliability estimates are generally stable over intervals of two days to two weeks (Marx et al., 2003).

The test–retest reliability was assessed to determine the stability of the practice items over time. For binary Practice items (1–7), agreement between test and retest responses was evaluated using Cohen's κ. The κ coefficient ranges from 0.00 to 1.00, with higher values indicating stronger agreement. According to Landis and Koch (1977), values below 0.20 indicate poor agreement, 0.21–0.40 fair agreement, 0.41–0.60 moderate agreement, 0.61–0.80 substantial agreement, and 0.81–1.00 almost

perfect agreement. Meanwhile, for Beliefs items (8–47), test–retest reliability was assessed using single-measure Intraclass Correlation Coefficients (ICC) derived from a two-way mixed-effects model with absolute agreement. In particular, ICC values below 0.50 were interpreted as poor, 0.50 to 0.75 as moderate, 0.75 to 0.90 as good, and above 0.90 as excellent (Koo & Li, 2016).

3.4.1.5 Step 5: Feasibility Test

Following reliability testing, the instrument was prepared in both hardcopy and online formats using the SurveyMonkey™ platform. A feasibility test was conducted to evaluate the practicality of both formats and identify potential logistical and technical challenges prior to large-scale implementation. This process enabled the research team to refine the instrument based on participants' feedback and user experience (Connelly, 2008; Doody & Doody, 2015; Van Teijlingen & Hundley, 2002).

Although pilot study guidelines typically recommend a sample size of 10 to 30 participants or approximately 10.0% of the intended study sample (Browne, 1995; Connelly, 2008; Hill, 1998; Isaac & Michael, 1995), a larger group of 49 CPs from Selangor and Kuala Lumpur was identified through purposive sampling based on characteristics aligned with the study's target population and subsequently approached for participation. Participants were given the option to complete the questionnaire in their preferred format: hard copy or online.

Informed consent was obtained, and participants completed the instrument while providing feedback on its clarity, accessibility, and ease of use. Accordingly, feedback focused on ease of navigation, response format, completion time, and overall user experience. Based on their input, minor refinements were made to optimise clarity and user-friendliness. The instrument was subsequently considered feasible for implementation in the main cross-sectional survey.

3.4.2 Phase 2: Cross-Sectional Questionnaire Survey

Phase 2 applied the validated survey instrument developed and validated in Phase 1 as previously described in Section 3.4.1.

3.4.2.1 Study Design

A cross-sectional survey was conducted over five months, from 1st April to 31st August, 2024, using both a self-administered paper-based questionnaire and an online survey distributed via SurveyMonkey™. Paper-based questionnaires were distributed by the researcher and trained research assistants during visits to eligible community pharmacies in Selangor and Kuala Lumpur. During these visits, potential participants were informed about the study objectives, eligibility criteria, and voluntary nature of participation before being invited to complete the questionnaire. CPs who agreed to participate were provided with the questionnaire together with the participant information sheet and consent form. Completed questionnaires were either returned immediately or collected at a later agreed time. The cross-sectional approach was selected to obtain a snapshot of CPs' practices and beliefs within a defined time frame. At the same time, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement was used as a guideline for reporting this cross-sectional study (von Elm et al., 2007) (Appendix 9).

3.4.2.2 Study Setting

The study was conducted in Selangor and Kuala Lumpur, two densely populated regions in Malaysia with a high concentration of community pharmacies. At the time of the survey, a total of 1,742 CPs were registered in retail pharmacies in these areas (Pharmaceutical Services Programme, 2025). CPs in Selangor and Kuala Lumpur practise across various community pharmacy settings, including independent and chain pharmacies.

3.4.2.3 Study Population

Registered CPs working in community pharmacy settings within Selangor and Kuala Lumpur were invited to participate. Specifically, inclusion criteria required CPs with a minimum of one year of professional practice experience and able to understand and respond in English. However, pharmacists engaged solely in managerial roles and provisionally registered pharmacists were excluded from the study. The sample size

was estimated separately according to the main quantitative objectives, and the largest required sample size was selected as the final target sample.

First, for estimating the proportion of CPs involved in pre-travel pharmacist consultation activities, the single proportion formula was used (Charan & Biswa, 2013).

$$n = Z^2P(1 - P) / d^2 \quad (3.1)$$

where Z = 1.96 for 95% confidence level, P = estimated proportion of CP involvement, and d = margin of error. Based on an estimated proportion of 85.0% from a previous Malaysian study (Kc et al., 2020) and a 5% margin of error:

$n = (1.96)^2(0.85)(0.15) / (0.05)^2$
$n = 196$

After accounting for a 20% non-response or incomplete response rate (Bolarinwa, 2020), the adjusted sample size was 245. Therefore, approximately 245 participants were required for proportion of CPs involved in pre-travel pharmacist consultation activities.

Second, for comparing belief scores between CPs involved and not involved in selected activities, the sample size for comparing two independent means was considered. As no prior study provided expected mean differences and standard deviations for TDF belief scores in this context, a medium effect size was assumed (Cohen's d = 0.50), with 95% confidence level and 80% power. Using the formula for two independent groups:

n per group $= 2(Z\alpha/2 + Z\beta)^2 / d^2$
n per group $= 2(1.96 + 0.84)^2 / 0.50^2$
n per group $= 2(2.80)^2 / 0.25$
n per group $= 62.72$

Thus, approximately 63 participants were required per group, giving a minimum total sample size of 126 participants. After accounting for a 20% non-response or incomplete response rate (Bolarinwa, 2020), the adjusted sample size was 158.

Therefore, approximately 158 participants were required for comparison between involved and non-involved CPs.

Third, for identifying factors associated with involvement using binary logistic regression, the events-per-variable principle was applied. Since up to 23 predictors were considered in the multivariable models, a minimum of 10 outcome events per predictor was used as a rule of thumb. A minimum of 230 outcome events was required. It should be noted that the number of outcome events varied across the activity-specific logistic regression models. For some activities, particularly medication list preparation, the relatively small number of outcome events resulted in lower events-per-variable ratios than the conventional recommendation of 10 events per predictor variable (Peduzzi et al., 1996). However, this recommendation is considered a guideline rather than a strict requirement (Vittinghoff & McCulloch, 2007; van Smeden et al., 2016). Therefore, findings from these models should be interpreted cautiously. After accounting for a 20% non-response or incomplete response rate (Bolarinwa, 2020), the adjusted sample size was 288. Therefore, approximately 288 participants were required for identifying factors associated with involvement in pre-travel pharmacist consultation activities. Based on these considerations, the largest estimated sample size was selected as the target sample size. A total of 323 completed responses were ultimately included in the final analysis.

3.4.2.4 Study Tool

The questionnaire used in this study was developed based on findings from the scoping review i.e., Study 1 (Abdul Kadir et al., 2023), qualitative study i.e., Study 2 (Kadir et al., 2025) and relevant literature on the TDF (Atkins et al., 2017; Cane et al., 2012; Huijg et al., 2014). It was prepared in both paper-based and online formats via SurveyMonkey™ to accommodate various modes of distribution and maximise participation.

The final instrument comprised three main sections. Section 1 captured sociodemographic characteristics (13 items), including age, gender, educational background, and other relevant variables. Meanwhile, Section 2 assessed practices (7 items) related to the types of pre-travel pharmacist consultation activities provided by CPs for prospective Hajj and Umrah pilgrims. Section 3 focused on beliefs (40 items), which were developed based on the TDF. The belief section was organised according

to the 14 domains of the TDF (Atkins et al., 2017; Cane et al., 2012) (Appendix 10). An additional open-ended question was included to collect qualitative feedback. The development and validation process of the questionnaire, including expert panel review, cognitive interviews, test-retest reliability and feasibility testing, is detailed in the 3.4.1 Phase 1: Development and Validation of the Survey Instrument section.

3.4.2.5 Data Collection Procedure

Data collection for the cross-sectional survey was conducted between 1st April and 31st August 2024 by using two approaches: face-to-face (by-hand) distribution and online distribution. A combination of purposive and convenience sampling approaches was employed in this study. Purposive sampling was used to identify eligible CPs practising in community pharmacies within Selangor and Kuala Lumpur, while convenience sampling facilitated recruitment of CPs who were accessible and willing to participate during the data collection period. This combined approach was appropriate, as the survey aimed to obtain broader insights and identify patterns across a larger group of CPs rather than population generalisation.

Purposive sampling was applied in the face-to-face distribution. CPs were identified from a licensing database (Pharmaceutical Services Programme, 2025), and researchers visited selected premises to invite potential participants. CPs were approached through on-site visits to community pharmacies across various town areas. Upon arrival, CPs were screened for eligibility and those who met the study criteria were recruited. Printed copies of the questionnaire were hand-delivered, accompanied by a brief explanation of the study. Participants were allowed to ask questions before completing the questionnaire. This method facilitated targeted recruitment, enhanced completion rates, and minimised the risk of incomplete or misinterpreted responses. Correspondingly, completed questionnaires were collected on-site and securely stored for subsequent data entry and analysis.

For the online survey, questionnaire links were distributed through professional pharmacy networks, pharmacy-related social media groups, and messaging applications commonly used by CPs, including WhatsApp and Telegram. Email invitations were disseminated using publicly available pharmacy contact information and professional networks accessible to the researcher. Although any CP could access the survey link, a series of screening questions was presented at the beginning of the questionnaire. Only

those who passed the screening were permitted to proceed and complete the full survey. At the same time, periodic reminders were sent to increase response rates, and participants were encouraged to complete the questionnaire within the specified timeframe.

Several methodological precautions were implemented to minimise the risk of duplicate responses across paper-based and online survey modes. For the online survey platform, system settings were configured to limit multiple submissions from the same device by monitoring technical identifiers such as IP addresses and email-linked access, without collecting personally identifiable information. Although IP addresses may be considered indirect personal identifiers under data protection regulations, including the Personal Data Protection Act 2010 (PDPA), the IP information in this study was used solely for response verification and duplicate entry screening purposes. The IP addresses were not linked to participants' identities, were not analysed as research data, and were not used to identify individual respondents. All survey responses remained anonymous, and no directly identifiable personal information was collected during the study.

For the paper-based survey, face-to-face administration was conducted in a controlled setting, and a participant log was maintained to ensure that each eligible respondent completed the questionnaire only once. In addition, participants were informed that the survey should be completed via either the paper-based or online format, but not both. Additionally, responses were reviewed during data cleaning to identify potential duplicate entries. These combined procedural and system-level measures were intended to reduce the likelihood of duplicate participation while preserving respondent anonymity.

3.4.2.6 Data Analysis

Survey data were entered and analysed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp. Armonk, NY, USA). Descriptive statistics were used to summarise the demographic characteristics of respondents, with results presented as frequencies and percentages for categorical variables, and as means and standard deviations (SD) for continuous variables. In this study, respondents' involvement in each key activity was measured using binary (Yes/No) responses. The activities were ordered according to the proportion of respondents reporting involvement. For analysis

of the belief items, responses on the five-point Likert scale were collapsed into three categories: “agree” (strongly agree/agree), “neutral,” and “disagree” (strongly disagree/disagree). The belief items were presented as means and SD and were summarised to the domain mean score for each of the 14 TDF domains.

The Pearson’s chi-square test or Fisher’s exact test was used to examine the association between various categorical variables of CPs’ sociodemographic characteristics and their involvement in pre-travel pharmacist consultations. Fisher’s exact test was performed when more than 20% of the cells had an expected count of less than five. Normality of the belief domain mean scores was assessed using the Shapiro-Wilk test, with a p-value below 0.05 indicating non-normal distribution (Mishra et al., 2019). Accordingly, the Mann-Whitney U test was used to compare belief domain mean scores between involved and non-involved CPs.

Multivariable logistic regression analyses were conducted to identify independent predictors of involvement. Seven separate binary logistic regression models were developed, one for each pre-travel pharmacist consultation activity. As multiple predictors were examined across several models, the possibility of Type I error due to multiple statistical testing cannot be excluded. Type I error occurs when a statistically significant association is identified even though no true association exists (i.e., a false-positive result). However, formal adjustment methods such as Bonferroni correction or false discovery rate correction were not applied because the analyses were exploratory and intended to identify potentially relevant behavioural and contextual factors rather than confirm predefined causal relationships. Although multiple-testing corrections can reduce the risk of Type I error, they may increase the risk of Type II error, whereby a true association is incorrectly classified as non-significant (i.e., a false-negative result). In exploratory studies, highly conservative correction methods may therefore reduce the ability to detect potentially meaningful predictors, particularly in areas where limited prior evidence exists. Accordingly, the regression findings were interpreted cautiously by considering the magnitude and direction of the adjusted odds ratios, confidence intervals, consistency with the TDF and COM-B frameworks, and consistency of findings across the different models. The level of significance was set at 0.05.

To build the initial multivariable model, independent variables were identified using univariate logistic regression analysis. A significance level of $p < 0.25$ was used to identify independent variables for inclusion in the multivariable logistic regression

analysis. This approach is recommended to minimise the risk of excluding potentially important variables that would have been missed at a level of $p < 0.05$ (Bursac et al., 2008). Based on the univariate analyses, the independent variables that were potentially associated with the dependent variable were identified. A binary logistic regression analysis was performed with involvement in each pre-travel pharmacist consultation activity as the dependent variable. This outcome variable was dichotomised and coded as 0 = "No" and 1 = "Yes". For categorical independent variables containing more than two categories, k−1 dummy variables were created prior to inclusion in the logistic regression analyses, where k represents the total number of categories within the variable. One category was designated as the reference category, while the remaining categories were compared against this reference group within the regression models. All other dichotomous independent variables were coded 0 = "No" and 1 = "Yes".

The forward likelihood ratio (Forward LR) method was used to develop the multivariable logistic regression models. The Forward LR procedure allows predictors that contribute meaningfully to model performance to enter the model sequentially, thereby reducing the risk of overfitting that may occur when all variables are entered simultaneously. Alternative approaches, including the enter and backward likelihood ratio methods, were considered. However, the enter method was not selected because inclusion of all candidate predictors could increase the risk of multicollinearity, unstable parameter estimates, and overfitting across several activity-specific models. Similarly, backward elimination may retain variables influenced by sample-specific variation and may produce less parsimonious models when predictors are correlated. Nevertheless, it is acknowledged that forward selection methods have recognised limitations, including sensitivity to sampling variation and the possibility of excluding variables that may become important when considered alongside other predictors. To minimise these limitations, model interpretation was not based solely on automated variable selection procedures. Instead, the final models were evaluated using adjusted odds ratios, confidence intervals, model fit statistics, model classification accuracy, and Hosmer–Lemeshow goodness-of-fit statistics and consistency with the TDF and COM-B model.

Classification accuracy was interpreted in relation to the baseline accuracy of the majority outcome category. Because some activities demonstrated imbalanced outcome distributions, relatively high classification accuracy could be achieved by a null model that predicts all cases as belonging to the majority category.

3.4.3 Ethical Considerations

Ethical approval for the study was obtained from the Research Ethics Committee of Universiti Teknologi MARA (REC/02/2024 [PG/MR/85]) (Appendix 11), and the study was registered with the National Medical Research Register of Malaysia (NMRR ID: 24-01806-JTF). Participation was voluntary, and respondents were informed that completing the questionnaire implied consent. In addition, no identifiable personal information was collected, and data were treated with strict confidentiality. All completed questionnaires (hardcopy and digital) and electronic data were anonymised and stored in locked filing cabinets or in a password-protected, access-restricted computer. Access to the data was limited to the principal investigator and the supervisory team only. Research data will be retained for five years following publication of the findings and subsequently destroyed in accordance with institutional data management policy.

3.5 Chapter Summary

Chapter three presented the methodological processes undertaken in this study. In summary, three studies were conducted to answer the research questions. The research began with a scoping review (Study 1) that synthesised existing studies to characterise the practice and the factors (including barriers and facilitators) influencing CPs' involvement in pre-travel health services. This was followed by a qualitative study (Study 2) designed to elicit insights from CPs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Building on these findings, the activities relevant to the consultations were identified. The study also explored CPs' salient beliefs underpinning their engagement in these services, as mapped onto the TDF. Subsequently, the findings from the scoping review and qualitative study, underpinned by TDF, informed the development and validation of the survey instrument (Study 3). This process followed five key steps: (1) item generation, (2) content validation, (3) cognitive interviews, (4) reliability assessment, and (5) feasibility testing. The final study involved administering a cross-sectional survey using this validated instrument to identify key practices, beliefs, and factors influencing the consultations in a larger sample of CPs in Selangor and Kuala Lumpur. The following chapter presents the results derived from the three studies.

CHAPTER 4
RESULTS

4.1 Introduction

This chapter presents the findings from the three studies. Study 1 was a scoping review aimed at analysing the practices and factors influencing pre-travel health services by CPs from existing studies. Study 2 was a qualitative study aimed at identifying the salient practices in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among CPs in Selangor and Kuala Lumpur. The study also explored the beliefs of CPs concerning the consultations. Study 3 aimed to develop, validate, and administer a TDF-informed survey instrument to assess the key practices, beliefs, and factors influencing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among CPs.

4.2 Study 1: Scoping Review of Practices, Barriers and Facilitators to the Delivery of Pre-Travel Health Services by Community Pharmacists Using the Theoretical Domains Framework

4.2.1 Search Results

A total of 3,626 articles were identified from the electronic databases. After removing duplicates and screening titles and abstracts, 36 articles remained for the full-text review. A manual search of the reference lists of the full-text articles, Google Scholar, and the two travel medicine journals identified an additional eight potential articles. However, 32 articles did not meet the eligibility criteria and were therefore excluded. Overall, 12 articles were included in this scoping review (Figure 4.1).

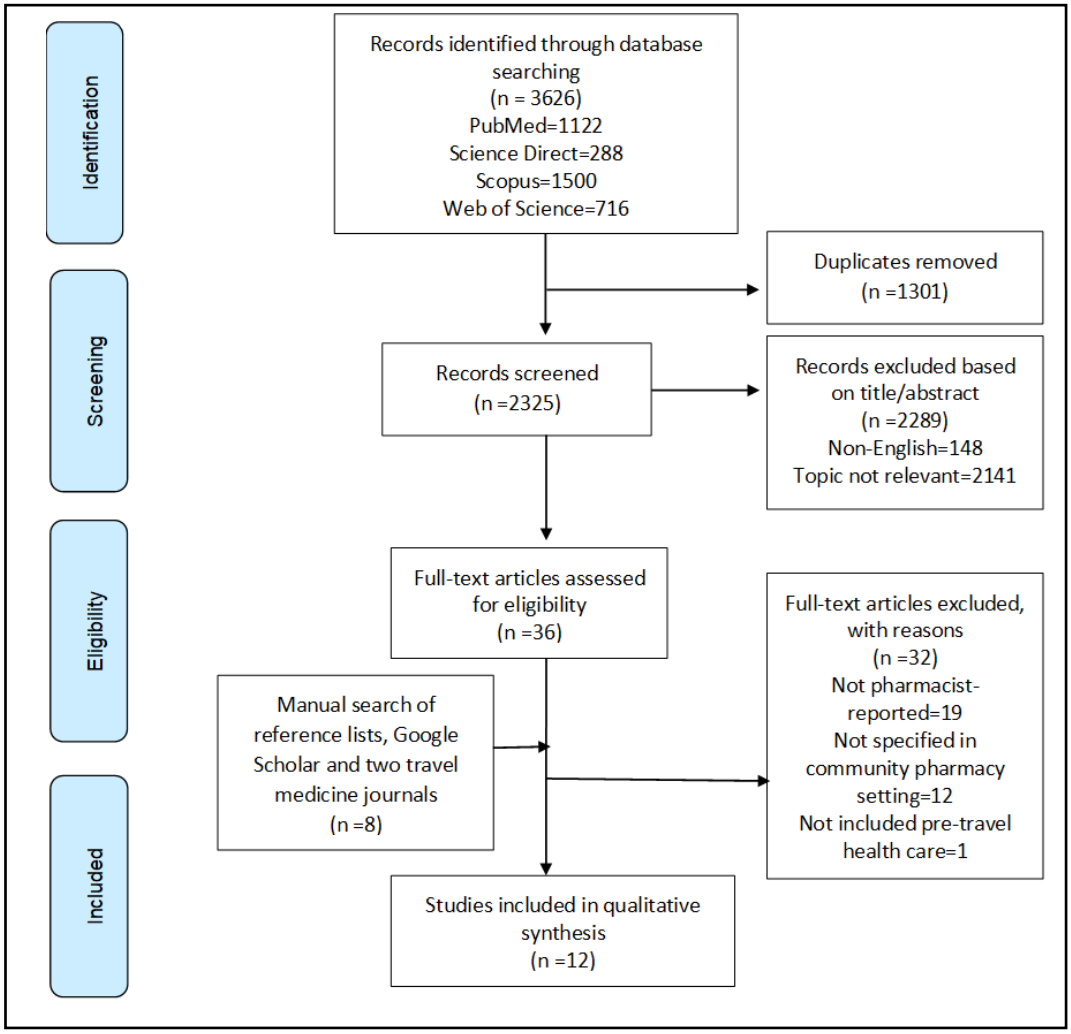


Figure 4.1 PRISMA Flow Diagram of the Search Results

4.2.2 Study Characteristics

The studies were published between 1999 and 2022, with three studies published before 2010 (Kodkani et al., 1999; Teodósio et al., 2006; Toovey, 2006) and nine from 2010 onwards (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018, 2020; Houle et al., 2019; Kc et al., 2022; Kc et al., 2020; Taha & See, 2016; Thidrickson & Goodyer, 2019). Nine studies were cross-sectional surveys (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018, 2020; Kc et al., 2020; Kodkani et al., 1999; Taha & See, 2016; Teodósio et al., 2006; Toovey, 2006), two studies employed qualitative analyses of free text responses (Kc et al., 2022; Thidrickson & Goodyer, 2019), and one study used a mixed-methods design (Houle et al., 2019). The studies were conducted in Canada (n = 3) (Bascom et al., 2015; Houle et al., 2019; Thidrickson & Goodyer, 2019), Australia (n = 2) (Heslop et al., 2018, 2020), Malaysia (n = 2) (Kc et al., 2020; Taha &

See, 2016), Italy (n = 1) (Della Polla et al., 2020), Portugal (n = 1) (Teodósio et al., 2006), South Africa (n = 1) (Toovey, 2006) and Switzerland (n = 1) (Kodkani et al., 1999). One study involved CPs from multiple countries, including Malaysia, the US, the UK, Canada, and Germany (Kc et al., 2022). The full details of each study are provided in Appendix 12.

4.2.3 Quality Assessment

Table 4.1 summarises the results of the quality assessment of the included studies. The quality scores ranged from 48.0% to 85.0%, with a mean of 70.0%. The studies scored high (4 or 5; 5 is the highest) in the following aspects: introduction (12/12); preliminaries (10/12); results (8/12); ethics (7/12); and discussion (7/12). A high proportion of the studies scored ≤3 for design (9/12), sampling (8/12), and data collection (8/12). Of note, seven studies failed to report, or did not adequately report, the sample size calculations.

Table 4.1
Quality Assessment of the Included Studies Using the Crowe Critical Appraisal Tool (CCAT)

Study	Preliminaries	Introduction	Design	Sampling	Data collection	Ethics	Results	Discussion	Total score maximum = 40	Percentage (%)*
Kodkani et al. (1999)	3	4	3	2	3	1	3	3	22	55
Teodósio et al. (2006)	4	4	2	3	3	2	3	3	24	60
Toovey (2006)	3	4	2	1	2	1	3	3	19	48
Bascom et al. (2015)	4	4	3	3	3	3	4	3	27	68
Taha & See (2016)	4	4	3	3	3	4	3	4	28	70
Heslop et al. (2018)	4	4	3	4	3	4	4	4	30	75
Houle et al. (2019)	4	4	3	3	4	4	4	4	30	75
Thidrickson & Goodyer (2019)	4	4	3	3	4	2	4	3	27	68
Della Polla et al. (2020)	4	4	3	4	4	4	4	4	31	78
Heslop et al. (2020)	4	4	4	4	3	4	4	4	31	78
Kc et al. (2020)	4	4	4	3	3	4	4	4	30	75
Kc et al. (2022)	4	5	4	4	4	5	4	4	34	85

Note: *Calculated by (Total/40) x 100.

4.2.4 Practices of Pre-Travel Health Services

Table 4.2 presents the details of CPs' pre-travel health services reported in the studies. The provision of pre-travel health advice by CPs was reported in all included studies (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018, 2020; Houle et al., 2019; Kc et al., 2022; Kc et al., 2020; Kodkani et al., 1999; Taha & See, 2016; Teodósio et al., 2006; Thidrickson & Goodyer, 2019; Toovey, 2006). As reported in four studies, travellers' diarrhoea was the most common topic in pre-travel health advice (Della Polla et al., 2020; Heslop et al., 2018; Taha & See, 2016; Teodósio et al., 2006). Other common advice was related to vaccination (Della Polla et al., 2020; Heslop et al., 2018; Kc et al., 2020; Teodósio et al., 2006), malaria prevention (Heslop et al., 2018; Kc et al., 2020; Teodósio et al., 2006), mosquito/insect bites prevention, safe food and water consumption (Della Polla et al., 2020; Heslop et al., 2018), sun protection, and recommended medications, particularly for tropical destinations (Teodósio et al., 2006). In one study, CPs emphasised fitness, medication storage, and travel supplies when advising travellers with pre-existing chronic conditions. The study also highlighted that the management of the menstrual cycle was the focus of advice provided to Muslim pilgrims attending Hajj and Umrah in Mecca, Saudi Arabia (Kc et al., 2020). However, advice concerning travel health insurance was noted in another Malaysian study as the least frequent form of advice given to travellers (Taha & See, 2016).

Table 4.2
Pharmacist Activities of Pre-Travel Health Services in Community Pharmacy Practices as Identified in Twelve Studies

No.	Pharmacist activities	References
1.	Provision of pre-travel health counselling, education and advice	Kodkani et al. (1999); Teodósio et al. (2006); Toovey (2006); Bascom et al. (2015); Taha & See (2016); Heslop et al. (2018); Heslop et al. (2020); Houle et al. (2019); Thidrickson & Goodyer (2019); Della Polla et al. (2020); Kc et al. (2020); Kc et al. (2022)
2.	Referring to information resources	Kodkani et al. (1999); Teodósio et al. (2006); Toovey (2006); Taha & See (2016); Heslop et al. (2018); Della Polla et al. (2020)
3.	Performing pre-travel health risk assessment	Toovey (2006); Taha & See (2016); Heslop et al. (2018); Houle et al. (2019); Thidrickson & Goodyer (2019)
4.	Providing vaccinations	Houle et al. (2019); Thidrickson & Goodyer (2019); Kc et al. (2022)
5.	Collaborating or cooperating with doctors and other healthcare professionals	Kodkani et al. (1999); Toovey (2006); Houle et al. (2019)
6.	Provision of educational information resources	Kodkani et al. (1999); Heslop et al. (2018)
7.	Prescribing oral medications or vaccines	Houle et al. (2019)
8.	Dispensing preventive	Kc et al. (2022)

No.	Pharmacist activities	References
	medications	
9.	Packaging and labelling regular medications for travellers	Kc et al. (2022)
10.	Supplying travel-related health products	Kc et al. (2020)
11.	Organising travel clinic days or events	Houle et al. (2019)

Pre-travel health assessments were reportedly conducted by CPs in five studies. As reported by Heslop et al. (2018), Australian CPs formally conduct pre-travel health risk assessments, but they perform them on an infrequent basis. To perform patient assessment, they normally collect the itinerary and medical history of travellers. According to a study conducted in South Africa, although CPs performed pre-travel health risk assessments to some extent, they seldom conducted a thorough medical history assessment or identified possible contraindications to antimalarial medication before advising travellers on malaria chemoprophylaxis (Toovey, 2006).

The provision of educational information resources to travellers was reported in two studies. Such educational information resources were provided in writing (e.g., booklets prepared by travel medicine experts, pamphlets from the pharmaceutical companies, and computer printouts) (Kodkani et al., 1999) or provided verbally (Heslop et al., 2018). In particular, six studies reported that CPs utilised various information sources before providing advice to travellers (Della Polla et al., 2020; Heslop et al., 2018; Kodkani et al., 1999; Taha & See, 2016; Teodósio et al., 2006; Toovey, 2006). The sources of information reported by the studies included the internet, scientific journals, educational programmes (Della Polla et al., 2020), the Bulletin of the Federal Office of Health, the pharmaceutical industry (Kodkani et al., 1999), the Medication Information Centres, tourist destination magazines, doctors (Teodósio et al., 2006), generic drug information sources, travel-specific websites (Heslop et al., 2018), and the International Travel and Health guide from the WHO (Taha & See, 2016).

Three studies reported collaborative activities between CPs and healthcare professionals (Houle et al., 2019; Kodkani et al., 1999; Toovey, 2006). A Swiss study reported that CPs double-check doctors' recommendations for travellers, including drug dosages, and provide explanations about prescribed medications (Kodkani et al., 1999). Conversely, a South African study reported that CPs who recommended malaria prophylaxis would immediately refer travellers to doctors for further advice and

prescriptions (Toovey, 2006). Furthermore, a Canadian study mentioned that nurses refer their patients to CPs for their recommendations (Houle et al., 2019).

In a study that explored the type of travel health services provided by CPs at airport pharmacies of selected countries (including Malaysia, the US, the UK, Canada, and Germany), CPs were noted to commonly dispense preventive medications. This includes providing advice on travel-related diseases, providing health counselling, supplying travel-related health products, administering vaccinations, and packaging and labelling regular medications for travellers (Kc et al., 2022). Services related to travel vaccination were reported in two studies (Houle et al., 2019; Thidrickson & Goodyer, 2019). According to a study conducted in Canada, the Canadian CPs had prescribed and administered vaccines following the expansion of travel vaccination services in Ontario (Houle et al., 2019). In another Canadian study, the majority of CPs reported providing comprehensive travel health services, including vaccinations (Thidrickson & Goodyer, 2019).

4.2.5 Barriers and Facilitators in Providing Pre-Travel Health Services

Table 4.3 summarises the barriers and facilitators of the provision of pre-travel health services by CPs identified from the included studies, which were then mapped to the TDF domains (Figure 4.2). Ten out of the fourteen TDF domains encompass the barriers and facilitators. Six TDF domains contain factors that are both barriers and facilitators, namely knowledge, skills, beliefs about capabilities, beliefs about consequences, environmental context and resources, and emotion. Barriers in the domain of social influence were also concurrently identified. Facilitators that are associated with social and professional roles and identity, optimism, and intentions were also reported.

In general, the TDF domains related to knowledge and skills were the most frequently identified in the studies (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018; Houle et al., 2019; Kc et al., 2020; Kodkani et al., 1999; Teodósio et al., 2006; Thidrickson & Goodyer, 2019; Toovey, 2006). Of note, most of the reported barriers and facilitators were related to the environmental context and resources domain (Heslop et al., 2018; Houle et al., 2019; Kc et al., 2022; Kc et al., 2020; Kodkani et al., 1999; Taha & See, 2016; Thidrickson & Goodyer, 2019). A summary of the facilitators and barriers related to the ten TDF domains is provided in the following subsections.

Table 4.3
Pharmacist-Reported Actual or Potential Barriers and Facilitators in Providing Pre-Travel Health Services that Map to the Theoretical Domains Framework

TDF Domains	Barriers	Facilitators
D1. Knowledge	Lack of knowledge about travel health topics (Bascom et al., 2015; Kodkani et al., 1999; Teodósio et al., 2006; Toovey, 2006). Lack of clinical knowledge about travel health (Houle et al., 2019).	Having knowledge about travel health issues (Bascom et al., 2015; Della Polla et al., 2020; Kodkani et al., 1999; Toovey, 2006). Being informed or updated about travel medicine (Della Polla et al., 2020; Teodósio et al., 2006). Having clinical knowledge (Thidrickson & Goodyer, 2019).
D2. Skills	Lack of training in travel medicine/travel health services (Heslop et al., 2018; Houle et al., 2019; Kc et al., 2020; Thidrickson & Goodyer, 2019). Lack of training in administering injections (Houle et al., 2019).	Training in travel medicine (Houle et al., 2019; Kc et al., 2020; Kodkani et al., 1999; Teodósio et al., 2006).
D3. Social/ professional role and identity	None	CPs' perceptions of role/professional responsibilities in relation to travel health advice/travel medicine (Della Polla et al., 2020; Heslop et al., 2018; Kc et al., 2020; Kodkani et al., 1999).
D4. Beliefs about capabilities	Lack of confidence (Bascom et al., 2015; Houle et al., 2019).	Confidence (Bascom et al., 2015; Houle et al., 2019). Beliefs in capability of pharmacists (Della Polla et al., 2020).
D5. Optimism	None	Optimism about implementation (Heslop et al., 2018).
D6. Beliefs about consequences	Risks to patients – anaphylaxis or adverse reaction to a vaccine (Houle et al., 2019). Liability for vaccination (Houle et al., 2019).	Expected outcomes to pharmacies i.e., profits/revenue generation (Heslop et al., 2018; Houle et al., 2019). Perceived benefits to patients i.e., convenience (Houle et al., 2019; Thidrickson & Goodyer, 2019), clinical benefits (Thidrickson & Goodyer, 2019).
D7. Reinforcement	None	None
D8. Intentions	None	Interest in or liking of travel medicine/travel health services (Heslop et al., 2018; Teodósio et al., 2006).
D9. Goals	None	None
D10. Memory, attention, and decision processes	None	None
D11.	Accessibility: lack of access to resources or	Adequate time (Heslop et al.,

TDF Domains	Barriers	Facilitators
Environmental context and resources	materials (Houle et al., 2019; Thidrickson & Goodyer, 2019) Time: lack of time (Heslop et al., 2018; Houle et al., 2019; Thidrickson & Goodyer, 2019). Resources: lack of staff (Heslop et al., 2018; Houle et al., 2019; Thidrickson & Goodyer, 2019); lack of private space (Houle et al., 2019). Patient factors: lack of patients' awareness of pharmacist's scope (Houle et al., 2019); lack of patient willingness to pay (Houle et al., 2019; Thidrickson & Goodyer, 2019); lack of patient demand (Houle et al., 2019); patient hesitation (Houle et al., 2019); patients' high expectations (Thidrickson & Goodyer, 2019). Legislative: lack of prescribing authorisation (Houle et al., 2019; Thidrickson & Goodyer, 2019).	2018) Resources: adequate staff (Heslop et al., 2018; Houle et al., 2019), pharmacist educational resources (Kodkani et al., 1999), marketing and promotional activities (Houle et al., 2019; Thidrickson & Goodyer, 2019). Patient factors: patient awareness of pharmacist's scope (Houle et al., 2019); patient demand (Houle et al., 2019); patient satisfaction (Thidrickson & Goodyer, 2019). Legislative: prescribing authorisation (Houle et al., 2019).
D12. Social influences	Lack of doctors' awareness (Houle et al., 2019). Competition or overlapping of services (Houle et al., 2019; Thidrickson & Goodyer, 2019). Desire to avoid interprofessional conflicts (Houle et al., 2019). Pharmacy owner unwilling to offer the service (Houle et al., 2019). Lack of support from other doctors (Thidrickson & Goodyer, 2019).	Good cooperation/collaboration or partnerships with other health professionals/ travel clinics/ health centres (Houle et al., 2019; Thidrickson & Goodyer, 2019). Good pharmacist-patient relationship (Houle et al., 2019). Referrals from other patients and doctors (Thidrickson & Goodyer, 2019).
D13. Emotion	Discomfort with administering injections (Houle et al., 2019).	Comfortable about recognising referral needs (Houle et al., 2019).
D14. Behavioural regulation	None	None

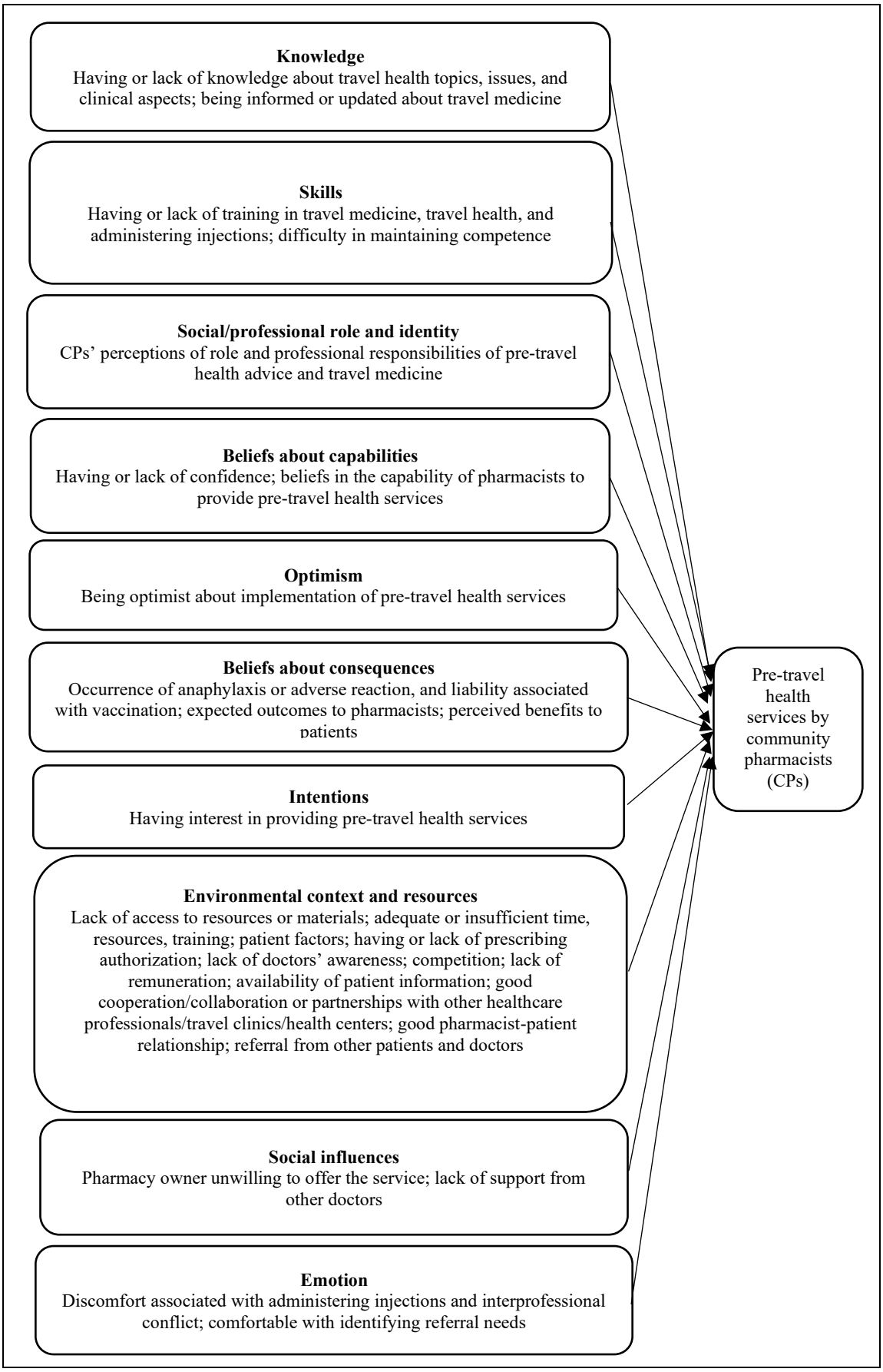


Figure 4.2 The Ten Theoretical Domains Framework (TDF) Identified in Twelve Studies of Pre-Travel Health Services Provided by CPs

4.2.5.1 Knowledge

Knowledge of travel health was reported as a facilitator of the provision of pre-travel health services by CPs in five studies (Bascom et al., 2015; Della Polla et al., 2020; Kodkani et al., 1999; Teodósio et al., 2006; Toovey, 2006). Four of these studies identified a lack of travel health knowledge as a significant barrier (Bascom et al., 2015; Kodkani et al., 1999; Teodósio et al., 2006; Toovey, 2006), consistent with two other studies in 2019 (Houle et al., 2019; Thidrickson & Goodyer, 2019). Specifically, a study by Houle et al. (2019) reported that poor travel health knowledge was a barrier to expanding the pharmacy travel vaccination services. Clinical knowledge is perceived as crucial for CPs to develop or introduce comprehensive pharmacy-based travel health services as reported by Thidrickson and Goodyer (2019). According to Bascom et al. (2015), CPs generally have a good understanding of pre-travel assessments and travellers' diarrhoea. However, their knowledge regarding vaccines and travelling at high altitudes is relatively limited. Certain contextual factors, such as being informed or updated with current travel medicine knowledge (Della Polla et al., 2020; Teodósio et al., 2006) and working in pharmacies where more travellers were advised (Teodósio et al., 2006) were observed to enhance CPs' knowledge and ability to provide accurate information to travellers.

4.2.5.2 Skills

Of note, few studies discussed specific travel health competencies, skills or training in detail although several reported inadequate training. Three studies documented that CPs have expressed a deficiency in their training in areas concerning travel health services (Heslop et al., 2018), travel medicine (Houle et al., 2019), injection administration (Houle et al., 2019) and global epidemiology of travel-related illness (Kc et al., 2020). Maintaining competence in travel health is a recognised challenge when introducing new pharmacy services, a point supported by the work of Thidrickson and Goodyer (2019).

4.2.5.3 Social/Professional Role and Identity

CPs had favourable opinions of their roles in relation to travel health as reported in three different studies. These roles included advising travellers on travel health issues, as well as supplementing or reinforcing the advice offered by other healthcare professionals. Other CP responsibilities included providing advice on the contents of travellers' first aid kits as well as referring patients who require immunisations, antimalarials, or other prescriptions to doctors (Heslop et al., 2018; Kc et al., 2020; Kodkani et al., 1999). According to one study, CPs consider travel health to be part of their professional obligations (Della Polla et al., 2020). In another study, the CPs regarded themselves as crucial "gatekeepers" in determining whether or not travellers required specialised advice from a doctor or clinic (Kodkani et al., 1999). Consistent with the aforementioned findings, a Malaysian study reported that some of them perceived themselves as well-positioned to provide travel health information and recommendations (Kc et al., 2020).

4.2.5.4 Beliefs about Capabilities

Della Polla et al. (2020) revealed that most CPs perceived themselves as being capable of providing pre-travel advice. However, two studies reported that CPs lacked the confidence to provide such services (Bascom et al., 2015; Houle et al., 2019). For instance, Bascom et al. (2015) disclosed that CPs were not confident in providing pre-travel health advice in the absence of travel health information. Despite this, many were still confident in their ability to find this information and share it with travellers. As mentioned by Houle et al. (2019), CPs expressed uncertainty about how to incorporate pre-travel health services into the current workflow. Their inadequate confidence in delivering such services hindered their provision of pre-travel health services. Conversely, CPs were more likely to provide pre-travel health services when they had greater confidence in the subject matter.

4.2.5.5 Optimism

In a study by Heslop et al. (2018), CPs expressed optimism regarding the development of pharmacy-based travel health services. Despite potential opposition

from the medical community, which they did not anticipate, they believed traveller support was substantial and remained committed to developing pre-travel health services. Furthermore, approximately half of them believed that the inability to legally administer travel vaccines or prescription-only medications were not perceived as major barriers to the development of pre-travel health services.

4.2.5.6 Beliefs about Consequences

Houle et al. (2019) cited the potential risk of anaphylaxis and adverse reactions associated with vaccines, and the liability as barriers to pharmacist-provided travel vaccination. Despite this, many CPs felt that pre-travel health services could be profitable (Heslop et al., 2018) and may generate revenue for pharmacies (Houle et al., 2019). Moreover, Houle et al. (2019) noted that pre-travel health services by pharmacists can provide convenience to patients, as flexible service times and extended operating hours were offered. This allows patients to access most of their travel health needs at one location. It was also reported that CP's pre-travel health services allow easier billing for insurance companies that cover both medications and services. Similarly, it was highlighted that pharmacist interventions regarding potential drug-drug or drug-disease interactions, as well as other health-related services were offered. This includes smoking cessation, which could yield various potential clinical benefits for patients consulting pharmacists (Thidrickson & Goodyer, 2019).

4.2.5.7 Intentions

Only one study specifically investigated CPs' interests in providing pre-travel health services. It was revealed that a high majority of CPs (82.3%) reported being interested in offering pre-travel health services (Heslop et al., 2018).

4.2.5.8 Emotion

In one study, there were concerns among CPs regarding discomfort with administering injections and potential interprofessional conflict, which hindered their provision of travel vaccinations. On the other hand, some were comfortable identifying indications that a patient may need a referral to other healthcare professionals, such as

patients who require a yellow fever vaccination, as well as paediatric patients (Houle et al., 2019).

4.2.5.9 Social Influences

According to two Canadian studies, barriers to developing or introducing comprehensive pharmacy travel health services and expanding travel vaccinations included a lack of support from other doctors (Thidrickson & Goodyer, 2019) and pharmacy owners' reluctance to provide such services (Houle et al., 2019), respectively.

4.2.5.10 Environmental Context and Resources

Three studies identified staffing issues and insufficient time as barriers to the provision of pre-travel health services (Heslop et al., 2018; Houle et al., 2019; Thidrickson & Goodyer, 2019). In addition, prescribing authorisation was cited in two studies as an important factor in determining whether a pharmacist can provide extended travel health services (Houle et al., 2019; Thidrickson & Goodyer, 2019). At the same time, a lack of private space and poor access to travel health resources or materials were identified as barriers in a Canadian study (Houle et al., 2019). Another study conducted in the same country reported that CPs had limited access to vaccination records. The non-availability of certain items, including vaccines, has also been identified as a significant barrier to the provision of pre-travel health services by CPs (Thidrickson & Goodyer, 2019).

Another commonly reported barrier to the expansion of pharmacy-based travel health services has been recognised as the lack of remuneration for newly introduced travel health services. Additionally, CPs who lack the necessary prescribing authority to prescribe medications or vaccines may encounter difficulties in obtaining prescriptions for their travelling patients. As such, the availability of similar services from other medical practitioners may lead patients to view pharmacy-led travel health services as a duplication of care, potentially increasing their hesitancy to pay for them (Houle et al., 2019).

In two other studies, barriers related to patients were identified, including a lack of awareness among patients regarding the scope of a pharmacist's role, low demand for such services, reluctance to have a pharmacist administer travel vaccination (Houle

et al., 2019), high expectations for immediate responses (Thidrickson & Goodyer, 2019) and a lack of willingness to pay for these services (Houle et al., 2019; Thidrickson & Goodyer, 2019). It was reported that pharmacies in Canada were not reimbursed for patients' routine or public health vaccinations (Thidrickson & Goodyer, 2019).

A lack of access to training in travel medicine was identified in four studies as a barrier to their provision of pre-travel health services (Heslop et al., 2018; Houle et al., 2019; Kc et al., 2020; Thidrickson & Goodyer, 2019). Houle et al. (2019) reported that additional training in travel medicine would facilitate their provision of pre-travel health services. Research involving CPs at airport pharmacies highlighted significant barriers to providing pre-travel health services, including linguistic differences, the demand for specific international medicine brands, and limited financial resources among travellers (Kc et al., 2022).

Inadequate awareness among doctors of the extent of a pharmacist's role (Houle et al., 2019) and the presence of competition or redundancy in services offered by other pharmacies and clinics also imposed similar hurdles to implementation of pre-travel health services in two separate Canadian studies (Houle et al., 2019; Thidrickson & Goodyer, 2019). Improvements to service delivery can be made via the establishment of partnerships or collaborations with other healthcare practitioners or travel clinics (Houle et al., 2019; Thidrickson & Goodyer, 2019), the good rapport between pharmacists and patients (Houle et al., 2019) and referrals from other patients and doctors (Thidrickson & Goodyer, 2019).

Sufficient staff, availability of marketing and promotional activities targeted at customers (e.g., brochures and posters) and experience in delivering presentations on travel health topics were reported as facilitators to the provision of pre-travel health services by CPs in studies by Houle et al. (2019) and Thidrickson & Goodyer (2019). Several studies have also highlighted patient-related facilitators, such as awareness of the pharmacist's role in travel health, patient demand (Houle et al., 2019), and patient satisfaction (Thidrickson & Goodyer, 2019). According to Taha and See (2016), patient information such as travel destination, pre-existing medical conditions, season, trip length, and travel type can facilitate the provision of pre-travel health advice.

4.3 Study 2: A Qualitative Exploration of Community Pharmacists' Practices and Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

4.3.1 Characteristics of Community Pharmacists Interviewed

Of the 30 CPs invited, 24 participated in the qualitative interview (Table 4.4). Five CPs refused to participate, and one CP cancelled the scheduled interview due to a busy schedule. Data collection and analysis were conducted concurrently to facilitate ongoing assessment of thematic emergence. New themes and behavioural determinants continued to emerge throughout the interview process, with an additional theme identified during Interview 22. Subsequent interviews (Interviews 23 and 24) did not yield any new themes, concepts, or behavioural determinants, indicating thematic redundancy and suggesting that saturation had been achieved by the completion of data collection. This approach is consistent with recommendations that saturation should be determined by the point at which additional interviews no longer contribute substantively new information relevant to the research objectives (Guest et al., 2006).

The qualitative analysis identified factors spanning all 14 domains of the TDF. Saturation was assessed at the overall thematic level rather than separately for each individual TDF domain. Consequently, some domains were represented more frequently than others, reflecting differences in the salience and prominence of behavioural determinants within the study context. The additional interviews conducted towards the end of data collection provided confirmation that no new behavioural determinants relevant to CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims were emerging, thereby supporting the adequacy of the sample for achieving theoretical sufficiency (Appendix 13).

In particular, the participants consisted of 79.2% (19/24) females, with an age range of 25 to 50 years. Slightly more than half of the CPs worked in independent pharmacies (58.3%, 14/24), and the majority were situated in urban areas (75.0%, 18/24).

Table 4.4
Demographic Characteristics of the Community Pharmacists Interviewed

Demographic characteristics of community pharmacists	Number of informants in each category (%)
Age	Less than 30 years: 9 (37.5)
	30-40 years: 11 (45.8)
	41-50 years: 4 (16.7)
	Mean (SD): 33.6 (7.2)
Sex	Female: 19 (79.2)
	Male: 5 (20.8)
Ethnicity	Malay: 17 (70.8)
	Chinese: 5 (20.8)
	Indian: 1 (4.2)
	Others: 1 (4.2)
Highest pharmacy qualification	Undergraduate: 22 (91.7)
	Postgraduate: 2 (8.3)
Years as a community pharmacist	Less than 5 years: 12 (50.0)
	5-10 years: 7 (29.2)
	11-15 years: 1 (4.2)
	16-20 years: 1 (4.2)
	More than 20 years: 3 (12.5)
	Mean (SD): 7.1 (7.0)
Type of pharmacy	Independent: 14 (58.3)
	Chain: 10 (41.7)
Location of pharmacy	Urban: 18 (75.0)
	Suburban: 6 (25.0)
Current job position	Owner: 2 (8.3)
	Part-owner: 2 (8.3)
	Employee: 20 (83.3)
Had training in travel medicine	Yes: 3 (12.5)
	No: 21 (87.5)

4.3.2 Practices of Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

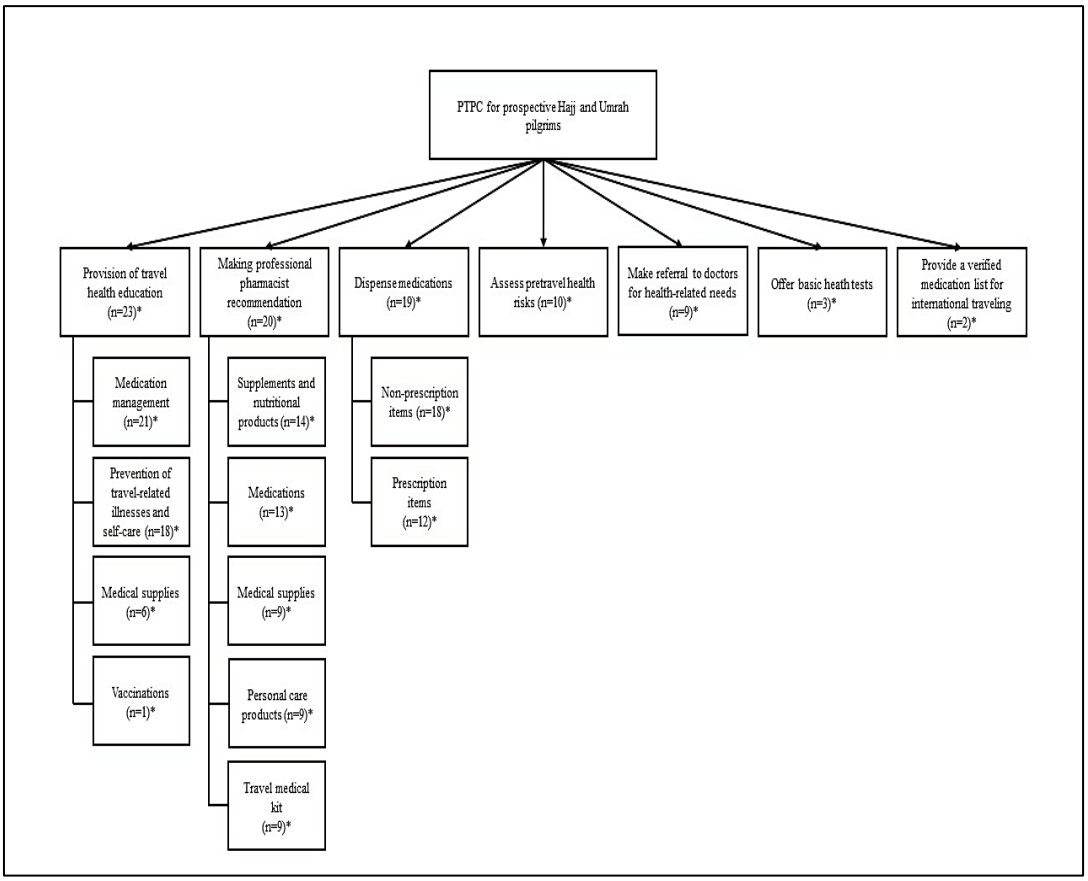
In total, 23 out of 24 participants (95.8%) reported conducting at least one type of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Seven consultation activities were identified, namely provision of travel health education, recommendation of health-related products, dispensing of medications, assessment of pre-travel health risks, referral activities, basic health testing, and provision of verified medication lists, as detailed in Figure 4.3. The themes, subthemes, sample quotations, and frequency of participant mentions are presented in Table 4.5.

Among the identified themes, provision of travel health education emerged as the most frequently reported activity. Most participants (83.3%, 20/24) described providing counselling related to medication management, including medication adherence, appropriate medicine storage during exposure to extreme heat, and ensuring adequate medication supply throughout the pilgrimage. In addition, 75.0% (18/24) reported providing preventive advice related to hydration, infection prevention, hand

hygiene, and self-care during mass gatherings. Advice regarding medical supplies was mentioned by 37.5% (9/24) of participants, while only a smaller proportion discussed vaccination-related information (20.8%, 5/24).

Making professional pharmacist recommendations (medications) refers to pharmacists' recommendations regarding appropriate medications or products for travel-related needs, including over-the-counter products, preventive medications, symptom management, or medication adjustments based on travel-related health considerations. More than half of the participants recommended supplements and nutritional products (58.3%, 14/24) and medications for common travel-related illnesses (54.2%, 13/24). In addition, 37.5% (9/24) reported recommending medical supplies, personal care products suitable during Ihram, and travel medical kits. Participants described recommending products such as face masks, cooling products, pill organisers, and fragrance-free personal care items tailored to the needs of pilgrims. Dispensing of medications was also widely described by participants. Most CPs (75.0%, 18/24) reported dispensing non-prescription medicines intended for standby use during travel, including medicines for cough, flu, fever, diarrhoea, and pain management. Meanwhile, half of the participants (50.0%, 12/24) reported dispensing prescription medicines, particularly chronic disease medications and oral contraceptives for menstrual suppression among female pilgrims.

Some participants further described conducting preliminary pre-travel health assessments. Specifically, 41.7% (10/24) reported assessing patients' medical histories, medication use, vaccination status, and potential travel-related health risks before making recommendations. Referral activities were reported by 37.5% (9/24) of participants, particularly when patients required vaccinations, further medical evaluation, or management of unstable chronic conditions beyond the CPs' scope of practice. In contrast, only a small proportion of participants reported conducting basic health tests (12.5%, 3/24), such as blood pressure and blood glucose monitoring, or preparing and verifying medication lists for travel purposes (8.3%, 2/24). Provide a verified medication list referred to documenting or verifying a pilgrim's current medications to support continuity of care and medication management during Hajj or Umrah.



Note. The frequencies presented represent descriptive indicators of thematic occurrence within the qualitative dataset and were included to illustrate the relative prominence of specific practices identified across participant narratives. These frequencies were not intended to represent statistical significance, prevalence estimates, or quantitative generalisability

Figure 4.3 Reported Activities Relevant to Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims as Mentioned by the Participants (* number of mentions)

This study's findings indicate that CPs are actively approached by patients for health-related products and advice pertaining to their Hajj or Umrah travel requirements. In response, most of the CPs (83.3%, 20/24) had provided recommendations on various health-related products, including supplements (58.3%, 14/24), medications (54.2%, 13/24), medical supplies (37.5%, 9/24), personal care products (37.5%, 9/24), and travel medical kits (37.5%, 9/24). They usually tailor their product recommendations to specific patients and religious requirements, such as non-drowsy medicines and fragrance-free skin products.

Additionally, while most of the CPs (75.0%, 18/24) had dispensed non-prescription medicines for common travel-related illnesses and standby medications, some (50.0%, 12/24) had also dispensed prescription medicines, such as OCPs and chronic disease medications. About 41.7% (10/24) had conducted pre-travel health

assessments, which involved gathering patients' health and medication histories, checking vaccination status, and assessing potential exposure to destination-specific health risks. Meanwhile, some of them (37.5%, 9/24) have referred patients to doctors upon recognising health issues requiring medical intervention beyond their scope of practice (such as potential exacerbation of chronic conditions or the need for vaccinations). Only a small number of them offered basic health tests (12.5%, 3/24) (e.g., blood pressure and blood glucose level checks) and provided verified medication lists upon request (8.3%, 2/24) for comprehensive records of medications allowed by the customs to prospective pilgrims.

Table 4.5
Participants' Practices Regarding Pre-Travel Pharmacist Consultation Activities for Prospective Hajj and Umrah Pilgrims

Theme	Subtheme	Sample of Quotation	Frequency of Participant Mentions (n = 24)
Provision of travel health education	Medication management	"We usually counsel them on how to take and store their medicines properly during Hajj because the weather is very hot." (P12, Female, 34 years)	20
	Prevention of travel-related illnesses and self-care	"I advise them regarding hydration, hand hygiene, and how to prevent infections during the pilgrimage." (P05, Male, 39 years)	18
	Medical supplies	"Some pilgrims ask about what medical supplies they should bring, such as thermometers or masks." (P18, Female, 31 years)	9
	Vaccinations	"A few customers asked us regarding flu vaccines and meningococcal vaccination requirements." (P03, Male, 42 years)	5
Recommendation of health-related products	Supplements and nutritional products	"We recommend supplements and vitamins to help maintain stamina during Hajj." (P10, Female, 29 years)	14
	Medications	"Usually, they ask for medications for flu, pain, diarrhoea, or motion sickness before travelling." (P07, Male, 36 years)	13
	Medical supplies	"We recommend items such as face masks, pill boxes, and cooling products." (P15, Female, 33 years)	9
	Personal care products	"Some customers specifically request fragrance-free products suitable for Ihram." (P09, Female, 28 years)	9

Theme	Subtheme	Sample of Quotation	Frequency of Participant Mentions (n = 24)
	Travel medical kits	"We help them prepare travel kits containing basic medicines and healthcare items." (P21, Male, 41 years)	9
Dispensing of medications	Non-prescription medicines	"Most of the time we dispense standby medicines for common illnesses during travel." (P02, Female, 30 years)	18
	Prescription medicines	"Some patients request chronic medications or oral contraceptives before Hajj." (P14, Female, 37 years)	12
Assessment of pre-travel health risks	Assessment of health and medication history, vaccination status, and travel-related risks	"We ask about their medical conditions, medications, and vaccination status before making recommendations." (P06, Male, 40 years)	10
Referral activities	Referral to doctors for conditions beyond pharmacists' scope of practice	"If they need vaccinations or have unstable medical conditions, we refer them to the clinic." (P11, Female, 35 years)	9
Basic health tests	Blood pressure and blood glucose monitoring	"Sometimes we check their blood pressure or blood glucose before they travel." (P19, Male, 44 years)	3
Provision of verified medication lists	Medication verification for customs and travel purposes	"A few customers requested medication lists for customs declaration and travel documentation." (P08, Female, 32 years)	2

Note. Frequencies represent the number of participants who mentioned each activity during the interviews. Multiple subthemes could be reported by the same participant. The frequencies presented represent descriptive indicators of thematic occurrence within the qualitative dataset and were included to illustrate the relative prominence of specific practices identified across participant narratives. These frequencies were not intended to represent statistical significance, prevalence estimates, or quantitative generalisability.

4.3.3 Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Table 4.6 outlines the CPs' beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, mapped to the 14 TDF domains. The most frequently mentioned belief domains were knowledge, beliefs about capabilities, beliefs about consequences, environmental context and resources, social influences, and emotions, with all CPs stating all of them. Conversely, the least mentioned belief concerned the domain of reinforcement, involving only one CP (4.2%).

Table 4.6
Participants' Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Domains	Specific belief	Sample quote	Frequency of mentions
Knowledge	Lack of knowledge or awareness of Hajj and Umrah travel guidelines/ recommendations	"I'm not aware of any specific guideline at the moment. There may be some, but I am not certain." (CP10, 34-year-old female) "I'm not aware of that. Perhaps I need more information such as recommendations or guidelines to refer to. I currently don't have any knowledge of available guidelines, so I'll need to search for them." (CP12, 34-year-old female)	21
	Lack of knowledge of health-related issues relevant to the Hajj and Umrah pilgrimage	"I'm confident when it comes to medication, but for anything else, I might not be as knowledgeable." (CP06, 27-year-old female) "Being non-Muslims, we are unfamiliar with what they might require. I am unsure if they need any particular advice." (CP24, 40-year-old female)	8
	Having knowledge of health-related issues relevant to the Hajj and Umrah pilgrimage	"They often inquire about the medicines they should bring, seeking a comprehensive list. Anticipating common health issues such as flu, fever, coughs, allergic reactions, or stomach upsets is crucial. Even if these ailments might not occur, it's important to inform them about the potential and provide detailed information on each medication, including dosage and frequency. Moreover, emphasising the importance of supplements is also crucial." (CP10, 34-year-old female) "As pharmacists, it's crucial for us to be well-informed about vaccinations, including the different types available and their potential side effects. Equally important is reassuring people about the safety and effectiveness of vaccines in preventing infections." (CP20, 29-year-old female)	16
	Having knowledge or awareness of Hajj and Umrah travel guidelines/ recommendations	"Pharmacists must familiarise themselves with the yearly regulations, which can frequently change, whether from the local	6

Domains	Specific belief	Sample quote	Frequency of mentions
		government or abroad." (CP15, 50-year-old female) "I'm aware that there are guidelines. I remember seeing a module for Hajj and Umrah from the MOH (Ministry of Health)." (CP16, 33-year-old male)	
	Having knowledge of the cultural aspects of the Hajj and Umrah pilgrimage	"We should have a good understanding of the Hajj journey, the environment, and the weather conditions during that period, as these can impact the health of pilgrims. It's crucial for pharmacists to be well-informed about these aspects." (CP05, 29-year-old female)	3
Skills	Communication skills	"What I need, of course, are communication skills to simplify terms, making it easier for patients to understand." (CP03, 31-year-old female) "In the context of travel health, effective communication skills are crucial. Considering that Hajj and Umrah pilgrims are predominantly elderly, our approach needs to be tailored differently compared to how we would communicate with teenagers or the general population." (CP17, 32-year-old male)	8
	Pharmaceutical care skills	"We inquire about patients' medical histories to tailor our recommendations on medicines, supplements, devices, and diet requirements." (CP16, 33-year-old male) "We have clinical skills and an understanding of a patient's medical history, along with expertise in medication therapy. This includes knowledge of safely combining medications, such as pairing cough medicine with fever reducers or using cooling methods to lower body temperature. This comprehensive care can enhance the patient's overall condition." (CP04, 29-year-old female)	6
	Counselling skills	"Counselling skills are essential to prepare patients for their trip. This is particularly important for the elderly, who may feel nervous and excited. As my friend mentioned,	3

Domains	Specific belief	Sample quote	Frequency of mentions
		certain rituals can be very strenuous, and the paths may be rocky. Our role is to comfort them and instil confidence." (CP22, 45-year-old male)	
Memory, attention and decisions	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is integrated into the usual practice	"Our approach to these customers is the same as for others. When it comes to Hajj and Umrah, we specifically focus on their unique health requirements." (CP16, 33-year-old male) "I provide consultations based on individual needs. There isn't a specific standard operating procedure that we follow here for prospective Hajj and Umrah pilgrims." (CP01, 30-year-old female)	19
Behavioural regulation	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is supported by the vision and mission of the company	"Our vision and mission always serve as our motivators. Our community pharmacy has a clear vision and mission. They are our guiding principles, representing our hope for growth and serving as our main drive, always aiming for customer satisfaction." (CP01, 30-year-old female) "Yes, it's our mission to make a positive impact on the quality of life of our customers. This is a broad statement, but when we break it down, providing this service is one way we can contribute to this larger goal. Ultimately, we aim to enhance their well-being during their trip." (CP22, 45-year-old male)	10
	Customer feedback system	"Our commitment is to deliver the best service possible to our customers. Adhering to customer satisfaction as our quality policy guides our consultation." (CP17, 32-year-old male)	1
Social/professional role and identity	Pharmacist's professional role	"I believe it is my responsibility as a pharmacist to educate our customers. They come to us seeking knowledge, and it's our duty to provide it, ensuring they have a smooth and informed journey during Umrah and Hajj." (CP20, 29-year-old female) "I see my role as providing consultations to ensure they take the right medications, thus helping	18

Domains	Specific belief	Sample quote	Frequency of mentions
		them maintain their health while they are there." (CP06, 27-year-old female)	
	Pharmacists' social responsibility	"I believe this is very important in this multiracial country." (CP24, 40-year-old female) "Because some of our customers are regulars, they're like family to us. It's important to guide them on what to bring and what to expect, especially if they haven't travelled before." (CP13, 29-year-old female)	5
Beliefs about capabilities	Limited confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims regarding regulations	"Whether certain medicines can be brought on a flight, I'm not entirely sure which ones are allowed, and which are not." (CP08, 32-year-old female) "I'm concerned that I might give advice that doesn't comply with the regulations. Regulations vary between countries, such as here and there. For example, during COVID and the recent Hajj, they still needed to wear masks, but now it's no longer required. We're uncertain about the regulations, especially since regulations keep changing." (CP15, 50-year-old female)	12
	Belief that pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is not easy to provide	"It's not easy, I'd say it's moderate because we have to cater to individual needs. So, at times, it can be challenging because people have different concerns." (CP22, 45-year-old male)	6
	Limited confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims regarding the management of disease	"Regarding diseases, I would consider my knowledge to be moderate. If someone discloses having specific conditions, I must conduct research and compile relevant information before offering advice." (CP07, 27-year-old female)	4
	Having confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims on medicine-related matters	"When it comes to medications, I would say I am confident." (CP07, 27-year-old female) "If they ask about medication, I'm very confident. Issues like diarrhoea, cold, fever, and supplements. It's something I deal with on a daily basis." (CP01, 30-year-old female)	12
Optimism	Being optimist with pre-	"People need this service annually,	16

Domains	Specific belief	Sample quote	Frequency of mentions
	travel pharmacist consultations for prospective Hajj and Umrah pilgrims	creating a recurring demand each year. Pharmacists are required to fulfil this need." (CP14, 48-year-old female) "Yes, there is a prospect because they can get in-depth information regarding medication at the community pharmacy. Clinics and hospitals, as well as doctors, often lack the time to provide detailed explanations." (CP02, 31-year-old female)	
Reinforcement	Incentives or rewards	"Receiving recognition for our counselling service from an authority or any organisation would be good. I also believe that financial support would be even more advantageous. For instance, offering the service and then receiving an allowance from Tabung Haji for patient counselling would be great." (CP22, 45-year-old male)	1
Beliefs about consequences	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can ensure pilgrims' well-being	"In my opinion, we provide customers with comprehensive medication to meet their needs. Some customers find it challenging to obtain medication from Mecca, possibly due to pricing. Additionally, since they are going there to perform Hajj or Umrah, they need to concentrate on their *ibadah* (worship). Therefore, it's crucial to fulfil their health needs in advance in case they fall ill. Apart from providing them with the necessary medication, we also address any health-related inquiries. That is my point of view." (CP01, 30-year-old female) "By being better prepared, pilgrims can experience a smoother journey with fewer issues, less stress, and more enjoyment. This preparation helps them meet their religious obligations." (CP24, 40-year-old female)	20
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can lead to increased sales	"The benefit for us is in boosting our sales to some extent." (CP22, 45-year-old male) "From a pharmacy and business perspective, we can certainly	17

Domains	Specific belief	Sample quote	Frequency of mentions
		generate more sales." (CP03, 31-year-old female)	
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can enhance customers' trust and loyalty	"I love educating people and love it when customers come back. It helps me gain their trust and build rapport." (CP02, 31-year-old female) "As a community pharmacist, gaining the trust of the customer is essential. Once you have their trust, they are more likely to come back to you." (CP07, 27-year-old female)	5
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can lead to patients/customers' cost-savings	"It's expensive over there (referring to medications), so this can help reduce their costs." (CP14, 48-year-old female)	2
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, reduces pharmacists' reputations	"It can affect my credibility. It gives the impression that we lack the necessary skills when customers seek consultation, but we're unable to provide it." (CP08, 32-year-old female) "As a pharmacist, it's not good if we don't know or don't fulfil our role. It will tarnish our reputation." (CP13, 29-year-old female)	10
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, causes a loss of customers' trust	"Patients will lose trust in the pharmacy. For us, this represents a significant loss." (CP15, 50-year-old female) "The most common consequence of not providing (referring to pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims) is the loss of the customer." (CP01, 30-year-old female)	9
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided does not cause any disadvantages	"Because if we didn't provide it, there are always people over there who can take care of them, especially during Hajj." (CP16, 33-year-old male)	4
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, impairs patients' well-being	"I believe that delaying treatment can significantly impair patients' safety and health. Late treatment can escalate into a cascade of health issues; for instance, untreated gastric problems can progress to bloating and, if prolonged, lead to dehydration.	2

Domains	Specific belief	Sample quote	Frequency of mentions
		Therefore, the timely provision of medication is crucial. There is a risk associated with not offering consultation, as it can result in the patient's condition worsening." (CP03, 31-year-old female)	
Intentions	Willing to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in the future	"Yes, because I wouldn't want the patient or customer to leave here without getting what they need. It's important to fulfil their needs. It's also satisfying for me." (CP09, 31-year-old male) "Yes, I look at these elderly customers as if they were my own parents. I find satisfaction in helping them." (CP13, 29-year-old female)	24
Goals	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim to equipping patients with relevant knowledge	"My goal is driven by the desire for customers to fully understand and acquire the necessary knowledge, which they can then apply during their travels. It's important to me that they comprehend the information and use it effectively." (CP13, 29-year-old female) "When we provide this consultation, our aim is to equip pilgrims with knowledge so that they can be prepared to face any situation over there." (CP20, 29-year-old female)	16
	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of improving their well-being	"Our main goal is the well-being of our customers. When they set out on a journey far from home, our aim is to ensure a smooth pilgrimage for them." (CP01, 30-year-old female) "I want to assist customers and ensure that they can complete their worship without falling sick." (CP18, 25-year-old male)	7
	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of equipping them with medications or products	"Many people don't realise the importance of bringing basic medications with them. In case of an emergency, having medications in their possession can be a convenience. This helps avoid the need to locate a pharmacy in an unfamiliar place, which can be challenging and stressful. Not knowing the local setup can make finding help difficult, so having immediate access to their	6

Domains	Specific belief	Sample quote	Frequency of mentions
		medications is a more convenient solution." (CP09, 31-year-old male) "To ease their journey and make their minds at ease by having backup medicines for common issues like diarrhoea or headaches. This can smooth their experience during the trip." (CP20, 29-year-old female)	
	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of enhancing customer satisfaction and trust	"Our goal is to achieve exceptional customer satisfaction and build long-term loyalty. This is important for sustaining our business successfully over the long term." (CP22, 45-year-old male)	3
Emotion	Feeling happy	"It's fulfilling to raise awareness and provide valuable knowledge, including offering advice on necessary preparations. It brings me a great sense of satisfaction." (CP20, 29-year-old female) "We share knowledge to offer guidance and find it rewarding. Helping people brings us happiness." (CP02, 31-year-old female)	17
	Feeling satisfied	"I feel satisfied knowing that people are gaining valuable knowledge." (CP03, 31-year-old female) "As a pharmacist, we find satisfaction." (CP16, 33-year-old male)	17
	Stress and tiredness	"I remember feeling exhausted while assisting a queue of Umrah customers, all facing similar menstrual issues." (CP02, 31-year-old female) "Dealing with customers who are unaware, particularly the elderly and first-time Hajj travellers, can be quite exhausting." (CP18, 25-year-old male)	3
Social influences	Having support from the public/patients/customers	"The public will support us because the community pharmacy is easily accessible. People can simply walk in and see a pharmacist at their convenience. In contrast, clinics or hospitals often have long wait times and require appointments to see a doctor."	23

Domains	Specific belief	Sample quote	Frequency of mentions
		(CP23, 30-year-old female) "Yes, because we don't charge, it's free of charge. They will come." (CP10, 34-year-old female)	
	Having support from national professional organisations	"They will support us. Firstly, to empower the role of community pharmacies within the community, raising awareness that pharmacies offer more than just medication." (CP05, 29-year-old female) "Yes, the Malaysian Pharmacists Society represents the pharmacy profession. They will support anything that brings benefits to the pharmacy." (CP11, 49-year-old female)	23
	Having support from other community pharmacists	"Yes, even non-Muslims will support it because there's not much difference between pre-travel pharmacist consultations for Hajj, Umrah, and regular travel. If they provide pre-travel pharmacist consultations for regular travel, it means they can also provide them for Hajj and Umrah because the differences are minimal." (CP08, 32-year-old female) "I believe they will support it because it can be an opportunity to enhance the services offered at their pharmacy." (CP05, 29-year-old female)	20
	Having support from travel agencies	"The travel agency will support it. Previously, I received an invitation to provide basic consultations to their customers." (CP03, 31-year-old female) "Yes, I believe travel agents will support because it will make their job easier." (CP15, 50-year-old female)	19
	Having support from doctors	"I believe they will support us. They will advise the customer to come to us." (CP12, 34-year-old female) "I believe the doctors would support this. I don't think they have the time to do it. Normally, customers are laymen. One question could trigger two or three more questions. Doctors don't have time for that." (CP15, 50-	17

Domains	Specific belief	Sample quote	Frequency of mentions
		year-old female)	
	Having support from other healthcare professionals (e.g., nutritionists, nurses)	"They are likely to support. In fact, we can seek their cooperation." (CP04, 29-year-old female) "I believe they will support unless they have conflicting business interests, but from my perspective, I haven't seen any conflicts." (CP05, 29-year-old female)	16
	Lack of support from doctors	"I don't think the doctor will support it. The doctors will likely suggest going to see a doctor." (CP16, 33-year-old male) "We rarely receive referrals or collaborations from doctors." (CP02, 31-year-old female)	6
	Having support from the company	"Yes, I believe they will support us because our customers are mostly Muslim. If we have a demand, they can support it." (CP20, 29-year-old female) "I believe they will support it because it can be a good opportunity for the company." (CP05, 29-year-old female)	5
Environmental context and resources	Shortage staff	"Having two pharmacists makes it easier, whereas it is more challenging when working alone due to staff shortage" (CP07, 27-year-old female) "It's difficult when we work alone... not enough staff. So, when we have a lot of customers, we can only provide simple consultations." (CP17, 32-year-old male)	10
	Lack of time	"The barriers are time and staffing. If we have enough staff, there is no issue. However, if we are short-staffed, it may take longer and interrupt other services. Providing pre-travel pharmacist consultations can be time-consuming. To expedite the process, we might have to shorten the consultation, but this could lead to the customer not fully understanding." (CP08, 32-year-old female)	9
	High workload	"The patient transaction per day is quite high, so our time is limited. Instead of taking 15 to 20 minutes, we need to shorten the	9

Domains	Specific belief	Sample quote	Frequency of mentions
		consultation as much as possible and provide concise information to the patient. That is the limitation." (CP03, 31-year-old female)	
	Limited availability of the products	"One more barrier is that sometimes patients demand certain types of medications that are really hard to obtain, especially those that require cold chain handling or have a longer delivery time, like some medications that take one week to be delivered. That aspect takes time." (CP03, 31-year-old female)	9
	Non-Muslim populated areas	"Depends on the location. Areas like Bangi may have more Muslim customers, while here, we only have a few Muslim customers. I might encounter six to seven Muslim customers per year." (CP24, 40-year-old female)	4
	Customer demand	"Based on the patient's questions and demands, which are usually quite specific when they come here. For instance, they might ask, 'I'm going to travel, I'm going to Hajj, what medications do I need to take?' These are common questions. So, I cover the basics". (CP03, 31-year-old female)	21
	Availability of training and education	"If I were given training, I know more, I know what to cover in pre-travel pharmacist consultations." (CP17, 32-year-old male).	18
	Availability of pharmacist resources	"If there are any updates from Saudi Arabia, I usually inquire with the travel agency first since they typically receive information beforehand. For example, they might be informed about the latest requirements for rapid test kits. When customers inquire about these updates, I immediately contact the travel agency for the most recent information. Some customers ask about whether a swab test is required or not, and I provide them with the latest updates from Saudi Arabia." (CP02, 31-year-old female) "We recently attended a vaccination course where we were introduced to websites to obtain information about vaccinations, such as the CDC (Centers for Disease Control and Prevention),	13

Domains	Specific belief	Sample quote	Frequency of mentions
		which we can refer to". (CP24, 40-year-old female)	
	Adequate staff	"We have two pharmacists here, so it's easier. Usually, it's harder when you're alone." (CP07, 27-year-old female)	11
	Muslim populated areas	"In our area with a large Malay population, we frequently serve customers preparing for Hajj and Umrah. During the Hajj season, we typically assist around 30 to 50 customers per month, and for Umrah, which occurs year-round, we attend to about 20 to 30 customers monthly." (CP03, 31-year-old female)	8

Note. The frequencies presented represent descriptive indicators of thematic occurrence within the qualitative dataset and were included to illustrate the relative prominence of specific beliefs identified across participant narratives. These frequencies were not intended to represent statistical significance, prevalence estimates, or quantitative generalisability. *CP, community pharmacist; MPS, Malaysian Pharmacists Society.

4.3.3.1 Knowledge

Sixteen CPs (66.7%) demonstrated awareness of various health-related issues associated with the Hajj and Umrah pilgrimages. In contrast, only three participants (12.5%, 3/24) demonstrated awareness of the cultural aspects of the Hajj and Umrah pilgrimages. Furthermore, the majority of CPs (87.5%, 21/24) identified knowledge gaps regarding Hajj and Umrah travel health guidelines and recommendations. In comparison, eight participants (33.3%, 8/24) reported limited awareness of the health-related issues relevant to Hajj and Umrah pilgrimages.

Knowledge appeared to vary according to participants' exposure to Hajj and Umrah consultations, personal pilgrimage experience, and practice location. CPs practising in predominantly Muslim-populated areas, regardless of religious affiliations reported more frequent interactions with prospective pilgrims and consequently demonstrated greater familiarity with common pilgrimage-related health issues. Muslim CPs and those who had personally performed Hajj or Umrah also appeared to possess greater awareness of cultural practices and pilgrimage-specific healthcare needs. In contrast, non-Muslim CPs and those practising in areas with fewer Muslim customers more frequently reported uncertainty regarding pilgrimage requirements, travel regulations, and specific health risks. Despite adequate knowledge of medication-related issues across most participants, knowledge gaps relating to travel health

guidelines and vaccination requirements were evident regardless of years of experience, suggesting limited formal training opportunities in travel medicine.

4.3.3.2 Skills

The CPs identified several skills as important for delivering effective pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Some participants (33.3%, 8/24) recognised the importance of communication skills in providing the consultation and expressed confidence in their ability to communicate effectively with pilgrims. Others emphasised the importance of pharmaceutical care skills (25.0%, 6/24). It is noteworthy that perceived competence in pharmaceutical care varied among participants, with those possessing greater experience or training in travel medicine perceived themselves to be more competent.

Opinions diverged regarding the need for specialised training to enhance travel health-related pharmaceutical care skills. Some CPs advocated for targeted training covering medications, supplements, and medical supplies commonly required by pilgrims, whereas others believed that general pharmaceutical care training was sufficient. Moreover, a few participants (12.5%, 3/24) highlighted the importance of counselling skills and suggested that CPs with personal Hajj or Umrah experience may be better equipped to provide comprehensive advice because of their familiarity with the pilgrimage context. They also believed that CPs with personal experience in Hajj or Umrah are better equipped to provide comprehensive advice in this area.

Differences in perceived skills appeared to be influenced more by professional exposure and training than by demographic characteristics. CPs with greater experience providing consultations to pilgrims, particularly those practising in Muslim-majority communities, generally expressed higher confidence in counselling and pharmaceutical care skills. Participants with prior Hajj or Umrah experience also appeared more comfortable discussing pilgrimage-related issues. In contrast, less experienced CPs and those with limited exposure to pilgrims were more likely to report uncertainty regarding specialised travel health advice.

4.3.3.3 Memory, Attention and Decision Process

Most CPs (79.2%, 19/24) mentioned that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims were similar to other consultations routinely conducted in their pharmacies. These consultations were perceived as a natural extension of their daily practice and were often integrated into routine patient interactions. This Memory, Attention, and Decision Processes (MADP) domain relates to the psychological capability component of the COM-B model required to perform the behaviour, namely providing pre-travel pharmacist consultations. The characterisation of such consultations as a natural practice suggests that the behaviour occurs without being asked.

The integration of pre-travel pharmacist consultation into routine practice was reported across participants regardless of age, gender, ethnicity, or pharmacy type. However, CPs working in pharmacies with a higher volume of Muslim customers appeared more likely to routinely incorporate travel-related discussions into their consultations. The absence of standard operating procedures across most pharmacies suggests that consultation practices depended largely on individual CPs' experience and judgement rather than organisational systems.

4.3.3.4 Behavioural Regulation

Some CPs (41.7%, 10/24) stated that offering pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims aligns with their pharmacy's organisational vision and mission, underscoring its relevance in their service provision. Interestingly, one of them (4.2%) highlighted the presence of a formal feedback mechanism, including monitoring customer satisfaction, which facilitated the ongoing provision of pre-travel pharmacist consultations.

Behavioural regulation appeared to differ according to organisational context. Participants employed in chain pharmacies more frequently referred to company vision, mission statements, and customer service policies as guiding their behaviour. In contrast, CPs practising in independent pharmacies appeared to rely more on personal professional values and individual initiative. Regardless of pharmacy type, formal monitoring systems, performance indicators, or structured protocols for pre-travel pharmacist consultations were largely absent.

4.3.3.5 Social/Professional Role and Identity

Overall, most CPs (75.0%, 18/24) acknowledged their role in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, viewing it as part of their professional responsibilities. However, their responsibilities were confined within the scope of their practice. Five of them (20.8%) viewed the provision of pre-travel pharmacist consultations as part of their social responsibility and perceived this service as a means of better serving their culturally diverse communities.

Professional role beliefs were consistently expressed across participants regardless of demographic characteristics. However, CPs who regularly served Muslim communities appeared to express a stronger sense of responsibility towards supporting pilgrims because of greater awareness of their healthcare needs. Participants with personal Hajj or Umrah experience also appeared to view pre-travel pharmacist consultations as an important extension of their professional role, reflecting both professional commitment and cultural familiarity with the pilgrimage.

4.3.3.6 Beliefs about Capabilities

Half of the CPs (50.0%, 12/24) demonstrated confidence in delivering pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, particularly in medication-related topics, citing their knowledge, experience, and expertise in this domain. Conversely, many reported challenges and a lack of confidence, specifically in regulations for travelling with medications (50.0%, 12/24), and a few lacked confidence in managing diseases (16.7%, 4/24).

Perceived capability appeared to vary according to both experience and consultation complexity. More experienced CPs and those with previous exposure to Hajj and Umrah consultations generally reported greater confidence in providing advice on medication management and common health issues. However, even experienced participants frequently expressed uncertainty regarding travel regulations, vaccination requirements, and disease-specific recommendations. This suggests that confidence appeared to be influenced more by familiarity with the consultation topic than by years of professional practice.

4.3.3.7 Optimism

Most CPs (66.7%, 16/24) were generally optimistic about their roles in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. This optimism stemmed from the annual Hajj and Umrah, which led to frequent encounters with customers planning these trips. They also expressed positivity with regard to the potential expansion of professional pharmacy services, collaboration with external agencies, and the enhancement of their responsibilities.

Optimistic beliefs were observed across participants from different demographic backgrounds and practice settings. However, CPs practising in Muslim-majority areas appeared particularly optimistic regarding the future demand for pre-travel pharmacist consultations because of their frequent interactions with pilgrims. Participants who had previously observed positive customer outcomes also expressed stronger optimism regarding the sustainability and value of the service.

4.3.3.8 Beliefs about Consequences

Overall, CPs expressed positive beliefs about the benefits of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, viewing the consultations as beneficial to pilgrims, CPs and community pharmacies. Most of them (83.3%, 20/24) associated the provision of pre-travel pharmacist consultations with the potential to enhance pilgrims' well-being, thereby improving patient convenience and allowing them to better focus on their worship activities. Additionally, many (70.8%, 17/24) believed that providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims could increase sales, whereas nearly half (41.7%, 10/24) highlighted that failing to provide this service could undermine customer trust and negatively impact the pharmacy business viability.

Perceived consequences varied according to participants' professional roles and practice settings. Pharmacy owners and managers appeared more likely to recognise business-related benefits such as customer retention, loyalty, and increased sales. Conversely, employed CPs more frequently emphasised patient-centred outcomes, including improved preparedness and health outcomes. Nevertheless, concern for pilgrims' well-being remained the dominant perceived benefit across all participant groups.

4.3.3.9 Intentions

All of the participants (100.0%, 24/24) expressed their willingness to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, citing their professional obligation to provide the service as the main motivating factor. Strong intentions to provide pre-travel pharmacist consultations were expressed by all participants, regardless of age, experience, ethnicity, or pharmacy type. This consistency suggests that willingness to provide the service was not a major barrier.

4.3.3.10 Goals

More than half of the CPs in this study (66.7%, 16/24) believed that the goals of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims were to provide relevant health and medication-related information, with some (21.2%, 7/24) emphasising the aim of improving the well-being of the pilgrims. A minority of them stated that these were meant to ensure pilgrims were equipped with appropriate medications and healthcare products (25.0%, 6/24), and to enhance customer satisfaction, and foster trust to promote business growth (12.5%, 3/24).

Goals were predominantly patient-centred across all participant groups. However, participants practising in areas with greater pilgrim demand more frequently emphasised improving pilgrims' preparedness and medication safety. Pharmacy owners and managers occasionally identified customer satisfaction and business sustainability as additional goals, although these remained secondary to patient-care objectives.

4.3.3.11 Reinforcement

Only one CP (4.2%, 1/24) suggested that offering incentives and rewards could motivate pharmacists to provide the service. For instance, the authorities could offer financial benefits and professional recognition to encourage greater involvement in pre-travel pharmacist consultations. External reinforcement was rarely mentioned regardless of participant characteristics or practice setting. The limited emphasis on financial incentives or recognition suggests that involvement was primarily driven by emotions and professional commitment rather than extrinsic rewards. This pattern appeared consistent across both independent and chain pharmacies.

4.3.3.12 Emotion

Most of the participants expressed positive emotions during pre-travel pharmacist consultations with prospective Hajj and Umrah pilgrims, including satisfaction (70.8%, 17/24) and happiness (70.8%, 17/24). However, several of them (12.5%, 3/24) reported negative feelings such as stress and tiredness, which could adversely affect their motivation. This is particularly true when addressing heavy workloads that could demotivate them from offering subsequent consultations.

Positive emotions such as happiness and satisfaction were reported across participants regardless of demographic background. However, reports of stress and fatigue were more commonly associated with busy pharmacy environments, staffing shortages, and periods of high pilgrim demand. This suggests that emotional responses were influenced more by workplace conditions than by individual participant characteristics.

4.3.3.13 Social Influences

Nearly all participants (95.8%, 23/24) believed that patients, the public, and the national professional organisation (e.g., the Malaysian Pharmacists Society) would support the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Although some (25.0%, 6/24) expressed concerns that doctors might not support this idea, a significant majority of them felt that entities such as community pharmacies (83.3%, 20/24), travel agencies (79.2%, 19/24), doctors (70.8%, 17/24), and other healthcare professionals (66.7%, 16/24) including nurses and nutritionists would be supportive of such program.

On the other hand, only a few CPs (20.8%, 5/24) felt encouraged by their employers or companies. It was also noted that distinct support systems and operational dynamics exist between CPs in chain and independent pharmacies, positively impacting their ability to this service. In essence, while chain pharmacies often require permission for such practices, they can offer a structured support system to the CPs. Meanwhile, independent pharmacies benefit from self-motivation, flexibility, and more personalised services without needing permission from higher authorities.

Perceived social support varied according to participants' professional networks and practice contexts. CPs with previous collaborations with travel agencies or

healthcare providers reported stronger support from external stakeholders. Participants practising in Muslim-majority communities also appeared more likely to perceive support from customers and travel agencies due to higher demand for pilgrimage-related services. In contrast, views regarding doctors' support were mixed, reflecting variation in interprofessional relationships across practice settings.

4.3.3.14 Environmental Context and Resources

There were various environmental factors that either facilitate or impede the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The main barrier reported were the shortage of staff (41.7%, 10/24) and lack of time (37.5%, 9/24) to provide the consultations. This is mainly due to the fact that most of them work alone in their community pharmacies, making it challenging to manage consultations alongside their other responsibilities. Additionally, some CPs (37.5%, 9/24) cited the heavy daily workload as a barrier, as it limits the time available to provide consultation and potentially compromises service quality.

Various environmental contexts and resources were perceived as facilitators in this service. The main facilitator mentioned by the pharmacists was the customers' demand for the consultation (87.5%, 21/24). Additionally, the majority (75.0%, 18/24) believed that a training programme in travel health could enable them to deliver the consultation effectively. Many of them (54.2%, 13/24) highlighted that the availability of resources and guidelines tailored to the unique needs of Hajj and Umrah pilgrims can facilitate their provision of pre-travel pharmacist consultations.

The CPs in this study utilised information from diverse sources, including travel agencies, airline websites, WHO, CDC, Tabung Haji (the Malaysian hajj pilgrims fund board) website, Malaysia MOH platforms, and pharmacy-related websites. Furthermore, for some CPs (33.3%, 8/24), the location of their pharmacies in Muslim-populated areas and areas with a high proportion of elderly individuals also increased their involvement in providing pre-travel pharmacist consultations for prospective pilgrims.

Environmental factors appeared to be the most context-dependent determinants. Participants working in independent pharmacies often reported greater flexibility in providing consultations but were more affected by staffing shortages and resource limitations. Conversely, chain pharmacy employees frequently described organisational

support and training opportunities but also reported workflow pressures and operational constraints. CPs practising in Muslim-majority areas reported greater customer demand and more opportunities to gain experience with pilgrims, whereas those in non-Muslim-majority areas encountered fewer opportunities to develop travel health expertise. These findings suggest that local population characteristics, staffing arrangements, and organisational structures substantially influenced opportunities to provide pre-travel pharmacist consultations.

4.4 Study 3: Assessment of Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur

4.4.1 Phase 1: Development and Validation of the Survey Instrument

4.4.1.1 Step 1: Item Generation

Initially, a pool of 62 items was generated. Following a consensus review by the research team, the final instrument comprised 49 items. This included seven binary (Yes/No) questions assessing CPs' pre-travel pharmacist consultation practices for prospective Hajj and Umrah pilgrims, and 42 items measuring levels of agreement on beliefs, guided by the TDF.

4.4.1.2 Step 2: Content Validity

Table 4.7 presents the summary of I-CVI scores for item relevancy analysis. The average I-CVI for Part 1: Practices was 0.98, and for Part 2: Beliefs, 0.94. For the Practices section, 14.3% of items (1 out of 7) had an I-CVI of 0.88, while 85.7% (6 out of 7) achieved an I-CVI of 1. For the Beliefs section, 4.8% of items (2 out of 42) scored 0.75, 38.1% (16 out of 42) scored 0.88, and 57.1% (24 out of 42) achieved an I-CVI of 1. The Practices section demonstrated an S-CVI/Ave of 0.98, while the Beliefs section demonstrated an S-CVI/Ave of 0.94, indicating excellent overall content validity for both sections.

Two items (Questions 13 and 17) received I-CVI scores below the acceptable threshold of 0.78 and were subsequently removed based on expert review. The excluded items were: *"I have the consultative skills to provide pre-travel pharmacist consultation*

to prospective Hajj/Umrah travellers" (TDF domain: Skills) and *"My organisation has effective mechanisms to gather feedback from customers"* (TDF domain: Behavioural Regulation). The removal of these items improved the overall content validity of the instrument by retaining only items demonstrating adequate expert agreement.

Table 4.7
Item Content Validity Index (I-CVI) for Item Relevancy Analysis

Domain/sub-domain	I-CVI Range	I-CVI Average
Practices	0.88 - 1.00	0.98
Beliefs		
Knowledge	0.88	0.88
Skills	0.75 - 1.00 (0.88 – 1.00)*	0.91 (0.96)*
Memory, attention, and decision processes	1.00	1.00
Behavioural regulation	0.75 - 0.88 (0.88)*	0.82 (0.88)*
Social/professional role and identity	0.88 - 1.00	0.94
Beliefs about capabilities	0.88 - 1.00	0.94
Optimism	1.00	1.00
Beliefs about consequences	0.88 - 1.00	0.96
Intentions	1.00	1.00
Goals	0.88	0.88
Reinforcement	0.88	0.88
Emotion	0.88 - 1.00	0.94
Social influences	0.88 - 1.00	0.94
Environmental context and resources	0.88 - 1.00	0.95

Note: *Values in parentheses represent I-CVI range and average after removal of one item from the Skills domain and one item from Behavioural Regulation. Note: Where the range is represented by a single value (e.g., Knowledge domain), all items within that domain had identical I-CVI scores.

4.4.1.3 Step 3: Cognitive Interviews

A total of 10 CPs participated in the cognitive interviews, of whom 80.0% were females. The sample included participants from diverse ethnic backgrounds, comprising 60.0% Malay, 30.0% Chinese, and 10.0% Indian. These participants had between 3 and 20 years of professional experience in community pharmacy practice.

Following the cognitive interviews, all items were retained. However, modifications were made to improve clarity and precision based on participant feedback. Revisions included adjustments to grammar, word choice, and response options. Participants identified several issues related to clarity and ambiguity in specific items (Table 4.8). For example, Question 7 (Practice), which referred to a "medication list," was unclear and required clarification on whether it meant a list issued in Saudi Arabia. Similarly, Questions 8 and 9 (Knowledge), which assessed awareness of

guidelines and medical issues, were reworded to improve comprehensibility. Question 24 (Beliefs about consequences), which addressed cost-saving measures for pilgrims, was also revised to enhance clarity and precision. The revised items were subsequently reassessed during the cognitive interview process through participant feedback and probing techniques to ensure improved clarity, interpretation, and readability. Following rewording, participants demonstrated better understanding of the revised terminology and phrasing, with no further major concerns regarding ambiguity or interpretation reported. In addition, the revised items retained their intended conceptual meaning while improving contextual appropriateness for the target population.

Table 4.8
Summary of Participant Feedback and Identified Issues from the Cognitive Interviews

	Original Item	Identified Issues	Revised Item
Q7 (Practice)	I have prepared a medication list for prospective Hajj/Umrah pilgrims for international travel requirements	Ambiguity in terminology	I have prepared a medication list for prospective Hajj/Umrah pilgrims to be used as their official reference during their travel
Q8 (Knowledge)	I am aware of the guidelines for providing pre-travel pharmacist consultations for prospective Hajj/Umrah pilgrims	Lack of clarity	I am aware of the travel health requirements/recommendations in providing pre-travel pharmacist consultations for prospective Hajj/Umrah pilgrims
Q9 (Knowledge)	I am aware of the medical-related problems or health issues related to Hajj/Umrah	Lack of clarity	I am aware of the health-related problems/ issues related to Hajj/Umrah
Q24 (Beliefs about consequences)	I can help prospective Hajj/Umrah pilgrims save on medical and medication costs	Clarity issue	I can help prospective Hajj/Umrah pilgrims save their medication costs during their travel

4.4.1.4 Step 4: Reliability Test

Of the 36 CPs initially invited, 30 completed the retest survey to yield a response rate of 83.3%. Table 4.9 presents the Cohen's κ and ICC values across the domains. Test-retest reliability over a one-week interval produced Cohen's κ values ranging from 0.583 to 1.00 for binary Practice items (1-7), indicating moderate to almost perfect agreement. Meanwhile, for Beliefs items (8-47), test–retest reliability was assessed using single-measure (ICC, two-way mixed-effects model, absolute agreement), with values ranging from 0.530 to 0.910, indicating moderate to excellent reliability. In essence, all κ and ICC values were statistically significant at $p < 0.01$ (two-tailed).

The lowest κ was recorded for Practice item 4 ("I have assessed medication-related issues [e.g. medication adherence, safety, and appropriateness]") at κ = 0.583 (moderate agreement). The lowest ICC was recorded for the Beliefs item 23 (*"I believe that by providing pre-travel pharmacist consultation, I can help reduce pilgrims' medication costs"*), with ICC = 0.530 (moderate reliability). Despite their lower ICC values, both items were retained in the final instrument due to their theoretical importance within the TDF framework and relevance to real-world community pharmacy practice.

Table 4.9
Summary of Test–Retest Reliability for Practice (Cohen's κ) and Belief (ICC) Items

Domain/sub-domain	Item	Reliability Coefficient [a]	Range
Practice (binary Yes/No)	1-7	κ	0.583 – 1.000*
Beliefs			
Knowledge	8-10	ICC	0.578 - 0.819*
Skills	11-13	ICC	0.554 - 0.653*
Memory, attention and decision processes	14	ICC	0.670*
Behavioural regulation	15	ICC	0.775*
Social/professional role and identity	16-17	ICC	0.663 - 0.909*
Beliefs about capabilities	18-19	ICC	0.617 - 0.684*
Optimism	20-21	ICC	0.580 - 0.698*
Beliefs about consequences	22-25	ICC	0.530 - 0.658*
Intentions	26	ICC	0.722*
Goals	27	ICC	0.818*
Reinforcement	28	ICC	0.655*
Emotion	29-31	ICC	0.596 - 0.856*
Social influences	32-38	ICC	0.587 - 0.818*
Environmental context and resources	39-47	ICC	0.600 - 0.910*

Note: [a] κ = Cohen's kappa coefficient (binary items); ICC = intraclass correlation coefficient (Likert items), single-measure, two-way mixed-effects model, absolute agreement. * $p < 0.01$ (two-tailed) for all κ and ICC values.

4.4.1.5 Step 5: Feasibility Test

From the total of 49 CPs who were invited to participate in the feasibility test, 30 had completed the questionnaire. Non-participation was primarily due to the participants being unavailable during data collection and work-related time constraints. Of those who participated, seven completed the paper-based version, while 23 used the online format. Overall, the feasibility test indicated that the questionnaire in both formats was clear and easy to use. However, clarification was required for the screening items assessing community pharmacy experience and whether participants' current responsibilities involved direct customer service. Consequently, minor revisions were

made to improve the clarity of the instructions and wording of the screening questions, namely: “Do you have less than one year of community pharmacy experience?” and “Do your current responsibilities comprise solely managerial duties and without service to customers?” Following these revisions, participants demonstrated better understanding of the screening items, with no further major concerns regarding clarity or interpretation reported. The average time required to complete the questionnaire ranged between 15 and 20 minutes.

4.4.1.6 Final Survey Instrument

Following the refinement of the survey instrument, the final version comprised 47 items across two sections: seven Yes/No questions assessing CPs’ practices and 40 Likert-scale items measuring beliefs across the TDF domains. A detailed mapping of the final questionnaire items, corresponding TDF domains, and sources of item generation is presented in Appendix 14. Table 4.10 summarises the survey instrument refinement process, detailing the initial number of items, revisions based on expert and participant feedback, and the finalised item count following modifications.

Table 4.10
Summary of the Processes to Develop and Validate the Survey Instrument

Step	Details	Outcome
Item generation	Literature review and qualitative study	62 items generated (initial pool)
Initial reduction	Removal of redundant/irrelevant items based on researchers’ consensus	13 items removed → 49 items retained for preliminary version
Content validity	8 SMEs (I-CVI computed for all items)	2 items excluded, 40 reworded → 47 items
Cognitive interviews	Face validation with 10 CPs	4 items rephrased for clarity and contextual relevance (no change in count) → 47 items
Reliability test	Test-retest assessment with 30 CPs	Practice items (Yes/No): all $\kappa \geq 0.50$; Belief items (Likert): all ICC $(3,1) \geq 0.50$ (no change in count) → 47 items
Feasibility test	Evaluation of format and usability with 30 CPs	Screening questions refined (no change in count) → Final instrument: 47 items (7 practice, 40 beliefs)

4.4.2 Phase 2: Cross-Sectional Questionnaire Survey

A total of 600 questionnaires were distributed by hand, of which 209 were returned, resulting a response rate of 34.8%. Of the returned questionnaires, 198 were

fully completed corresponding to a completion rate of 94.7%. For the online survey, 193 participants attempted the questionnaire, of whom 125 provided complete responses, resulting in a completion rate of 64.8%. In total, 323 fully completed questionnaires (198 paper-based and 125 online) and all 47 items answered were included in the final analysis.

4.4.2.1 Characteristics of Respondents

Table 4.11 presents the demographic characteristics of the respondents. The majority (70.3%) of respondents were female, and over half (55.4%) of them aged between 30 - 39 years. Chinese respondents accounted for 47.4%, and Muslims represented 43.0% of respondents. Most reported no prior Hajj/Umrah experience or indicated that it was not applicable (84.5%). The majority (90.4%) held an undergraduate qualification (BPharm/PharmD), and more than half had been practising since graduation for 5-9 years. Furthermore, over half of the respondents had 1-4 years of experience working in community pharmacies (54.2%) or employed in chain pharmacies (64.4%). Most of them worked full-time (93.8%) and in an employee position (84.8%). More than half (67.2%) had not received any formal training in travel medicine.

Analysis of respondent characteristics by data collection mode indicated a single notable difference. Pharmacists with prior training in travel medicine were more likely to be recruited via the online survey than those without such training (54.7% vs 30.9%, $p < 0.001$). In contrast, no statistically significant differences were observed between online and paper-based respondents for other demographic characteristics (Appendix 15).

Table 4.11
Characteristics of respondents (n=323)

Demographics	Frequency (%)
Age (years)	
29 or below	107 (33.1)
30 – 39	179 (55.4)
40 and above	37 (11.5)
Gender	
Male	96 (29.7)
Female	227 (70.3)
Ethnicity	
Malay	142 (44.0)
Non-Malay	181 (56.0)
Chinese	153 (47.4)

Demographics	Frequency (%)	
Indians		27 (8.3)
Others		1 (0.3)
Religious affiliation		
Islam	139 (43.0)	
Others	184 (57.0)	
Buddhism		127 (39.3)
Christianity		26 (8.1)
Hinduism		26 (8.1)
Other religions		5 (1.5)
Hajj/Umrah travel experience		
Yes	50 (15.5)	
No	89 (27.5)	
Not applicable	184 (57.0)	
Highest academic qualification		
Undergraduate (BPharm / PharmD)	292 (90.4)	
Postgraduate	31 (9.6)	
Duration since graduation (years)		
Less than 5	75 (23.2)	
5-9	171 (52.9)	
10 and above	77 (23.9)	
Duration in community pharmacy practice (years)		
Less than 5	174 (53.9)	
5-9	104 (32.2)	
10 and above	45 (13.9)	
Type of community pharmacy		
Independent	115 (35.6)	
Chain	208 (64.4)	
Current position		
Owner	31 (9.6)	
Part-owner	18 (5.6)	
Employee	274 (84.8)	
Type of employment status		
Full-time	303 (93.8)	
Part-time	20 (6.2)	
Training in travel medicine		
Yes	106 (32.8)	
No	217 (67.2)	

4.4.2.2 Activities Related to Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Table 4.12 presents the details of seven activities involved during pre-travel pharmacist consultations. Dispensing medications for the pilgrimage emerged as the most frequent activity (89.2%). Other common practices included making recommendations for health-related products (83.9%), medication assessment (73.7%), basic health testing (70.6%), and travel health education (56.3%). Other activities included medical professional referrals for health-related needs (43.3%), and the preparation of medication lists to serve as an official reference during travel (29.4%).

The most frequently dispensed medication categories were minor ailments (98.9%), followed by oral contraceptive pills (75.3%) and chronic disease medications

(59.0%). The top three categories of recommended health-related products were supplements and nutritional products (93.7%), medications (93.4%), and medical supplies (60.1%). Additionally, the travel health education provided by the respondents was on medication management (87.4%), prevention of travel-related illnesses and self-care practices (79.7%), medical supplies (65.4%), and vaccinations (17.0%).

Table 4.12
Respondents' Involvement in Pre-Travel Pharmacist Consultation Activities for Prospective Hajj Umrah Pilgrims

Activities	Frequency (%)	
Dispense medications to be used throughout the journey	288 (89.2)	
Minor ailments medications		285 (98.9)
Oral contraceptive pills		217 (75.3)
Chronic disease medications		170 (59.0)
Make recommendations for health-related products	271 (83.9)	
Supplements and nutritional products		254 (93.7)
Medications		253 (93.4)
Medical supplies		163 (60.1)
Personal care products		161 (59.4)
Travel medical kit		156 (57.6)
Others (vaccines)		1 (0.4)
Assess medication-related issues	238 (73.7)	
Offer basic health tests upon request	228 (70.6)	
Provide travel health education	182 (56.3)	
Medication management		159 (87.4)
Prevention of travel-related illnesses and self-care practices		145 (79.7)
Medical supplies		119 (65.4)
Vaccinations		31 (17.0)
Make referrals to other medical professionals for health-related needs	140 (43.3)	
Prepare a medication list to be used as an official reference during travel	95 (29.4)	

4.4.2.3 Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Table 4.13 presents the CPs' beliefs regarding the provision of pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims. The domain mean scores, presented in descending order were as follows: Beliefs about Consequences (4.18 ± 0.62), Social/Professional Role and Identity (4.12 ± 0.64), Optimism (4.05 ± 0.67), Goals (3.92 ± 0.71), Intentions (3.88 ± 0.77), Emotion (3.82 ± 0.61), Social

Influence (3.81 ± 0.58), Knowledge (3.72 ± 0.77), Skills (3.70 ± 0.67), Beliefs about Capabilities (3.60 ± 0.68), Memory, Attention and Decision Processes (3.56 ± 0.84), Environmental Context and Resources (3.42 ± 0.57), Behavioural Regulation (3.35 ± 0.96) and Reinforcement (2.64 ± 0.98).

Item-level analysis demonstrated a high level of agreement (i.e. mean score larger than 4) across several domains. The highest mean score was observed for the item concerning Beliefs about Consequences regarding the improvement of trust in CPs through pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims (4.25 ± 0.67). This is followed by the respondents showed strong agreement that providing this consultation can enhance the reputation of community pharmacies (Beliefs about Consequences) (4.24 ± 0.70). Furthermore, the respondents showed strong agreement that the consultation helps to ensure the well-being of pilgrims during their travels (Beliefs about Consequences) (4.15 ± 0.70) and helps prospective pilgrims save on their medication costs (Beliefs about Consequences) (4.11 ± 0.70). A similar result was found for the item asserting that a CP has a professional role in providing this service (Social/Professional Role and Identity) (4.19 ± 0.68).

Conversely, the lowest mean agreement was found for the item regarding provision of consultation due to anticipated reward (Reinforcement) (2.64 ± 0.98). Other low-agreement items included those pertaining to many requests for consultation (Environmental Context and Resources) (2.89 ± 0.96), receiving adequate training (Environmental Context and Resources) (2.95 ± 0.87), the usual practice of the consultation in their pharmacy (Behavioural Regulation) (3.35 ± 0.96), and having enough time to provide comprehensive services, including Hajj and Umrah pre-travel pharmacist consultation (Environmental Context and Resources) (3.41 ± 0.86).

The Knowledge domain was assessed in accordance with the TDF, which conceptualises knowledge as an individual's awareness and understanding of information relevant to a behaviour. Accordingly, the items were designed to evaluate participants' self-reported awareness and perceived knowledge related to travel health services rather than objectively testing factual knowledge or clinical competency. This approach is consistent with the study's aim of identifying behavioural determinants influencing CPs' involvement in pre-travel pharmacist consultation. Nevertheless, future studies may consider incorporating objective knowledge-based assessments to complement self-reported measures and provide a more comprehensive evaluation of pharmacists' travel health knowledge.

Although communication skills and counselling skills are conceptually related, they were retained as separate items during instrument development because the qualitative findings suggested that participants viewed them as distinct aspects of practice. Communication skills referred more broadly to the ability to establish rapport, exchange information effectively, and communicate with pilgrims in a clear and appropriate manner. In contrast, counselling skills encompassed more structured and patient-centred activities, including patient assessment, provision of personalised advice, behavioural guidance, and health education within the context of pre-travel pharmacist consultation. As these distinctions emerged from the qualitative data and reflected different dimensions of pharmacist–patient interaction, both items were retained to ensure comprehensive representation of the experiences and perceptions reported by participants.

Regarding the Reinforcement item "I provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims because I would be rewarded." The item is a non-reversed reinforcement item because it is positively aligned with the construct being measured. In the TDF domain of reinforcement, rewards or incentives are expected to increase the likelihood of performing a behaviour. Therefore, agreement with the statement reflects stronger reinforcement influences, whereas disagreement reflects weaker reinforcement influences, without requiring reverse scoring. The questionnaire predominantly consisted of positively worded belief items. Only one negatively framed item, namely "Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel stressed," was included under the Emotion domain to capture potential negative emotional responses associated with service provision. This item was treated as a reverse-oriented item during analysis to maintain consistency in score interpretation across domains.

The primary analyses focused on associations between TDF domain scores and involvement in pre-travel pharmacist consultation activities, rather than examining differences in TDF belief domains across sociodemographic groups. Therefore, sociodemographic characteristics were included in the logistic regression analyses to determine whether they influenced involvement in pre-travel pharmacist consultation activities alongside the TDF belief domains. The full results of the belief items are shown in Appendix 16.

Table 4.13
Respondents' Reporting Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Item	Statement	Disagree	Neutral	Agree	Mean ± SD
		n (%)			
TDF Domain: Knowledge					
1.	I am aware of the travel health requirements/recommendations in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	29 (9.0)	90 (27.8)	204 (63.2)	3.67 ± 0.89
2.	I am aware of the health-related problems/ issues related to Hajj/Umrah	16 (5.0)	81 (25.0)	226 (70.0)	3.77 ± 0.82
3.	I am aware of the medication-related problems/issues related to Hajj/Umrah	21 (6.5)	79 (24.5)	223 (69.0)	3.72 ± 0.81
	Domain mean score (rank)				3.72 ± 0.77 (8)
TDF Domain: Skills					
4.	I have pharmaceutical care skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	23 (7.2)	97 (30.0)	203 (62.8)	3.63 ± 0.77
5.	I have communication skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	10 (3.1)	88 (27.2)	225 (69.7)	3.78 ± 0.72
6.	I have counselling skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	20 (6.2)	90 (27.9)	213 (65.9)	3.70 ± 0.77
	Domain mean score (rank)				3.70 ± 0.67 (9)
TDF Domain: Memory, Attention and Decision Processes					
7.	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims is something that I do without being asked to	31 (9.6)	111 (34.4)	181 (56.0)	3.56 ± 0.84
	Domain mean score (rank)				3.56 ± 0.84 (11)
TDF Domain: Behavioural Regulation					
8.	Providing pre-travel pharmacist consultation to prospective Hajj/Umrah pilgrims is a usual practice I do in my pharmacy	62 (19.2)	109 (33.7)	152 (47.1)	3.35 ± 0.96
	Domain mean score (rank)				3.35 ± 0.96 (13)
TDF Domain: Social/Professional Role and Identity					
9.	I believe that a pharmacist has a professional role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (1.0)	34 (10.5)	286 (88.5)	4.19 ± 0.68
10.	I believe it is my social responsibility to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims upon request	5 (1.5)	48 (14.9)	270 (83.6)	4.06 ± 0.71
	Domain mean score (rank)				4.12 ± 0.64 (2)
TDF Domain: Beliefs about Capabilities					
11.	I have a satisfactory level of self-confidence in my ability to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	13 (4.1)	108 (33.4)	202 (62.5)	3.65 ± 0.73

Item	Statement	Disagree	Neutral	Agree	Mean ± SD
			n (%)		
1	It is easy for me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	23 (7.1)	116 (35.9)	184 (57.0)	3.56 ± 0.78
	Domain mean score (rank)				3.60 ± 0.68 (10)
TDF Domain: Optimism					
1	I believe that there will be a continuous demand for pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	5 (1.5)	51 (15.8)	267 (82.7)	4.03 ± 0.71
1	I am optimistic that pharmacists' roles in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims will expand in the future	4 (1.2)	54 (16.8)	265 (82.0)	4.07 ± 0.73
	Domain mean score (rank)				4.05 ± 0.67 (3)
TDF Domain: Beliefs about Consequences					
	I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims:				
1	I can help to ensure that the well-being of prospective Hajj/Umrah pilgrims is taken care of during their travel	5 (1.5)	34 (10.5)	284 (88.0)	4.15 ± 0.70
1	I can help prospective Hajj/Umrah pilgrims save their medication costs during their travel	6 (1.9)	36 (11.1)	281 (87.0)	4.11 ± 0.70
1	I can improve trust in community pharmacists	3 (1.0)	25 (7.7)	295 (91.3)	4.25 ± 0.67
1	I can enhance the reputation of community pharmacy	4 (1.2)	28 (8.7)	291 (90.1)	4.24 ± 0.70
	Domain mean score (rank)				4.18 ± 0.62 (1)
TDF Domain: Intentions					
1	I intend to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims in the coming Hajj/Umrah seasons	6 (1.9)	92 (28.4)	225 (69.7)	3.88 ± 0.77
	Domain mean score (rank)				3.88 ± 0.77 (5)
TDF Domain: Goals					
2	I aim to provide prospective Hajj/Umrah pilgrims with pre-travel pharmacist consultation whenever possible	3 (0.9)	79 (24.5)	241 (74.6)	3.92 ± 0.71
	Domain mean score (rank)				3.92 ± 0.71 (4)
TDF Domain: Reinforcement					
2	I provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims because I would be rewarded e.g. recognition, incentives	134 (41.5)	134 (41.5)	55 (17.0)	2.64 ± 0.98
	Domain mean score (rank)				2.64 ± 0.98 (14)
TDF Domain: Emotion					
2	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me happy	7 (2.2)	121 (37.5)	195 (60.3)	3.73 ± 0.77

Item	Statement	Disagree	Neutral	Agree	Mean ± SD
			n (%)		
2	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel satisfied	4 (1.2)	92 (28.5)	227 (70.3)	3.86 ± 0.73
2	*Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel stressed*[a]	23 (7.1)	75 (23.2)	225 (69.5)	3.89 ± 0.92
	Domain mean score (rank)				3.82 ± 0.61 (6)
TDF Domain: Social Influences					
2	Customers would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	2 (0.6)	69 (21.4)	252 (78.0)	3.95 ± 0.67
2	Doctors would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	12 (3.7)	126 (39.0)	185 (57.3)	3.61 ± 0.72
2	Other community pharmacists would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	7 (2.2)	82 (25.4)	234 (72.4)	3.82 ± 0.68
2	Other healthcare professionals e.g. nutritionists, dietitians and nurses would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	8 (2.5)	102 (31.6)	213 (65.9)	3.74 ± 0.70
2	National professional bodies e.g. Malaysian Pharmacists Society (MPS) would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	5 (1.5)	78 (24.1)	240 (74.4)	3.89 ± 0.70
3	My company would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	4 (1.2)	65 (20.1)	254 (78.7)	4.00 ± 0.72
3	Travel agencies would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	10 (3.1)	129 (39.9)	184 (57.0)	3.66 ± 0.76
	Domain mean score (rank)				3.81 ± 0.58 (7)
TDF Domain: Environmental Context and Resources					
3	I have sufficient staff supporting me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	30 (9.3)	121 (37.5)	172 (53.2)	3.50 ± 0.83
3	I have a manageable workload that allows me to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	39 (12.1)	124 (38.4)	160 (49.5)	3.44 ± 0.83
3	I have enough time to provide comprehensive services, including Hajj/Umrah pre-travel pharmacist consultation	44 (13.6)	128 (39.6)	151 (46.8)	3.41 ± 0.86
3	I receive many requests for consultations from prospective Hajj/Umrah pilgrims in the past one year	110 (34.1)	125 (38.7)	88 (27.2)	2.89 ± 0.96
3	I receive adequate training and education in travel health	98 (30.3)	141 (43.7)	84 (26.0)	2.95 ± 0.87
3	My premise serves predominantly Muslim customers	56 (17.3)	108 (33.4)	159 (49.3)	3.47 ± 1.03
3	My pharmacy has sufficient pharmacy-related information resources to support travel consultations	30 (9.3)	111 (34.4)	182 (56.3)	3.54 ± 0.79
3	There is a wide range of products that are suitable	9 (2.8)	46	268	3.96 ±

Item	Statement	Disagree	Neutral	Agree	Mean ± SD
			n (%)		
	for Hajj/Umrah pilgrims at the pharmacy		(14.2)	(83.0)	0.67
4(	My pharmacy premise has adequate space to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	16 (5.0)	99 (30.7)	208 (64.3)	3.69 ± 0.74
	Domain mean score (rank)				3.42 ± 0.57 (12)

Note: [a]*reversed question*

4.4.2.4 Factors Influencing Involvement in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims among Respondents

Tables 4.14 to 4.20 present the associations between respondents' characteristics, beliefs and their involvement in specific pre-travel pharmacist consultation activities. Although the study evaluated multiple pre-travel pharmacist consultation activities, provision of travel health education may represent the most conceptually important activity within the context of the present study because it reflects broader preventive healthcare engagement beyond traditional medication dispensing roles. Travel health education encompasses risk communication, preventive counselling, self-management support, and behavioural guidance, which align closely with the preventive and patient-centred objectives of pre-travel healthcare for Hajj and Umrah pilgrims.

In general, pharmacists who were involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims' activities reported higher scores across most belief domains, although the specific independent predictors differed by activity. Across the models, environmental context and resources appeared as the most consistent factor, associated with involvement in dispensing, making recommendations, offering basic health tests, providing travel health education and making referrals. Capability-related TDF domains showed activity-specific associations, including knowledge (dispensing, recommendations and making referrals), skills (medication assessment and lists), while behavioural regulation was associated with medication assessment, health education, making referrals and preparing medication lists. Reinforcement was largely non-significant and was inversely associated with dispensing. Most sociodemographic characteristics did not remain significant after adjustment, with limited exceptions such as religion, prior Hajj/Umrah experience, duration since graduation and in community pharmacy practice.'

a. Dispensing Medications for Prospective Hajj and Umrah Pilgrims

Table 4.14 presents the associations between respondents' characteristics and involvement in dispensing medications for prospective Hajj and Umrah pilgrims. Involvement was significantly higher among Malay [94.9% (131/138)] and Muslim [95.0% (132/139)] respondents compared to their non-Malay [84.9% (157/185)] and non-Muslims [84.8% (156/184)] counterparts (both $p = 0.004$). No statistically significant associations were identified for age, gender, education level, prior Hajj or Umrah experience, duration since graduation, duration of community pharmacy practice, type of pharmacy, current position, type of employment or training in travel medicine.

Belief Domains and Involvement in Dispensing Medications

Respondents involved in dispensing medications for prospective Hajj and Umrah pilgrims reported significantly higher mean scores across most belief domains compared to those who were not. Statistically significant differences were identified for knowledge (mean ± SD: 3.79 ± 0.71 vs 3.13 ± 0.97, $p < 0.001$), skills (3.76 ± 0.62 vs 3.21 ± 0.85, $p < 0.001$), and memory, attention and decision processes (2.52 ± 0.64 vs 2.03 ± 0.71, $p < 0.001$).

Significant differences were also identified for behavioural regulation (2.34 ± 0.75 vs 1.80 ± 0.76, $p < 0.001$), social and professional role and identity (4.18 ± 0.60 vs 3.66 ± 0.79, $p < 0.001$), beliefs about capabilities (3.67 ± 0.63 vs 3.10 ± 0.89, $p < 0.001$), optimism (4.11 ± 0.63 vs 3.53 ± 0.79, $p < 0.001$), and beliefs about consequences (4.24 ± 0.58 vs 3.73 ± 0.77, $p < 0.001$). Statistically significant differences were also observed for intentions (2.73 ± 0.48 vs 2.29 ± 0.57, $p < 0.001$), goals (2.78 ± 0.43 vs 2.34 ± 0.54, $p < 0.001$), emotion (3.87 ± 0.60 vs 3.40 ± 0.52, $p < 0.001$), social influences (3.86 ± 0.54 vs 3.39 ± 0.70, $p < 0.001$), and environmental context and resources (3.48 ± 0.54 vs 2.98 ± 0.61, $p < 0.001$). No statistically significant difference was observed for reinforcement ($p = 0.065$).

Factors Associated with the Involvement in Dispensing Medications for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

Univariate analyses revealed that several respondent characteristics, specifically ethnicity ($p = 0.006$) and religion ($p = 0.005$), along with various belief domains, were significantly associated with involvement in dispensing medications for Hajj and Umrah pilgrims.

With respect to belief domains, significant associations were observed for knowledge ($p < 0.001$), skills ($p < 0.001$), memory, attention and decision processes ($p < 0.001$), behavioural regulation ($p < 0.001$), social and professional role and identity ($p < 0.001$), beliefs about capabilities ($p < 0.001$), optimism ($p < 0.001$), beliefs about consequences ($p < 0.001$), intentions ($p < 0.001$), goals ($p < 0.001$), emotion ($p < 0.001$), social influences ($p < 0.001$), and environmental context and resources ($p < 0.001$).

Multivariable Analysis

All respondent characteristics and belief domains with a p-value of less than 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only four belief domains remained independently associated with involvement in dispensing medications. Knowledge (adjusted OR = 1.75, 95% CI: 1.03–2.98, $p = 0.040$) and social/professional role/identity (adjusted OR = 2.47, 95% CI: 1.23-4.98, $p = 0.011$) were associated with higher odds of involvement. Environmental context and resources also remained significant (adjusted OR = 5.34, 95% CI: 2.18-13.04, $p < 0.001$). Meanwhile, reinforcement was associated with lower odds of involvement (adjusted OR = 0.47, 95% CI: 0.29-0.75, $p = 0.002$). No respondent characteristic variables retained statistical significance in the adjusted model.

Table 4.14
Association between Respondents' Characteristics and Their Involvement in Dispensing Medications for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in dispensing medications		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years)			0.620				
<30	93 (86.9)	14 (13.1)		1			
30-39	161 (89.9)	18 (10.1)		1.35 (0.64, 2.83)	0.433	-	-
≥40	34 (91.9)	3 (8.1)		1.71 (0.46, 6.31)	0.423		
Gender			0.532				
Male	84 (87.5)	12 (12.5)		1			
Female	204 (89.9)	23 (10.1)		1.27 (0.60, 2.66)	0.532	-	-
Ethnicity†			0.004*				
Malay	131 (94.9)	7 (5.1)		3.34 (1.41, 7.89)	0.006	-	-
Non-Malay	157 (84.9)	28 (15.1)		1			
Religion†			0.004*				
Islam	132 (95.0)	7 (5.0)		3.38 (1.43, 8.00)	0.005	-	-
Non-Muslim	156 (84.8)	28 (15.2)		1			
Level of education			1.00[b]				
Undergraduate	260 (89.0)	32 (11.0)		1			
Postgraduate	28 (90.3)	3 (9.7)		1.15 (0.33, 3.99)	0.827	-	-
Prior Hajj or Umrah experience†			0.091				
Yes	48 (96.0)	2 (4.0)		3.30 (0.776, 1.22)	0.109	-	-
No	240 (87.9)	33 (12.1)		1			
Duration since graduation (years)			0.859				
<5	66 (88.0)	9 (12.0)		1			
5-9	154 (90.1)	17 (9.9)		1.23 (0.52, 2.91)	0.629	-	-
≥10	68 (88.3)	9 (11.7)		1.03 (0.38, 2.76)	0.953		

Variables	Involvement in dispensing medications		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Duration in community pharmacy practice (years)			0.994				
<5	155 (89.1)	19 (10.9)		1			
5-9	93 (89.4)	11 (10.6)		1.04 (0.47, 2.27)	0.929	-	-
≥10	40 (88.9)	5 (11.1)		0.98 (0.34, 2.79)	0.971		
Type of pharmacy			0.357				
Independent	105 (91.3)	10 (8.7)		1.43 (0.66, 3.10)	0.359	-	-
Chain	183 (88.0)	25 (12.0)		1			
Current position†			0.099				
Owner	47 (95.9)	2 (4.1)		3.22 (0.75, 13.87)	0.117	-	-
Employee	241 (88.0)	33 (12.0)		1			
Type of employment			0.465[b]				
Full-time	271 (89.4)	32 (10.6)		1.49 (0.41, 5.38)	0.539	-	-
Part-time	17 (85.0)	3 (15.0)		1			
Training in travel medicine†			0.184				
Yes	98 (92.5)	8 (7.5)		1.74 (0.76, 3.97)	0.188	-	-
No	190 (87.6)	27 (12.4)		1			
Beliefs							
Knowledge†	3.79 ± 0.71	3.13 ± 0.97	<0.001[c]*	2.59 (1.70, 3.96)	<0.001	1.75 (1.03, 2.98)	0.040*
Skills†	3.76 ± 0.62	3.21 ± 0.85	<0.001[c]*	3.09 (1.85, 5.17)	<0.001	-	-
Memory, Attention and Decision Processes†	2.52 ± 0.64	2.03 ± 0.71	<0.001[c]*	2.26 (1.49, 3.44)	<0.001	-	-
Behavioural Regulation†	2.34 ± 0.75	1.80 ± 0.76	<0.001[c]*	2.26 (1.54, 3.32)	<0.001	-	-
Social/Professional Role and Identity†	4.18 ± 0.60	3.66 ± 0.79	<0.001[c]*	3.14 (1.81, 5.44)	<0.001	2.47 (1.23, 4.98)	0.011*
Beliefs about Capabilities†	3.67 ± 0.63	3.10 ± 0.89	<0.001[c]*	3.09 (1.84, 5.19)	<0.001	-	-
Optimism†	4.11 ± 0.63	3.53 ± 0.79	<0.001[c]*	3.15 (1.86, 5.35)	<0.001	-	-
Beliefs about Consequences†	4.24 ± 0.58	3.73 ± 0.77	<0.001[c]*	2.96 (1.71, 5.11)	<0.001	-	-

Variables	Involvement in dispensing medications		p-value	Simple logistic regression		Multiple logistic regression	
	Yes	No		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
	n (%) / mean ± SD	n (%) / mean ± SD					
Intentions†	2.73 ± 0.48	2.29 ± 0.57	<0.001[c]*	3.00 (1.83, 4.92)	<0.001	-	-
Goals†	2.78 ± 0.43	2.34 ± 0.54	<0.001[c]*	3.49 (2.00, 6.08)	<0.001	-	-
Reinforcement†	1.73 ± 0.72	1.94 ± 0.72	0.065[c]	0.70 (0.49, 1.01)	0.056	0.47 (0.29, 0.75)	0.002*
Emotion†	3.87 ± 0.60	3.40 ± 0.52	<0.001[c]*	4.29 (2.15, 8.54)	<0.001	-	-
Social Influences†	3.86 ± 0.54	3.39 ± 0.70	<0.001[c]*	4.02 (2.03, 7.95)	<0.001	-	-
Environmental Context and Resources†	3.48 ± 0.54	2.98 ± 0.61	<0.001[c]*	5.54 (2.62, 11.69)	<0.001	5.34 (2.18, 13.04)	<0.001*

Chi-square test was applied unless otherwise stated
[b]Fisher's exact test was applied as more than 20% of cells have an expected count of less than 5
[c]Mann-Whitney U test was applied
† Variables included in the multiple logistic regression
OR: Odds ratio; CI: Confidence interval; *p < 0.05 denotes statistical significance
[f]Forward LR selection method applied
No interaction and multi-collinearity detected
Hosmer-Lemeshow test, p = 0.086
Classification table 89.8% correctly classified; Baseline accuracy 89.2%, Area under ROC curve = 0.811 (95% CI: 0.74-0.88, p < 0.001)

b. Making Medication and Health Recommendations for Prospective Hajj and Umrah Pilgrims

Table 4.15 presents the associations between respondents' characteristics and involvement in making medication and health recommendations for prospective Hajj and Umrah pilgrims. Involvement was significantly higher among Malay respondents compared to non-Malays [92.0% vs. 77.8%, $p < 0.001$], a trend similarly reflected among Muslim respondents when compared to non-Muslims [92.1% vs. 77.7%, $p < 0.001$].

Among professional characteristics, involvement differed significantly by pharmacy type with higher proportions observed in independent pharmacies compared with chain pharmacies [90.4% (104/115) vs 80.3% (167/208), $p = 0.018$], and by current position, with owners reporting greater involvement than employees [93.9% (46/49) vs 82.1% (225/271), $p = 0.039$]. No statistically significant associations were identified for age, gender, education level, prior Hajj or Umrah experience, duration since graduation, duration of community pharmacy practice, type of employment, or training in travel medicine.

Belief Domains and Involvement in Making Medication and Health Recommendations

Respondents involved in making medication and health recommendations reported significantly higher mean scores across most belief domains. When comparing respondents who were involved in making medication and health recommendations for prospective Hajj and Umrah pilgrims with those who were not, significantly higher mean scores were observed across most belief domains. Statistically significant differences were observed for knowledge (mean ± SD: 3.81 ± 0.72 vs 3.26 ± 0.85, $p < 0.001$), skills (3.79 ± 0.62 vs 3.25 ± 0.76, $p < 0.001$), memory, attention and decision processes (2.54 ± 0.63 vs 2.06 ± 0.70, $p < 0.001$), and behavioural regulation (2.39 ± 0.74 vs 1.71 ± 0.67, $p < 0.001$).

Significant differences were also identified for social and professional role and identity (4.18 ± 0.59 vs 3.84 ± 0.79, $p < 0.001$), beliefs about capabilities (3.70 ± 0.62 vs 3.12 ± 0.78, $p < 0.001$), optimism (4.14 ± 0.62 vs 3.61 ± 0.78, $p < 0.001$), beliefs about consequences (4.25 ± 0.58 vs 3.86 ± 0.76, $p < 0.001$), intentions (2.73 ± 0.47 vs 2.40 ± 0.60, $p < 0.001$), goals (2.79 ± 0.42 vs 2.44 ± 0.54, $p < 0.001$), and emotion (3.89 ± 0.60 vs 3.45 ± 0.55, $p < 0.001$). Statistically significant differences were also observed

for social influences (3.87 ± 0.55 vs 3.51 ± 0.64, $p < 0.001$), and environmental context and resources (3.51 ± 0.54 vs 2.98 ± 0.50, $p < 0.001$). No statistically significant difference was observed for reinforcement ($p = 0.803$).

Factors Associated with Involvement in Making Medication and Health Recommendations for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

Univariate analyses revealed that among the respondent characteristics, ethnicity ($p < 0.001$), religion ($p < 0.001$), and type of pharmacy ($p = 0.020$) were significantly associated with involvement in making medication and health recommendations for prospective Hajj and Umrah pilgrims.

With respect to belief domains, significant associations were observed for knowledge ($p < 0.001$), skills ($p < 0.001$), memory, attention and decision processes ($p < 0.001$), behavioural regulation ($p < 0.001$), social and professional role and identity ($p < 0.001$), beliefs about capabilities ($p < 0.001$), optimism ($p < 0.001$), beliefs about consequences ($p < 0.001$), intentions ($p < 0.001$), goals ($p < 0.001$), emotion ($p < 0.001$), social influences ($p < 0.001$), and environmental context and resources ($p < 0.001$). Reinforcement was not significantly associated with involvement ($p = 0.056$).

Multivariable Analysis

All respondent characteristics and belief domains with a p-value of less than 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only one respondent characteristic and two belief domains remained independently associated with involvement in making medication and health recommendations. Duration since graduation was associated with lower involvement (adjusted OR = 0.62, 95% CI: 0.39–0.99, $p = 0.047$). Furthermore, knowledge was associated with higher odds of involvement (adjusted OR = 1.96, 95% CI: 1.28-3.00, $p = 0.002$. Environmental context and resources also remained significant (adjusted OR = 6.07, 95% CI: 2.95–12.50, $p < 0.001$).

Table 4.15
Association between Respondents' Characteristics and Their Involvement in Making Medication and Health Recommendations for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in making medication and health recommendations		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years)			0.997				
<30	90 (84.1)	17 (15.9)		1			
30-39	150 (83.8)	29 (16.2)		0.98 (0.51, 1.88)	0.944	-	-
≥40	31 (83.8)	6 (16.2)		0.98 (0.35, 2.70)	0.963		
Gender†			0.240				
Male	77 (80.2)	19 (19.8)		1			
Female	194 (85.5)	33 (14.5)		1.45 (0.78, 2.70)	0.242	-	-
Ethnicity†			<0.001*				
Malay	127 (92.0)	11 (8.0)		3.29 (1.62, 6.67)	<0.001	-	-
Non-Malay	144 (77.8)	41 (22.2)		1			
Religion†			<0.001*				
Islam	128 (92.1)	11 (7.9)		3.34 (1.64, 6.76)	<0.001	-	-
Non-Muslim	143 (77.7)	41 (22.3)		1			
Level of education			0.608				
Undergraduate	246 (84.2)	46 (15.8)		1			
Postgraduate	25 (80.6)	6 (19.4)		0.78 (0.30, 2.00)	0.605	-	-
Prior Hajj or Umrah experience†			0.002*				
Yes	46 (92.0)	4 (8.0)		2.45 (0.84, 7.14)	0.100	-	-
No	225 (82.4)	48 (17.6)		1			
Duration since graduation (years) †			0.254				
<5	65 (86.7)	10 (13.3)		1			
5-9	146 (85.4)	25 (14.6)		0.79 (0.41, 1.98)	0.790		
≥10	60 (77.9)	17 (22.1)		0.54 (0.23, 1.28)	0.162	0.62 (0.39, 0.99)	0.047*

Variables	Involvement in making medication and health recommendations		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Duration in community pharmacy practice (years)			0.821				
<5	144 (82.8)	30 (17.2)		1			
5-9	89 (85.6)	15 (14.4)		1.24 (0.63, 2.42)	0.538	-	-
≥10	38 (84.4)	7 (15.6)		1.13 (0.46, 2.77)	0.788		
Type of pharmacy†			0.018*				
Independent	104 (90.4)	11 (9.6)		2.32 (1.14, 4.72)	0.020	-	-
Chain	167 (80.3)	41 (19.7)		1			
Current position†			0.039*				
Owner	46 (93.9)	3 (6.1)		3.34 (1.00, 11.18)	0.050	-	-
Employee	225 (82.1)	46 (17.9)		1			
Type of employment			1.00[b]				
Full-time	254 (83.8)	49 (16.2)		0.91 (0.26, 3.24)	0.890	-	-
Part-time	17 (85.0)	3 (15.0)		1			
Training in travel medicine			0.323				
Yes	92 (86.8)	14 (13.2)		1.39 (0.72, 2.70)	0.325	-	-
No	179 (82.5)	38 (17.5)		1			
Beliefs							
Knowledge†	3.81 ± 0.72	3.26 ± 0.85	<0.001[c]*	2.59 (1.70, 3.96)	<0.001	1.96 (1.28, 3.00)	0.002*
Skills†	3.79 ± 0.62	3.25 ± 0.76	<0.001[c]*	3.09 (1.85, 5.17)	<0.001	-	-
Memory, Attention and Decision Processes†	2.54 ± 0.63	2.06 ± 0.70	<0.001[c]*	2.26 (1.49, 3.44)	<0.001	-	-
Behavioural Regulation†	2.39 ± 0.74	1.71 ± 0.67	<0.001[c]*	2.26 (1.55, 3.32)	<0.001	-	-
Social/Professional Role and Identity†	4.18 ± 0.59	3.84 ± 0.79	<0.001[c]*	3.14 (1.81, 5.44)	<0.001	-	-
Beliefs about Capabilities†	3.70 ± 0.62	3.12 ± 0.78	<0.001[c]*	3.09 (1.84, 5.19)	<0.001	-	-
Optimism†	4.14 ± 0.62	3.61 ± 0.78	<0.001[c]*	3.15 (1.86, 5.35)	<0.001	-	-
Beliefs about Consequences†	4.25 ± 0.58	3.86 ± 0.76	<0.001[c]*	2.96 (1.71, 5.11)	<0.001	-	-

Variables	Involvement in making medication and health recommendations		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Intentions†	2.73 ± 0.47	2.40 ± 0.60	<0.001[c]*	3.00 (1.83, 4.92)	<0.001	-	-
Goals†	2.79 ± 0.42	2.44 ± 0.54	<0.001[c]*	3.49 (2.00, 6.08)	<0.001	-	-
Reinforcement†	1.75 ± 0.73	1.77 ± 0.73	0.803[c]	0.70 (0.49, 1.01)	0.056	-	-
Emotion†	3.89 ± 0.60	3.45 ± 0.55	<0.001[c]*	4.29 (2.15, 8.54)	<0.001	-	-
Social Influences†	3.87 ± 0.55	3.51 ± 0.64	<0.001[c]*	4.02 (2.03, 7.95)	<0.001	-	-
Environmental Context and Resources†	3.51 ± 0.54	2.98 ± 0.50	<0.001[c]*	5.54 (2.62, 11.69)	<0.001	6.07 (2.95, 12.50)	<0.001*

Chi-square test was applied unless otherwise stated

[b]Fisher's exact test was applied as more than 20% of cells have an expected count of less than 5

[c]Mann-Whitney U test was applied; † Variables included in the multiple logistic regression

OR: Odds ratio; CI: Confidence interval; *p < 0.05 denotes statistical significance

[f]Forward LR selection method applied; No interaction and multi-collinearity detected; Hosmer-Lemeshow test, p = 0.314

Classification table 85.1% correctly classified; Baseline accuracy 83.9%; Area under ROC curve = 0.793 (95% CI: 0.72-0.86, p < 0.001).

c. Assessing Medications for Prospective Hajj and Umrah Pilgrims

Table 4.16 presents the associations between respondents' characteristics and involvement in assessing medications for prospective Hajj and Umrah pilgrims. A higher proportion of Malay respondents were involved compared with non-Malay respondents [80.4% (111/138) vs 68.6% (127/185), p = 0.017]. Similarly, involvement was more frequent among Muslim respondents than non-Muslims [80.6% (112/139) vs 68.5% (126/184), p = 0.015]. No statistically significant associations were identified for the other characteristics.

Belief Domains and Involvement in Assessing Medications

Respondents involved in assessing medications for prospective Hajj and Umrah pilgrims demonstrated significantly higher mean scores across most belief domains compared to those who were not involved. Statistically significant differences were observed for knowledge (mean ± SD: 3.81 ± 0.72 vs 3.47 ± 0.85, $p < 0.001$), skills (3.83 ± 0.59 vs 3.36 ± 0.76, $p < 0.001$), and memory, attention and decision processes (2.55 ± 0.61 vs 2.21 ± 0.74, $p < 0.001$).

Significant differences were also identified for behavioural regulation (2.40 ± 0.71 vs 1.93 ± 0.80, $p < 0.001$), beliefs about capabilities (3.72 ± 0.61 vs 3.28 ± 0.77, $p < 0.001$), beliefs about consequences (4.24 ± 0.58 vs 4.03 ± 0.71, p = 0.018), and environmental context and resources (3.51 ± 0.55 vs 3.20 ± 0.56, $p < 0.001$). No statistically significant difference was observed for social or professional role and identity (p = 0.127), optimism (p = 0.054), intentions (p = 0.063), goals (p = 0.188), reinforcement (p = 0.509), emotion (p = 0.133), and social influences (p = 0.057).

Factors Associated with Involvement in Assessing Medications for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

Univariate analyses revealed that several respondent characteristics and belief domains were significantly associated with involvement in assessing medications for prospective Hajj and Umrah pilgrims, with ethnicity (p = 0.018), and religion (p = 0.015) emerging as key significant factors.

With respect to belief domains, significant associations were observed for knowledge ($p < 0.001$), skills ($p < 0.001$), memory, attention and decision processes (p

< 0.001), behavioural regulation (p < 0.001), beliefs about capabilities (p < 0.001), optimism (p = 0.047), beliefs about consequences (p = 0.010), and environmental context and resources (p < 0.001). Social or professional role and identity (p = 0.074), intentions (p = 0.063), goals (p = 0.186), reinforcement (p = 0.751), emotion (p = 0.100), and social influences (p = 0.057) were not significantly associated with involvement.

Multivariable Analysis

All respondent characteristics and belief domains with a p-value of less than 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only two belief domains remained independently associated with involvement in medication assessment. Skills was associated with higher odds of involvement (adjusted OR = 2.29, 95% CI: 1.44–3.64, p < 0.001). Behavioural regulation also remained significant (adjusted OR = 1.49, 95% CI: 1.08-2.05, p = 0.015). No respondent characteristic variables retained statistical significance in the adjusted model.

Table 4.16
Association between Respondents' Characteristics and Their Involvement in Assessing Medications for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in assessing medications		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years)			0.367				
<30	78 (72.9)	29 (27.1)		1			
30-39	136 (76.0)	43 (24.0)		1.18 (0.68, 2.03)	0.562	-	-
≥40	24 (64.9)	13 (35.1)		0.69 (0.31, 1.52)	0.356		
Gender			0.532				
Male	73 (76.0)	23 (24.0)		1			
Female	165 (72.7)	62 (27.3)		0.84 (0.48, 1.46)	0.532	-	-
Ethnicity†			0.017*				
Malay	111 (80.4)	27 (19.6)		1.88 (1.11, 3.17)	0.018	-	-
Non-Malay	127 (68.6)	58 (31.4)		1			
Religion†			0.015*				
Islam	112 (80.6)	27 (19.4)		1.91 (1.13, 3.22)	0.015	-	-
Non-Muslim	126 (68.5)	58 (31.5)		1			
Level of education			0.355				
Undergraduate	213 (72.9)	79 (27.1)		1			
Postgraduate	25 (80.6)	6 (19.4)		1.55 (0.61, 3.91)	0.358	-	-
Prior Hajj or Umrah experience			0.520				
Yes	35 (70.0)	15 (30.0)		0.80 (0.41, 1.56)	0.520	-	-
No	203 (74.4)	70 (25.6)		1			
Duration since graduation (years)			0.224				
<5	58 (77.3)	17 (22.7)		1			
5-9	129 (75.4)	42 (24.6)		0.90 (0.47, 1.71)	0.749	-	-
≥10	51 (66.2)	26 (33.8)		0.57 (0.28, 1.18)	0.575		

Variables	Involvement in assessing medications		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Duration in community pharmacy practice (years)			0.426				
<5	128 (73.6)	46 (26.4)		1			
5-9	80 (76.9)	24 (23.1)		1.20 (0.68, 2.11)	0.533	-	-
≥10	30 (66.7)	15 (33.3)		0.72 (0.35, 1.45)	0.359		
Type of pharmacy†			0.165				
Independent	90 (78.3)	25 (21.7)		0.68 (0.40, 1.17)	0.166	-	-
Chain	148 (71.2)	60 (28.8)		1			
Current position			0.505				
Owner	38 (77.6)	11 (22.4)		1.28 (0.62, 2.63)	0.505	-	-
Employee	200 (73.0)	74 (27.0)		1			
Type of employment			0.699				
Full-time	224 (73.9)	79 (26.1)		1.21 (0.45, 3.27)	0.700	-	-
Part-time	14 (70.0)	6 (30.0)		1			
Training in travel medicine			0.295				
Yes	82 (77.4)	24 (22.6)		1.34 (0.78, 2.30)	0.295	-	-
No	156 (71.9)	61 (28.1)		1			
Beliefs							
Knowledge†	3.81 ± 0.72	3.47 ± 0.85	<0.001[c]*	1.77 (1.28, 2.45)	<0.001	-	-
Skills†	3.83 ± 0.59	3.36 ± 0.76	<0.001[c]*	2.99 (1.98, 4.52)	<0.001	2.29 (1.44, 3.64)	<0.001*
Memory, Attention and Decision Processes†	2.55 ± 0.61	2.21 ± 0.74	<0.001[c]*	1.89 (1.39, 2.57)	<0.001	-	-
Behavioural Regulation†	2.40 ± 0.71	1.93 ± 0.80	<0.001[c]*	1.93 (1.47, 2.55)	<0.001	1.49 (1.08, 2.05)	0.015*
Social/Professional Role and Identity†	4.16 ± 0.59	4.02 ± 0.76	0.127[c]	1.42 (0.97, 2.07)	0.074	-	-
Beliefs about Capabilities†	3.72 ± 0.61	3.28 ± 0.77	<0.001[c]*	2.70 (1.78, 4.06)	<0.001	-	-
Optimism†	4.09 ± 0.64	3.92 ± 0.74	0.054[c]	1.44 (1.00, 2.08)	0.047	-	-
Beliefs about Consequences†	4.24 ± 0.58	4.03 ± 0.71	0.018[c]*	1.69 (1.13, 2.51)	0.010	-	-

Variables	Involvement in assessing medications		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Intentions†	2.71 ± 0.48	2.58 ± 0.56	0.063[c]	1.35 (0.98, 1.87)	0.063	-	-
Goals†	2.76 ± 0.44	2.66 ± 0.50	0.188[c]	1.27 (0.89, 1.79)	0.186	-	-
Reinforcement	1.77 ± 0.73	1.71 ± 0.72	0.509[c]	1.04 (0.81, 1.34)	0.751	-	-
Emotion†	3.86 ± 0.61	3.73 ± 0.62	0.133[c]	1.41 (0.94, 2.14)	0.100	-	-
Social Influences†	3.84 ± 0.53	3.71 ± 0.70	0.057[c]	1.49 (0.97, 2.29)	0.068	-	-
Environmental Context and Resources†	3.51 ± 0.55	3.20 ± 0.56	<0.001[c]*	2.80 (1.72, 4.54)	<0.001	-	-

Chi-square test was applied unless otherwise stated
[c]Mann-Whitney U test was applied
† Variables included in the multiple logistic regression
OR: Odds ratio
CI: Confidence interval
*p < 0.05 denotes statistical significance
[f]Forward LR selection method applied
No interaction and multi-collinearity detected
Hosmer-Lemeshow test, p = 0.457
Classification table 76.2% correctly classified; Baseline accuracy 73.7%; Area under ROC curve = 0.712 (95% CI: 0.65-0.78, p < 0.001).

d. Offering Basic Health Tests Upon Request for Prospective Hajj and Umrah Pilgrims

Table 4.17 presents the associations between respondents' characteristics and involvement in offering basic health tests upon request for prospective Hajj and Umrah pilgrims. A significantly greater proportion of Malay respondents were involved in these services compared to non-Malays (69.6% vs 46.5%, $p < 0.001$). Similarly, Muslim respondents reported higher involvement than non-Muslims (69.8% vs 46.2%, $p < 0.001$).

Higher proportions of involvement were observed in independent pharmacies compared to chain pharmacies [77.4% (89/115) vs 66.8% (139/208), $p = 0.046$]. Pharmacy owners reported greater involvement than employees [83.7% (41/49) vs 68.2% (187/274), $p = 0.029$]. Training in travel medicine was also associated with involvement [79.2% (84/106) vs 66.4% (144/217), $p = 0.017$]. No statistically significant associations were identified for other demographics.

Belief Domains and Involvement in Offering Basic Health Tests Upon Request

Respondents involved in offering basic health tests upon request reported significantly higher mean scores across most belief domains. When comparing respondents who were involved in offering basic health tests for prospective Hajj and Umrah pilgrims with those who were not, significantly higher mean scores were observed across most belief domains. Statistically significant differences were observed for knowledge (mean ± SD: 3.85 ± 0.70 vs 3.42 ± 0.84, $p < 0.001$), skills (3.83 ± 0.59 vs 3.41 ± 0.76, $p < 0.001$), and memory, attention and decision processes (2.57 ± 0.61 vs 2.20 ± 0.71, $p < 0.001$).

Significant differences were also identified for behavioural regulation (2.42 ± 0.73 vs 1.95 ± 0.75, $p < 0.001$), beliefs about capabilities (3.75 ± 0.60 vs 3.25 ± 0.74, $p < 0.001$), optimism (4.13 ± 0.61 vs 3.85 ± 0.77, $p = 0.005$), beliefs about consequences (4.25 ± 0.57 vs 4.02 ± 0.72, $p = 0.004$). Statistically significant differences were also observed for intentions (2.75 ± 0.45 vs 2.52 ± 0.60, $p < 0.001$), goals (2.83 ± 0.38 vs 2.52 ± 0.56, $p < 0.001$), emotion (3.90 ± 0.58 vs 3.63 ± 0.65, $p = 0.001$), social influences (3.84 ± 0.53 vs 3.71 ± 0.70, $p = 0.025$), and environmental context and resources (3.55 ± 0.53 vs 3.13 ± 0.55, $p < 0.001$). No statistically significant difference was observed for social and professional role and identity ($p = 0.076$), and reinforcement ($p = 0.606$).

Factors Associated with Involvement in Offering Basic Health Tests for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

In univariate analyses, several respondent characteristics and belief domains were significantly associated with involvement in offering basic health tests upon request for prospective Hajj and Umrah pilgrims. Among respondent characteristics, type of pharmacy ($p = 0.047$), current position ($p = 0.033$), and training in travel medicine ($p = 0.018$) were significantly associated with involvement.

With respect to belief domains, significant associations were observed for knowledge ($p < 0.001$), skills ($p < 0.001$), memory, attention and decision processes ($p < 0.001$), behavioural regulation ($p < 0.001$), social and professional role and identity ($p = 0.040$), beliefs about capabilities ($p < 0.001$), optimism ($p < 0.001$), beliefs about consequences ($p = 0.003$), intentions ($p < 0.001$), goals ($p = 0.001$), emotion ($p < 0.001$), social influences ($p = 0.009$), and environmental context and resources ($p < 0.001$). Reinforcement was not significantly associated with involvement ($p = 0.448$).

Multivariable Analysis

All respondent characteristics and belief domains with a p-value < 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only two belief domains remained independently associated with involvement in offering basic health tests upon request. Beliefs about Capabilities was associated with higher odds of involvement (adjusted OR = 2.23, 95% CI: 1.40-3.55; Environmental context and resources also remained significant (adjusted OR = 3.00, 95% CI: 1.69–5.32, $p < 0.001$). No respondent characteristic variables retained statistical significance in the adjusted model.

Table 4.17
Association between Respondents' Characteristics and Their Involvement in Offering Basic Health Tests for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in offering basic health tests		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years) †			0.144				
<30	68 (63.6)	39 (36.4)		1			
30-39	132 (73.7)	47 (26.3)		1.61 (0.96, 2.70)	0.070	-	-
≥40	28 (75.7)	9 (24.3)		1.78 (0.76,4.17)	0.181		
Gender			0.387				
Male	71 (74.0)	25 (26.0)		1			
Female	157 (69.2)	70 (30.8)		0.79 (0.46, 1.35)	0.388	-	-
Ethnicity†			0.061				
Malay	105 (76.1)	33 (23.9)		1.60 (0.98, 2.63)	0.062	-	-
Non-Malay	123 (66.5)	62 (33.5)		1			
Religion†			0.052				
Islam	106 (76.3)	33 (23.7)		1.63 (0.99, 2.68)	0.053	-	-
Non-Muslim	122 (66.3)	62 (33.7)		1			
Level of education			0.643				
Undergraduate	205 (70.2)	87 (29.8)		1			
Postgraduate	23 (74.2)	8 (25.8)		1.22 (0.52, 2.83)	0.644	-	-
Prior Hajj or Umrah experience†			0.211				
Yes	39 (78.0)	11 (22.0)		1.58 (0.77, 3.23)	0.214	-	-
No	189 (69.2)	84 (30.8)		1			
Duration since graduation (years)			0.980				
<5	53 (70.7)	22 (29.3)		1			
5-9	120 (70.2)	51 (29.8)		0.98 (0.54, 1.77)	0.938	-	-
≥10	55 (71.4)	22 (28.6)		1.04 (0.51, 2.09)	0.918		

Variables	Involvement in offering basic health tests		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Duration in community pharmacy practice (years)			0.590				
<5	119 (68.4)	55 (31.6)		1			
5-9	75 (72.1)	29 (27.9)		1.19 (0.70, 2.04)	0.513	-	-
≥10	34 (75.6)	11 (24.4)		1.43 (0.67, 3.03)	0.352		
Type of pharmacy†			0.046*				
Independent	89 (77.4)	26 (22.6)		1.70 (1.01, 2.87)	0.047	-	-
Chain	139 (66.8)	69 (33.2)		1			
Current position†			0.029*				
Owner	41 (83.7)	8 (16.3)		2.38 (1.07, 5.30)	0.033	-	-
Employee	187 (68.2)	87 (31.8)		1			
Type of employment			0.952				
Full-time	214 (70.6)	89 (29.4)		1.03 (0.38, 2.77)	0.952	-	-
Part-time	14 (70.0)	6 (30.0)		1			
Training in travel medicine†			0.017*				
Yes	84 (79.2)	22 (20.8)		1.94 (1.12, 3.35)	0.018	-	-
No	144 (66.4)	73 (33.6)		1			
Beliefs							
Knowledge†	3.85 ± 0.70	3.42 ± 0.84	<0.001[c]*	2.10 (1.50, 2.93)	<0.001	-	-
Skills†	3.83 ± 0.59	3.41 ± 0.76	<0.001[c]*	2.66 (1.79, 3.95)	<0.001	-	-
Memory, Attention and Decision Processes†	2.57 ± 0.61	2.20 ± 0.71	<0.001[c]*	2.08 (1.53, 2.82)	<0.001	-	-
Behavioural Regulation†	2.42 ± 0.73	1.95 ± 0.75	<0.001[c]*	1.94 (1.48, 2.54)	<0.001	-	-
Social/Professional Role and Identity†	4.17 ± 0.57	4.01 ± 0.77	0.076[c]	1.48 (1.02, 2.15)	0.040	-	-
Beliefs about Capabilities†	3.75 ± 0.60	3.25 ± 0.74	<0.001[c]*	3.30 (2.15, 5.07)	<0.001	2.23 (1.40, 3.55)	<0.001*
Optimism†	4.13 ± 0.61	3.85 ± 0.77	0.005[c]*	1.82 (1.28, 2.68)	<0.001	-	-

Variables	Involvement in offering basic health tests		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Beliefs about Consequences†	4.25 ± 0.57	4.02 ± 0.72	0.004[c]*	1.84 (1.24, 2.74)	0.003	-	-
Intentions†	2.75 ± 0.45	2.52 ± 0.60	<0.001[c]*	1.86 (1.34, 2.57)	<0.001	-	-
Goals†	2.83 ± 0.38	2.52 ± 0.56	<0.001[c]*	2.49 (1.70, 3.64)	<0.001	-	-
Reinforcement	1.75 ± 0.73	1.77 ± 0.72	0.606[c]	0.91 (0.71, 1.16)	0.448	-	-
Emotion†	3.90 ± 0.58	3.63 ± 0.65	0.001[c*]	2.15 (1.41, 3.28)	<0.001	-	-
Social Influences†	3.84 ± 0.53	3.71 ± 0.70	0.025[c]*	1.77 (1.15, 2.72)	0.009	-	-
Environmental Context and Resources†	3.55 ± 0.53	3.13 ± 0.55	<0.001[c]*	4.55 (2.70, 7.67)	<0.001	3.00 (1.69, 5.32)	<0.001*

Chi-square test was applied unless otherwise stated
[c]Mann-Whitney U test was applied
† Variables included in the multiple logistic regression
OR: Odds ratio; CI: Confidence interval; *p < 0.05 denotes statistical significance
[f]Forward LR selection method applied
No interaction and multi-collinearity detected
Hosmer-Lemeshow test, p = 0.349
Classification table 73.1% correctly classified; Baseline accuracy 70.6%; Area under ROC curve = 0.736 (95% CI: 0.67-0.80, p < 0.001)

e. Providing Travel Health Education for Prospective Hajj and Umrah Pilgrims

Table 4.18 presents the associations between respondents' characteristics and involvement in travel health education for prospective Hajj and Umrah pilgrims. A higher proportion of Malay respondents were involved compared to non-Malay respondents [69.6% (96/138) vs 46.5% (86/185), $p < 0.001$]. Similarly, involvement was more frequent among Muslim respondents than non-Muslims [69.8% (97/139) vs 46.2% (85/184), $p < 0.001$]. Respondents with prior Hajj or Umrah experience also showed higher involvement among those who had performed the pilgrimage [70.0% (35/50)], compared with those without such experience [53.8% (147/273), $p = 0.034$].

Among professional characteristics, involvement differed significantly by pharmacy type, with higher proportions observed in independent pharmacies compared with chain pharmacies [67.0% (77/115) vs 50.5% (105/208), $p = 0.004$], and by current position, with owners reporting greater involvement than employees [69.4% (34/49) vs 54.0% (148/274), $p = 0.046$]. Training in travel medicine was also associated with involvement [64.2% (68/106) vs 52.5% (114/217), $p = 0.048$]. No statistically significant associations were identified for age, gender, education level, duration since graduation, duration of community pharmacy practice, or type of employment.

Belief Domains and Involvement in Travel Health Education

Respondents involved in travel health education reported significantly higher mean scores across most belief domains. When comparing respondents who were involved in travel health education for prospective Hajj and Umrah pilgrims with those who were not, significantly higher mean scores were observed across most belief domains. Statistically significant differences were observed for knowledge (mean ± SD: 3.91 ± 0.62 vs 3.47 ± 0.87, $p < 0.001$), skills (3.88 ± 0.61 vs 3.48 ± 0.69, $p < 0.001$), and memory, attention and decision processes (2.66 ± 0.54 vs 2.21 ± 0.72, $p < 0.001$).

Significant differences were also identified for behavioural regulation (2.55 ± 0.63 vs 1.93 ± 0.79, $p < 0.001$), beliefs about capabilities (3.80 ± 0.63 vs 3.36 ± 0.68, $p < 0.001$), optimism (4.19 ± 0.62 vs 3.87 ± 0.70, $p < 0.001$), intentions (2.80 ± 0.42 vs 2.52 ± 0.57, $p < 0.001$), goals (2.84 ± 0.39 vs 2.61 ± 0.52, $p < 0.001$), emotion (3.98 ± 0.61 vs 3.63 ± 0.56, $p < 0.001$), social influences (3.91 ± 0.55 vs 3.68 ± 0.59, $p < 0.001$), and environmental context and resources (3.64 ± 0.49 vs 3.16 ± 0.55, $p < 0.001$). Statistically significant differences were also observed for social and professional role

and identity (p = 0.013) and beliefs about consequences (p = 0.002). No statistically significant difference was observed for reinforcement (p = 0.053).

Factors Associated with Involvement in Providing Travel Health Education for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

In univariate analyses, several respondent characteristics and belief domains were significantly associated with involvement in travel health education for prospective Hajj and Umrah pilgrims. Among respondent characteristics, ethnicity (p < 0.001), religion (p < 0.001), prior Hajj or Umrah experience (p = 0.037), type of pharmacy (p = 0.005), current position (p = 0.048), and training in travel medicine (p = 0.049) were significantly associated with involvement.

With respect to belief domains, significant associations were observed for knowledge (p < 0.001), skills (p < 0.001), memory, attention and decision processes (p < 0.001), behavioural regulation (p < 0.001), social and professional role and identity (p = 0.015), beliefs about capabilities (p < 0.001), optimism (p < 0.001), beliefs about consequences (p = 0.002), intentions (p < 0.001), goals (p < 0.001), emotion (p < 0.001), social influences (p < 0.001), and environmental context and resources (p < 0.001). Reinforcement was not significantly associated with involvement (p = 0.196).

Multivariable Analysis

All respondent characteristics and belief domains with a p-value < 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only one respondent characteristic and two belief domains remained independently associated with involvement in providing travel health education. Religion was associated with higher involvement (adjusted OR = 1.82, 95% CI: 1.08-3.06, p = 0.024). Furthermore, behavioural regulation was associated with higher odds of involvement (adjusted OR = 1.81, 95% CI: 1.31–2.49, p < 0.001). Environmental context and resources also remained significant (adjusted OR = 3.68, 95% CI: 2.07–6.54, p < 0.001).

Table 4.18
Association between Respondents' Characteristics and Their Involvement in Providing Travel Health Education for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in providing travel health education		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years) †			0.450				
<30	55 (51.4)	52 (48.6)		1			
30-39	105 (58.7)	74 (41.3)		1.34 (0.83, 2.17)	0.232	--	-
≥40	22 (59.5)	15 (40.5)		1.39 (0.65, 2.96)	0.398		
Gender			0.788				
Male	53 (55.2)	43 (44.8)		1			
Female	129 (56.8)	98 (43.2)		1.07 (0.66, 1.73)	0.789	-	-
Ethnicity†			<0.001*				
Malay	96 (69.6)	42 (30.4)		2.63 (1.65, 4.18)	<0.001	-	-
Non-Malay	86 (46.5)	99 (53.5)		1			
Religion†			<0.001*				
Islam	97 (69.8)	42 (30.2)		2.69 (1.69, 4.28)	<0.001	1.82 (1.08, 3.06)	0.024*
Non-Muslim	85 (46.2)	99 (53.8)		1			
Level of education			0.839				
Undergraduate	164 (56.2)	128 (43.8)		1			
Postgraduate	18 (58.1)	13 (41.9)		1.08 (0.51, 2.29)	0.839	-	-
Prior Hajj or Umrah experience†			0.034*				
Yes	35 (70.0)	15 (30.0)		2.00 (1.04, 3.83)	0.037	-	-
No	147 (53.8)	126 (46.2)		-			
Duration since graduation (years)			0.932				
<5	43 (57.3)	32 (42.7)		1			
5-9	97 (56.7)	74 (43.3)		0.97 (0.56, 1.69)	0.929	-	-
≥10	42 (54.5)	35 (45.5)		0.89 (0.47, 1.69)	0.729		

Variables	Involvement in providing travel health education		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Duration in community pharmacy practice (years) †			0.418				
<5	93 (53.4)	81 (46.6)		1			
5-9	64 (61.5)	40 (38.5)		1.39 (0.85, 2.29)	0.189	-	-
≥10	25 (55.6)	20 (44.4)		1.09 (0.56, 2.10)	0.800		
Type of pharmacy†			0.004*				
Independent	77 (67.0)	38 (33.0)		1.99 (1.24, 3.19)	0.005	-	-
Chain	105 (50.5)	103 (49.5)		1			
Current position†			0.046*				
Owner	34 (69.4)	15 (30.6)		1.93 (1.00, 3.70)	0.048	-	-
Employee	148 (54.0)	126 (46.0)		1			
Type of employment			0.420				
Full-time	169 (55.8)	134 (44.2)		0.68 (0.26, 1.75)	0.423	-	-
Part-time	13 (65.0)	7 (35.0)		1			
Training in travel medicine†			0.048*				
Yes	68 (64.2)	38 (35.8)		1.62 (1.00, 2.61)	0.049	-	-
No	114 (52.5)	103 (47.5)		1			
Beliefs							
Knowledge†	3.91 ± 0.62	3.47 ± 0.87	<0.001[c]*	2.29 (1.63, 3.21)	<0.001	-	-
Skills†	3.88 ± 0.61	3.48 ± 0.69	<0.001[c]*	2.67 (1.82, 3.91)	<0.001	-	-
Memory, Attention and Decision Processes†	2.66 ± 0.54	2.21 ± 0.72	<0.001[c]*	2.52 (1.84, 3.44)	<0.001	-	-
Behavioural Regulation†	2.55 ± 0.63	1.93 ± 0.79	<0.001[c]*	2.68 (2.02, 3.57)	<0.001	1.81 (1.31, 2.49)	<0.001*
Social/Professional Role and Identity†	4.20 ± 0.60	4.02 ± 0.68	0.013[c]*	1.56 (1.09, 2.23)	0.015	-	-
Beliefs about Capabilities†	3.80 ± 0.63	3.36 ± 0.68	<0.001[c]*	2.95 (1.99, 4.38)	<0.001	-	-
Optimism†	4.19 ± 0.62	3.87 ± 0.70	<0.001[c]*	2.15 (1.49, 3.12)	<0.001	-	-
Beliefs about Consequences†	4.28 ± 0.62	4.06 ± 0.62	0.002[c]*	1.82 (1.24, 2.68)	0.002	-	-

Variables	Involvement in providing travel health education		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Intentions†	2.80 ± 0.42	2.52 ± 0.57	<0.001[c]*	2.14 (1.56, 2.94)	<0.001	-	-
Goals†	2.84 ± 0.39	2.61 ± 0.52	<0.001[c]*	2.13 (1.51, 3.01)	<0.001	-	-
Reinforcement†	1.82 ± 0.72	1.67 ± 0.72	0.053[c]	1.16 (0.93, 1.45)	0.196	-	-
Emotion†	3.98 ± 0.61	3.63 ± 0.56	<0.001[c]*	2.75 (1.84, 4.12)	<0.001	-	-
Social Influences†	3.91 ± 0.55	3.68 ± 0.59	<0.001[c]*	2.05 (1.35, 3.10)	<0.001	-	-
Environmental Context and Resources†	3.64 ± 0.49	3.16 ± 0.55	<0.001[c]*	6.27 (3.74, 10.53)	<0.001	3.68 (2.07, 6.54)	<0.001*

Chi-square test was applied unless otherwise stated
[c]Mann-Whitney U test was applied
† Variables included in the multiple logistic regression
OR: Odds ratio; CI: Confidence interval; *p < 0.05 denotes statistical significance
[f]Forward LR selection method applied
No interaction and multi-collinearity detected
Hosmer-Lemeshow test, p = 0.668
Classification table 73.1% correctly classified; Baseline accuracy 56.3%
Area under ROC curve = 0.787 (95% CI: 0.74-0.84, p < 0.001).

f. Making Referrals for Prospective Hajj and Umrah Pilgrims

Table 4.19 presents the associations between respondents' characteristics and involvement in making referrals for prospective Hajj and Umrah pilgrims. A higher proportion of respondents aged 40 years and more [54.1% (20/37)] and 30-39 years old [46.9% (84/179] were involved compared to respondents aged 30 years and less [33.6% (36/107), p = 0.034]. Similarly, involvement was more frequent among respondents who had graduated over 10 years and above, and 5-9 years, than 5 years and less [49.4% (38/77) vs 46.2% (79/171) vs 30.7% (23/75), p = 0.037]. Respondents with more experience in community pharmacy practice showed significantly higher involvement. Specifically, involvement was higher among those with 10 or more years of experience [60.0% (27/45)] and those with 5–9 years [51.0% (53/104)], compared to respondents with less than 5 years in service [34.5% (60/174), p < 0.001].

Among professional characteristics, involvement differed significantly by employment type, with higher proportions observed in full-time CPs compared with part-time CPs [45.2% (137/303) vs 15.0% (3/20), p = 0.008]. No statistically significant associations were identified for gender, ethnicity, religion, education level, prior Hajj or Umrah experience, pharmacy type, current position and training in travel medicine.

Belief Domains and Involvement in Making Referrals

Respondents involved in making referrals reported significantly higher mean scores across most belief domains. When comparing respondents who were involved in making referrals for prospective Hajj and Umrah pilgrims with those who were not, significantly higher mean scores were observed across most belief domains. Statistically significant differences were observed for knowledge (mean ± SD: 3.91 ± 0.68 vs 3.58 ± 0.80, p < 0.001), skills (3.86 ± 0.61 vs 3.59 ± 0.69, p < 0.001), and behavioural regulation (2.59 ± 0.67 vs 2.04 ± 0.75, p < 0.001).

Significant differences were also identified for beliefs about capabilities (3.81 ± 0.60 vs 3.45 ± 0.70, p < 0.001), and environmental context and resources (3.62 ± 0.52 vs 3.28 ± 0.57, p < 0.001). Statistically significant differences were also observed for memory, attention and decision processes (p = 0.002], optimism (p = 0.026), and emotion (p = 0.035). No statistically significant difference was observed for social or professional role and identity (p = 0.994), beliefs about consequences (p = 0.376), intentions (p = 0.596), goals (p = 0.588), reinforcement (p = 0.113), and social influences (p = 0.053).

Factors Associated with Involvement in Making Referrals for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

In univariate analyses, several respondent characteristics and belief domains were significantly associated with involvement in making referrals for prospective Hajj and Umrah pilgrims. Among respondent characteristics, age ($p = 0.030$), duration since graduation ($p = 0.024$), duration in community pharmacy practice ($p = 0.007$), and type of employment ($p = 0.015$) were significantly associated with involvement.

With respect to belief domains, significant associations were observed for knowledge ($p < 0.001$), skills ($p < 0.001$), memory, attention and decision processes ($p = 0.005$), behavioural regulation ($p < 0.001$), beliefs about capabilities ($p < 0.001$), optimism ($p = 0.020$), emotion ($p = 0.018$), social influences ($p = 0.040$), and environmental context and resources ($p < 0.001$). On the other hand, Social or professional role and identity ($p = 0.868$), beliefs about consequences ($p = 0.237$), intentions ($p = 0.529$), goals ($p = 0.442$), and reinforcement ($p = 0.162$) were not significantly associated with involvement.

Multivariable Analysis

All respondent characteristics and belief domains with a p-value < 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only two respondent characteristics and four belief domains remained independently associated with involvement in making referrals. Duration in community pharmacy practice was associated with higher odds of involvement (adjusted OR = 1.83, 95% CI: 1.30–2.57, $p < 0.001$). Similarly, type of employment remained significant (adjusted OR = 5.46, 95% CI: 1.44–20.66, $p = 0.012$). Furthermore, knowledge also associated with higher odds of involvement (adjusted OR = 1.59, 95% CI: 1.05–2.38, $p = 0.027$). Behavioural regulation was associated with higher odds of involvement (adjusted OR = 2.11, 95% CI: 1.39–3.19, $p < 0.001$). Environmental context and resources also remained significant (adjusted OR = 2.00, 95% CI: 1.16-3.44, $p = 0.013$). Higher scores in the Memory, Attention and Decision Processes domain were significantly associated with lower involvement in referral activities among CPs (adjusted OR = 0.55; 95% CI: 0.35–0.87; $p = 0.011$). This inverse association suggests

that CPs who reported greater cognitive engagement with referral-related decision-making processes were less likely to be involved in referral activities.

Table 4.19
Association between Respondents' Characteristics and Their Involvement in Making Referrals for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in making referrals		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years) †			0.034*				
<30	36 (33.6)	71 (66.4)		1			
30-39	84 (46.9)	95 (53.1)		1.74 (1.06, 2.87)	0.028	-	-
≥40	20 (54.1)	17 (45.9)		2.32 (1.08, 4.96)	0.030		
Gender			0.733				
Male	43 (44.8)	53 (55.2)		1			
Female	97 (42.7)	130 (57.3)		0.92 (0.57, 1.49)	0.733	-	-
Ethnicity†			0.103				
Malay	67 (48.6)	71 (51.4)		1.45 (0.93, 2.26)	0.103	-	-
Non-Malay	73 (39.5)	112 (60.5)		1			
Religion†			0.079				
Islam	68 (48.9)	71 (51.1)		1.49 (0.95, 2.32)	0.079	-	-
Non-Muslim	72 (39.1)	112 (60.9)		1			
Level of education†			0.190				
Undergraduate	130 (44.5)	162 (55.5)		1			
Postgraduate	10 (32.3)	21 (67.7)		0.59 (0.27, 1.30)	0.194	-	-
Prior Hajj or Umrah experience			0.302				
Yes	25 (50.0)	25 (50.0)		1.37 (0.75, 2.51)	0.303	-	-
No	115 (42.1)	158 (57.9)		1			
Duration since graduation (years) †			0.037*				
<5	23 (30.7)	52 (69.3)		1			
5-9	79 (46.2)	92 (53.8)		1.94 (1.09, 3.45)	0.024	-	-
≥10	38 (49.4)	39 (50.6)		2.20 (1.13, 4.28)	0.020		

Duration in community pharmacy practice (years) †			0.001*				
<5	60 (34.5)	114 (65.5)		1			
5-9	53 (51.0)	51 (49.0)		1.97 (1.20, 3.24)	0.007		
≥10	27 (60.0)	18 (40.0)		2.85 (1.45, 5.59)	0.002	1.83 (1.30, 2.57)	<0.001*
Type of pharmacy			0.330				
Independent	54 (47.0)	61 (53.0)		1.26 (0.79, 1.99)	0.330	-	-
Chain	86 (41.3)	122 (58.7)		1			
Current position†			0.071				
Owner	27 (55.1)	22 (44.9)		1.75 (0.95, 3.22)	0.074	-	-
Employee	113 (41.2)	161 (58.8)		1			
Type of employment†			0.008*				
Full-time	137 (45.2)	166 (54.8)		4.68 (1.34, 16.29)	0.015	5.462 (1.444, 20.660)	0.012*
Part-time	3 (15.0)	17 (85.0)		1			
Training in travel medicine			0.332				
Yes	50 (47.2)	56 (52.8)		1.26 (0.79, 2.01)	0.332	-	-
No	90 (41.5)	127 (58.5)		1			
Beliefs							
Knowledge†	3.91 ± 0.68	3.58 ± 0.80	<0.001[c]*	1.87 (1.34, 2.59)	<0.001	1.59 (1.05, 2.38)	0.027*
Skills†	3.86 ± 0.61	3.59 ± 0.69	<0.001[c]*	1.90 (1.32, 2.72)	<0.001	-	-
Memory, Attention and Decision Processes†	2.58 ± 0.66	2.38 ± 0.66	0.002[c]*	1.47 (1.12, 1.94)	0.005	0.55 (0.35, 0.87)	0.011*
Behavioural Regulation†	2.59 ± 0.67	2.04 ± 0.75	<0.001[c]*	2.16 (1.65, 2.82)	<0.001	2.11 (1.39, 3.19)	<0.001*
Social/Professional Role and Identity	4.13 ± 0.61	4.12 ± 0.67	0.994[c]	1.03 (0.73, 1.45)	0.868	-	-
Beliefs about Capabilities†	3.81 ± 0.60	3.45 ± 0.70	<0.001[c]*	2.36 (1.62, 3.44)	<0.001	-	-
Optimism†	4.15 ± 0.61	3.97 ± 0.71	0.026[c]*	1.51 (1.06, 2.13)	0.020	-	-
Beliefs about Consequences†	4.23 ± 0.57	4.15 ± 0.66	0.376[c]	1.24 (0.87, 1.79)	0.237	-	-
Intentions	2.72 ± 0.47	2.64 ± 0.53	0.596[c]	1.10 (0.82, 1.46)	0.529	-	-
Goals	2.77 ± 0.42	2.71 ± 0.49	0.588[c]	1.13 (0.83, 1.55)	0.442	-	-
Reinforcement†	1.81 ± 0.71	1.72 ± 0.74	0.113[c]	1.17 (0.94, 1.47)	0.162	-	-
Emotion†	3.92 ± 0.59	3.75 ± 0.62	0.035[c]*	1.56 (1.08, 2.25)	0.018	-	-

Social Influences†	3.89 ± 0.53	3.75 ± 0.61	0.053[c]	1.51 (1.02, 2.25)	0.040	-	-
Environmental Context and Resources†	3.62 ± 0.52	3.28 ± 0.57	<0.001[c]*	3.07 (1.98, 4.77)	<0.001	2.00 (1.16, 3.44)	0.013*

Chi-square test was applied unless otherwise stated
[c]Mann-Whitney U test was applied
† Variables included in the multiple logistic regression
OR: Odds ratio
CI: Confidence interval
*$p < 0.05$ denotes statistical significance
[f]Forward LR selection method applied
No interaction and multi-collinearity detected
Hosmer-Lemeshow test, $p = 0.511$
Classification table 69.3% correctly classified; Baseline accuracy 56.7% (majority not involved)
Area under ROC curve = 0.762 (95% CI: 0.71-0.81, $p < 0.001$).

g. Preparing Medication Lists for Prospective Hajj and Umrah Pilgrims

Table 4.20 presents the associations between respondents' characteristics and involvement in preparing medication list for prospective Hajj and Umrah pilgrims. A higher proportion of respondents aged 40 years and above [45.9% (17/37)] and 30-39 year [32.4% (58/179] were involved compared with respondents aged 30 years and below [18.7% (20/107), $p = 0.003$]. A higher proportion of Malay respondents were involved compared with non-Malay respondents [43.5% (60/138) vs 18.9% (35/185), $p < 0.001$]. Similarly, involvement was more frequent among Muslim respondents than non-Muslims [43.9% (61/139) vs 18.5% (34/184), $p < 0.001$]. Respondents with prior Hajj or Umrah experience also showed higher involvement among those who had performed the pilgrimage [62.0% (31/50)], compared with those without such experience [23.4% (64/273), $p < 0.001$].

Similarly, involvement was more frequent among respondents who had graduated over more than 10 years and above, and 5-9 years, than 5 years and below [39.0% (30/77) vs 29.8% (51/171) vs 18.7% (14/75), $p = 0.023$). Respondents with more experience in community pharmacy practice showed significantly higher involvement. Specifically, involvement was higher among those with 10 or more years of experience [37.8% (17/45)] and those with 5–9 years [36.5% (38/104)], compared to respondents with 5 years or less years in service [23.0% (40/174), $p = 0.023$].

Among professional characteristics, involvement differed significantly by current position, with higher proportions observed among owners compared with employees [51.0% (25/49) vs 25.5% (70/274), $p < 0.001$]. Training in travel medicine was also associated with involvement [39.6% (42/106) vs 24.4% (53/217), $p = 0.005$]. No statistically significant associations were identified for gender, education level, type of pharmacy, and type of employment.

Belief Domains and Involvement in Preparing Medication List

Respondents involved in preparing medication lists reported significantly higher mean scores across most belief domains. When comparing respondents who were involved in preparing medication lists for prospective Hajj and Umrah pilgrims with those who were not, significantly higher mean scores were observed across most belief domains. Statistically significant differences were observed for knowledge (mean ± SD: 4.02 ± 0.81 vs 3.60 ± 0.72, $p < 0.001$), skills (4.00 ± 0.67 vs 3.58 ± 0.64, $p < 0.001$), and memory, attention and decision processes (2.68 ± 0.55 vs 2.37 ± 0.69, $p < 0.001$).

Significant differences were also identified for behavioural regulation (2.62 ± 0.64 vs 2.14 ± 0.77, $p < 0.001$), beliefs about capabilities (3.80 ± 0.63 vs 3.36 ± 0.68, $p < 0.001$), goals (2.82 ± 0.41 vs 2.70 ± 0.48, $p < 0.001$), emotion (4.00 ± 0.64 vs 3.75 ± 0.58, $p < 0.001$), and environmental context and resources (3.68 ± 0.58 vs 3.32 ± 0.53, $p < 0.001$). Statistically significant differences were also observed for social and professional role and identity ($p = 0.022$), intentions ($p = 0.004$), and social influences ($p = 0.015$). No statistically significant difference was observed for beliefs about consequences ($p = 0.099$), and reinforcement ($p = 0.169$).

Factors Associated with Involvement in Preparing Medication Lists for Prospective Hajj and Umrah Pilgrims

Univariate Analysis

In univariate analyses, several respondent characteristics and belief domains were significantly associated with involvement in preparing medication lists for prospective Hajj and Umrah pilgrims. Among respondent characteristics, age ($p = 0.013$), ethnicity ($p < 0.001$), religion ($p < 0.001$), prior Hajj or Umrah experience ($p < 0.001$), duration since graduation ($p = 0.007$), duration in community pharmacy practice ($p = 0.046$), current position ($p < 0.001$), and training in travel medicine ($p = 0.005$) were significantly associated with involvement.

With respect to belief domains, significant associations were observed for knowledge ($p < 0.001$), skills ($p < 0.001$), memory, attention and decision processes ($p < 0.001$), behavioural regulation ($p < 0.001$), beliefs about capabilities ($p < 0.001$), optimism ($p = 0.017$), intentions ($p = 0.014$), goals ($p = 0.002$), emotion ($p < 0.001$), social influences ($p = 0.018$), and environmental context and resources ($p < 0.001$). However, social and professional role and identity ($p = 0.069$), beliefs about consequences ($p = 0.290$), and reinforcement ($p = 0.134$) were not significantly associated with involvement.

Multivariable Analysis

All respondent characteristics and belief domains with a p-value < 0.25 in univariate analyses were entered into the multivariable logistic regression model. After adjustment, only two respondent characteristics and three belief domains remained independently associated with involvement in preparing medication lists. Religion was

associated with higher odds of involvement (adjusted OR = 1.96, 95% CI: 1.05–3.67, p = 0.034). Prior Hajj or Umrah experience also remained significant (adjusted OR = 3.45, 95% CI: 1.59–7.51, p = 0.002). Skills was associated with higher odds of involvement (adjusted OR = 2.85, 95% CI: 1.56–5.22, p < 0.001). Behavioural regulation also associated with higher odds of involvement (adjusted OR = 1.72, 95% CI: 1.21–2.44, p = 0.002). Social and professional role and identity also remained significant (adjusted OR = 0.48, 95% CI: 0.27–0.85, p = 0.011).

Table 4.20
Association between Respondents' Characteristics and Their Involvement in Preparing Medication List for Prospective Hajj and Umrah Pilgrims

Variables	Involvement in preparing medication lists		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Respondent characteristics							
Age group (years)†			0.003*				
<30	20 (18.7)	87 (81.3)		1			
30-39	58 (32.4)	121 (67.6)		2.08 (1.17, 3.72)	0.013	-	-
≥40	17 (45.9)	20 (54.1)		3.70 (1.65, 8.30)	0.002		
Gender			0.550				
Male	26 (27.1)	70 (72.9)		1			
Female	69 (30.4)	158 (69.6)		1.18 (0.69, 2.00)	0.551	-	-
Ethnicity†			<0.001*				
Malay	60 (43.5)	78 (56.5)		3.30 (2.00, 5.43)	<0.001	-	-
Non-Malay	35 (18.9)	150 (81.1)		1			
Religion†			<0.001*				
Islam	61 (43.9)	78 (56.1)		3.45 (2.09, 5.69)	<0.001	1.96 (1.05, 3.67)	0.034*
Non-Muslim	34 (18.5)	150 (81.5)		1			
Level of education†			0.108				
Undergraduate	82 (28.1)	210 (71.9)		1			
Postgraduate	13 (41.9)	18 (58.1)		1.85 (0.87, 3.95)	0.112	-	-
Prior Hajj or Umrah experience†			<0.001*				
Yes	31 (62.0)	19 (38.0)		7.20 (3.64, 14.23)	<0.001	3.45 (1.59, 7.51)	0.002*
No	64 (23.4)	209 (76.6)		2.24 (1.26, 3.99)	0.006		
Duration since graduation (years)†			0.023*				
<5	14 (18.7)	61 (81.3)		1			
5-9	51 (29.8)	120 (70.2)		1.85 (0.95, 3.61)	0.070	-	-
≥10	30 (39.0)	47 (61.0)		2.78 (1.33, 5.83)	0.007		

Variables	Involvement in preparing medication lists		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Duration in community pharmacy practice (years)†			0.023*				
<5	40 (23.0)	134 (77.0)		1			
5-9	38 (36.5)	66 (63.5)		1.93 (1.13, 3.29)	0.016	-	-
≥10	17 (37.8)	28 (62.2)		2.03 (1.01, 4.09)	0.046		
Type of pharmacy†			0.115				
Independent	40 (34.8)	75 (65.2)		1.48 (0.91, 2.43)	0.116	-	-
Chain	55 (26.4)	153 (73.6)		1			
Current position†			<0.001*				
Owner	25 (51.0)	24 (49.0)		3.04 (1.63, 5.66)	<0.001	-	-
Employee	70 (25.5)	204 (74.5)		1			
Type of employment			0.952				
Full-time	89 (29.4)	214 (70.6)		0.97 (0.36, 2.61)	0.952	-	-
Part-time	6 (30.0)	14 (70.0)		1			
Training in travel medicine†			0.005*				
Yes	42 (39.6)	64 (60.4)		2.03 (1.23, 3.34)	0.005	-	-
No	53 (24.4)	164 (75.6)		1			
Beliefs							
Knowledge†	4.02 ± 0.81	3.60 ± 0.72	<0.001[c]*	2.41 (1.63, 3.56)	<0.001		
Skills†	4.00 ± 0.67	3.58 ± 0.64	<0.001[c]*	3.06 (1.96, 4.79)	<0.001	2.85 (1.56, 5.22)	<0.001*
Memory, Attention and Decision Processes†	2.68 ± 0.55	2.37 ± 0.69	<0.001[c]*	2.16 (1.55, 3.00)	<0.001	-	-
Behavioural Regulation†	2.62 ± 0.64	2.14 ± 0.77	<0.001[c]*	2.17 (1.62, 2.92)	<0.001	1.72 (1.21, 2.44)	0.002*
Social/Professional Role and Identity†	4.23 ± 0.69	4.08 ± 0.62	0.022[c]*	1.45 (0.92, 2.12)	0.069	0.48 (0.27, 0.85)	0.011*
Beliefs about Capabilities†	3.88 ± 0.76	3.49 ± 0.62	<0.001[c]*	2.64 (1.71, 3.91)	<0.001	-	-
Optimism†	4.19 ± 0.73	3.99 ± 0.64	0.005[c]*	1.61 (1.09, 2.37)	0.017	-	-
Beliefs about Consequences	4.24 ± 0.73	4.16 ± 0.58	0.099[c]	1.24 (0.83, 1.85)	0.290	-	-

Variables	Involvement in preparing medication lists		p-value	Simple logistic regression		Multiple logistic regression	
	Yes n (%) / mean ± SD	No n (%) / mean ± SD		Unadjusted OR (95 % CI)	p-value	Adjusted OR (95 % CI)	p-value
Intentions†	2.76 ± 0.48	2.64 ± 0.51	0.004[c]	1.51 (1.09, 2.09)	0.014	-	-
Goals†	2.82 ± 0.41	2.70 ± 0.48	<0.001[c]*	1.79 (1.24, 2.58)	0.002	-	-
Reinforcement†	1.83 ± 0.72	1.72 ± 0.73	0.169[c]	1.21 (0.94, 1.54)	0.134	-	-
Emotion†	4.00 ± 0.64	3.75 ± 0.58	<0.001[c]*	2.00 (1.33, 3.01)	<0.001	-	-
Social Influences†	3.93 ± 0.63	3.76 ± 0.55	0.015[c]*	1.69 (1.09, 2.62)	0.018	-	-
Environmental Context and Resources†	3.68 ± 0.58	3.32 ± 0.53	<0.001[c]*	3.36 (2.08, 5.41)	<0.001	-	-

Chi-square test was applied unless otherwise stated; [c]Mann-Whitney U test was applied; † Variables included in the multiple logistic regression
OR: Odds ratio; CI: Confidence interval; *p < 0.05 denotes statistical significance; [f]Forward LR selection method applied; No interaction and multi-collinearity detected; Hosmer-Lemeshow test, p = 0.560; Classification table 76.2% correctly classified; Baseline accuracy 70.6% (majority not involved)
Area under ROC curve = 0.777 (95% CI: 0.72-0.83, p < 0.001).

4.5 Chapter Summary

This chapter presented the results from three studies, providing empirical evidence on CPs' practices and beliefs related to pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

Study 1, a scoping review, included 12 studies published between 1999 and 2022 across multiple countries, including two studies from Malaysia. The review revealed that the most commonly reported pharmacist activities included patient education and counselling, pre-travel assessments, dispensing of travel-related medications, and, in some jurisdictions, travel vaccinations. Despite these services, the review found variability in the scope of services across countries. One Malaysian study by Kc et al. (2020) reported CP involvement in providing menstrual management advice to Hajj pilgrims, particularly regarding use of hormonal medications to delay menstruation during pilgrimage rituals. The study was conducted among CPs practising in Selangor. Although the study explored selected travel health-related activities relevant to Hajj pilgrims, its primary focus was broader travel health-related services provided by CPs rather than comprehensive structured pre-travel pharmacist consultations specifically targeting Hajj and Umrah pilgrims. However, no studies have specifically focused on pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The barriers and facilitators findings were mapped to ten TDF domains. The barriers identified included limited knowledge or training, time constraints, insufficient staffing and limited access to travel-health resources. Facilitators included collaborative relationships with physicians, pharmacist education and patient demand.

Study 2 involved interviews with 24 CPs in Selangor and Kuala Lumpur. The study identified seven distinct activities performed by CPs. Travel health education was the most common activity reported. Their beliefs were categorised into 14 TDF domains. Most participants were motivated to offer consultations to the pilgrims. However, their involvement was reported to be limited by factors such as inadequate staffing, time constraints, a lack of confidence in regulations and disease management, and perceived lack of support from doctors.

Study 3 Part 1, which involved instrument development and validation, produced a final 47-item TDF-based survey instrument comprising 7 practice items and 40 belief items. Content validity was high, with S-CVI/Ave values of 0.98 for the

Practices section and 0.94 for the Beliefs section. Two belief items were removed due to I-CVI scores. Cognitive interviews improved the clarity and contextual relevance of the items. Test-retest reliability ranged from moderate to excellent: κ values ranging from 0.583 to 1.000 for practice items and ICC values between 0.530 and 0.910 for belief items. Feasibility testing indicated that the survey instrument was clear, accessible, and required an average of 15-20 minutes to complete.

Study 3 Part 2, a cross-sectional survey, involved 323 CPs and quantified their involvement in seven pre-travel pharmacist consultation activities. Involvement was highest for dispensing medications (89.2%), recommending health products (83.9%), assessing medication issues (73.7%) and offering basic health tests (70.6%). Less common activities were travel health education (56.3%), referrals (43.3%), and preparing medication lists (29.4%). Sub-activity analyses revealed that among those dispensing medications, 98.9% supplied minor ailment treatments, 75.3% dispensed oral contraceptives, and 59.0% supplied chronic disease medications. Belief scores showed moderate-to-high agreement across TDF domains, particularly for perceived benefits, professional responsibility and optimism. Chi-square analyses demonstrated significant associations between involvement and sociodemographic and professional variables such as ethnicity, religion, and prior pilgrimage experience. For example, Malay CPs (94.9%) and Muslim CPs (95.0%) were significantly more likely to dispense for pilgrims than their counterparts. Mann-Whitney U tests revealed that CPs who were involved in pre-travel pharmacist consultation activities recorded significantly higher belief scores across most TDF domains than those who were not.

The findings across all three studies reveal a consistent pattern. CPs already contribute meaningfully to preparing Hajj and Umrah pilgrims, particularly through medication-related support, yet the overall delivery of pre-travel pharmacist consultations is fragmented, reactive, and inconsistent. Variations in involvement are influenced by CPs' demographic backgrounds, practice environments, and underlying belief patterns. The following chapter discusses the findings.

CHAPTER 5
DISCUSSION

5.1 Introduction

This chapter presents a synthesis of the key findings from the individual studies, integration of findings across the three studies, and discusses their implications in relation to the research objectives and existing literature. Study 1, a scoping review, identified existing research evidence on the nature of travel health services provided by CPs and highlighted gaps in the delivery of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Study 2 explored the practices and beliefs of CPs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, revealing salient beliefs through the lens of the TDF. Study 3 focused on the development, validation and administration of a survey instrument to quantitatively assess the practices, beliefs, and sociodemographic factors associated with CPs' involvement in pre-travel pharmacist consultations. Based on these findings, this chapter outlines key recommendations to enhance CPs' involvement in travel health, acknowledges the limitations of the study, and proposes directions for future research. While Chapter 2 reviewed international and national literature on pharmacists' involvement in pre-travel pharmacist consultations, the following discussion situates the present findings within that evidence base, highlighting points of convergence, divergence, and areas where this study extends existing knowledge.

5.2 Study 1: Scoping Review of Practices, Barriers and Facilitators to the Delivery of Pre-Travel Health Services by Community Pharmacists Using the Theoretical Domains Framework

5.2.1 Practices of Pre-Travel Health Services

This scoping review has identified the practices and potential influencing factors related to the provision of pre-travel health services by CPs. The most frequently reported pre-travel health services provided by CPs were the delivery of pre-travel health counselling, education, and advice (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018, 2020; Houle et al., 2019; Kc et al., 2022; Kc et al., 2020; Kodkani et al., 1999; Taha & See, 2016; Teodósio et al., 2006; Thidrickson & Goodyer, 2019;

Toovey, 2006). These findings suggest that the activities may encourage patients to take appropriate precautions before travelling, such as receiving the proper vaccinations (Della Polla et al., 2020; Heslop et al., 2018; Kc et al., 2020; Teodósio et al., 2006) and taking chemoprophylactic medications (Heslop et al., 2018; Kc et al., 2020; Teodósio et al., 2006).

However, it was observed that the emphasis of CPs' advice varied across studies. Possible causes include the fact that CPs in a particular study may encounter travellers with distinct health requirements compared to those in other countries. Interestingly, while all studies included in this review addressed the provision of pre-travel health counselling, education, and advice by CPs, the literature has indicated a relatively infrequent discussion of the pre-travel risk assessment by CPs (Heslop et al., 2018; Houle et al., 2019; Taha & See, 2016; Thidrickson & Goodyer, 2019; Toovey, 2006). Furthermore, these scant studies indicated that CPs were less frequently engaged in conducting risk assessments before travel. This finding is clinically important because given that pre-travel risk assessments are a crucial component of effective pre-travel health consultations provided by CPs (Chiodini et al., 2020; Hill et al., 2006; Kc et al., 2023).

The results indicating the diversity of topics covered by CPs in their consultations and the infrequent conduct of pre-travel risk assessments may be ascribed to the lack of established protocols for CPs in travel health (Fernandes & Houle, 2019). Also, it is noteworthy that the ranges of CPs' activities described in the studies differ from one another, supporting the lack of uniformity in the roles that CPs play in travel health. A Canadian study developed and validated a clinical practice framework, namely the "5W Approach to Travel Risk Identification", that could support a standardised method for assessing patients' travel-related risk. The tool may assist pharmacists who are new to travel medicine in distinguishing between low-risk patients who can be managed within the pharmacy setting and high-risk individuals requiring referral. The framework is organised around five key domains: Who? (patient-specific factors), Where? (travel destination), When? (timing of travel), Why? (purpose of travel), and What? (planned activities). Designed as a concise, one-page checklist featuring "Yes/No" questions, it facilitates streamlined patient interactions. Preliminary testing demonstrated its effectiveness in guiding pharmacist decision-making and structuring clinical assessments (Fernandes & Houle, 2019; Houle et al., 2019; Kc et al., 2022; Thidrickson & Goodyer, 2019).

Three recent studies have discussed vaccination services by CPs, with two of them being carried out in Canada (Houle et al., 2019; Thidrickson & Goodyer, 2019). Over the past few years, the provision of travel vaccination services to patients by Canadian CPs has gained significant importance. The extended responsibilities undertaken by CPs in prescribing and administering vaccinations to travellers have been facilitated by changes in legislation in the country (Houle, 2018b). The significance of these extended responsibilities lies in the facilitation of patients' access to travel vaccinations and associated services in a more convenient and accessible manner.

Of note, access to travel clinics or other healthcare providers offering such services may not be readily available to a significant number of travellers, who may also face constraints in terms of time and resources to seek them (Abu Assab et al., 2022). The Canadian experience in expanding the role of CPs in providing travel vaccination services can serve as a valuable lesson for other nations (Foong et al., 2017; Houle et al., 2019). This approach can be explored further to ensure that travellers receive adequate care in a convenient and accessible manner.

The COVID-19 outbreak has resulted in modifications to travel requirements, including vaccination and diagnostic testing. The important responsibilities that CPs play in offering patients travel health services were covered in a recent review of pharmacist-managed and pharmacy-based travel health services during the COVID-19 pandemic. The study recommended that CPs incorporate COVID-19 vaccination and testing services into their travel health practices (Hurley-Kim et al., 2022). However, travel health services provided by CPs in relation to COVID-19 were not discussed in the majority of studies included in this review, primarily because the studies were conducted before the pandemic. Nonetheless, a study involving airport CPs revealed that CPs can play a variety of roles during pandemics, including supplying medications, assisting airport authorities with basic health screening such as measuring temperature and blood pressure, supplying health products such as masks, sanitisers, face shields and disinfectants, and offering health advice (Kc et al., 2022).

5.2.2 Barriers and Facilitators in Providing Pre-Travel Health Services

This scoping review identified various factors that either enable or hinder the provision of pre-travel health services by CPs, falling within ten domains of the TDF.

In this review, most studies documented facilitators and barriers that are associated with the domains of knowledge and skills (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018; Houle et al., 2019; Kc et al., 2020; Kodkani et al., 1999; Teodósio et al., 2006; Thidrickson & Goodyer, 2019; Toovey, 2006). This is not surprising given the dynamic nature of travel advisories and information regarding epidemics and outbreaks of infectious diseases. In addition, recommendations regarding traveller health are frequently revised in response to current events. This poses a challenge for CPs who must equip themselves with current information and maintain their skills in travel health (Heslop et al., 2018; Houle et al., 2019).

The findings suggest that CPs require adequate travel health knowledge and training to provide effective pre-travel pharmacist consultations and services (International Society of Travel Medicine, 2023a; World Health Organization, 2011). A lack of knowledge could cause CPs to lack confidence in their ability to provide travel health services. Thus, CPs should be provided with continuous education and training to ensure they have the necessary skills and knowledge to provide high-quality travel health services (Bascom et al., 2015; Houle et al., 2019; Kc et al., 2020; Kodkani et al., 1999; Teodósio et al., 2006). This will not only benefit travellers, but it will also strengthen the role of CPs in the healthcare system and improve the population's overall health outcomes.

Training for CPs in travel health can be provided by healthcare and pharmacy organisations. It can cover topics such as disease/infection prevention and travel vaccinations via seminars, webinars, and other means. In addition, these organisations may provide clinical guidelines and online resources to facilitate the provision of pre-travel health services by CPs. It is noteworthy that some areas of travel medicine in pharmacy practice may be considered specialised and require additional training. For instance, to provide pharmacy-based travel medicine services in the US, the UK, and Canada, specialised training in this field is required (Evans, 2018; Houle, 2018b; Hurley-Kim et al., 2018).

Using the US as an example, pharmacists must complete a comprehensive immunisation training program, become authorised immunisation providers in their state, complete an ISTM training program to obtain a Certificate in Travel Health (CTH), and participate in a continuous professional development program to maintain their competency (Hurley-Kim et al., 2018). In the context of undergraduate pharmacy education, incorporating travel health topics into undergraduate pharmacy curricula can

assist in preparing future pharmacy graduates to provide effective travel health consultations and services (Taha & See, 2016). These findings support the need for pharmacy schools collaborate with public health agencies and travel medicine experts to ensure their curricula are updated and relevant to the current travel health landscape.

Consistent with previous studies, CPs generally show positive attitudes regarding their roles as providers of travel health services. Even though travel health services vary by country, legislation, and funding framework, CPs are optimistic that their responsibilities in travel medicine are vital. This is optimistic for pharmacy-based travel health services. CPs and other healthcare professionals, including doctors and nurses, can use guidelines such as "Good Practice Guidance for Providing a Travel Health Service" to comprehend their roles and responsibilities in relation to travel health services (Chiodini et al., 2020).

The 'Good Practice Guidance for Providing a Travel Health Service' refers to professional guidance developed to support safe and structured delivery of travel health services within pharmacy and primary care settings. The guidance typically outlines recommended competencies, scope of practice, risk assessment procedures, vaccination considerations, documentation practices, referral processes, patient counselling, and professional governance requirements relevant to travel health service provision. The guidance is publicly accessible through professional travel health organisations and pharmacy practice bodies in several countries, particularly the UK. However, although the guidance provides useful reference principles, direct application within the Malaysian context may require adaptation to local healthcare structures, pharmacy regulations, training systems, prescribing limitations, and pilgrimage-related healthcare needs. To date, there is limited research examining the roles of CPs in self-care practices and patient-centred care in travel health. The national pharmacist association can take the initiative to enhance the roles of CPs in these areas. Further research on the responsibilities of CPs from a variety of perspectives and contexts could strengthen the roles of CPs in travel health care and services.

In the "environmental context and resources" domain, insufficient resources, time, space, and staff were frequently cited as barriers to implementing pre-travel health services (Heslop et al., 2018; Houle et al., 2019; Thidrickson & Goodyer, 2019). However, it should be noted that the barriers in the "environmental context and resources" domain are typically beyond the control of practitioners and require organisational-level changes to be resolved (Michie et al., 2014). To address resource

limitations, CPs can consider partnering with other healthcare providers or organisations in sharing resources and workload.

In fact, this review showed that the implementation of travel health services by CPs would be facilitated by good relationships between CPs and other health practitioners (Houle et al., 2019; Thidrickson & Goodyer, 2019). In this context, the "good relationships" between CPs and other healthcare practitioners referred to collaborative and supportive interprofessional interactions that facilitated the delivery of travel health services. The Canadian studies by Houle et al. (2019) and Thidrickson & Goodyer (2019) demonstrated that CPs' involvement in travel health services was strengthened when other healthcare practitioners recognised and supported CPs' clinical roles in travel care. For example, Houle et al. (2019), which examined the uptake of travel health services among CPs in Ontario, Canada following expansion of pharmacist immunisation authority, reported that some CPs established collaborative relationships with physicians and nurse practitioners who referred travellers to pharmacists for vaccination recommendations and travel-related consultations. One pharmacist described receiving referrals from a local nurse practitioner who would subsequently provide prescriptions based on the pharmacist's recommendations. However, the study also highlighted variability in interprofessional relationships, whereby some physicians viewed pharmacists as collaborative partners, while others perceived pharmacists' expanded travel health roles as overlapping or competing with existing medical services.

Similarly, Thidrickson and Goodyer (2019), in a Canadian qualitative study involving early adopters of pharmacist-led travel health services, found that pharmacists perceived collaboration with family physicians and health centres as important for service development and patient referrals. Pharmacists reported receiving referrals from physicians and maintaining cooperative relationships with local healthcare providers, which helped increase awareness and utilisation of pharmacy-based travel health services. The study also suggested that positive interprofessional relationships contributed to continuity of care, particularly for travellers requiring vaccinations, prescriptions, or more complex travel-related medical management. Such a relationship can enhance communication (Mutie et al., 2014), comprehension, and appreciation of one another's roles and expertise.

In addition, CPs and other healthcare professionals should develop shared care plans that outline the roles and responsibilities of each practitioner involved in patient

care activities. The use of technologies such as electronic health records and telemedicine can also improve the communication and exchange of patient information between CPs and other healthcare professionals.

Nevertheless, this review found that the legislative issues pertaining to prescribing authorisation may either impede or facilitate CPs' ability to expand their pre-travel health services (Evans, 2018; Hind et al., 2008; Houle, 2018b; Houle et al., 2019; Thidrickson & Goodyer, 2019). It is noteworthy that the provision of vaccines in pharmacies without the need for a prescription played a pivotal role in the development of travel health services that are managed by pharmacies in the UK, the US, and Canada.

However, the absence of prescribing authorisation should not impede CPs from delivering pre-travel health services. They can still administer other services, such as providing travellers with over-the-counter medications, such as those for travellers' diarrhoea and motion sickness, sunburn relief, and insect repellents, provide health advice and refer patients to other healthcare professionals (Houle, 2018a).

It is noteworthy that studies have shown that patient awareness of the roles of CPs in travel health and public demand for such services are important factors influencing CPs' involvement in pre-travel health services (Houle et al., 2019). International evidence suggests that the public are generally receptive towards pre-travel health services by CPs, particularly due to the accessibility, convenience, and extended operating hours offered by community pharmacies. In the Canadian study by Houle et al. (2019), CPs reported that travellers valued the convenience of obtaining travel-related advice and vaccinations without requiring physician appointments, especially during evenings and weekends. The study also demonstrated that collaborative and accessible pharmacy-based services could encourage utilisation of pharmacist-led travel health care.

However, despite this potential public support, the study also identified low patient awareness regarding CPs' expanded roles in travel health services as a major barrier to service uptake. Many CPs perceived that travellers were still unaware that CPs could provide travel vaccinations and pre-travel consultations, which contributed to lower patient demand and limited utilisation of the services. Similar findings have been reported internationally, where public awareness, confidence in pharmacists' competencies, and acceptance of pharmacist-led clinical services were found to influence the uptake of travel health services provided by CPs (Houle et al., 2019; Hess et al., 2010; Durham et al., 2011).

In Malaysia, evidence specifically examining public perceptions or acceptance of pre-travel health services by CPs is limited. Nevertheless, given the accessibility of community pharmacies and the expanding roles of CPs in patient counselling, chronic disease management, and preventive health services, CPs may be well-positioned to support the pre-travel healthcare needs of prospective Hajj and Umrah pilgrims. However, public awareness regarding these expanded professional roles may still be insufficient, potentially limiting demand and utilisation of pre-travel pharmacist consultations.

Therefore, it is essential to increase patient awareness of the scope of a CP's role in travel health. This can be accomplished by promoting the services through marketing and advertising strategies, educating patients during their visits about the importance of pre-travel health consultations, collaborating with other healthcare providers and travel medicine experts to raise awareness, providing information on website or social media platforms to help patients understand the services, and providing educational seminars or workshops on travel health to the public.

5.2.3 Strengths and Limitations

To the authors' knowledge, this is the first scoping review of studies regarding CP-reported practices, barriers, and facilitators for providing pre-travel health services utilising the TDF. The strength of this review is that it utilised a systematic scoping review methodology and adhered to the PRISMA-ScR recommendations (Arksey & O'Malley, 2005; Peters et al., 2015; Tricco et al., 2018). The search strategy and manual searching for potentially relevant articles in multiple databases were likely to yield a comprehensive overview of the reported barriers and facilitators. In addition, the TDF was used as a theoretical framework to classify the barriers and facilitators in this review (Cane et al., 2012). This would enable the identification of aspects that should be focused on efforts to promote the delivery of pre-travel health services by CPs.

Of note, the facilitators and barriers related to the TDF domains of reinforcement, behavioural regulation, goals, memory, attention, and decision processes have not been identified. Generally, the studies included in this review were not designed to investigate exhaustively the full spectrum of these factors across all 14 TDF domains, so these domains may have received insufficient research attention. However,

it is possible that the delivery of pre-travel health services by CPs could be affected by these unidentified domains. These subjects warrant additional research in the future.

Despite its strengths, this review has several limitations. First, although the quality assessment of the included studies can identify various methodological limitations such as a lack of sample size justification and limited recruitment of eligible participants, the quality of the studies was not considered when selecting the articles for the review. Nevertheless, the findings regarding the quality of the included studies could provide an overall picture of the quality of the research on pharmacy-based travel services. In addition, the search strategy was limited to four databases and only articles written in English were considered. Thus, the review may have excluded relevant studies published in other languages, potentially introducing bias into the findings and limiting their applicability to populations and settings where English is not the primary language.

The present review included studies that mainly utilised cross-sectional designs and were conducted in countries such as Australia, Canada, Malaysia, Italy, Portugal, South Africa, and Switzerland. It is acknowledged that the barriers and facilitators to implementing pre-travel health services in other countries may vary. Another important limitation observed in the reviewed studies pertained to their small sample sizes. Although the studies can provide valuable insights into the topic, it is important to exercise caution when interpreting findings from studies with small sample sizes, as these findings may not be generalisable to broader perspectives, thereby warranting the need for further research.

Furthermore, although the barriers and facilitators for the provision of pre-travel health services by CPs can be categorised into ten domains of the TDF, there is a lack of comprehensive research on each individual domain. For instance, while the knowledge domain emerged as the most frequently addressed topic, it was found to be the subject of discussion in only about half of the studies examined. Domains such as social influences and emotion were discussed to a lesser extent. This suggests that further research is necessary to examine how other domains of the TDF may impact the provision of pre-travel health services by CPs. Additionally, this review compiled only the practices of CPs and the factors that facilitate or impede the provision of pre-travel health services from the CPs' perspective. Future research may attempt to investigate the topics from the perspectives of other stakeholders, such as other healthcare

professionals, professional organisations, policymakers, patients, and the general public.

5.3 Study 2: A Qualitative Exploration of Community Pharmacists' Practices and Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

5.3.1 Practices of Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

This study showed that CPs have engaged in various pre-travel pharmacist consultation activities tailored to the needs of Hajj and Umrah pilgrims, with the most common activity being the provision of travel health education and recommendations of health and self-care products and preventive medications. The provision of pre-travel pharmacist consultations to pharmacy clients, including prospective Hajj and Umrah pilgrims, has been reported to face barriers such as knowledge gaps in travel health and limited training in two previous Malaysian studies (Kc et al., 2020; Taha & See, 2016).

This study contributes to the existing body of knowledge by revealing that the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims is influenced not only by training and knowledge but also by various factors, including physical and social opportunities, as well as physical and psychological capabilities. These findings shed light on the multifaceted nature of factors affecting the delivery of pre-travel pharmacist consultations to pilgrims, indicating the need for a holistic approach addressing the multiple behavioural determinants involved (Cane et al., 2012; Michie et al., 2011) in providing effective pre-travel health care. To the best of our knowledge, this study is the first to employ a theoretical approach to explore the topic. The utilisation of the TDF facilitated a comprehensive exploration of the factors influencing the practice of providing pre-travel pharmacist consultations for these pilgrims.

5.3.2 Beliefs Regarding Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

The present study suggests a substantial opportunity for CPs to take a more proactive role in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The findings that emerged from the study showed an apparent demand from prospective pilgrims for pre-travel pharmacist consultations at community

pharmacies, and CPs are well-equipped to meet this need due to their accessibility. Pre-travel pharmacist consultation is viewed as a professional obligation for pharmacists, aligning with their expanding role in public health and preventive care (Ang et al., 2022; Nordin et al., 2017). Moreover, CPs demonstrate an optimism and willingness to actively engage in promoting the health and safety of individuals undertaking these religious journeys.

The diverse skill set possessed by CPs, which includes communication and counselling skills, along with pharmaceutical care skills concerning medication-related needs, positions them as invaluable resources for prospective pilgrims seeking pre-travel health advice, especially given the intricate health-related considerations associated with Hajj and Umrah. Additionally, pre-travel pharmacist consultations were perceived by CPs as beneficial that extends beyond improving the well-being of Hajj and Umrah pilgrims to encompass the growth and sustainability of community pharmacies, as well as enhancing the reputation of CPs. These findings support the need for encourage initiatives that promote and support pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims and maximise the potential benefits for both pilgrims and community pharmacy establishments.

An additional observation was that some motivation-related beliefs appeared to be influenced by cultural and religious familiarity with the Hajj and Umrah pilgrimage. Malay Muslim CPs, particularly those who had previously performed Hajj or Umrah, frequently expressed a strong sense of personal responsibility, empathy, and commitment towards supporting prospective pilgrims. These beliefs were reflected across several TDF domains, including Social/Professional Role and Identity, Beliefs about Consequences, Goals, and Emotion. Participants often described satisfaction derived from helping pilgrims prepare for their religious journey and viewed such services as an extension of their professional and community responsibilities.

However, the study was not designed to compare behavioural determinants across ethnic groups, and the qualitative sample was not sufficiently large to draw definitive conclusions regarding racial or ethnic differences. Furthermore, although some culturally and religiously influenced motivations were evident, the TDF does not explicitly capture faith-based beliefs, religious obligations, or cultural identity as distinct constructs. Consequently, the extent to which cultural and religious factors influenced CPs' involvement may not have been fully captured. Future research may benefit from exploring these influences using culturally sensitive approaches or

complementary theoretical frameworks that explicitly examine socio-cultural and religious determinants of healthcare practice.

Nevertheless, for CPs to effectively provide pre-travel pharmacist consultations to the pilgrims, this study's findings suggest that it is crucial that they possess comprehensive knowledge on specific topics such as common diseases encountered by pilgrims, vaccination requirements, pilgrimage activities, and travel regulations. The present study revealed a significant lack of training in travel health among CPs, with only three CPs (12.5%) having received such training, highlighting the need for more training programs to address this gap. Furthermore, the frequent encounters with potential pilgrims at the pharmacy requesting advice and medicinal products would mean that the CPs need to be equipped with the necessary knowledge to support them. This training can also be beneficial for CPs who are not familiar with Hajj and Umrah pilgrimages and the health-related needs of the pilgrims, including non-Muslims and younger CPs.

Therefore, a collaborative effort among relevant stakeholders is recommended to develop tailored training programs for CPs (Ministry of Health Malaysia, 2025), focusing on the identified knowledge gaps to better support the health and well-being of prospective Hajj and Umrah pilgrims. Developing such training programs in partnership with travel health experts, academic institutions, and professional associations can enrich the training by providing access to up-to-date resources, practical insights, and networking opportunities.

In addition to this, CPs can be supported in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims by providing them with reliable resources. These resources can integrate recommendations and current information from reputable sources such as the WHO (World Health Organization, 2021a), CDC (Centers for Disease Control and Prevention, 2021), Tabung Haji and the Ministry of Health of Malaysia (Tabung Haji, 2021). The availability of such resources is particularly important due to the dynamic nature of Hajj and Umrah travel regulations and requirements set forth by the Saudi and Malaysian authorities, which often necessitate frequent updates (Ministry of Health, Kingdom of Saudi Arabia, 2023, 2024). Given that Umrah occurs throughout the year and Hajj takes place annually, CPs can always refer to these resources to ensure they are providing the most up-to-date and accurate information to prospective pilgrims.

The present study has also highlighted the opportunity for collaboration with other stakeholders, particularly doctors, the Malaysian Pharmacists Society, and travel agencies. In this study, it was revealed that some CPs recognise that their provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims is confined to their scope of practice, acknowledging that activities such as vaccination services fall under the purview of medical practitioners. However, CPs mentioned that they can identify health issues requiring medical intervention beyond their scope, such as potential exacerbation of chronic conditions or the need for vaccinations, leading to referrals to doctors. This underscores the potential for collaboration with doctors to enhance the well-being of prospective Hajj and Umrah pilgrims.

Travel vaccination services in Malaysia remain relatively limited within community pharmacy settings compared with countries such as Canada, UK, and Australia, where pharmacists possess broader immunisation authority and are more formally integrated into travel health services (Houle et al., 2019; Bascom et al., 2015). In Malaysia, travel vaccination services are predominantly physician-led and are mainly provided through private medical clinics, hospitals, government health facilities, and specialised travel medicine centres. As CPs are not routinely authorised to independently administer travel vaccines, their involvement is generally limited to vaccine education, counselling, referral, and promotion of preventive health awareness.

Participants in the present study frequently expressed uncertainty regarding legal boundaries and scope of practice associated with vaccination services, reflecting broader regulatory and organisational limitations within Malaysian pharmacy practice. Nevertheless, CPs remain highly accessible healthcare professionals and may play an important role in increasing vaccine awareness, reinforcing vaccination recommendations, identifying high-risk pilgrims, and facilitating referral to appropriate vaccination providers. International evidence suggests that pharmacist involvement in vaccination services may improve accessibility, vaccine uptake, and engagement with preventive healthcare among travellers (Houle et al., 2019). Therefore, greater integration of CPs into structured travel vaccination programmes may represent an important opportunity to strengthen pilgrimage-focused preventive healthcare services in Malaysia.

It was noted that some CPs expressed a lack of support from doctors in enabling them to provide pre-travel pharmacist consultations for these pilgrims, which may stem from the differences in understanding of roles and responsibilities, limited

communication, and a lack of awareness among doctors regarding the potential contributions of CPs (Alabid et al., 2021). Addressing this issue may require enhancing inter-professional communication and collaboration (Mutie et al., 2014), such as through regular meetings, workshops, or joint training sessions to foster mutual understanding and support between CPs and doctors.

Furthermore, the Malaysian Pharmacists Society and travel agencies can assist in narrowing this gap by advocating for the roles of CPs in promoting the well-being of Hajj and Umrah pilgrims through educational campaigns, policy advocacy, professional training, and information dissemination, thereby elevating the recognition and support for CPs in providing pre-travel pharmacist consultations for pilgrims and fostering a more collaborative and integrated approach to pilgrim care. Additionally, recognition from doctors, the Malaysian Pharmacists Society, and travel agencies of CPs' roles in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can serve as a "reward" for CPs to offer these services.

Interestingly, the present study reveals inadequate encouragement from CPs' employers or companies for them to provide pre-travel pharmacist consultations to prospective Hajj and Umrah pilgrims, possibly due to reasons such as a lack of awareness, resource allocation priorities, time and workload pressures. To address this, initiatives can be made to educate employers about the benefits of these consultations and develop clear policies emphasising the importance of pre-travel pharmacist consultations, fostering a more supportive environment and encouraging CPs to actively engage in providing this valuable service.

5.3.3 Strengths and Limitations

The strength of the study is that it is the first study conducted on the activities and beliefs of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims from CPs' perspectives. The application of TDF provides insight from the theoretical lens of the topic. The study has several limitations. Firstly, the qualitative phase may have been subject to selection bias due to the use of purposive and snowball sampling. Participants were recruited through professional networks and referrals, which may have increased the likelihood of enrolling CPs who were more interested or engaged in pre-travel health services. This may partially explain the high level of reported involvement, with 23 of 24 participants (95.8%) indicating participation in at

least one pre-travel pharmacist consultation activity. In addition, social desirability bias may have influenced participants to portray their professional practices more favourably during interviews. Consequently, the findings may underrepresent the perspectives of pharmacists with limited or no involvement in pre-travel pharmacist consultations. Nevertheless, purposive sampling was considered appropriate for the exploratory objectives of the study, which sought to obtain in-depth insights into the phenomenon under investigation. Secondly, it only included a small number of CPs from a capital city and a state in Malaysia. It is acknowledged that CPs' practices and perceptions of facilitators and barriers to the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims within the various regions in the country may differ. Furthermore, the participant CPs were primarily from urban and suburban areas and may not fully represent the practices and perceptions of those located in rural community pharmacy settings. Moreover, the majority of participants in the study worked in community-based settings, which may not entirely capture the specific challenges faced by pharmacists in other settings, such as airport pharmacies, who are renowned for their unique travel health services (Kc et al., 2022).

The study's findings indicating the generally positive attitude of CPs towards the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims could be influenced by social desirability bias. It is noteworthy, however, that some CPs admitted to not providing certain pre-travel pharmacist consultation activities, suggesting a reduction in such bias, mainly due to the offer of confidentiality and anonymity in the study. Efforts were also made to minimise social desirability bias by having the interviewer pose as a researcher rather than as a healthcare provider.

Future research could aim to include a more diverse sample of CPs from various regions, including rural areas, and different pharmacy settings, such as airport pharmacies, to gain a comprehensive understanding of the facilitators and barriers to the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Airport pharmacists may have unique exposure to travellers, including prospective Hajj and Umrah pilgrims seeking last-minute medications, travel-related advice, preventive products, or management of travel-associated health concerns immediately prior to departure. Consequently, their experiences and involvement in travel health-related activities may differ from those practising in conventional community pharmacy settings. However, the present study primarily focused on routine community pharmacy practice settings within residential and urban healthcare

environments where pilgrims were more likely to seek ongoing pre-travel preparation, medication counselling, chronic disease management support, and preventive healthcare services prior to departure. Future studies may benefit from inclusion of airport-based pharmacists and other travel-associated healthcare settings to provide broader understanding of pharmacists' roles across different stages of the travel preparation pathway.

Exploring the perspectives of key stakeholders, including prospective pilgrims, doctors, national pharmacists' organisations, and travel agencies can provide valuable insights for improvement. Furthermore, a future quantitative study using a structured questionnaire could be considered to assess the factors significantly associated with the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

5.4 Study 3: Assessment of Community Pharmacists' Practices and Beliefs in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur

5.4.1 Phase 1: Development and Validation of the Survey Instrument

This study successfully developed a 47-item survey instrument grounded in the TDF to assess CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The instrument comprises seven Yes/No practice items identified from preceding qualitative work and 40 Likert-scale belief items mapped to the TDF domains. The instrument underwent a rigorous multi-phase validation process, including expert content validation, cognitive interviews, test–retest reliability assessment, and feasibility testing. Reliability analysis demonstrated moderate to almost perfect agreement for practice items, as indicated by Cohen's κ values (Landis & Koch, 1977), and moderate to excellent reliability for belief items, as indicated by ICC values (Koo & Li, 2016). The use of formative indicators enabled the instrument to capture heterogeneous, context-specific constructs, thereby reflecting the complexity of real-world pharmacy practice. Unlike previous descriptive studies lacking theoretical grounding, (Abdul Kadir et al., 2023) this study introduces a structured, theory-informed approach to evaluating practical engagement and the factors underlying CPs' involvement in pre-travel health services.

The results revealed variability in test–retest reliability across the TDF domains for belief items. Lower ICC values observed in domains such as Knowledge and Skills suggest that some responses may be more context-dependent than indicative of stable beliefs. CPs' responses in these areas could be influenced by factors such as participation in training, changes in workplace policies, or the introduction of updated clinical guidelines during the test interval. Similarly, responses within the Beliefs about Consequences and Beliefs about Capabilities domains may be shaped by organisational context, interprofessional dynamics, or workload pressures. In contrast, practice items (assessed using Cohen's κ) demonstrated moderate to almost perfect agreement, indicating high temporal stability for reported activities over the one-week interval. Despite variations in reliability, all κ and ICC values remained within acceptable thresholds (Koo & Li, 2016; Landis & Koch, 1977), and the observed fluctuations are likely to reflect the evolving nature of professional beliefs and practices rather than deficiencies in measurement reliability.

The removal of items with low content validity (I-CVI), warrants consideration as an important refinement step in the instrument development process. Although this led to a slight reduction in representation for certain domains, specifically Skills and Behavioural Regulation, it contributed to improved conceptual clarity, item precision, and overall relevance. The formative nature of the instrument ensures that each retained item continues to make a distinct and meaningful contribution to the measurement of CPs' beliefs. As such, the removal of less representative items does not compromise the instrument's integrity but rather enhances its usability and psychometric robustness.

Cognitive interviews further contributed to improving the instrument's clarity and practical relevance. Although the items had already undergone expert validation, CPs identified issues such as ambiguity in terminology. For example, the term "medication list" generated inconsistent interpretations, highlighting potential variation in how pharmacists apply concepts in practice. This is consistent with best practices in instrument development, reaffirming the value of cognitive interviews in enhancing item clarity and ensuring content validity in behavioural research instruments.

A notable strength of this instrument lies in its theoretical grounding within the TDF, and in its integration of context-specific insights generated inductively from the qualitative phase of the present study. While the TDF provided the overarching deductive behavioural framework guiding domain development, the qualitative findings contributed inductive insights reflecting CPs lived experiences, contextual challenges,

practice realities, and pilgrimage-specific considerations relevant to the Malaysian setting. This hybrid deductive–inductive approach enhanced the contextual relevance of the instrument while maintaining theoretical coherence across study phases. By mapping items to key domains such as knowledge, beliefs about consequences, social influences, and environmental context and resources, the instrument provides a comprehensive understanding of the factors that shape CPs' engagement in pre-travel health services. The integration of findings from a prior qualitative study further contributed to ensuring that the items were not only theoretically sound but also contextually salient and relevant to local pharmacy practice.

The instrument also offers practical utility for informing training needs, service planning, and workforce development. By capturing relevant factors, it can be used to identify specific barriers and enablers to CPs' involvement in travel health consultations. For example, insights from domains such as Beliefs about Capabilities can inform training programmes that aim to build pharmacists' confidence and competence in delivering pre-travel pharmacist consultations, while findings related to social influences and organisational context can guide strategies for strengthening interprofessional collaboration and structural support. The ability to compare engagement across different pharmacy settings, including independent, chain, and hospital-affiliated pharmacies, may help to identify service disparities and tailor interventions accordingly. Variations in CP engagement may also reflect differences in regional healthcare infrastructure, resource availability, or workplace culture, all of which are captured within the TDF domains.

Beyond the local context, the instrument holds potential for application in cross-country studies aimed at assessing and comparing CPs' roles in travel health services globally. However, while the core structure may be adaptable, item-level modifications may be necessary to reflect local practice norms, healthcare policies, and sociocultural factors. The adaptability of TDF-based instruments for cross-disciplinary and international use has been demonstrated in previous studies. For instance, generic TDF-based questionnaires have been successfully applied in various professional contexts (Huijg et al., 2014), including medication error reporting (Stewart et al., 2018), frailty screening (France et al., 2023), and the adoption of full-scope pharmacy practice (Hussein et al., 2021). The instrument developed in this study contributes to this growing body of work by offering a contextually grounded tool that may be adapted,

with appropriate modifications, to support broader assessments of pharmacist-led pre-travel health services.

The final instrument comprises 40 belief-related items mapped across the domains of the TDF, with each domain represented by between one and nine items. There is no universally established standard for the number of items per domain in TDF-based instruments; previous studies have demonstrated variability depending on the study objectives, conceptual scope, and methodological approach (Wong et al., 2022). Some instruments represent certain domains with few or no items when those domains are not central to the construct under investigation (Huijg et al., 2014). In this study, expert validation and qualitative input were used to ensure that domain representation was appropriate and that retained items were contextually salient and theoretically relevant.

5.4.1.1 Limitations of the Study

Several limitations should be considered when interpreting the findings. Although the instrument was developed and validated through a systematic and rigorous process, certain constraints warrant consideration. Firstly, the instrument was designed and tested within the Malaysian context, and its applicability to other countries or healthcare systems remains uncertain. Differences in pharmacy practice models, regulatory frameworks, and sociocultural norms may influence the instrument's performance in alternative settings. Future validation studies are recommended to assess its transferability and to ensure contextual relevance in other healthcare environments.

Secondly, while the instrument's comprehensiveness contributes to strong content validity, its length may present practical challenges in routine or large-scale implementation. A 47-item survey may lead to respondent fatigue or reduced completion rates. Developing a shortened version that retains the most salient items could enhance feasibility without compromising the integrity of the measurement. Furthermore, construct validity using exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) was not evaluated. This was primarily because the instrument was developed as a formative, theory-informed measure grounded deductively in the TDF, whereby the items were intended to capture distinct beliefs that collectively contribute to the construct, rather than interchangeable indicators of a single underlying latent

variable (Coltman et al., 2008). Consequently, conventional latent variable approaches such as EFA and CFA may be less suitable for formative measurement models (Hair et al., 2019). Accordingly, the present study prioritised expert content review, cognitive interviewing, test–retest reliability, and feasibility assessment to establish conceptual relevance, comprehensiveness, item clarity, and temporal stability. Future validation studies could evaluate construct validity using EFA or CFA if the instrument is subsequently refined into reflective or domain-specific scales for broader psychometric application.

Despite these limitations, the instrument was developed using a theory-informed and methodologically robust approach, supported by feedback from a diverse range of participants. The structured application of development procedures ensures that the tool is both psychometrically sound and adaptable for future use in research and practice. Further studies are encouraged to examine its predictive validity and to evaluate its applicability across varied contexts and populations.

5.4.2 Phase 2: Cross-Sectional Questionnaire Survey

This study provides a snapshot of Malaysian CPs' perspectives on pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims and factors influencing the involvement among CPs. To our knowledge, this is the first study that applies the TDF approach related to the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims among CPs in Malaysia. The outcomes of this study may be useful in developing targeted interventions to enhance CPs' involvement in delivering pre-travel pharmacist consultations for the pilgrims.

5.4.2.1 Practices of Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

The pattern of involvement observed in this study suggests that CPs' contributions to pre-travel health care remain strongly anchored to traditional medication management functions rather than comprehensive travel health service delivery. Activities that closely align with CPs' established expertise, professional identity, and routine workflow appear to be more readily integrated into daily practice, whereas activities requiring additional clinical assessment, documentation, care coordination, or interprofessional collaboration remain less embedded. This finding

reflects the continued influence of the dispensing-oriented structure of community pharmacy practice in Malaysia, where CPs' routine interactions with patients are predominantly centred on medication supply and product-related consultations.

The higher involvement of medication-focused activities may also reflect how CPs perceive and operationalise their professional role in practice. Although contemporary pharmacy practice increasingly emphasises patient-centred and preventive care services, the absence of dispensing separation in Malaysia may continue to reinforce a product-oriented practice environment. In such settings, CPs frequently encounter pilgrims seeking medications, supplements, and health-related products, making these activities more visible, familiar, and readily integrated into existing workflows. This interpretation is supported by Loh et al. (2021), who reported that the lack of separation between prescribing and dispensing was perceived by Malaysian CPs as a major barrier to the expansion of pharmaceutical care services.

The comparatively lower engagement in activities such as medication list preparation, referrals, and travel health education suggests that these practices have not yet become routine components of community pharmacy service delivery. Unlike medication supply activities, these services require additional cognitive, organisational, and collaborative processes, including documentation, clinical judgement, communication with other healthcare professionals, and access to structured consultation frameworks. Therefore, their lower integration into practice may reflect broader system-level limitations rather than a lack of willingness among CPs to contribute. This interpretation is consistent with the behavioural findings of the present study, which identified environmental context and resources as an important influence on CPs' involvement.

Particularly noteworthy is the limited involvement in medication list preparation despite its potential importance for medication continuity and patient safety during international travel. This finding may indicate that documentation-related activities are not routinely prioritised within community pharmacy practice, possibly because they are not formally required, reimbursed, or supported by standardised practice procedures. Given the high proportion of Hajj and Umrah pilgrims who are older adults with chronic conditions and polypharmacy, insufficient attention to medication reconciliation and documentation may represent a missed opportunity to support safer medicine use during pilgrimage.

The contrast between the present findings and travel health practices reported in countries such as the United Kingdom, Canada, and the United States further highlights the influence of healthcare system structures on CPs' roles. In these countries, CPs are more formally integrated into travel health service delivery through mechanisms such as expanded vaccination scope of practice, prescribing authority, and established travel health frameworks (Evans, 2018; Houle, 2018; Hurley-Kim et al., 2018). Consequently, travel health services are delivered as structured clinical activities rather than extensions of routine dispensing practice. The disparity observed suggests that the current limitations in Malaysian community pharmacy practice may be attributable less to CPs' capability or motivation and more to the absence of enabling systems, policies, and practice infrastructure required to support comprehensive pre-travel care.

5.4.2.2 Beliefs Related to Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

The pattern of beliefs observed in this study suggests that CPs generally perceive pre-travel pharmacist consultations as professionally valuable and beneficial to both patients and the pharmacy profession. CPs recognised that such consultations could improve patient well-being, enhance public trust, strengthen the professional image of community pharmacy, and contribute to safer medication use during pilgrimage. These findings indicate the presence of strong reflective motivation, whereby CPs perceive pre-travel pharmacist consultations as consistent with their professional responsibilities and future role development. Similar positive perceptions towards travel health services have been reported among CPs in Australia, Canada, Malaysia, and Portugal, where CPs generally recognised their potential contribution to travel health and preventive care (Bascom et al., 2015; Heslop et al., 2020; Taha & See, 2016; Teodósio et al., 2021).

However, the coexistence of positive beliefs with only moderate intentions to provide the service highlights a potential intention–behaviour gap. Although CPs appeared motivated to contribute, this motivation did not consistently translate into routine involvement across all pre-travel pharmacist consultation activities. This finding supports previous observations that favourable attitudes alone are often insufficient to sustain practice change when capability and opportunity barriers remain unresolved (Ajzen, 1991; Cane et al., 2012). Within the COM-B model, motivation appears relatively strong, whereas capability and opportunity may represent the principal

constraints preventing consistent behavioural enactment. Therefore, the findings suggest that the challenge is not persuading CPs of the value of pre-travel pharmacist consultations, but enabling them to integrate such services into routine practice.

Capability-related influences were particularly evident in relation to CPs' perceived preparedness to provide comprehensive travel health services. Although respondents generally reported confidence in medication-related counselling and pharmaceutical care activities, their confidence appeared less certain when more specialised travel health competencies were required. This pattern may reflect the distinction between general pharmacy competence and travel health-specific competence. CPs routinely manage medication-related issues. However, pre-travel pharmacist consultations require additional expertise in vaccination recommendations, travel medicine guidelines, risk assessment, and regulatory requirements. Similar knowledge and training gaps have been reported among CPs in Australia, Switzerland, Italy, Canada, and Malaysia, particularly regarding travel vaccinations, malaria prevention, and management of travel-related health risks (Della Polla et al., 2020; Heslop et al., 2018; Kc et al., 2022; Taha & See, 2016). Consequently, CPs may perceive pre-travel pharmacist consultations as professionally appropriate while simultaneously feeling insufficiently equipped to deliver comprehensive services. This finding reinforces the importance of targeted continuing professional development and structured travel health training programmes.

The findings also emphasise the importance of opportunity-related influences in shaping CPs' involvement. Although CPs appeared professionally willing to provide pre-travel pharmacist consultations, the practice environment may not adequately support routine service delivery. The overall pattern suggests that pre-travel pharmacist consultations remain largely dependent on individual initiative rather than established organisational processes. This interpretation is consistent with the findings for Behavioural Regulation and Environmental Context and Resources, which indicate that pre-travel pharmacist consultations have not yet become fully embedded within routine pharmacy workflows. Similar organisational barriers have been reported internationally, including insufficient time, staffing constraints, competing workload demands, inadequate access to travel health resources, and limited integration of travel health services into routine pharmacy practice (Bascom et al., 2015; Della Polla et al., 2020; Heslop et al., 2018; Houle et al., 2019). Therefore, the findings suggest that

expanding CPs' involvement will require system-level changes that support implementation, rather than relying solely on individual motivation.

Another notable finding is the limited importance of reinforcement-related beliefs. CPs did not appear to view incentives, rewards, or recognition as primary drivers of involvement in pre-travel pharmacist consultations. Instead, their willingness to contribute appeared to stem largely from professional responsibility, patient benefit, and commitment to service provision. This finding suggests that interventions focused exclusively on financial or external incentives may be insufficient to achieve sustained behavioural change. Rather, strengthening capability and opportunity through training, practice support, and organisational infrastructure may be more effective approaches for enhancing involvement.

These findings indicate that CPs possess a strong motivational foundation for providing pre-travel pharmacist consultations, but this motivation is not consistently supported by the capability and opportunity conditions required for sustained implementation. Within the COM-B model, the results suggest that future interventions should focus primarily on strengthening travel health competencies, structured practice processes, referral pathways, organisational support, and enabling practice environments. This interpretation aligns with the broader findings of the present thesis, which consistently identified opportunity-related influences as the most important determinants of CPs' involvement."

5.4.2.3 Factors Associated with Involvement in Providing Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

This study provides a comprehensive examination of the factors influencing CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, extending existing literature by situating these findings within a specific religious mass gathering travel context.

a. Associations between sociodemographic characteristics and involvement

The findings of this study indicate that several sociodemographic characteristics are associated with CPs' involvement in pre-travel pharmacist consultations. The present study identified that CPs who were Malay and Muslim, as well as those with prior Hajj and Umrah experience, were more actively involved in pre-travel pharmacist

consultations. This finding extends previous studies, which have largely examined general travel health services without considering the cultural or religious alignment between CPs and specific traveller populations. Earlier studies have shown that familiarity with travel medicine increases confidence and engagement (Taha & See, 2016; Teodósio et al., 2006), the present findings suggest that cultural competence may play an additional role in influencing CPs' willingness and confidence to engage in pilgrimage-related services.

Compared with previous studies that showed recent graduates gave better advice (Teodósio et al., 2006), the present study showed that greater professional experience was associated with higher involvement in pre-travel pharmacist consultations. Experienced CPs may be more likely to have greater clinical confidence, familiarity with travel-related conditions, and exposure to diverse patient needs, facilitating more active engagement. However, as with earlier studies, the cross-sectional nature of the data limits causal inference. It remains unclear whether experience leads to increased involvement or whether engagement in travel health encourages skill development and professional confidence.

Workplace context emerged as a significant factor of involvement. CPs practising in independent or owner-operated pharmacies were more likely to engage in pre-travel pharmacist consultations compared with those in chain or corporate settings. This aligns with prior literature indicating that organisational autonomy, flexibility in workflow, and decision-making authority are key enablers of extended professional services (Houle et al., 2019; Thidrickson & Goodyer, 2019). In contrast, CPs in more standardised or corporate environments may encounter structural constraints that limit the provision of comprehensive consultations.

In summary, the findings suggest that involvement in pre-travel pharmacist consultations is associated with individual, experiential, and organisational factors. These associations highlight the importance of considering contextual and structural influences when designing interventions to enhance CPs' engagement in pre-travel health services. Addressing these factors may help support more consistent and equitable delivery of such services across practice settings.

b. Differences of domain mean scores between CPs who are involved and not involved

The present study provides insights into how differences in belief domains influence CPs' involvement in pre-travel pharmacist consultations, extending existing evidence by situating these findings within a structured theoretical framework. Across all consultation activities examined, CPs who reported active involvement showed significantly higher scores in multiple theoretical domains, particularly knowledge, skills, memory, attention and decision processes, behavioural regulation, beliefs about capabilities, and environmental context and resources. These differences suggest that engagement in pre-travel health services is closely associated with cognitive, motivational, and contextual factors that support CPs' capacity and willingness to engage in pre-travel care.

Consistent with prior research, this study found that CPs who were actively involved in pre-travel pharmacist consultations demonstrated significantly higher levels of knowledge, skills, and confidence than those who were not involved. This aligns with earlier findings that CPs with greater domain-specific knowledge and training are more likely to provide travel-related advice and interventions (Bascom et al., 2015; Taha & See, 2016; Teodósio et al., 2006).

Furthermore, the higher differences between involvement and belief domains related to professional identity and perceived consequences, including beliefs about capabilities, beliefs about consequences, and intentions. These findings suggest the importance of intrinsic motivation. Similar findings reported by Heslop et al. (2018) and Della Polla et al. (2020), CPs who viewed travel health as aligned with their professional role were more likely to engage in service provision.

In contrast, the domain of reinforcement showed limited differentiation between involved and non-involved CPs, suggesting that external incentives, such as financial rewards or extrinsic recognition, play a limited role in motivating engagement. This finding aligns with self-determination theory, which emphasises that intrinsic motivation and internalised professional values are more influential than external rewards in sustaining complex professional behaviours (Ryan & Deci, 2000). This challenges assumptions that financial incentives alone can drive the expansion of pharmacist travel health services and underscores the importance of fostering intrinsic motivation through professional recognition, competence development, and supportive practice environments.

Comparatively, earlier studies have often emphasised structural and systemic barriers, such as lack of time, staffing constraints, and regulatory limitations as primary barriers to service delivery (Houle et al., 2019; Thidrickson & Goodyer, 2019). While the present study corroborates the relevance of these barriers, it also reveals that organisational constraints interact with individual-level beliefs to shape behaviour. In other words, even when structural barriers exist, CPs with high professional identity and perceived competence may still engage in service provision, whereas those lacking these factors may not, even in supportive environments.

c. Sociodemographic and Belief-Related Factors Influencing Involvement in Pre-Travel Pharmacist Consultations

The multivariable regression analyses provide important insights into the factors independently influencing CPs' involvement in pre-travel pharmacist consultations. By adjusting for potential confounding, the models demonstrate that involvement is not explained solely by sociodemographic characteristics but rather by a combination of experiential, organisational, and behavioural factors.

A key convergence with past studies is in the capability and confidence-related domains in predicting engagement. Earlier studies have shown that CPs' travel health activity is constrained by insufficient training and knowledge. CPs with higher knowledge tend to report greater confidence in delivering travel advice (Bascom et al., 2015; Taha & See, 2016). The multivariable models indicated that perceived capability and other belief-related domains remain a significant independent predictor of involvement even when other characteristics are controlled.

The findings also corroborate the role of environmental context and resource challenges as highlighted in previous studies. International studies identified time constraints, workflow integration issues, and regulatory limitations, e.g., prescribing authority, vaccine accessibility, as barriers to delivering comprehensive travel-health services (Houle et al., 2019; Thidrickson & Goodyer, 2019). In this study, workplace context (independent vs. chain setting, ownership position) predicted involvement, reinforcing the broader literature on CPs' capacity to deliver extended services is influenced by organisational structures and opportunity (Houle, 2018a).

Additionally, this study diverges from and extends prior work in indicating that experiential exposure, particularly prior Hajj or Umrah experience, is an independent predictor of involvement. Much of the existing literature has focused on general

travellers and has treated “experience” as years in practice or time since graduation (Teodósio et al., 2006), rather than experience that is directly relevant to a specific high-risk traveller group. The persistence of pilgrimage-specific experience in multivariable models suggests that familiarity with the pilgrim journey and its health demands may contribute through formal training and targeted experiential learning opportunities that are context-specific.

Similarly, the strong predictive factors of social/professional role and identity, and beliefs about consequences extends previous evidence beyond broad attitudinal factors. Prior studies have reported that CPs commonly view travel health as within their scope of practice and anticipate that patients may seek such services (Della Polla et al., 2020; Heslop et al., 2018).

Furthermore, the present study indicated that reinforcement is not a consistent predictor of involvement. While some system-level studies in high-income settings emphasise financial structures and service reimbursement (e.g., insurance billing models) as facilitators of uptake (Thidrickson & Goodyer, 2019), the present findings suggest that involvement in this Malaysian pilgrim-specific context is less dependent on incentives and more strongly aligned with intrinsic, professional, and values-based motivation. This does not imply that remuneration is irrelevant, but it indicates that incentives alone are unlikely to overcome capability limitations or organisational constraints, particularly when the role and professional identity are underdeveloped.

An interesting finding of the present study was the significant inverse association between the Memory, Attention and Decision Processes (MADP) domain and involvement in referral activities among CPs. Higher MADP scores were associated with a lower likelihood of making referral, suggesting that CPs who reported greater cognitive engagement with referral-related decision-making were less likely to actively perform referral activities. One possible explanation is that CPs with greater awareness of the complexity, uncertainty, and professional implications of referral decisions may adopt a more cautious approach when determining whether referral is appropriate. Within the context of pre-travel pharmacist consultations for Hajj and Umrah pilgrims, referral decisions may require consideration of multiple clinical and logistical factors, including chronic disease stability, vaccination requirements, travel-related risks, and the availability of appropriate referral pathways. In the absence of structured travel health protocols, standardised referral criteria, and formal travel medicine training,

greater cognitive deliberation may reduce confidence in initiating referrals independently.

This finding may also suggest that referral decision-making among CPs remains largely reactive, experience-dependent, and informally structured rather than supported by systematic clinical decision-making processes. CPs who perceived referral decisions as cognitively demanding or uncertain may have been more hesitant to engage in referral activities, particularly when organisational support, interprofessional collaboration, and formal referral systems were limited. This interpretation is consistent with the qualitative findings, in which several participants expressed uncertainty regarding professional role boundaries, referral responsibilities, and decision-making confidence in more complex travel health situations. These findings suggest that the development of structured referral pathways, decision-support tools, and travel health-specific training may help reduce cognitive uncertainty and support more consistent referral practices among CPs providing pre-travel pharmacist consultations.

In summary, the findings suggest that strategies aimed at strengthening CPs' involvement in pre-travel pharmacist consultations should extend beyond education. While training remains essential, it must be complemented by organisational support, role clarification, and system-level integration of travel health services. Addressing these interrelated factors may facilitate more active involvement, enabling CPs to contribute more effectively to the health and safety of Hajj and Umrah pilgrims.

5.4.2.4 Limitations of the Study

The study was subject to several limitations. Firstly, reliance on self-reported data may introduce recall and response biases, potentially affecting the accuracy of reported behaviours. To minimise this, the recall period was restricted to the past year. Secondly, the cross-sectional design limits causal interpretations, offering only a snapshot of current practices. Thirdly, the dual mode online and paper may have introduced mode effects, causing differences in interpretation or social desirability. Fourthly, the online distribution method may have introduced selection bias, particularly favouring younger, digitally engaged pharmacists who were more likely to access and respond to the survey.

The potential under-representation of male pharmacists (only 29.7%) which may influence gender-related associations. Although the study achieved a relatively

high response rate of 73.1% (323/442), the final sample size did not fully reach the initially calculated target sample size of 367 respondents. Consequently, the study may have had reduced statistical power to detect smaller associations, particularly in subgroup analyses and multivariable logistic regression models involving less frequently reported activities, such as preparation of medication lists (29.4%, 95/323) and referral activities (43.3%, 140/323). Nevertheless, the achieved sample size remained adequate for exploratory analyses addressing the primary study objectives and provided valuable insights into CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

In addition, although the study examined multiple behavioural domains based on the TDF alongside selected sociodemographic characteristics, other potentially influential factors were not investigated. These may include organisational policies, pharmacy ownership structure, commercial pressures, remuneration systems, public awareness regarding pre-travel health services, interprofessional collaboration, availability of formal travel health training programmes, accessibility of travel health resources, and CPs' prior personal or professional experiences related to Hajj and Umrah healthcare. Furthermore, broader healthcare system and regulatory factors influencing the integration of preventive pharmacy services within Malaysian community pharmacy practice were not examined directly. Given that environmental context and resources emerged as one of the strongest predictors of involvement across several activities in the present study, these unexamined structural and system-level factors may also substantially influence CP involvement in pre-travel pharmacist consultations. Future studies incorporating organisational, healthcare system, and patient-related variables may therefore provide a more comprehensive understanding of the determinants influencing pharmacist involvement in pilgrimage-related pre-travel healthcare services.

Geographical coverage was limited to Selangor and Kuala Lumpur, which may affect the generalisability of findings to other regions in Malaysia. Additionally, while the study explored CPs' involvement in various pre-travel pharmacist consultation activities, it did not assess specific beliefs linked to each activity. The focus on Hajj and Umrah pilgrims may also limit the applicability of findings to other traveller populations.

Future research should involve more representative sampling across wider regions to improve generalisability. Longitudinal or interventional studies are needed

to explore behavioural change over time. Further investigations should assess the impact of tailored interventions, including structured training programmes and decision-support tools, and examine belief–behaviour relationships for specific consultation activities to support effective travel health services by CPs.

5.5 Summary of Research

The present thesis explored the involvement of CPs in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. In Malaysia, CPs are highly accessible and actively engaged in various health promotion activities, such as diabetes management, smoking cessation, and weight counselling. Consequently, they are in an ideal position to provide pre-travel pharmacist consultations with clients preparing for Hajj and Umrah pilgrimages. Despite the huge annual number of Malaysian Hajj and Umrah pilgrims and the potential roles of CPs in ensuring their well-being, CPs' provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims as well as their beliefs of the service are not well documented. While some studies have investigated the involvement of Malaysian CPs in travel health services, these studies did not delve into the detailed practices of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, nor did they explore the beliefs, including barriers and facilitators surrounding the practice.

The distinct health-related needs of Hajj and Umrah pilgrims, as compared to other travellers, warrant a specific focus on the role of CPs in addressing these needs. Furthermore, CPs may hold perspectives on pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims that differ from their perspectives on usual patient consultations. Thus, this thesis aimed to enhance understanding of CPs' provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, the practices and beliefs that facilitate or impede their provision of the service and propose a driven model to enhance CPs' involvement towards sustainable pre-travel pharmacist consultations in Malaysia.

The thesis discussion begins by summarising key findings, providing an integrated synthesis of the principal findings of CPs' beliefs and its practices. Specifically, three studies were conducted to identify the potential activities and beliefs shaping their involvement towards the service provision. A scoping review, qualitative interviews, and a cross-sectional survey study provided analysis of the pre-travel

pharmacist consultations, uncovering activities, domains, and statistical relationships that illuminate the CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, relevant factors, and their impact on practices, policy, academia and research. A scoping review on studies of pre-travel health services provided by CPs worldwide was conducted to identify practices and beliefs, including barriers and facilitators.

Complementing this, a qualitative study provided a deeper insight by capturing CPs practices and beliefs, emphasising the current activity landscape, potential factors influencing service provision. Additionally, quantitative data analyses on CPs' practices and beliefs were conducted to assess relationships between the selected variables and involvement status. Each study contributed distinct insights into CPs' involvement in practice and their beliefs. When synthesised, this narrative integration of key findings offered a more nuanced and comprehensive understanding of practices and beliefs of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

5.5.1 Practices

Evidence across the three studies suggests that general health education is the most commonly delivered pre-travel service. The scoping review identified education and minor ailment management as the most frequent pre-travel health services in the global context. Similarly, the qualitative interviews revealed that CPs often educate pilgrims about basic health topics, such as using over-the-counter medications and managing chronic conditions during pilgrimage. This was reinforced by the quantitative findings, where health education emerged as one of the most frequently reported activities. These converging findings suggest that CPs perceive health education as within their existing competency and operational workflow, requiring minimal resources or institutional change.

Additionally, all three studies indicated that CPs commonly deliver pre-travel pharmacist consultations in a reactive rather than proactive manner. Rather than initiating structured consultations, most CPs reported responding to pilgrim queries on an ad hoc basis. This reactive practice pattern was evident in both the scoping review and qualitative interviews and corroborated by survey data indicating that only a minority of CPs routinely initiate full consultations or follow-up discussions.

Despite broad convergence across the three studies, several divergences were observed between the qualitative and quantitative findings. The most notable divergence concerned dispensing medications and recommending health-related products. In the quantitative survey, 98.9% of respondents reported involvement in dispensing medications for prospective Hajj and Umrah pilgrims, whereas qualitative participants seldom described dispensing as the top pre-travel pharmacist consultation activity. This discrepancy may be explained by differences in how involvement was conceptualised and captured across the two study phases. The survey measured whether respondents had performed specific activities and may therefore have captured any medication-related interaction involving pilgrims. Consequently, routine dispensing activities may have been reported as pre-travel pharmacist consultations even when no formal consultation process was undertaken. In contrast, the qualitative interviews encouraged participants to reflect on how consultations were delivered in practice, which may have prompted a distinction between routine dispensing and more comprehensive pre-travel care. Therefore, the findings suggest that CPs may perceive medication supply and product recommendations as contributing to pre-travel care, although these activities are not necessarily delivered as structured consultation services.

Differences in sampling approaches may also have contributed to the observed variation. The qualitative study employed purposive and snowball sampling and recruited participants who were able to provide rich insights into the phenomenon under investigation. As a result, qualitative participants may have possessed a more developed understanding of the scope and expectations of pre-travel pharmacist consultations and may have applied stricter criteria when describing their involvement. In contrast, the survey captured a broader range of CPs with varying levels of experience and exposure to travel health services, potentially resulting in more diverse interpretations of what constitutes a pre-travel pharmacist consultation.

The discrepancy may further reflect the distinction between reported behaviour and enacted behaviour. Survey responses capture participants' perceptions of their involvement, whereas qualitative interviews provide greater insight into how activities are operationalised in everyday practice. Although CPs may accurately report dispensing medications to pilgrims, the qualitative findings suggest that these interactions are often reactive, patient-initiated, and focused primarily on medication supply rather than proactive travel health planning. Thus, the discrepancy may not

necessarily indicate inconsistency between findings, but rather differences in the depth at which practice behaviours were explored.

Importantly, the findings may also indicate the absence of a shared professional understanding of pre-travel pharmacist consultations within Malaysian community pharmacy practice. Unlike established pharmacy services that are supported by formal protocols and clearly defined practice expectations, pre-travel pharmacist consultations remain relatively unstructured. Consequently, CPs may differ in how they interpret the scope of the service. Some may regard medication dispensing, product recommendations, and brief counselling as constituting pre-travel pharmacist consultations, whereas others may reserve the term for more comprehensive activities involving travel risk assessment, travel health education, documentation, and referrals. This interpretation is supported by the qualitative findings, which highlighted variability in how CPs described and enacted their roles during pre-travel encounters.

These findings suggest that CPs are already contributing to the healthcare needs of prospective Hajj and Umrah pilgrims. However, their involvement frequently occurs through routine medication-related activities than through formalised and comprehensive pre-travel pharmacist consultation services. This highlights the need for clearer service definitions, standardised practice expectations, and structured consultation frameworks to support the integration of pre-travel pharmacist consultations into routine community pharmacy practice.

Another area of divergence relates to vaccination advice and referral, which was strongly advocated in the literature and global guidelines but was marginal in the interviews and survey responses. Most CPs acknowledged their limited role in vaccine-related services, citing a lack of training, regulatory constraints, and a preference for referring patients to clinics or physicians. This highlights a gap between international best practices and local implementation realities.

Of note, no evidence across the three studies suggested the use of formal documentation, structured assessment tools, or patient follow-up systems. The scoping review did not identify any Malaysian studies reporting systematic protocols for CPs in pre-travel care. Similarly, the CPs that were interviewed did not describe the use of checklists, decision aids, or electronic records for pre-travel health provision. This absence was further reflected in the survey, where no items addressed structured workflow or digital integration. These findings indicate that the practice of pre-travel pharmacist consultations among Malaysian CPs remains fragmented and largely

unstandardised, contrasting with more mature models in countries like Canada and Australia.

5.5.2 Beliefs

Across all three studies, a consistent pattern was observed indicating that CPs are professionally committed and generally optimistic about providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The evidence suggests that CPs largely view this service as compatible with their professional role and perceive potential benefits for pilgrims' well-being. However, the consistency of service delivery appeared to be influenced by practical considerations related to capability and more prominently, environmental context.

Motivation-related domains were reported at relatively high levels. CPs described intrinsic drivers such as professional responsibility and patient-centred commitment. However, the coexistence of high motivational beliefs and variable practice suggests that motivation alone may not fully account for engagement patterns. Rather than indicating attitudinal resistance, the findings suggest that other determinants may moderate behavioural enactment.

Environmental context and resource-related barriers were recurrently identified across studies. Limitations in time, staffing, access to training, and organisational support were frequently described as influencing the feasibility of delivering structured consultations. These findings suggest that opportunity-related conditions may shape the extent to which capability and motivation are translated into practice. However, given the cross-sectional nature of the quantitative phase, these associations should be interpreted cautiously.

Capability-related factors also emerged, although the synthesis indicates that knowledge and skills operate within broader contextual conditions. While gaps in specific areas such as vaccination counselling were reported, competence alone did not appear sufficient to ensure consistent service provision in the absence of enabling practice structures.

There was limited evidence of formal reinforcement mechanisms, goal-setting processes, or structured behavioural regulation systems supporting pre-travel pharmacist consultations. The absence of such mechanisms may contribute to

variability in service delivery, particularly where practice depends heavily on individual initiative. This interpretation, however, warrants further empirical examination.

Importantly, there was minimal indication of active resistance or entrenched interprofessional conflict. Variability in engagement appeared more closely related to structural feasibility than to ideological opposition. Collectively, the findings suggest that strengthening pre-travel pharmacist consultations may require system-level enablement rather than attitudinal change.

A further pattern across the three studies was limited embedding of formal structures that would support the routinisation of pre-travel pharmacist consultations. There was minimal evidence of specific goal setting, reinforcement mechanisms, behavioural regulation, or structured cognitive supports to standardise consultation delivery. Qualitative findings suggested that consultations were often opportunistic and reactive rather than organised around systematic routines, while quantitative findings indicated low endorsement of domains related to structured planning, monitoring, or incentive mechanisms. This absence may help to explain the observed intention–behaviour gap, whereby CPs express willingness to provide pre-travel pharmacist consultations, however, in the absence of routines, accountability mechanisms, and supportive infrastructure, service delivery remains variable and dependent on individual circumstances.

5.6 Implications and Future Research

The convergence of findings across the three studies provides a coherent basis for considering potential directions to strengthen pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The evidence suggests that CPs demonstrate professional alignment and willingness to engage in pre-travel pharmacist consultations, however, service delivery appears influenced by environmental, organisational, and system-level conditions. Accordingly, the implications extend beyond individual behaviour and may involve consideration of structural, educational, and regulatory contexts.

5.6.1 Implications for Practice

The findings indicate that pre-travel pharmacist consultations are frequently delivered opportunistically rather than through structured workflows. This pattern may

reflect the absence of formal service frameworks rather than lack of professional commitment. Strengthening pre-travel pharmacist consultations within community pharmacy settings may therefore involve exploring mechanisms to better integrate consultations into routine workflows. Approaches such as clearer service definitions, documentation templates, and decision-support tools may assist in reducing variability and supporting consistency. However, the feasibility of such measures would require evaluation within real-world pharmacy contexts.

5.6.2 Implications for Training and Professional Development

Across studies, CPs demonstrated baseline knowledge and medication-related competence, yet variability was observed in confidence for more specialised consultation components. This suggests that professional development initiatives could consider focusing on activity-specific competencies, particularly in areas such as vaccination counselling, structured risk assessment, and referral decision-making. Applied learning approaches, including case-based exercises or simulation, may support translation of knowledge into practice. Nevertheless, further empirical evaluation would be required to determine the effectiveness of different training modalities.

5.6.3 Implications for Policy and System-Level Support

The need for policy-level interventions is highlighted by the continued significance of environmental context and resources as a limiting factor. Although CPs demonstrated high intrinsic motivation, the lack of formal recognition, remuneration, and regulatory support limits the sustainability and scalability of pre-travel pharmacist consultations. Therefore, policy efforts may focus on formalising pre-travel pharmacist consultations through national guidelines, service frameworks, accreditation mechanisms, and reimbursement models. Reinforcement mechanisms, both financial and non-financial are essential to support pre-travel pharmacist consultations as a valued healthcare service rather than an informal, discretionary activity. While intrinsic motivation may initiate service provision, policy support is required to sustain and normalise practice at scale.

5.6.4 Implications for Interprofessional Collaboration

The findings suggest variability in collaboration between CPs and other healthcare providers. This variability did not appear to reflect entrenched professional resistance but may relate to informal or unclear referral pathways. Structured communication channels and clearly delineated roles may support more coordinated care. However, the acceptability and practicality of such models would need further investigation.

5.6.5 Implications for Future Research

From a research perspective, the application of TDF and COM-B in this thesis supports the relevance of behavioural frameworks in examining CP engagement in Hajj and Umrah-focused pre-travel pharmacist consultations. Future research may move beyond descriptive analyses towards evaluating determinant-informed interventions.

Longitudinal studies could examine whether changes in environmental context, training exposure, or workflow integration are associated with sustained changes in pre-travel pharmacist consultations involvement. Implementation research may explore multi-component strategies that address capability, opportunity, and motivational sustainability concurrently. Additionally, incorporating objective organisational measures alongside self-reported beliefs may provide a more comprehensive understanding of practice conditions. Further psychometric refinement of the developed instrument, including confirmatory factor analysis and testing in broader populations, would strengthen construct validity. Research exploring patient perspectives and outcomes associated with pre-travel pharmacist consultations may also provide complementary insight into service effectiveness. These directions may contribute to a more comprehensive understanding of how pre-travel health services by CPs can be systematically supported and evaluated within evolving healthcare systems.

5.6.6 Stakeholder-Specific Enhancement Strategies

The integrated findings from the three studies suggest that CPs are professionally aligned with the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, yet service delivery remains variable and often opportunistic. Across studies, CPs expressed strong beliefs about the value of the

consultations and reported intentions to provide such services. The observed intention–behaviour gap, therefore, appears unlikely to be attributable to lack of willingness alone and may instead reflect broader capability and system-level conditions.

In response to these findings, this thesis proposes a set of stakeholder-specific enhancement strategies informed by the COM-B model. As summarised in Table 5.1, these strategies are derived from patterns consistently identified across the three studies and are organised according to the potential roles of government and policymakers, professional pharmacy organisations, academia, and researchers. The proposed framework offers a structured interpretation of how different stakeholders may contribute to strengthening pre-travel pharmacist consultations in a coordinated manner.

Integrated findings indicated CPs demonstrated baseline knowledge and strong medication-related competencies. However, variability was observed in more complex or preventive aspects of pre-travel pharmacist consultations, including vaccination counselling and structured risk assessment. Capability appeared to be activity-specific and often experiential. In this context, capability-focused strategies may include the articulation of competency expectations, development of structured professional development pathways, and provision of cognitive supports such as decision aids or checklists. Government and professional bodies could consider formal competency standards or accreditation mechanisms to support consistency. Academic institutions may examine opportunities to integrate pilgrimage-specific travel health competencies into curricula. Researchers may further evaluate educational approaches and develop tools that support structured consultation delivery. These approaches are proposed as theory-informed implementation mechanisms to strengthen capability, subject to feasibility and evaluation.

Environmental context and resource-related factors were consistently associated with pre-travel pharmacist consultations across all studies. Time constraints, staffing limitations, workflow design, and lack of formal recognition appeared to influence the feasibility of structured consultations. Accordingly, opportunity-oriented strategies may involve exploring ways to embed the consultations into routine pharmacy workflows, for example, through the development of standard operating procedures, documentation templates, or referral pathways. At the policy level, formal recognition of pre-travel pharmacist consultations within broader service frameworks may provide structural support. Professional organisations may translate policy signals into practice-level guidance suitable for diverse pharmacy settings. Researchers may investigate

implementation models to determine how workflow integration could be achieved in different contexts. These proposed strategies reflect the interpretation that opportunity-related conditions influence behavioural enactment, although their practical impact would require empirical validation.

Motivation-related domains, including professional identity and perceived positive consequences, were consistently strong across studies. Motivation did not emerge as a primary limiting factor. Therefore, proposed strategies do not aim to increase motivation but to support and sustain existing intrinsic drivers. Stakeholders may consider mechanisms that reinforce professional recognition of the consultations as a valued service, including linkage to professional standards, public acknowledgement, or integration within national health priorities. Such measures may help sustain engagement over time, particularly in environments where opportunity remains constrained. However, the relationship between formal recognition and sustained motivation warrants further investigation. In summary, these stakeholder-specific enhancement strategies provide the foundation for the development of a strategic model that integrates factors with system-level responsibilities, as described in the following section.

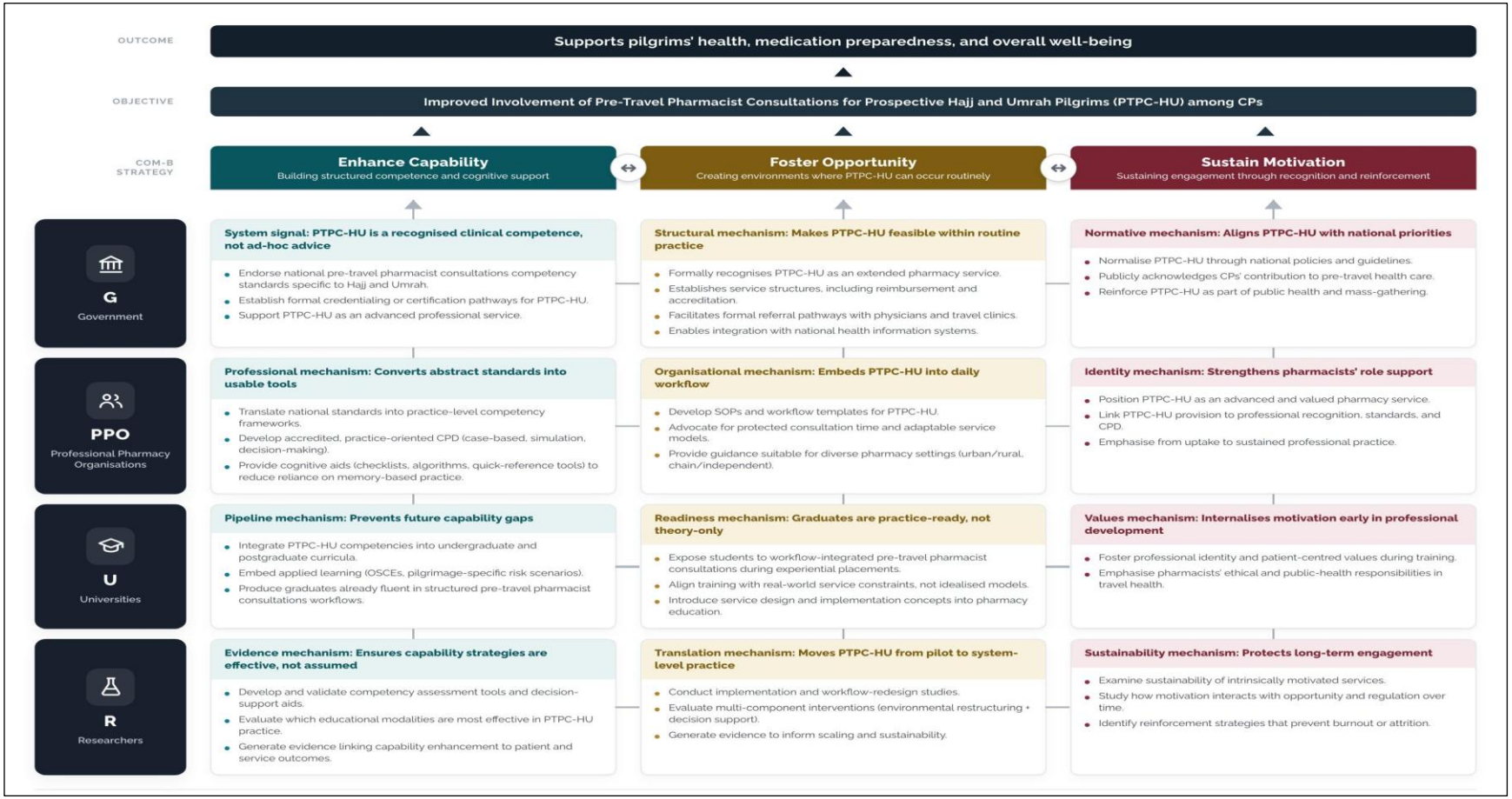
Table 5.1
Proposed Stakeholder-Specific Enhancement Strategies to Strengthen Community Pharmacists' Involvement in Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

COM-B Component	Consistent findings across Studies 1-3	Government / Policy-Level Enhancement	Professional pharmacy bodies	Academia (Education & Training)	Researchers (Evidence & Implementation)
Capability	CPs possess baseline and experiential knowledge and skills, particularly for medication-related activities, but lack structured, guideline-based knowledge, advanced consultation skills, and cognitive supports. Capability is activity-specific, and confidence is uneven, especially for vaccination counselling, risk assessment, and regulatory aspects.	Endorse national competency standards for pre-travel pharmacist consultations, particularly for Hajj and Umrah contexts. Enhance credentialing or certification pathways for pre-travel pharmacist consultations competencies.	Develop nationally aligned pre-travel pharmacist consultations competency frameworks linked to CPD accreditation. Offer applied, practice-oriented CPD (case-based, simulation, decision-making skills). Provide practical cognitive tools (e.g. checklists, algorithms, quick-reference guides) to reduce reliance on memory-based practice.	Integrate pre-travel pharmacist consultations and travel health competencies into undergraduate and postgraduate pharmacy curricula. Embed applied learning (case scenarios, OSCEs, pilgrimage-specific risk assessment)	Develop and validate competency-based assessment tools for pre-travel pharmacist consultations. Develop and validate decision-support tools and structured consultation aids. Evaluate the effectiveness of educational interventions (e.g. simulation, case-based learning) and generate evidence linking capability enhancement to practice outcomes.
Opportunity	Environmental context and resources are the strongest and most consistent factors of involvement. Time constraints, staffing	Formally recognise pre-travel pharmacist consultations as an extended pharmacy service within primary care and mass-	Develop standard operating procedures (SOPs) and workflow templates to embed pre-travel pharmacist consultations into	Prepare graduates to operate within structured service models by exposing students to workflow-integrated pre-travel	Conduct implementation and workflow-redesign studies examining how pre-travel pharmacist consultations can be embedded into daily

	shortages, workflow design, lack of remuneration, and absence of formal systems prevent routinisation of pre-travel pharmacist consultations despite high motivation and capability.	gathering health frameworks. Establish service structures, including accreditation and reimbursement mechanisms, and facilitate formal referral pathways with physicians and travel clinics. Enable integration with national health information systems	routine pharmacy practice. Advocate for protected consultation time and adaptable service models suitable for diverse pharmacy settings.	pharmacist consultations during experiential placements. Align workforce preparation with emerging service frameworks. Incorporate service design and implementation concepts into pharmacy education	practice. Evaluate multi-component interventions that combine environmental restructuring, decision support, and organisational change to inform scale-up.
Motivation	Motivation is high, intrinsic, and stable across all studies, driven by professional identity, moral responsibility, and strong beliefs about positive consequences. However, motivation is under-supported by formal recognition and reinforcement mechanisms.	Support and normalise pre-travel pharmacist consultations through national policies and guidelines. Publicly acknowledge CPs' contribution to pre-travel care	Reinforce professional identity by positioning pre-travel pharmacist consultations as an advanced and valued pharmacy service. Recognise pre-travel pharmacist consultations provision through professional standards, practice recognition, and linkage to CPD, shifting focus from uptake to sustainability.	Foster professional identity and patient-centred values during training. Emphasise ethical and public health roles of pharmacists in travel health	Examine sustainability of intrinsically motivated services under different system conditions. Study how motivation interacts with opportunity and regulation over time

5.7 A Proposal of Stakeholder-Driven Strategic Framework for Strengthening Pre-Travel Pharmacist Consultations

Building on the proposed stakeholder-specific enhancement strategies outlined in the preceding section, this thesis proposes a COM-B-informed, stakeholder-driven strategic framework to guide the systematic strengthening of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims (Figure 5.1). The framework was developed through synthesis of findings from the scoping review, qualitative interviews, and cross-sectional survey, and is intended to translate empirical evidence into an actionable framework for implementation rather than a purely conceptual representation. The need for this framework arises from a central and consistent empirical insight, although CPs demonstrate strong professional motivation, positive beliefs about pre-travel pharmacist consultations, and clear intentions to provide such services, their involvement are inconsistent and opportunistic. This intention-behaviour gap is not explained by resistance or lack of willingness, but by uneven capability and, more importantly, by structural opportunity constraints within current community pharmacy practice. Accordingly, the framework is structured around the three interacting components of the COM-B framework and explicitly aligns each component with coordinated stakeholder responsibilities.



Notes: G, Government; PPO, Professional Pharmacy Organisations; R, Research; PTPC-HU, Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims; U, Universities

Figure 5.1 Proposal of Strategic Stakeholder-Integrated COM-B Framework for Strengthening Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims

Figure 5.1 presents the proposed COM-B-informed strategic framework developed from the integrated findings of the scoping review, qualitative interviews, and quantitative survey. The framework illustrates how CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can be strengthened through coordinated stakeholder actions targeting Capability, Opportunity, and Motivation. In contrast to a linear implementation pathway, the framework is conceptualised as an interconnected system in which behavioural determinants interact with organisational, professional, and policy-level influences to shape practice behaviour.

At the apex of the framework is the intended outcome, namely enhanced and sustained involvement of CPs in pre-travel pharmacist consultations. This outcome reflects the overarching objective of translating CPs' existing readiness and professional commitment into routine and consistent practice that supports pilgrims' health, medication preparedness, and overall well-being. Directly beneath this outcome is the central implementation challenge identified across all three study phases. Despite positive attitudes, strong professional identity, and willingness to contribute to pilgrims' healthcare, pre-travel pharmacist consultations remained largely reactive, individual-dependent, and insufficiently embedded within routine pharmacy workflows. This challenge provides the organising logic of the framework and explains the emphasis on system-level enablement rather than individual behaviour change alone.

Within the framework, Capability serves as the foundation for practice readiness. The integrated findings demonstrated that CPs generally possessed baseline knowledge and strong medication-related counselling skills but showed variability in confidence and competence for more specialised travel health activities, including vaccination counselling, pilgrimage-specific risk assessment, referral decision-making, regulatory considerations, and structured consultation delivery. Decision-making was often experiential and memory-based, contributing to inconsistency in practice. Consequently, the framework proposes capability enhancement through targeted travel health education, competency-based training, continuing professional development programmes, structured consultation guidance, and decision-support tools. Responsibility for capability development is distributed across stakeholders, whereby government agencies and professional pharmacy bodies establish competency expectations, academic institutions prepare future CPs through curriculum integration, and researchers develop evidence-based resources to support consistent practice.

Opportunity occupies the central position within the framework, reflecting its consistent identification as the most influential determinant of CPs' involvement across all three study phases. Environmental context and resources, including workload pressures, staffing limitations, consultation space, workflow design, access to guidelines, remuneration, and organisational support, repeatedly influenced CPs' ability to provide pre-travel pharmacist consultations. The central placement of Opportunity signifies its gatekeeping role in determining whether existing capability and motivation can be translated into actual behaviour. Accordingly, the framework emphasises system-level interventions, including formal recognition of pre-travel pharmacist consultations, development of national service frameworks and practice guidelines, establishment of referral pathways, workflow integration, digital support systems, and strengthened interprofessional collaboration. By positioning Opportunity at the centre, Figure 5.1 explicitly communicates that sustainable implementation depends not only on individual CPs but also on the environments in which they practise.

Motivation is represented as a sustaining and reinforcing component rather than the primary target for intervention. Across all study phases, motivation-related domains, including Beliefs about Consequences, Social/Professional Role and Identity, Optimism, and Intentions, were consistently positive and did not emerge as major barriers to involvement. CPs generally recognised the benefits of pre-travel pharmacist consultations for improving medication safety, disease prevention, and pilgrims' preparedness. Therefore, the strategic function of Motivation within the framework is to preserve and reinforce existing professional commitment rather than generate new motivation. Stakeholder actions consequently focus on policy endorsement, professional recognition, public awareness initiatives, and reinforcement mechanisms that sustain engagement over time. This reflects the broader conclusion of the thesis that motivation alone is insufficient to produce behavioural change when opportunity-related barriers remain unresolved.

A defining feature of the framework is its emphasis on stakeholder integration and synchronised action. Rather than assigning responsibility to a single stakeholder group, the framework illustrates how government agencies, professional pharmacy organisations, academic institutions, researchers, and CPs operate at different leverage points within the COM-B system. The interconnected pathways depicted in Figure 5.1 demonstrate that progress in one domain reinforces progress in others. For example, policy recognition and service frameworks enhance Opportunity, which enables CPs to

apply their Capability and sustain Motivation. Similarly, training programmes may strengthen Capability, but their impact is likely to be limited if organisational barriers continue to restrict implementation. This systems-oriented representation reflects the empirical conclusion that isolated interventions, such as standalone training programmes or awareness campaigns, are unlikely to produce sustained change. Instead, strengthening CPs' involvement in pre-travel pharmacist consultations requires coordinated action across Capability, Opportunity, and Motivation domains, supported by clearly defined and complementary stakeholder roles.

In summary, Figure 5.1 synthesises the key findings of this thesis into a coherent, theory-informed framework for implementation. The framework demonstrates that improving CPs' involvement in pre-travel pharmacist consultations does not primarily require changing CPs' attitudes or increasing their motivation. Rather, it requires institutionalising pre-travel pharmacist consultations through structured capability development, opportunity creation, and system-level reinforcement. By explicitly linking behavioural determinants with stakeholder responsibilities, the proposed COM-B-informed strategic framework provides a practical and scalable roadmap for policy development, professional practice enhancement, workforce preparation, and future implementation efforts aimed at embedding pre-travel pharmacist consultations within routine community pharmacy practice in Malaysia.

5.8 Research Limitations

This thesis employed an integration of findings from a scoping review, qualitative interviews, and a quantitative survey to provide a comprehensive understanding of CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Nonetheless, several limitations should be acknowledged. Firstly, the scoping review was limited by the scarcity of studies specifically addressing CPs' involvement in pre-travel health services for Hajj and Umrah pilgrims. Consequently, evidence from the broader travel health literature was incorporated to provide contextual insights. Although this approach enabled a more comprehensive synthesis of the available evidence, some findings may not fully reflect the unique healthcare needs and pilgrimage-specific context of Hajj and Umrah travellers.

Secondly, the qualitative study may have been influenced by selection bias arising from the use of purposive and snowball sampling. Participants were recruited through professional networks and referrals, which may have increased the likelihood of including CPs who were more interested, engaged, or experienced in travel health services. This may partially explain the higher level of involvement reported in the qualitative study compared with the survey findings. For example, 23 of the 24 interviewed CPs reported providing travel health education, compared with 56.3% of survey respondents. In addition, social desirability bias may have influenced participants to portray their professional practices more favourably during interviews. As a result, the qualitative findings may underrepresent the perspectives of CPs with limited or no involvement in pre-travel pharmacist consultations. Furthermore, as the qualitative study was conducted among CPs in Selangor and Kuala Lumpur, the transferability of the findings to other regions of Malaysia may be limited due to differences in population characteristics, healthcare needs, and pharmacy practice environments.

Thirdly, the quantitative study employed purposive and convenience sampling and was restricted to CPs practising in Selangor and Kuala Lumpur. Although these states were selected because they contain the largest concentration of community pharmacies in Malaysia and represent diverse urban practice settings, the findings may not be fully generalisable to CPs practising in other states, particularly rural and underserved areas. In addition, the cross-sectional design limits the establishment of causal relationships between behavioural determinants and involvement in pre-travel pharmacist consultations. The survey also relied on self-reported data, which may be subject to recall and response biases, and actual practice behaviours may differ from those reported by participants.

Although integrating findings across the three studies strengthened the overall interpretation of the results, differences in study designs, participant characteristics, and data collection methods may have contributed to variations in findings across phases. These limitations highlight opportunities for future longitudinal, multi-site, and intervention-based studies to further investigate and validate the behavioural determinants influencing CPs' involvement in pre-travel pharmacist consultations.

Another limitation relates to the use of the TDF as the primary behavioural framework. Although the TDF provided a comprehensive assessment of cognitive, motivational, social, and environmental determinants, it may not have fully captured

cultural and religious influences relevant to the Hajj and Umrah context. In Malaysia, CPs' involvement in pilgrimage-related healthcare may be influenced not only by professional responsibility and perceived patient benefit, but also by cultural familiarity with pilgrimage practices, empathy towards pilgrims, and broader community-oriented values. While some of these influences may be partially reflected within domains such as Social/Professional Role and Identity and Beliefs about Consequences, the TDF was not specifically designed to examine faith-related beliefs or socio-cultural motivations. Consequently, the study may not have fully captured the extent to which cultural and religious factors influence CPs' involvement in pre-travel pharmacist consultations. Future research may benefit from incorporating culturally sensitive qualitative approaches or complementary socio-cultural frameworks to further explore these influences.

This thesis integrated evidence from a scoping review, qualitative interviews, and a quantitative survey to provide a comprehensive understanding of CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. While the multi-phase design strengthened the breadth, depth, and corroboration of findings, several limitations relating to the overall thesis were acknowledged. The integration of findings across different methodological approaches involved a degree of interpretive judgement. Although triangulation enabled convergence and complementarity across studies, differences in study design, sampling strategies, data collection methods, and analytical approaches may have influenced how findings were synthesised and interpreted. Consequently, the integrated conclusions and proposed strategic framework should be viewed as a theoretically informed representation of the evidence rather than a definitive explanation of all factors influencing practice behaviour.

An additional observation was that some motivation-related beliefs appeared to be influenced by cultural and religious familiarity with the Hajj and Umrah pilgrimage. Malay Muslim CPs, particularly those who had previously performed Hajj or Umrah, frequently expressed a strong sense of personal responsibility, empathy, and commitment towards supporting prospective pilgrims. These beliefs were reflected across several TDF domains, including Social/Professional Role and Identity, Beliefs about Consequences, Goals, and Emotion. Participants often described satisfaction derived from helping pilgrims prepare for their religious journey and viewed such services as an extension of their professional and community responsibilities.

However, the study was not designed to compare behavioural determinants across ethnic groups, and the qualitative sample was not sufficiently large to draw definitive conclusions regarding racial or ethnic differences. Furthermore, although some culturally and religiously influenced motivations were evident, the TDF does not explicitly capture faith-based beliefs, religious obligations, or cultural identity as distinct constructs. Consequently, the extent to which cultural and religious factors influenced CPs' involvement may not have been fully captured. Future research may benefit from exploring these influences using culturally sensitive approaches or complementary theoretical frameworks that explicitly examine socio-cultural and religious determinants of healthcare practice." Has been added.

Another limitation relates to the use of the TDF as the primary behavioural framework, with findings subsequently interpreted using the COM-B model. Although these frameworks provided a comprehensive and systematic approach for understanding cognitive, motivational, social, and environmental determinants of behaviour, they may not have fully captured broader cultural, religious, organisational, and health-system influences relevant to the Hajj and Umrah context. In Malaysia, CPs' involvement in pilgrimage-related healthcare may be shaped not only by professional responsibility and perceived patient benefit, but also by cultural familiarity with pilgrimage practices, religious motivations, empathy towards pilgrims, and broader community-oriented values. While some of these influences may be partially reflected within domains such as Social/Professional Role and Identity and Beliefs about Consequences, the TDF was not specifically designed to examine faith-related beliefs or socio-cultural motivations. Consequently, the study may not have fully captured the extent to which cultural and religious factors influence CPs' involvement in pre-travel pharmacist consultations. Future research may benefit from incorporating culturally sensitive qualitative approaches or complementary socio-cultural frameworks to further explore these influences.

Furthermore, the proposed COM-B-informed strategic framework was developed from empirical findings generated within the Malaysian community pharmacy context and has not yet undergone prospective implementation or evaluation. Therefore, while the framework provides a theory-informed roadmap for strengthening pre-travel pharmacist consultations, its effectiveness, feasibility, and sustainability remain to be established in practice. Future implementation studies are required to evaluate the framework and determine whether the proposed stakeholder-driven

strategies translate into meaningful improvements in service delivery and patient outcomes.

Moreover, the findings should be interpreted within the context of pilgrimage-focused travel health services. Although several identified determinants may be applicable to broader travel health and preventive pharmacy services, the unique religious, cultural, and healthcare requirements associated with Hajj and Umrah may limit direct transferability to other travel populations or healthcare settings. Nevertheless, the behavioural and implementation insights generated by this thesis may inform the development of pre-travel pharmacist consultation services in comparable contexts where preventive care, medication management, and health education play important roles.

Despite these limitations, the integration of multiple methodological approaches, application of established behavioural frameworks, and development of a stakeholder-driven strategic framework provide a robust foundation for understanding and strengthening CPs' involvement in pre-travel healthcare services. The findings offer important theoretical, practical, and policy-relevant insights that can guide future research, implementation efforts, and service development within Malaysia and similar healthcare settings."

5.9 Chapter Summary

This chapter provided a discussion of the findings obtained in this study. The various activities that CPs described as pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims were discussed. Additionally, the discussion about the salient beliefs about the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims was also provided. Measures to improve CPs' engagement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims' activities were recommended. The chapter also explained how the survey instrument was developed and provided support for the study's methodology. The chapter concluded with a discussion of the study's findings about the main practices, contributing variables, and attitudes around pre-travel pharmacist consultations for pilgrims performing the Hajj and Umrah. Each study's strengths and limitations were also examined. The chapter also offered recommendations and implications for future research undertakings.

CHAPTER 6
CONCLUSION

6.1 Conclusion

This thesis investigated CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in Malaysia. Guided by the TDF and interpreted through the COM-B model, the research employed a multi-phase approach comprising a scoping review, qualitative interviews, survey instrument development and validation, and a cross-sectional survey among Malaysian CPs. This study demonstrated that CPs in Malaysia were involved in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, although the extent of involvement varied across activities. CPs were predominantly involved in medication-related and product-oriented services, including dispensing medications, providing health product recommendations, and medication counselling, while more structured activities such as referral-making, travel health education, and preparation of medication lists were less consistently performed.

The study further identified that CPs' involvement in pre-travel pharmacist consultations was influenced by multiple interacting behavioural determinants across the TDF domains. Capability-related factors, including knowledge and skills, contributed to CPs' confidence in providing medication-related services but appeared less developed for specialised travel health activities. Motivation-related domains, such as professional role identity, intentions, and beliefs about consequences, were generally positive across study phases, suggesting that CPs recognised the importance and potential benefits of pre-travel pharmacist consultation services.

However, the findings consistently demonstrated that opportunity-related factors, particularly environmental context and resources, represented the most important influences affecting pre-travel pharmacist consultation implementation. Organisational barriers including workload, staffing constraints, lack of structured guidelines, limited consultation space, and regulatory limitations substantially affected CPs' involvement in pre-travel pharmacist consultations. The findings suggest that variability in pre-travel pharmacist consultations involvement reflects interaction between capability, opportunity, and motivation, with opportunity-related conditions

appearing particularly influential in shaping translation of positive beliefs into routine practice.

Objective 1 of the first study was achieved through a scoping review of 12 relevant studies of CPs' provision of pre-travel health services internationally. The scoping review identified that CPs commonly provided pre-travel health advice, with some countries also engaging in pre-travel health assessment and vaccination services. The second objective of identifying and describing the beliefs, barriers and facilitators influencing the delivery of pre-travel health services provided by CPs was explored under the ten out of fourteen TDF domains. These identified domains are knowledge, skills, social/professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, intentions, environmental context and resources, social influences, and emotions.

The barriers identified across the studies included limited knowledge of travel health topics, insufficient clinical knowledge, inadequate training in travel medicine or travel health services, and injection administration, and low confidence in providing travel-related services. Additional constraints comprised concerns regarding patient safety, such as the risk of anaphylaxis or adverse vaccination reactions, uncertainty surrounding professional liability, limited access to resources and educational materials, time constraints, insufficient staffing, lack of private consultation space, limited awareness of pharmacists' scope of practice, patients' unwillingness to pay and low patient demand or unrealistic expectations.

On the other hand, several facilitators were identified that supported the provision of pre-travel health services. These included adequate knowledge of travel health issues, up-to-date information on travel medicine, clinical competence, formal training in travel medicine, and positive perceptions of professional roles and responsibilities. Confidence in pharmacists' capabilities, optimism regarding service implementation, and perceived benefits such as improved patient outcomes and potential revenue generation further facilitated service provision.

At the environmental and interpersonal levels, additional facilitators included sufficient staffing and time, availability of educational resources, effective marketing and promotional activities, increased patient awareness and demand, supportive legislative frameworks (such as prescribing authority), collaborative relationships with other healthcare providers, good pharmacist-patient relationships, referrals from other patients and doctors, and comfort in recognising and managing referral needs.

In the second study (Qualitative Study), the first objective was achieved through semi-structured interviews involving 24 CPs in Selangor and Kuala Lumpur. The findings indicated that current practices are largely reactive. Seven consultation activities emerged, primarily on the provision of travel health education, making professional pharmacist recommendations on various health-related products, and dispensing medications.

The second objective was achieved through qualitative content analysis and mapped to 14 TDF domains. The findings indicated that participants expressed high positive beliefs to engage, including willingness to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, perceived support from the public, patients, and customers, and support from national or professional organisations. However, participants also acknowledged several challenges included gaps in knowledge and awareness related to Hajj and Umrah travel guidelines and recommendations, limited time and staffing, and perceived lack of support from doctors.

In the third study (Quantitative study), Part 1 of the development and preliminary validation of a survey instrument was achieved through an instrument development and validation process, which produced a 47-item survey instrument comprising seven practice items and 40 belief items. The instrument was developed using a formative measurement model and underwent item generation, expert content validation, cognitive interviews, reliability assessment, and feasibility testing.

The results indicated a conceptually sound instrument with acceptable content validity and temporal stability. Content validity was high, with S-CVI/Ave values of 0.98 for the 7-item Practice section and 0.94 for the 40-item Belief section. Test-retest reliability demonstrated a moderate to excellent stability (K: 0.583 - 1.000; ICC: 0.530 - 0.910). Feasibility testing involving 30 CPs confirmed that the instrument was clear, culturally appropriate, and required approximately 15 to 20 minutes to complete. Overall, this validated instrument could be useful to support future research and offers a foundation for understanding factors, identifying training needs, and informing strategies to strengthen pre-travel pharmacist consultation services.

The Quantitative study (Part II) first objective was achieved through a cross-sectional survey of 323 CPs. The findings demonstrated high involvement in medication dispensing (89.2%), health product recommendations (83.9%), medication assessment (73.7%), basic health testing (70.6%), and travel health education (56.3%), with

comparatively lower engagement in referral activities (43.3%) and the preparation of medication lists (29.4%). Further analysis of specific sub-activities revealed particularly high engagement in dispensing medications for minor ailments (98.9%), oral contraceptives (75.3%), and chronic disease management (59.0%).

The Quantitative study (Part II), second objective was achieved through analysis of TDF domain scores. The findings indicated that while CPs generally expressed positive beliefs towards service delivery but reported barriers such as inadequate training, limited time, low public demand, and insufficient inter-professional support.

The third objective of Part II (a) was achieved using Chi-Square analyses, which identified significant associations between involvement and sociodemographic factors, including ethnicity (Malay), religion (Islam), prior Hajj or Umrah experience, longer professional experience, independent pharmacy settings, and holding ownership positions. These findings suggest that involvement in pre-travel pharmacist consultations is associated with individual, experiential, and organisational factors.

The third objective, Part II(b) was achieved using Mann Whitney U Test to compare belief domain scores between CPs who were involved and those who were not involved in pre-travel pharmacist consultations. The findings indicated that CPs who are actively involved showed significantly higher scores in multiple theoretical domains, mainly on knowledge, skills, memory, attention and decision processes (MADP), behavioural regulation, beliefs about capabilities, and environmental context and resources. Meanwhile, the reinforcement domain showed no significant differences between involved and non-involved CPs, suggesting that external rewards or incentives may not be primary drivers of engagement. Overall, these findings suggest that CPs' engagement in pre-travel pharmacist consultations is linked with an interplay of cognitive, motivational, and contextual factors rather than isolated sociodemographic characteristics.

The fourth objective in Part II (a) to identify sociodemographic factors that independently predict involvement in pre-travel pharmacist consultations was achieved through multivariable logistic regression. The findings indicated that factors such as religion, experiential exposure and workplace-related factors significantly influenced engagement in these services, particularly in activities such as making referrals and preparing medication lists.

The fourth objective in Part II (b) to identify belief domains that independently predict involvement in pre-travel pharmacist consultations through regression analyses

revealed that higher levels of perceived capability, social/professional role and identity, and environmental context and resources were significant predictors of involvement. In contrast, the reinforcement domain inversely influences involvement. The reinforcement domain demonstrated a more limited influence compared with other TDF domains. However, it remained associated with involvement in dispensing medications, suggesting that external rewards, recognition, or perceived benefits may contribute to engagement in selected activities, although they do not appear to be consistent determinants across all pre-travel pharmacist consultation activities. The multivariable logistic regression analyses indicate that involvement in pre-travel pharmacist consultations is not driven by any single factor but arises from the interplay between individual capability, professional identity, and organisational context. Even when CPs possess adequate knowledge and motivation, their involvement may be constrained by environmental context and resources such as limited time, staffing shortages, and insufficient organisational support.

The findings of this thesis addressed all research objectives and contributed to advancing knowledge regarding CPs' involvement in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in Malaysia. Given the limited existing literature in this area, the study provides important empirical evidence on CPs' practices and beliefs. Across all study phases, the findings suggest that variability in involvement reflects the interaction between capability, opportunity, and motivation. Within the COM-B framework, opportunity-related factors emerged as particularly influential in shaping the translation of capability and motivation into consistent practice.

This thesis offers a novel contribution to the literature by identifying specific, and potentially modifiable factors influencing CPs' involvement in this emerging area of practice. The findings support the development of targeted interventions, including structured educational programmes, national guidelines tailored to the needs of religious travellers, interprofessional collaboration models, public awareness initiatives, and improved organisational support. Integrating travel health into undergraduate pharmacy curricula and recognising it as a formal area of professional development may further strengthen CPs' engagement. Within the Malaysian healthcare context, supportive policies, clearer role delineation among healthcare providers, and greater integration of travel health services are likely to facilitate service expansion and optimise patient outcomes.

Some limitations were acknowledged. The scoping review was constrained by the limited availability of studies specifically examining CPs' involvement in pre-travel health services for Hajj and Umrah pilgrims. In addition, the qualitative and quantitative phases were conducted among CPs practising in Selangor and Kuala Lumpur, which may limit the transferability and generalisability of the findings to other regions of Malaysia. As these states are highly urbanised and have a greater concentration of community pharmacies, healthcare infrastructure, and access to professional development opportunities, the findings may not fully reflect the experiences of CPs practising in rural or less densely populated areas. CPs practising in non-urban settings may encounter distinct barriers and facilitators. Therefore, future research involving broader geographical representation may provide a more comprehensive understanding of contextual variability in CPs' travel health practices across Malaysia and strengthen the transferability of findings to diverse community pharmacy settings. Future research should also focus on developing and evaluating targeted implementation strategies to support the integration of travel health services into community pharmacy practice and assess their long-term impact on service delivery and patient outcomes.

This thesis also provides several conceptual, methodological, and practical contributions to the field of pharmacy practice and travel health research. Conceptually, this thesis contributes to the limited body of theory-informed research examining CPs' involvement in pre-travel healthcare services, particularly within the context of Hajj and Umrah pilgrimage. The integration of the TDF and COM-B frameworks enabled systematic exploration of behavioural determinants influencing CPs' practice behaviour beyond descriptive assessment of barriers and facilitators. Importantly, the findings indicate that variability in CPs' involvement was influenced less by a lack of motivation and more by opportunity-related and organisational constraints. This challenges assumptions that limited involvement in travel health services is primarily attributable to poor professional attitudes or unwillingness to engage. Therefore, the study provides a more nuanced understanding of how behavioural and contextual factors interact to influence implementation of preventive healthcare services within community pharmacy settings.

The thesis also extends the application of the TDF in pharmacy practice research by examining behavioural determinants across multiple travel health-related activities rather than a single professional behaviour. Furthermore, the findings suggest that cultural and religious context may represent an important yet underexplored influence

on CPs' engagement in pilgrimage-related healthcare, highlighting the potential value of integrating socio-cultural perspectives into future behavioural pharmacy research.

Methodologically, the study contributes through its sequential multi-phase design integrating a scoping review, qualitative exploration, instrument development, and quantitative survey. This approach enabled triangulation of findings across different methodological perspectives and provided both breadth and depth in understanding CPs' involvement in pre-travel pharmacist consultations. The scoping review established the existing evidence base and behavioural gaps in the literature, the qualitative phase provided contextual and experiential insights, while the quantitative phase enabled broader evaluation of behavioural determinants and involvement patterns among CPs.

An additional methodological contribution is the development and preliminary validation of a theory-informed instrument to assess CPs' practices and beliefs regarding pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The instrument demonstrated acceptable content validity, face validity, feasibility, and temporal stability, and may provide a useful foundation for future research in travel health and pharmacy practice.

Practically, the thesis contributes evidence relevant to strengthening CPs' roles in preventive travel healthcare within Malaysia and potentially other settings involving mass religious gatherings. The proposed framework highlights the need for coordinated action involving healthcare authorities, professional pharmacy organisations, academic institutions, researchers, and CPs. The findings support implementation strategies such as structured travel health training, development of practice guidelines, integration of travel health into pharmacy curricula, establishment of referral pathways, enhancement of interprofessional collaboration, and organisational support for consultation services.

In conclusion, all research objectives were achieved. The findings demonstrate that Malaysian CPs possess the motivation and foundational capability to contribute meaningfully to pre-travel healthcare for prospective Hajj and Umrah pilgrims. However, sustainable expansion of these services requires improvements in opportunity-related conditions, including supportive policies, structured practice frameworks, workforce development, and organisational support. By integrating behavioural theory with empirical evidence, this thesis provides a robust foundation for strengthening pre-travel pharmacist consultations and advancing CPs' contribution to pilgrimage-focused healthcare in Malaysia.

REFERENCES

Abd-Ellatif, E. E., Alhomidan, L., Al-Assaf, L., AlGhamdi, L., Alharbi, A., Albeladi, O., AlQusibri, A., Abd El Rahman, S., & Almudarra, S. S. (2021). Assessment of knowledge, attitudes and practices concerning travel health among Hajj pilgrims (1439 H-2018 G) at Prince Mohammad bin Abdulaziz International Airport in AL-Madina, Saudi Arabia. *Global Journal of Health Science*, *13*(12), 39. https://doi.org/10.5539/gjhs.v13n12p39

Abdelmoety, D. A., El-Bakri, N. K., Almowalld, W. O., Turkistani, Z. A., Bugis, B. H., Baseif, E. A., Melbari, M. H., AlHarbi, K., & Abu-Shaheen, A. (2018). Characteristics of heat illness during Hajj: A cross-sectional study. *BioMed Research International*, *2018*, 5629474. https://doi.org/10.1155/2018/5629474

Abdu-Aguye, S. N., Mohammed, S., Danjuma, N. M., & Labaran, K. S. (2021). Improving outpatient medication counselling in hospital pharmacy settings: A behavioral analysis using the theoretical domains framework and behavior change wheel. *Pharmacy Practice*, *19*(2), 2271. https://doi.org/10.18549/PharmPract.2021.2.2271

Abdul Kadir, N., Wahab, M. S. A., Mohd Suhaimi, A., & Othman, N. (2023). Practices, barriers and facilitators to the delivery of pretravel health services by community pharmacists: A scoping review using the theoretical domains framework. *Research in Social and Administrative Pharmacy*, *19*(11), 1412-1423. https://doi.org/10.1016/j.sapharm.2023.08.004

Abu Assab, M., Alhamad, H., Almazari, I., Azzam, B., & Abu Assab, H. (2022). Barriers to medication review process implementation - Cross-sectional study among community pharmacists in Jordan. *Healthcare 10*(4), 651. https://doi.org/10.3390/healthcare10040651

Ahmed, Q. A., Arabi, Y. M., & Memish, Z. A. (2006). Health risks at the Hajj. *The Lancet, 367*(9515), 1008–1015. https://doi.org/10.1016/S0140-6736(06)68429-8

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Al-Tawfiq, J. A., Gautret, P., Benkouiten, S., & Memish, Z. A. (2016). Mass

gatherings and the spread of respiratory infections lessons from the Hajj. *Annals of the American Thoracic Society*, *13*(6), 759-765. https://doi.org/10.1513/AnnalsATS.201511-772FR

Al-Tawfiq, J. A., Kattan, R. F., & Memish, Z. A. (2022). Escalating the 2022 Hajj during the third year of the COVID-19 pandemic. *Journal of Travel Medicine*, *29*(6). https://doi.org/10.1093/jtm/taac059

Al-Tawfiq, J. A., Zumla, A., & Memish, Z. A. (2014). Travel implications of emerging coronaviruses: SARS and MERS-CoV. *Travel Medicine and Infectious Disease*, *12*(5), 422-428. https://doi.org/10.1016/j.tmaid.2014.06.007

Alabid, A. H. M. A., Ibrahim, M. I. M., Hassali, M. A., & Palaian, S. (2021). Community pharmacists' awareness toward their roles in healthcare and interaction with general practitioners: A cross-sectional study. *Journal of Pharmacy and Bioallied Sciences*, *13*(2), 220-229. https://doi.org/10.4103/jpbs.JPBS_680_20

Aldossari, M., Aljoudi, A., Celentano, D. D., & Baffoe-Bonnie, H. (2019). Pattern of illness among Hajj pilgrims requiring emergency care: A literature review. *Journal of Infection and Public Health, 12*(5), 601–606. https://doi.org/10.1016/j.jiph.2019.02.004

Alfadhly, A., Darraj, H., Alamlki, B., Alfaez, S., Alzahrani, M., Mubarak, A., Albogami, S., Almalki, D., Alqarni, A., & Alzahrani, A. (2022). Hyperglycaemic and hypoglycaemic emergencies among patients with diabetes mellitus who participated in pilgrims of the 2019/1440H Hajj season. *Journal of Family Medicine and Primary Care*, *11*(1), 312-318. https://doi.org/10.4103/jfmpc.jfmpc_1096_21

Alghadeer, S., Babelghaith, S. D., Syed, W., & Al-Arifi, M. N. (2023). Community pharmacists' knowledge, prospective and practice towards health related illness at Hajj and Umrah: A cross sectional study. *Saudi Pharmaceutical Journal*, *31*(10), 101786. https://doi.org/10.1016/j.jsps.2023.101786

Alhusein, N., Scott, J., Neale, J., Chater, A., & Family, H. (2021). Community pharmacists' views on providing a reproductive health service to women receiving opioid substitution treatment: A qualitative study using the TDF and COM-B. *Exploratory Research in Clinical and Social Pharmacy*, *4*, 100071. https://doi.org/10.1016/j.rcsop.2021.100071

Alqahtani, A. S., Althimiri, N. A., & BinDhim, N. F. (2019). Saudi Hajj pilgrims'

preparation and uptake of health preventive measures during Hajj 2017. *Journal of Infection and Public Health*, *12*(6), 772-776. https://doi.org/10.1016/j.jiph.2019.04.007

Alqahtani, A. S., Rashid, H., & Heywood, A. E. (2015). Vaccinations against respiratory tract infections at Hajj. *Clinical Microbiology and Infection 21*(2), 115-127. https://doi.org/10.1016/j.cmi.2014.11.026

Alqathama, A. A., & Ahmad, R. (2024). Muslim pilgrims' knowledge, attitudes, and practices regarding complementary and alternative medicine (CAM); a study conducted during Hajj season. *Saudi Pharmaceutical Journal*, *32*(3), 101988. https://doi.org/10.1016/j.jsps.2024.101988

Alrasheedy, A. A., Hassali, M. A., Wong, Z. Y., & Saleem, F. (2017). Pharmacist-managed medication therapy adherence clinics: The Malaysian experience. *Research in Social and Administrative Pharmacy, 13*(4), 885-886. https://doi.org/10.1016/j.sapharm.2017.02.011

Amer, S. A., & Almudarra, S. I. (2022). Assessment of drug use pattern among Hajj pilgrims Saudi Arabia, 1439h (2018). *Conference Proceedings of the 2nd International Conference on Public Health and Well-Being*, pp. 19-34. iConferences. https://doi.org/10.32789/publichealth.2021.1009

Ang, W. C., Fadzil, M. S., Ishak, F. N., Adenan, N. N., & Nik Mohamed, M. H. (2022). Readiness and willingness of Malaysian community pharmacists in providing vaccination services. *Journal of Pharmaceutical Policy and Practice*, *15*(1), 81. https://doi.org/10.1186/s40545-022-00478-0

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19-32. https://doi.org/10.1080/1364557032000119616

Atkins, L., Francis, J., Islam, R., O'Connor, D., Patey, A., Ivers, N., Foy, R., Duncan, E. M., Colquhoun, H., Grimshaw, J. M., Lawton, R., & Michie, S. (2017). A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation Science*, *12*(1), 77. https://doi.org/10.1186/s13012-017-0605-9

Azeem, M., Tashani, M., Barasheed, O., Heron, L., Hill-Cawthorne, G., Haworth, E., Dwyer, D., Rashid, H., & Booy, R. (2014). Knowledge, attitude and practice (KAP) survey concerning antimicrobial use among Australian Hajj pilgrims. *Infectious Disorders - Drug Targets*, *14*(2), 125-132.

https://doi.org/10.2174/1871526514666140713161757

Aziz, M. M., Abd El-Megeed, H. S., & Abd Ellatif, M. A. M. (2018). Pre-travel health seeking practices of Umrah pilgrims departing from Assiut International Airport, Egypt [Article]. *Travel Medicine and Infectious Disease*, *23*, 72-76. https://doi.org/10.1016/j.tmaid.2018.04.012

BaDawood, A. O., Bossei, A. A., AlSabhani, M. F., AlAhmari, S. M., Shata, M. T., & Hamam, A. F. (2020). The burden on EDs during Hajj due to pilgrim noncompliance with treatment for chronic conditions. *Saudi Journal of Emergency Medicine*, *1*(2), 103-109. https://doi.org/10.24911/sjemed/72-1571844482

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bascom, C. S., Rosenthal, M. M., & Houle, S. K. D. (2015). Are pharmacists ready for a greater role in travel health? An evaluation of the knowledge and confidence in providing travel health advice of pharmacists practicing in a community pharmacy chain in Alberta, Canada. *Journal of Travel Medicine*, *22*(2), 99-104. https://doi.org/10.1111/jtm.12172

Beatty, P. C., & Willis, G. B. (2007). Research synthesis: The practice of cognitive interviewing. *Public Opinion Quarterly*, *71*(2), 287-311. https://doi.org/10.1093/poq/nfm006

Bernama. (2023, March 2). *Saudi Arabia records arrival of over 300,000 Malaysian Umrah pilgrims in just 8 months*. Retrieved 6/2/24 from https://www.nst.com.my/news/nation/2023/03/885188/saudi-arabia-records-arrival-over-300000-malaysian-umrah-pilgrims-just-8

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, *6*, 149. https://doi.org/10.3389/fpubh.2018.00149

Bolarinwa, O. A. (2015). Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Nigerian Postgraduate Medical Journal*, *22*(4), 195-201. https://doi.org/10.4103/1117-1936.173959

Bolarinwa, O. A. (2020). Sample size estimation for health and social science researchers: The principles and considerations for different study designs.

Nigerian Postgraduate Medical Journal, *27*(2), 67-75. https://doi.org/10.4103/npmj.npmj_19_20

Browne, R. H. (1995). On the use of a pilot sample for sample size determination. *Statistics in Medicine*, *14*(17), 1933-1940. https://doi.org/10.1002/sim.4780141709

Bulkhi, A. A., Almoallim, H. M., Obaid, M. S., Hariri, N. H., Alqashqri, H. S., Alghamdi, I. A., ... & Khan, A. A. (2025). Immunization coverage and barriers among Hajj and Umrah pilgrims: insights into vaccine uptake and compliance. *Journal of Epidemiology and Global Health, 15*(1), 104. https://doi.org/10.1007/s44197-025-00447-1

Bursac, Z., Gauss, C. H., Williams, D. K., & Hosmer, D. W. (2008). Purposeful selection of variables in logistic regression. *Source code for biology and medicine*, *3*(1), 17. https://doi.org/10.1186/1751-0473-3-17

Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research*, *42*(3), 294-320. https://doi.org/10.1177/0049124113500475

Cane, J., O'Connor, D., & Michie, S. (2012). Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science*, *7*(1), 37. https://doi.org/10.1186/1748-5908-7-37

Castillo-Montoya, M. (2016). Preparing for interview research: The interview protocol refinement framework. *The Qualitative Report*, *21*(5), 811-831. https://doi.org/10.46743/2160-3715/2016.2337

Centers for Disease Control and Prevention. (2021). *Saudi Arabia: Hajj/Umrah Pilgrimage - Chapter 10*. https://wwwnc.cdc.gov/travel/yellowbook/2020/popular-itineraries/saudi-arabia-hajjumrah-pilgrimage

Charan, J., & Biswas, T. (2013). How to calculate sample size for different study designs in medical research?. *Indian Journal of Psychological Medicine*, *35*(2), 121-126

Chen, L. H., & Hochberg, N. S. (2024). The pretravel consultation. In CDC Yellow Book 2024: Health information for international travel. Centers for Disease Control and Prevention. https://wwwnc.cdc.gov/travel/yellowbook

Chiodini, J. H., Taylor, F., Geary, K., Lang, S., Moore, J., Ross, D. A., Evans, D. P.,

Britton, A., Coley, D., Anderson, J., Rossanese, A., & Allen, S. P. (2020). *Good practice guidance for providing a travel health service*. Faculty of Travel Medicine of the Royal College of Physicians and Surgeons of Glasgow. https://rcpsg.ac.uk/travel-medicine/good-practice-guidance-for-providing-a-travel-health-service

Collins, D. (2003). Pretesting survey instruments: An overview of cognitive methods. *Quality of life research*, *12*(3), 229-238. https://doi.org/10.1023/A:1023254226592

Coltman, T., Devinney, T. M., Midgley, D. F., & Venaik, S. (2008). Formative versus reflective measurement models: Two applications of formative measurement. *Journal of Business Research, 61*(12), 1250–1262. https://doi.org/10.1016/j.jbusres.2008.01.013

Committee to Advise on Tropical Medicine and Travel. (2009). *Guidelines for the practice of travel medicine. An advisory committee statement (ACS). Government of Canada*. https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2009-35/guidelines-practice-travel-medicine.html

Connelly, L. M. (2008). Pilot studies. *Medsurg nursing*, *17*(6), 411-412.

Crowe, M., & Sheppard, L. (2011). A general critical appraisal tool: An evaluation of construct validity. *International Journal of Nursing Studies*, *48*(12), 1505-1516. https://doi.org/10.1016/j.ijnurstu.2011.06.004

Crowe, M., Sheppard, L., & Campbell, A. (2011). Comparison of the effects of using the Crowe Critical Appraisal Tool versus informal appraisal in assessing health research: A randomised trial. *International Journal of Evidence-Based Healthcare*, *9*(4), 444-449. https://doi.org/10.1111/j.1744-1609.2011.00237.x

Crowe, M., Sheppard, L., & Campbell, A. (2012). Reliability analysis for a proposed critical appraisal tool demonstrated value for diverse research designs. *Journal of Clinical Epidemiology*, *65*(4), 375-383. https://doi.org/10.1016/j.jclinepi.2011.08.006

Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R., Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*, *4*(1), 50. https://doi.org/10.1186/1748-5908-4-50

Della Polla, G., Pelullo, C. P., Napolitano, F., Lambiase, C., De Simone, C., & Angelillo, I. F. (2020). Knowledge, attitudes, and practices towards infectious diseases related to travel of community pharmacists in Italy. *International Journal of Environmental Research and Public Health*, *17*(6), 2147. https://doi.org/10.3390/ijerph17062147

Department of Statistics Malaysia. (2025). *Demographic statistics, fourth quarter 2024* https://www.dosm.gov.my/portal-main/release-content/demographic-statistics-fourth-quarter-2024

Deris, Z. Z., Hasan, H., Sulaiman, S. A., Wahab, M. S. A., Naing, N. N., & Othman, N. H. (2010). The prevalence of acute respiratory symptoms and role of protective measures among Malaysian Hajj pilgrims. *Journal of Travel Medicine*, *17*(2), 82-88. https://doi.org/10.1111/j.1708-8305.2009.00384.x

Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, *17*(4), 263-282. https://doi.org/10.1111/j.1467-8551.2006.00500.x

Doody, O., & Doody, C. M. (2015). Conducting a pilot study: Case study of a novice researcher. *British Journal of Nursing*, *24*(21), 1074-1078. https://doi.org/10.12968/bjon.2015.24.21.1074

Durham, M. J., Goad, J. A., Neinstein, L. S., & Lou, M. (2011). A comparison of pharmacist travel-health specialists' versus primary care providers' recommendations for travel-related medications, vaccinations, and patient compliance in a college health setting. *Journal of Travel Medicine, 18*(1), 20-25. https://doi.org/10.1111/j.1708-8305.2010.00470.x

El Hajj, M. S., Al-Ziftawi, N., Stewart, D., & Al-Khater, D. M. A. (2023). Community pharmacists' participation in adult vaccination: A cross-sectional survey based on the theoretical domains framework. *British Journal of Clinical Pharmacology, 89*(2), 773-786. https://doi.org/10.1111/bcp.15529

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107-115. https://doi.org/10.1111/j.1365-2648.2007.04569.x

Elsevier B.V. (2023). *Travel Medicine and Infectious Disease*. ScienceDirect. Retrieved February 28, 2023 from https://www.sciencedirect.com/journal/travel-medicine-and-infectious-disease

Evans, D. (2018). Impact of pharmacy based travel medicine with the evolution of pharmacy practice in the UK. *Pharmacy*, *6*(3), 64. https://doi.org/10.3390/pharmacy6030064

Fernandes, H. V. J., & Houle, S. K. D. (2019). Development and testing of a clinical practice framework for pharmacists to assess patients' travel-related risks: The 5W approach to travel risk identification. *Pharmacy*, *7*(4), 159. https://doi.org/10.3390/pharmacy7040159

Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behavior: The reasoned action approach*. Psychology Press.

Foong, E. A. L., Edwards, D. J., Houle, S., & Grindrod, K. A. (2017). Ready or not? Pharmacist perceptions of a changing injection scope of practice before it happens. *Canadian Pharmacists Journal*, *150*(6), 387-396. https://doi.org/10.1177/1715163517732089

France, J., Lalonde, M., McIsaac, D. I., Squires, J. E., & Backman, C. (2023). Facilitators and barriers to nurses screening for frailty in acute care in a provincial health-care system: A survey study guided by the theoretical domains framework. *Canadian Geriatrics Journal*, *26*(2), 266-275. https://doi.org/10.5770/cgj.26.650

Gaddoury, M. A., Alghamdi, A. S., Alzahrani, M. M., Alotaibi, N. H., & Alotaibi, B. M. (2024). Predictors of inpatient mortality among hospitalised pilgrims during Hajj: A retrospective cohort study. *Travel Medicine and Infectious Disease, 61*, 102760. https://doi.org/10.1016/j.tmaid.2024.102760

Gautret, P., Angelo, K. M., Asgeirsson, H., Duvignaud, A., van Genderen, P. J. J., Bottieau, E., Chen, L. H., Parker, S., Connor, B. A., Barnett, E. D., Schlagenhauf, P., & Weber, R. (2019). International mass gatherings and travel-associated illness: A GeoSentinel cross-sectional, observational study. *Travel Medicine and Infectious Disease*, *32*, 101504. https://doi.org/10.1016/j.tmaid.2019.101504

Gautret, P., Benkouiten, S., Sridhar, S., Al-Tawfiq, J. A., & Memish, Z. A. (2015). Diarrhea at the Hajj and Umrah. *Travel Medicine and Infectious Disease*, *13*(2), 159-166. https://doi.org/10.1016/j.tmaid.2015.02.005

General Authority for Statistics. (2022a). *Hajj statistics 2022* https://www.stats.gov.sa/sites/default/files/Hajj_Statistics_2022_En_0.pdf

General Authority for Statistics. (2022b). *Umrah statistics 2022*. Retrieved November

18th, 2023 from https://www.stats.gov.sa/sites/default/files/Umrah_Statistics_2022_En_0.pdf

Goni, M. D., Naing, N. N., Hasan, H., Wan-Arfah, N., Deris, Z. Z., Arifin, W. N., & Baaba, A. A. (2019). Uptake of recommended vaccines and its associated factors among Malaysian pilgrims during Hajj and Umrah 2018. *Frontiers in Public Health*, *7*, 268, Article 268. https://doi.org/10.3389/fpubh.2019.00268

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An exploratory study of data saturation and variability. *Field Methods*, *18*(1), 59-82. https://doi.org/10.1177/1525822x05279903

Haddaway, N. R., Collins, A. M., Coughlin, D., & Kirk, S. (2015). The role of Google Scholar in evidence reviews and its applicability to grey literature searching. *PLoS ONE*, *10*(9), e0138237. https://doi.org/10.1371/journal.pone.0138237

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.

Hasan, G., Moabber, H., Alyamani, A., Sayeed, A., & Altatar, F. (2016). Study on risk factors (predisposing factors) for poor diabetes control during Hajj (1436/2015) in people with diabetes. *Pakistan Journal of Medical Sciences*, *32*(5), 1092-1096. https://doi.org/10.12669/pjms.325.11217

Hashim, H. T., Babar, M. S., Essar, M. Y., Ramadhan, M. A., & Ahmad, S. (2021). The Hajj and COVID-19: How the Pandemic Shaped the World's Largest Religious Gathering. *Am J Trop Med Hyg*, *104*(3), 797-799. https://doi.org/10.4269/ajtmh.20-1563

Hassali, M. A., Alrasheedy, A. A., McLachlan, A., Nguyen, T. A., Al-Tamimi, S. K., Ibrahim, M. I. M., & Aljadhey, H. (2014). The experiences of implementing generic medicine policy in eight countries: A review and recommendations for a successful promotion of generic medicine use. *Saudi Pharmaceutical Journal, 22*(6), 491-503. https://doi.org/10.1016/j.jsps.2013.12.017

Hassali, M. A. A., Shafie, A. A., See, O. G., & Wong, Z. Y. (2016). Pharmacy practice in Malaysia. In *Pharmacy practice in developing countries* (pp. 23-40). Academic Press. https://doi.org/10.1016/B978-0-12-801714-2.00002-2

Hatton, K., Bhattacharya, D., Scott, S., & Wright, D. (2021). Barriers and facilitators to pharmacists integrating into the ward-based multidisciplinary team: A systematic review and meta-synthesis. *Research in Social and Administrative Pharmacy*, *17*(11), 1923-1936. https://doi.org/10.1016/j.sapharm.2021.02.006

Heslop, I. M., Speare, R., Bellingan, M., & Glass, B. D. (2018). Australian pharmacists' perceptions and practices in travel health. *Pharmacy*, *6*(3), 90. https://doi.org/10.3390/pharmacy6030090

Heslop, I. M., Speare, R., Bellingan, M., & Glass, B. D. (2020). Assessing the travel health knowledge of Australian pharmacists. *Pharmacy*, *8*(2), 94. https://doi.org/10.3390/pharmacy8020094

Hess, K. M., Dai, C. W., Garner, B., & Law, A. V. (2010). Measuring outcomes of a pharmacist-run travel health clinic located in an independent community pharmacy. *Journal of the American Pharmacists Association*, *50*(2), 174-180. https://doi.org/10.1331/JAPhA.2010.09204

Hill, D. R., Ericsson, C. D., Pearson, R. D., Keystone, J. S., Freedman, D. O., Kozarsky, P. E., DuPont, H. L., Bia, F. J., Fischer, P. R., & Ryan, E. T. (2006). The practice of travel medicine: Guidelines by the Infectious Diseases Society of America. *Clinical Infectious Diseases*, *43*(12), 1499-1539. https://doi.org/10.1086/508782

Hill, R. (1998). What sample size is "enough" in internet survey research. *Interpersonal Computing and Technology: An electronic journal for the 21st century*, *6*(3-4), 1-12.

Hind, C. A., Bond, C. M., Lee, A., & van Teijlingen, E. R. (2008). Needs assessment study for community pharmacy travel medicine services. *Journal of Travel Medicine*, *15*(5), 328-334. https://doi.org/10.1111/j.1708-8305.2008.00231.x

Hoang, V.-T., Ali-Salem, S., Belhouchat, K., Meftah, M., Sow, D., Dao, T.-L., Ly, T. D. A., Drali, T., Ninove, L., & Yezli, S. (2019). Respiratory tract infections among French Hajj pilgrims from 2014 to 2017. *Scientific Reports*, *9*(1), 17771. https://doi.org/10.1038/s41598-019-54370-0

Hoang, V.-T., Gautret, P., Memish, Z. A., & Al-Tawfiq, J. A. (2020). Hajj and Umrah mass gatherings and COVID-19 infection. *Current Tropical Medicine Reports*, *7*(4), 133-140. https://doi.org/10.1007/s40475-020-00218-x

Hoang, V. T., Nguyen, T. T. T., Belhouchat, K., Meftah, M., Sow, D., Benkouiten, S., Dao, T. L., Anh Ly, T. D., Drali, T., Yezli, S., Alotaibi, B., Raoult, D., Parola, P., Pommier de Santi, V., & Gautret, P. (2019). Antibiotic use for respiratory infections among Hajj pilgrims: A cohort survey and review of the literature. *Travel Medicine and Infectious Disease*, *30*, 39-45. https://doi.org/10.1016/j.tmaid.2019.06.007

Houle, S. (2018). Is travel health a new destination for pharmacy practice and business? An examination of revenue opportunities from pre-travel consultations. *Canadian Pharmacists Journal 151*(6), 383-387. https://doi.org/10.1177/1715163518803972

Houle, S. K. D. (2018). Pharmacy travel health services: Current perspectives and future prospects. *Integrated Pharmacy Research and Practice*, *7*, 13-20. https://doi.org/10.2147/iprp.s142982

Houle, S. K. D., Kozlovsky, K., Fernandes, H. V. J., & Rosenberg-Yunger, Z. (2019). Uptake of travel health services by community pharmacies and patients following pharmacist immunization scope expansion in Ontario, Canada. *Pharmacy*, *7*(2), 35. https://doi.org/10.3390/pharmacy7020035

Huijg, J. M., Gebhardt, W. A., Crone, M. R., Dusseldorp, E., & Presseau, J. (2014). Discriminant content validity of a theoretical domains framework questionnaire for use in implementation research. *Implementation Science*, *9*(1), 11. https://doi.org/10.1186/1748-5908-9-11

Hurley-Kim, K., Babish, K., Chen, E., Diaz, A., Hahn, N., Evans, D., Seed, S., & Hess, K. (2022). The US travel health pharmacists' role in a post-COVID-19 pandemic era. *Pharmacy*, *10*(5), 134. https://doi.org/10.3390/pharmacy10050134

Hurley-Kim, K., Goad, J., Seed, S., & Hess, K. M. (2018). Pharmacy-based travel health services in the United States. *Pharmacy*, *7*(1), 5. https://doi.org/10.3390/pharmacy7010005

Hussein, R., Whaley, C. R., Lin, E. C., & Grindrod, K. (2021). Identifying barriers, facilitators and behaviour change techniques to the adoption of the full scope of pharmacy practice among pharmacy professionals: Using the Theoretical Domains Framework. *Research in Social and Administrative Pharmacy*, *17*(8), 1396-1406. https://doi.org/10.1016/j.sapharm.2020.10.003

International Society of Travel Medicine. (2023a). *Educational and professional development activities*. Retrieved May 11, 2023 from https://www.istm.org/educationalactivities

International Society of Travel Medicine. (2023b). *Pharmacist professional group*. Retrieved May 21, 2023 from https://www.istm.org/pharmacistgroup

Isaac, S., & Michael, W. B. (1995). *Handbook in research and evaluation: A collection of principles, methods, and strategies useful in the planning, design, and*

evaluation of studies in education and the behavioral sciences. Educational and Industrial Testing Services.

Isenor, J. E., Minard, L. V., Stewart, S. A., Curran, J. A., Deal, H., Rodrigues, G., & Sketris, I. S. (2018). Identification of the relationship between barriers and facilitators of pharmacist prescribing and self-reported prescribing activity using the theoretical domains framework. *Research in Social and Administrative Pharmacy*, *14*(8), 784-791. https://doi.org/10.1016/j.sapharm.2017.10.004

Islam, N., Ayaz, A., & Farooq, M. U. (2019). Awareness and experiences of female pilgrims about menstrual suppression during Hajj 1437 Hijrah: A cross-sectional study. *Saudi Journal for Health Sciences*, *8*(1), 12-16. https://doi.org/10.4103/sjhs.sjhs_104_18

Jared, W. (2024). Batik Air and Lion Air Group to make KLIA central umrah travel hub. *Malay Mail*. https://www.malaymail.com/news/life/2024/01/15/batik-air-and-lion-air-group-to-make-klia-central-umrah-travel-hub/112512

Kadir, N. A., Wahab, M. S. A., Suhaimi, A. W., & Othman, N. (2025). A qualitative exploration of community pharmacists' practices and beliefs of pretravel pharmacist consultations for prospective Hajj and Umrah pilgrims. *Pharmacy Practice 23*(2), 3188. https://doi.org/10.18549/PharmPract.2025.2.3188

Kc, B., Alrasheedy, A. A., Leggat, P. A., Mohamed Ibrahim, M. I., Christopher, C. M., Sapkota, B., & Shrestha, S. (2023). Types and outcomes of pharmacist-managed travel health services: A systematic review. *Travel Medicine and Infectious Disease*, *51*, 102494. https://doi.org/10.1016/j.tmaid.2022.102494

Kc, B., Alrasheedy, A. A., Leggat, P. A., Molugulu, N., Mohamed Ibrahim, M. I., Khatiwada, A. P., & Shrestha, S. (2022). Pharmacies in the airport ecosystem and how they serve travelers' health and medicines need: Findings and implications for the future. *Integrated Pharmacy Research and Practice*, *11*, 9-19. https://doi.org/10.2147/iprp.S345621

Kc, B., Khan, T. M., Xuan, W. Y., Alrasheedy, A. A., Ibrahim, M. I. M., & Leggat, P. A. (2020). Travel health-related activities and services provided by community pharmacies in Selangor, Malaysia: A cross-sectional analysis. *Travel Medicine and Infectious Disease*, *33*, 101463. https://doi.org/10.1016/j.tmaid.2019.07.019

Khan, I. D., Khan, S. A., Asima, B., Hussaini, S. B., Zakiuddin, M., & Faisal, F. A. (2018). Morbidity and mortality amongst Indian Hajj pilgrims: A 3-year

experience of Indian Hajj medical mission in mass-gathering medicine. *Journal of Infection and Public Health*, *11*(2), 165-170. https://doi.org/10.1016/j.jiph.2017.06.004

Khan, S., Mustafa, M. S., Rehman, R., Hussaini, S. B., Ahmad, F. M. H., Danish Khan, I., Faisal, F. A., Asima, B., Hashmi, S. A., & Salim, M. A. (2018). Emergency response of Indian Hajj medical mission to heat illness among Indian pilgrims in tent-clinics at Mina and Arafat during Hajj, 2016. *International Journal of Travel Medicine and Global Health*, *6*(1), 5-9. https://doi.org/10.15171/ijtmgh.2017.26

Kodkani, N., Jenkins, J. M., & Hatz, C. F. (1999). Travel advice given by pharmacists. *Journal of Travel Medicine*, *6*(2), 87-93. https://doi.org/10.1111/j.1708-8305.1999.tb00838.x

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155-163. https://doi.org/10.1016/j.jcm.2016.02.012

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*(1), 159-174. https://doi.org/10.2307/2529310

LaRocque, R. C., & Jentes, E. S. (2011). Health recommendations for international travel: A review of the evidence base of travel medicine. *Current Opinion in Infectious Diseases*, *24*(5), 403-409. https://doi.org/10.1097/QCO.0b013e32834a1aef

Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: Advancing the methodology. *Implementation Science*, *5*(1), 69. https://doi.org/10.1186/1748-5908-5-69

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.

Loh, P., Chua, S. S., & Karuppannan, M. (2021). The extent and barriers in providing pharmaceutical care services by community pharmacists in Malaysia: A cross-sectional study. *BMC Health Services Research*, *21*(1), 822. https://doi.org/10.1186/s12913-021-06820-7

Loh, P., Lee, J. W., Karuppannan, M., & Chua, S. S. (2023). Practice of pharmaceutical care by community pharmacists in response to self-medication request for a cough: a simulated client study. *BMC Health Services Research*, *23*(1), 657. https://doi.org/10.1186/s12913-023-09642-x

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing*

Research, *35*(6), 382-386. http://ijoh.tums.ac.ir/index.php/ijoh/article/view/26

Mandourah, Y., Ocheltree, A., & Yousef, A. (2012). The 2011 Saudi critical care Hajj experience: Featuring the patterns of admission to the Hajj intensive care units. *Critical Care Medicine*, *40*(12), 1-304. https://doi.org/10.1097/01.ccm.0000425605.04623.4b

Marx, R. G., Menezes, A., Horovitz, L., Jones, E. C., & Warren, R. F. (2003). A comparison of two time intervals for test-retest reliability of health status instruments. *Journal of Clinical Epidemiology*, *56*(8), 730-735. https://doi.org/10.1016/S0895-4356(03)00084-2

May, C., & Finch, T. (2009). Implementing, embedding, and integrating practices: an outline of normalization process theory. *Sociology*, *43*(3), 535-554. https://doi.org/10.1177/0038038509103208

Mayring, P. (2014). *Qualitative content analysis: Theoretical background and procedures*. Springer. https://doi.org/10.1007/978-94-017-9181-6_13

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: A meta-analysis. *Health Psychology Review*, *5*(2), 97-144. https://doi.org/10.1080/17437199.2010.521684

Memish, Z., Assiri, A., Turkestani, A., Yezli, S., Al Masri, M., Charrel, R., Drali, T., Gaudart, J., Edouard, S., & Parola, P. (2015). Mass gathering and globalization of respiratory pathogens during the 2013 Hajj. *Clinical Microbiology and Infection*, *21*(6), 571. e571-571. e578. https://doi.org/10.1016/j.cmi.2015.02.008

Memish, Z. A. (2018). Health of the Hajj. *Science*, *361*, 533. https://doi.org/10.1126/science.aau9617

Memish, Z. A., Steffen, R., White, P., Dar, O., Azhar, E. I., Sharma, A., & Zumla, A. (2019). Mass gatherings medicine: public health issues arising from mass gathering religious and sporting events. *The Lancet*, *393*(10185), 2073-2084.

Michie, S., Atkins, L., & West, R. (2014). *The behaviour change wheel: A guide to designing interventions*. Silverback Publishing.

Michie, S., Johnston, M., Abraham, C., Lawton, R., Parker, D., & Walker, A. (2005). Making psychological theory useful for implementing evidence based practice: A consensus approach. *Quality and Safety in Health Care*, *14*(1), 26-33. https://doi.org/10.1136/qshc.2004.011155

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, *6*(1), 42. https://doi.org/10.1186/1748-5908-6-42

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed. ed.). Sage Publications.

Ministry of Health Malaysia. (2021). Page 36 - Plan Strategik ANMS. Retrieved January 18, 2026 from https://infosihat.moh.gov.my/images/media sihat/garis panduan/pelanstrategik/files/basic-html/page36.html

Ministry of Health Malaysia. (2025). *Garis panduan pemeriksaan kesihatan bakal haji* (10th ed.). Ministry of Health Malaysia & Lembaga Tabung Haji

Ministry of Health, Kingdom of Saudi Arabia. (2023). *Health requirements and recommendations for travelers to Saudi Arabia for Umrah - 1444H (2023)*. Retrieved November 18, 2023 from https://www.moh.gov.sa/en/HealthAwareness/Pilgrims_Health/Documents/Health-Regulations-Umrah-En.pdf

Ministry of Health, Kingdom of Saudi Arabia. (2024). *Health requirements and recommendations for travelers to Saudi Arabia for Hajj – 1445H (2024)*. Retrieved Januari 4, 2024 from https://www.moh.gov.sa/en/HealthAwareness/Pilgrims_Health/Documents/Health-Regulations-En.pdf

Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, *22*(1), 67-72. https://doi.org/10.4103/aca.ACA15718

Muhammed, O. S., Serbessa, M. K., & Fenta, T. G. (2025). Exploring behavioral determinants of antimicrobial dispensing in drug retail outlets of Addis Ababa, Ethiopia: a mixed methods study. *Scientific Reports, 15*(1), 36423. https://doi.org/10.1038/s41598-025-20558-w

Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, *18*(1), 143. https://doi.org/10.1186/s12874-018-0611-x

Mutie, M., Naunton, M., Cooper, G., Kyle, G., & Zwar, N. (2014). Role of pharmacists in collaborative care of travellers with chronic conditions. *Travel Medicine and Infectious Disease*, *12*(3), 286-287. https://doi.org/10.1016/j.tmaid.2014.03.001

Nik Zuraina, N. M. N., Sarimah, A., Suharni, M., Hasan, H., & Suraiya, S. (2018). High frequency of Haemophilus influenzae associated with respiratory tract infections among Malaysian Hajj pilgrims. *Journal of Infection and Public Health*, *11*(6), 878-883. https://doi.org/10.1016/j.jiph.2018.07.010

Nordin, N., Hassali, M. A. A., & Sarriff, A. (2017). Actual or potential extended services performed by Malaysian community pharmacists, perceptions and barriers towards its performance: A systematic review. *International Journal of Pharmacy and Pharmaceutical Sciences*, *9*(10), 13-20. https://doi.org/10.22159/ijpps.2017v9i10.20694

O'Connor, C., & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods*, *19*, 1-13. https://doi.org/10.1177/1609406919899220

Oxford University Press. (2023). *Journal of Travel Medicine*. Retrieved February 28, 2023 from https://academic.oup.com/jtm

Pane, M., Kong, F. Y. M., Purnama, T. B., Glass, K., Imari, S., Samaan, G., & Oshitani, H. (2019). Indonesian Hajj cohorts and mortality in Saudi Arabia from 2004 to 2011. *Journal of Epidemiology and Global Health*, *9*, 11-18. https://doi.org/10.2991/jegh.k.181231.001

Parker, S., & Almayahi, Z. K. (2025). Saudi Arabia: Hajj and Umrah pilgrimages. In E. S. Halsey, K. M. Angelo, E. D. Barnett, L. H. Chen, C. Coyle, C. D. Ericsson, D. O. Freedman, S. M. Ostroff, K. Petersen, E. T. Ryan, M. Weinberg, S. Arshanapally, & M. C. Glynn (Eds.), CDC Yellow Book 2026: Health information for international travel. Centers for Disease Control and Prevention. https://www.cdc.gov/yellow-book/hcp/africa-middle-east/saudi-arabia-hajj-and-umrah-pilgrimages.html

Patton, D. E., Ryan, C., & Hughes, C. M. (2021). Enhancing community pharmacists' provision of medication adherence support to older adults: A mixed methods study using the Theoretical Domains Framework. *Research in Social and Administrative Pharmacy*, *17*(2), 406-418. https://doi.org/10.1016/j.sapharm.2020.03.004

Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology, 49*(12), 1373–1379. https://doi.org/10.1016/S0895-4356(96)00236-3

Peters, M. D. J., Godfrey, C. M., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare*, *13*(3), 141-146. https://doi.org/10.1097/XEB.0000000000000050

Peters, M. D., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., ... & Khalil, H. (2020). Updated methodological guidance for the conduct of scoping reviews. *JBI Evidence Synthesis*, *18*(10), 2119-2126. https://doi.org/ DOI: 10.11124/JBIES-20-00167

Pharmaceutical Services Division, M. o. H. M. (2016). *Community pharmacy benchmarking guideline* (2nd ed. ed.).

Pharmaceutical Services Programme, M. o. H. M. (2025). *Guidelines for application of Type A/ B/ E licence and NaOH/ psychotropic permit*. Retrieved February 20, 2025 from https://pharmacy.moh.gov.my/en/documents/guidelines-application-type-b-e-licence-and-naoh-psychotropic-permit.html

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, *29*(5), 489-497. https://doi.org/10.1002/nur.20147

Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing*, *41*(4), 376-382. https://doi.org/10.1046/j.1365-2648.2003.02537.x

Public Health England. (2020). *Achieving behaviour change. A guide for national government*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/933328/UFG_National_Guide_v04.00__1___1_.pdf

Rafidah, M. R., Zuhra, H., Azah, A. S., & Tan, C. E. (2021). Menstrual suppression practice among female Malaysian pilgrims. *IIUM Medical Journal Malaysia*, *20*(1), 37-44. https://doi.org/10.31436/imjm.v20i1.1788

Razavi, S. M., Sabouri-Kashani, A., Ziaee-Ardakani, H., Tabatabaei, A., Karbakhsh, M., Sadeghipour, H., ... & Salamati, P. (2013). Trend of diseases among Iranian pilgrims during five consecutive years based on a Syndromic Surveillance System in Hajj. *Medical Journal of the Islamic Republic of Iran*, *27*(4), 179.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68. https://doi.org/10.1037/0003-066X.55.1.68

Samarkandi, O., Alamri, F., Alsaleh, G., Al Abdullatif, L., Alhazmi, J., Basnawi, M., Alazmy, W., & Khan, A. (2025). Exploring the prevalence of chronic diseases and health status among international Hajj pilgrims. *PLoS ONE*, *20*(4), e0317555, Article e0317555. https://doi.org/10.1371/journal.pone.0317555

Samarkandi, O. A., Alamri, F., Aljishi, H., Alabdullatif, L., Alsaleh, G. S., Alfelali, M., Alhazmi, J., Alazmy, W., & Khan, A. (2025). Medication adherence among pilgrims with chronic diseases at Hajj 2024. *Medical Science Monitor*, *31*, e948979. https://doi.org/10.12659/MSM.948979

Saudi Press Agency. (2023). Makkah route initiative continues to serve pilgrims of Malaysia. https://spa.gov.sa/en/77e552d07ag

Seubert, L. J., Whitelaw, K., Boeni, F., Hattingh, L., Watson, M. C., & Clifford, R. M. (2017). Barriers and facilitators for information exchange during over-the-counter consultations in community pharmacy: A focus group study. *Pharmacy*, *5*(4), 65. https://doi.org/10.3390/pharmacy5040065

Shafie, A. A., Hassali, M. A., Azhar, S., & See, O. G. (2012). Separation of prescribing and dispensing in Malaysia: a summary of arguments. *Research in Social and Administrative Pharmacy*, *8*(3), 258-262. https://doi.org/10.1016/j.sapharm.2011.06.002

Siti Fatimah, M. N., Rosminah, M., Suhaimi, A. W., & Omar, O. (2017). The measurement of quality of life among population within the crowd: A case study among Malaysian pilgrims in Makkah. *Malaysian Journal of Public Health Medicine*, *17*(1), 137-145.

Stewart, D., Thomas, B., MacLure, K., Wilbur, K., Wilby, K., Pallivalapila, A., Dijkstra, A., Ryan, C., El Kassem, W., & Awaisu, A. (2018). Exploring facilitators and barriers to medication error reporting among healthcare professionals in Qatar using the theoretical domains framework: A mixed-methods approach. *PLoS ONE*, *13*(10), e0204987. https://doi.org/10.1371/journal.pone.0204987

Tabung Haji. (2021). *Hajj management*. https://www.tabunghaji.gov.my/index.php/en/hajj/services/hajj-management

Tabung Haji. (2022, June 22, 2022). Pelaksanaan tahun ketiga Makkah route untuk keselesaan jemaah Malaysia lambang kepercayaan kerajaan Arab Saudi. https://www.tabunghaji.gov.my/en/press-release/wed-06222022-1200/pelaksanaan-tahun-ketiga-makkah-route-untuk-keselesaan-jemaah

Tabung Haji (2026). *Kuota Haji*. https://www.tabunghaji.gov.my/info-haji

Taha, N. A., & See, Y. L. (2016). Provision of travel medicine advice through community pharmacies: Assessment of knowledge, attitudes and practices of pharmacists in Malaysia. *International Journal of Pharmacy Practice*, *24*(5), 326-332. https://doi.org/10.1111/ijpp.12256

Tan, Z. H., Zamli, F. N. A. M., Izal, L. H. M., Joseph, N., Mohamed, N. A., & Nordin, S. A. (2020). Knowledge and attitude towards vaccine preventable diseases and vaccination among prospective Malaysian Hajj pilgrims in Klang Valley, Malaysia. *Malaysian Journal of Medical and Health Sciences*, *16*(SP1), 2-8.

Teodósio, R., Gonçalves, L., Imperatori, E., & Atouguia, J. (2006). Pharmacists and travel advice for tropics in Lisbon (Portugal). *Journal of Travel Medicine*, *13*(5), 281-287. https://doi.org/10.1111/j.1708-8305.2006.00047.x

Tew, M. M., Hatah, E., Arif, F., Wahid, M. A. A., Makmor-Bakry, M., & Maulad, K. N. A. (2021). Geospatial analysis of distribution of community pharmacies and other health care facilities providing minor ailments services in Malaysia. *Journal of Pharmaceutical Policy and Practice*, *14*(1), 21. https://doi.org/10.1186/s40545-021-00308-9

Thidrickson, D., & Goodyer, L. (2019). Pharmacy travel health services in Canada: Experience of early adopters. *Pharmacy*, *7*(2), 42. https://doi.org/10.3390/pharmacy7020042

Tiong, J. J. L., Mai, C. W., Gan, P. W., Johnson, J., & Mak, V. S. L. (2016). Separation of prescribing and dispensing in Malaysia: the history and challenges. *International Journal of Pharmacy Practice*, *24*(4), 302-305. https://doi.org/10.1111/ijpp.12244

Tobaiqy, M., Alhasan, A. H., Shams, M. M., Amer, S. A., MacLure, K., Alcattan, M. F., & Almudarra, S. S. (2021). Assessment of preventative measures practice among Umrah pilgrims in Saudi Arabia, 1440H-2019. *International Journal of Environmental Research and Public Health*, *18*(1), 257. https://doi.org/10.3390/ijerph18010257

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349-357. https://doi.org/10.1093/intqhc/mzm042

Toovey, S. (2006). Malaria chemoprophylaxis advice: Survey of South African

community pharmacists' knowledge and practices. *Journal of Travel Medicine*, *13*, 161-165. https://doi.org/10.1111/j.1708-8305.2006.00035.x

Tran, D., Gatewood, S., Moczygemba, L. R., Stanley, D. D., & Goode, J. V. R. (2015). Evaluating health outcomes following a pharmacist-provided comprehensive pretravel health clinic in a supermarket pharmacy. *Journal of the American Pharmacists Association*, *55*(2), 143-152. https://doi.org/10.1331/JAPhA.2015.14140

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., Lewin, S., Godfrey, C. M., Macdonald, M. T., Langlois, E. V., Soares-Weiser, K., Moriarty, J., Clifford, T., Tuncalp, O., & Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467-473. https://doi.org/10.7326/M18-0850

Ucar Yaman, N., Ay, P., Sancar, M., Büyükkayhan, D., & Okuyan, B. (2025). Psychometric evaluation of a Theoretical Domains Framework based questionnaire on community pharmacists' pharmaceutical care service for breastfeeding women. *International Journal of Clinical Pharmacy, 47*(5), 1232-1238. https://doi.org/10.1007/s11096-025-01902-6

U.S. Embassy Malaysia. (2025). *2023 report on international religious freedom: Malaysia*. Retrieved February 16, 2025 from https://my.usembassy.gov/2023-report-on-international-religious-freedom-malaysia/#:~:text=According%20to%20the%20most%20recent,animists%2C%20Confucianists%2C%20Taoists%2C%20Sikhs

van Smeden, M., de Groot, J. A. H., Moons, K. G. M., Collins, G. S., Altman, D. G., Eijkemans, M. J. C., & Reitsma, J. B. (2016). No rationale for 1 variable per 10 events criterion for binary logistic regression analysis. *BMC Medical Research Methodology, 16*, 163. https://doi.org/10.1186/s12874-016-0267-3

Van Teijlingen, E., & Hundley, V. (2002). The importance of pilot studies. *Nursing Standard*, *16*(40), 33-36. https://doi.org/10.7748/ns2002.06.16.40.33.c3214

Varisco, T. J., Downs, C. G., Rathburn, K. R., Fleming, M. L., & Thornton, J. D. (2020). Applying the capability, opportunity, motivation, and behavior model to identify opportunities to increase pharmacist comfort dispensing naloxone in Texas: A

structural equation modeling approach. *International Journal of Drug Policy*, *83*, 102827. https://doi.org/10.1016/j.drugpo.2020.102827

Vittinghoff, E., & McCulloch, C. E. (2007). Relaxing the rule of ten events per variable in logistic and Cox regression. *American Journal of Epidemiology, 165*(6), 710–718. https://doi.org/10.1093/aje/kwk052

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gotzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Bulletin of the World Health Organization*, *85*(11), 867-872. https://doi.org/10.2471/BLT.07.045120

Willis, G. B. (2004). *Cognitive interviewing: A tool for improving questionnaire design*. Sage Publications.

Wong, E., Mavondo, F., Horvat, L., McKinlay, L., & Fisher, J. (2022). Healthcare professionals' perspective on delivering personalised and holistic care: Using the Theoretical Domains Framework. *BMC Health Services Research*, *22*(1), 281. https://doi.org/10.1186/s12913-022-07630-1

World Health Organization. (2011). *Joint FIP/WHO guidelines on good pharmacy practice: Standards for quality of pharmacy services*. Retrieved May 18, 2023 from https://www.who.int/docs/default-source/medicines/norms-and-standards/guidelines/distribution/trs961-annex8-fipwhoguidelinesgoodpharmacypractice.pdf

World Health Organization. (2012). *International travel and health*. WHO.

World Health Organization. (2021a). *Managing health risks during mass gatherings*. https://www.who.int/activities/managing-health-risks-during-mass-gatherings

World Health Organization. (2021b). *Travel advice.* https://www.who.int/travel-advice

World Health Organization. (2026). *Middle East respiratory syndrome: global summary and assessment of risk*. World Health Organization.

World Tourism Organization. (2024). *International tourism highlights, 2024 edition*. UNWTO. https://doi.org/10.18111/9789284425808

Yazdian Anari, P., Vaghefi, M., Sepehri, M., Sheibani Tehrani, D., & Habibi, M. (2015). Travel medicine: A systematic review. *International Journal of Travel Medicine and Global Health*, *3*(3), 107-109. https://doi.org/10.20286/ijtmgh-0303109

Yezli, S., Assiri, A. M., Alhakeem, R. F., Turkistani, A. M., & Alotaibi, B. (2016a).

Meningococcal disease during the Hajj and Umrah mass gatherings. *International Journal of Infectious Diseases*, *47*, 60-64. https://doi.org/10.1016/j.ijid.2016.04.007

Yezli, S., Bin Saeed, A. A., Assiri, A. M., Alhakeem, R. F., Yunus, M. A., Turkistani, A. M., Booy, R., & Alotaibi, B. M. (2016b). Prevention of meningococcal disease during the Hajj and Umrah mass gatherings: Past and current measures and future prospects. *International Journal of Infectious Diseases*, *47*, 71-78. https://doi.org/10.1016/j.ijid.2015.12.010

Yezli, S., Yassin, Y., Mushi, A., Aburas, A., Alabdullatif, L., Alburayh, M., & Khan, A. (2021a). Gastrointestinal symptoms and knowledge and practice of pilgrims regarding food and water safety during the 2019 Hajj mass gathering. *BMC Public Health*, *21*(1), 1288, Article 1288. https://doi.org/10.1186/s12889-021-11381-9

Yezli, S., Yassin, Y., Mushi, A., Almuzaini, Y., & Khan, A. (2022). Pattern of utilization, disease presentation, and medication prescribing and dispensing at 51 primary healthcare centers during the Hajj mass gathering. *BMC Health Services Research*, *22*(1), 206. https://doi.org/10.1186/s12913-022-07507-3

Yezli, S., Yassin, Y., Mushi, A., Balkhi, B., & Khan, A. (2021b). Insulin knowledge, handling, and storage among diabetic pilgrims during the Hajj mass gathering. *Journal of Diabetes Research*, *2021*, 5596914. https://doi.org/10.1155/2021/5596914

Yezli, S., Yassin, Y., Mushi, A., Balkhi, B., Stergachis, A., & Khan, A. (2021c). Medication handling and storage among pilgrims during the Hajj mass gathering. *Healthcare*, *9*(6), 626. https://doi.org/10.3390/healthcare9060626

Yezli, S., Yassin, Y., Mushi, A., Maashi, F., Aljabri, N., Mohamed, G., Bieh, K., Awam, A., & Alotaibi, B. (2019). Knowledge, attitude and practice (KAP) survey regarding antibiotic use among pilgrims attending the 2015 Hajj mass gathering. *Travel Medicine and Infectious Disease*, *28*, 52-58. https://doi.org/10.1016/j.tmaid.2018.08.004

Yezli, S., Yassin, Y. M., Awam, A. H., Attar, A. A., Al-Jahdali, E. A., & Alotaibi, B. M. (2017). Umrah. An opportunity for mass gatherings health research. *Saudi Med J*, *38*(8), 868-871. https://doi.org/10.15537/smj.2017.8.20124

Yezli, S., Zaraa, S., Yassin, Y., Mushi, A., Stergachis, A., & Khan, A. (2020). Medication utilization pattern among outpatients during the Hajj mass

gathering. *Saudi Pharmaceutical Journal*, *28*(9), 1122-1128. https://doi.org/10.1016/j.jsps.2020.07.014

Yuliasari, P., & Suwanto, P. (2019). Implementation promptness analysis in meningococcal meningitis vaccination in Umrah pilgrims in Surabaya. *Jurnal Berkala Epidemiologi*, *7*(2), 147-154. https://doi.org/10.20473/jbe.v7i22019.147-154

Yusoff, M. S. B. (2019). ABC of response process validation and face validity index calculation. *Education in Medicine Journal*, *11*(3), 55-61. https://doi.org/10.21315/eimj2019.11.3.6

Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A.-R. (2015). Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. *Journal of Caring Sciences*, *4*(2), 165-178. https://doi.org/10.15171/jcs.2015.017

Zhang, Y., & Wildemuth, B. (2009). *Thematic content analysis*. Libraries Unlimited.

Zittis, G., Alberti, T., Almazroui, M., Driouech, F., Faranda, D., Francis, D., Hadjinicolaou, P., Kurnaz, M. L., Lazoglou, G., & Nikulin, G. (2025). Analysis of the 2024 Hajj heat event and future temperature extremes in Mecca. *npj Natural Hazards*, *2*(1), 107. https://doi.org/10.1038/s44304-025-00159-3

APPENDICES

APPENDIX 1

Definition of the Pre-Travel Pharmacist Consultations for Prospective Hajj and Umrah Pilgrims and the Fourteen Domains of the Theoretical Domains Framework (TDF)

Domain (definition)	Definition in the context of this study
D1. Knowledge (An awareness of the existence of something)	CPs' awareness and familiarity with pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D2. Skills (An ability or proficiency acquired through practice)	CPs' skills, practice, and ability to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D3. Social/professional role and identity (A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting)	CPs' perception of his/her role in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D4. Beliefs about capabilities (Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use)	CPs' confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D5. Optimism (The confidence that things will happen for the best or that desired goals will be attained)	CPs' confidence that they will provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D6. Beliefs about Consequences (Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation)	CPs' belief about benefits/disadvantages of providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D7. Reinforcement (Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus)	The extent of recognition and reward the CP will receive for providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D8. Intentions (A conscious decision to perform a behaviour or a resolve to act in a certain way)	CPs' intentions of providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D9. Goals (Mental representation of outcomes or end states that an individual wants to achieve)	The relative importance for a CP to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D10. Memory, attention and decision processes (The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives)	CPs' aptitude to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims as part of their regular practice.

Domain (definition)	Definition in the context of this study
D11. Environmental context and resources (Any circumstances of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour)	CPs' environment/situation that encourages/discourages the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D12. Social influences (Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours)	CPs' surrounding relationships that influences them to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D13. Emotion (A complex reaction pattern involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event)	CPs' emotions surrounding the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
D14. Behavioural regulation (Anything aimed at managing or changing objectively observed or measured actions)	CPs' management/planning in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims

APPENDIX 2

Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Introduction
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Introduction
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	-
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status) and provide a rationale.	Study selection Table 3.2
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Search strategy

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Appendix 3
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Study selection
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Data extraction and analysis
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Appendix 4
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Quality assessment
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Data extraction and analysis
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Search results Figure 4.1
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Study characteristics
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Quality assessment Table 4.1
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Appendix 12

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Table 4.2 Table 4.3
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Discussion
Limitations	20	Discuss the limitations of the scoping review process.	Strengths and Limitations
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Conclusions
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Funding

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

APPENDIX 3

Table of Search Strategy for the Scoping Review, according to Databases Used

Databases	Keywords / Search terms
PubMed	("Travel Medicine" [MeSH] OR "Travel-Related Illness" [MeSH] OR "travel health" [tw] OR "travel medicine" [tw] OR travel [tw] OR pretravel [tw] OR pre-travel [tw]) AND (Pharmacy [MeSH] OR Pharmacies [MeSH] OR Pharmacists [MeSH] OR "Community Pharmacy Services" [MeSH] OR "Primary Health Care" [MeSH] OR pharmacy [tw] OR pharmacies [tw] OR "community pharmacy" [tw] or pharmacist* [tw])
Scopus	TITLE-ABS-KEY ((“travel medicine” OR “travel-related illness” OR “travel health” OR travel OR pretravel OR pre-travel) AND (pharmacy OR pharmacies OR pharmacist* OR “primary health care” OR “community pharmacy" OR “community pharmacist”))
Web of Science	TS= ((“travel medicine” OR “travel-related illness” OR “travel health” OR travel OR pretravel OR pre-travel) AND (pharmacy OR pharmacies OR pharmacist* OR “primary health care” OR “community pharmacy” OR "community pharmacist"))
Science Direct	(“travel medicine” OR “travel-related illness” OR “travel health” OR travel OR pretravel OR pre-travel) AND (pharmacy OR pharmacist OR “primary care”) in the title, abstract, or keywords

APPENDIX 4

Table of the Theoretical Domains Framework Domain, Definition and Constructs (Cane et al., 2012). The researchers prepared the examples to illustrate concepts of the scoping review

Domain	Definition	Constructs	Examples
1. Knowledge	An awareness of the existence of something	Knowledge (including knowledge of condition/scientific rationale) Procedural knowledge Knowledge of task environment	Gaps in knowledge Unaware of certain aspects of care
2. Skills	An ability or proficiency acquired through practice	Skills Skills development Competence Ability Interpersonal skills Practice Skills assessment	Clinical skills Communication skills
3. Social/ professional role and identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	Professional identity Professional role Social identity Identity Professional boundaries Professional confidence Group identity Leadership Organizational commitment	Pharmacists' perceptions of the role Public perceptions of the role of pharmacists
4. Beliefs about capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence	Being confident in one's own ability
5. Optimism	The confidence that things will happen for the best or that desired goals will be attained	Optimism Pessimism Unrealistic optimism Identity	Feeling optimistic/ pessimistic about the outcome of the situation or treatment
6. Belief about consequences	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation	Beliefs Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequents	Beliefs about patients Beliefs about expected outcomes Perceived difficulty Relevancy - importance
7. Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Rewards (proximal/distal, valued/not valued, probable/improbable) Incentives Punishment Consequents Reinforcement Contingencies Sanctions	Remuneration (e.g., pay or insurance) Patient referrals Professional satisfaction

Domain		Definition	Constructs	Examples
8.	Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way	Stability of intentions Stages of change model Transtheoretical model and stages of change	Routinely inquire/do/ask Motivation/interest
9.	Goals	Mental representation of outcomes or end states that an individual wants to achieve	Goals (distal/proximal) Goal priority Goal/target setting Goals (autonomous/controlled) Action planning Implementation intention	Financial goals Personal goals
10.	Memory, attention, and decision processes	The ability to retain information, focus selectively on aspects of the environment, and choose between two or more alternatives	Memory Attention Attention control Decision making Cognitive overload/tiredness	Making assumptions The complexity of decision-making Decision-making skills
11.	Environmental context and resources	Any circumstances of a person's situation or environment that discourage or encourage the development of skills and abilities, independence, social competence, and adaptive behaviour	Environmental stressors Resources/material resources Organisational culture /climate Salient events / critical incidents Person by environment interaction Barriers and facilitators	Accessibility Administrative issues Patient factors Time constraints Workplace policy Workplace procedures Practice modality Patient resources Pharmacist resources
12.	Social influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours	Social pressure Social norms Group conformity Social comparisons Group norms Social support Power Intergroup conflict Alienation Group identity Modelling	Pressure from patients who want an inevitable outcome Pressures from the healthcare team or management Peer support
13.	Emotion	A complex reaction pattern involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event	Fear Anxiety Affect Stress Depression Positive/negative affect Burn-out	Not comfortable having a conversation
14.	Behavioural regulation	Anything aimed at managing or changing objectively observed or measured actions	Self-monitoring Breaking habit Action planning	Having a plan for managing a particular pre-travel consultations Being ready to make a change

APPENDIX 5

Table of the Consolidated Criteria for Reporting Qualitative Studies (COREQ): 32-item Checklist

	Domain	Guide questions/description	Remarks	Section / subsection
Domain 1: Research team and reflexivity				
a)	*Personal characteristics*			
1.	Interviewer / facilitator	Which author/s conducted the interview or focus group?	NAK conducted all 24 interviews.	Methods / data collection
2.	Credentials	What were the researcher's credentials? E.g., PhD, MD	NAK had a Master of Social and Administrative Pharmacy degree and was a PhD candidate at the time of the study.	Author details / Methods / data collection
3.	Occupation	What was their occupation at the time of the study?	NAK is a PhD research student and registered pharmacist working in the Ministry of Health Malaysia on a full-time basis.	Author details / Methods / data collection
4.	Gender	Was the researcher male or female?	Female.	Methods / data collection
5.	Experience and training	What experience or training did the researcher have?	NAK had attended training in qualitative research methodologies and NVivo software training.	Methods / data collection
b)	*Relationship with participants*			
6.	Relationship established	Was a relationship established prior to study commencement?	Pharmacists were contacted via email, face-to-face and messaging platforms before participation to discuss participating in the study. Some participants were known to the researcher through professional pharmacy networks/contacts.	Methods / Sampling of study informants
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.g., personal goals, reasons for doing the research	Participants were aware that the researcher was a PhD student at the Faculty of Pharmacy, UiTM. Participants were aware that the research was ethically approved and funded by UiTM.	Discussion / Limitations of study
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g., Bias, assumptions, reasons and interests in the research topic	To minimize social desirability bias, the interviewer poses as a researcher / PhD student rather than a healthcare provider.	Methods / data collection
Domain 2: study design				
a)	*Theoretical framework*			
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g., grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The qualitative study conducted using semi-structured interviews and analysed using a hybrid content analysis approach. The research questions, interview topic guide and data analysis were guided	Methods / study design

	Domain	Guide questions/description	Remarks	Section / subsection
			by the Theoretical Domains Framework.	
b)	*Participant selection*			
10.	Sampling	How were participants selected? e.g., purposive, convenience, consecutive, snowball	Purposive and snowball sampling strategies were employed to identify pharmacists' demographic variations such as age, gender, years of experience and different types of community pharmacies e.g., independents and chains.	Methods / sampling of study informants
11.	Method of approach	How were participants approached? e.g., face-to-face, telephone, mail, email	Participants were initially contacted via telephone, email, or face-to-face. If they expressed interest at this stage, they were emailed or sent via the messaging platform a letter of invitation, participant information sheet, and consent form.	Methods / sampling of study informants
12.	Sample size	How many participants were in the study?	24 participants took part in the study.	Results / Characteristics of community pharmacists interviewed
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Five participants refused to participate, and one pharmacist cancelled a scheduled interview due to busyness.	Results / Characteristics of community pharmacists interviewed
c)	*Setting*			
14.	Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Data were collected at the participant's place of work e.g., consultation room and meeting room	Methods / data collection
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	No others were present at the time of each interview.	Non-applicable
16.	Description of sample	What are the important characteristics of the sample? E.g., demographic data, date	Information about the participant's demographic and professional background e.g., age, gender, years of experience in community pharmacy, job title and training in travel medicine was collected.	Results / Characteristics of community pharmacists interviewed / Table 4.4
d)	*Data collection*			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	An interview topic guide with prompts guided the interview sessions. The topic guide was piloted before use with five pharmacists who were practising in the community pharmacy setting.	Methods / Study instrument / Appendix 6
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	No repeat interviews were required.	Methods / data collection

Domain	Guide questions/description	Remarks	Section / subsection
19. Audio / visual recording	Did the research use audio or visual recording to collect the data?	All interviews were audio-recorded.	Methods / data collection
20. Field notes	Were field notes made during and/or after the interview or focus group?	The field notes were made by NAK during and/or after the interviews. These field notes aided in the analysis of the transcribed audio files.	Methods / data collection
21. Duration	What was the duration of the interviews or focus group?	Interviews ranged in duration from 25 to 93 minutes (total duration 1146 minutes).	Methods / data collection
22. Data saturation	Was data saturation discussed?	Data saturation was reached after twenty-four informants were interviewed, with no new themes or codes emerged from the last three interviews, indicating theoretical saturation had been achieved.	Results / Characteristics of community pharmacists interviewed
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Transcripts were returned to informants for comment or correction.	Methods / data analysis
Domain 3: analysis and findings			
a) Data analysis			
24. Number of data coders	How many data coders coded the data?	Initially, two researchers (NAK and MSAW) independently coded and analysed six interview transcripts (25.0%, 6/24). Discrepancies in the findings were resolved through further discussion and mutual consensus. The intercoder reliability, assessed using the percentage agreement approach, was 90.0% indicating acceptable reliability. Subsequently, NAK employed the coding manual to analyse the entire data. Additionally, a frequency count was conducted for each practice and belief identified.	Methods / data analysis
25. Description of the coding tree	Did authors provide a description of the coding tree?	Codes represented specific beliefs, barriers and facilitators expressed by informants were assigned to each domain of the TDF.	Appendix 7
26. Derivation of themes	Were themes identified in advance or derived from the data?	The practices of community pharmacists in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims were identified and categorized using inductive qualitative data analysis, while their beliefs regarding pre-travel pharmacist consultations were identified and categorised using	Methods / data analysis

	Domain	Guide questions/description	Remarks	Section / subsection
			deductive qualitative data analysis guided by the Theoretical Domains Framework.	
27.	Software	What software, if applicable, was used to manage the data?	NVivo™ version 12 (QSR International Pty Ltd)	Methods / data analysis
28.	Participant checking	Did participants provide feedback on the findings?	Participants reviewed interview transcripts for accuracy. However, they did not participate in reviewing the interpreted themes or findings.	Methods / data analysis
b)	*Reporting*			
29.	Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g., participant number	Quotations have been presented with identifiers removed. Each participant was given an anonymous code e.g., CP01.	Table 4.5 Table 4.6
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	The study findings were reported clearly and consistently to accurately reflect the collected data.	Results
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Yes.	Results
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes.	Results

APPENDIX 6

Interview Topic Guide

Description of Current Practices:

Have you ever provided pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims? If so, could you share your experiences in providing such consultations?

Prompt: What is your typical approach? How often do you offer this consultation? Is it weekly, monthly, or annually? What specific services, advice, or products do you provide? And what motivates you to offer these consultations?

Knowledge:

Could you please provide information about pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims? What, in your opinion, constitutes such consultations? Why is it important to conduct them? What topics do you believe should be addressed during these consultations? Are you familiar with any recommendations, guidelines, protocols, or sources of information for conducting these consultations?

Skills:

Do you possess knowledge of how to conduct pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims? Do you believe you have the necessary skills to offer such consultations? What specific skills or training do you think are required or beneficial for providing these consultations?

Social/professional role and identity:

Do you believe community pharmacists should conduct pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims? To what extent do you perceive this consultation as part of your role?

Beliefs about capabilities:

How confident are you in your ability to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?

i. If the informant reported high confidence: Can you elaborate on why?
ii. If the informant reported low confidence: Can you elaborate on why? What would help you gain confidence?
iii. If the informant reported that he/she is not currently providing these consultations: I understand that you are not currently offering this service. However, I would like to know your level of confidence in providing the consultation. Can you elaborate on why?

Prompt: How difficult or easy is it for you to conduct these consultations?

Optimism:

In your opinion, what is the future of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?

Prompt: What do you see as the future role of community pharmacists in this area? How confident are you that your pre-travel pharmacist consultations will yield positive outcomes?

Beliefs about consequences:

What do you think will happen if you provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims?

Prompt:

What are the benefits to:

i. You?
ii. Patients/Customers?
iii. Your community pharmacy?

What are the risks of not providing consultations to:

i. You?
ii. Patients/Customers?
iii. Your community pharmacy?

Reinforcement:

In your opinion, what rewards might a pharmacist receive for providing the consultations? What factors could reinforce you to offer these consultations?

Intentions:

Are you willing to provide these consultations regularly at your pharmacy? What motivates you to offer or not offer these consultations?

Goals:

If you provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, do you think other services at your pharmacy will be disrupted? What do you aim to achieve through these consultations?
Memory, attention, and decision processes: How do you decide whether or not to offer pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims? What processes do you typically follow when providing these consultations?
Environmental context and resources: What factors make it easier or support you in providing the consultation? What factors make it difficult or hinder you from providing the consultation? Prompt: Consider aspects such as work environment, resources, facilitators/barriers, competing tasks or time, staffing, space, facilities, access to information, patient factors, etc.
Social influences: In your opinion, who supports or approves of your provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims? Prompt: Do you believe doctors would support you, as a pharmacist, in providing these consultations? What about your peers, travel agents, other healthcare professionals, the public, or patients, and professional bodies? Can you elaborate on the reasons for their support or lack thereof?
Emotion: How does providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims make you feel? Prompt: Happy, grateful, anxious, uncomfortable, etc. Can you elaborate on why you feel this way? Does your emotional state make it easier or more difficult to conduct additional consultations?
Behavioural regulation: In your community pharmacy, is there any vision, protocol, or policy that encourages you to conduct pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims? How do you ensure that the consultations you provide are appropriate for the situation? What kind of support would you need to enhance the quality of your consultations?
Closing: Is there anything else you would like to add regarding the topic?

APPENDIX 7

Code Book

Section/Domain	Code
Practice	
Provision of travel health education	1. Medication management 2. Prevention of travel-related illnesses and self-care 3. Medical supplies 4. Vaccinations
Recommendation of health-related products	5. Supplements and nutritional products 6. Medications 7. Medical supplies 8. Personal care products 9. Travel medical kits
Dispensing of medications	10. Non-prescription medicines 11. Prescription medicines
Assessment of pre-travel health risks	12. Assessment of health and medication history, vaccination status, and travel-related risks
Referral activities	13. Referral to doctors for conditions beyond pharmacists' scope of practice
Basic health tests	14. Blood pressure and blood glucose monitoring
Provision of verified medication lists	15. Medication verification for customs and travel purposes
TDF Domain	
Knowledge	1. Lack of knowledge or awareness of Hajj and Umrah travel guidelines/ recommendations 2. Lack of knowledge of health-related issues relevant to the Hajj and Umrah pilgrimage 3. Having knowledge of health-related issues relevant to the Hajj and Umrah pilgrimage 4. Having knowledge or awareness of Hajj and Umrah travel guidelines/ recommendations 5. Having knowledge of the cultural aspects of the Hajj and Umrah pilgrimage
Skills	6. Communication skills 7. Pharmaceutical care skills 8. Counselling skills
Memory, attention and decisions	9. Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is integrated into the usual practice
Behavioural regulation	10. Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is supported by the vision and mission of the company 11. Customer feedback system
Social/professional role and identity	12. Pharmacist's professional role 13. Pharmacists' social responsibility
Beliefs about capabilities	14. Limited confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims regarding regulations

Section/Domain	Code
	15. Belief that pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is not easy to provide 16. Limited confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims regarding the management of disease 17. Having confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims on medicine-related matters
Optimism	18. Being optimist with pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims
Reinforcement	19. Incentives or rewards
Beliefs about consequences	20. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can ensure pilgrims' well-being 21. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can lead to increased sales 22. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can enhance customers' trust and loyalty 23. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can lead to patients/customers' cost-savings 24. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, reduces pharmacists' reputations 25. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, causes a loss of customers' trust 26. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided does not cause any disadvantages 27. Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, impairs patients' well-being
Intentions	28. Willing to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in the future
Goals	29. Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim to equipping patients with relevant knowledge 30. Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of improving their well-being 31. Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of equipping them with medications or products 32. Pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims is provided with the aim of enhancing customer satisfaction and trust
Emotion	33. Feeling happy 34. Feeling satisfied 35. Stress and tiredness

Section/Domain	Code
Social influences	36. Having support from the public/patients/customers 37. Having support from national professional organisations 38. Having support from other community pharmacists 39. Having support from travel agencies 40. Having support from doctors 41. Having support from other healthcare professionals (e.g., nutritionists, nurses) 42. Lack of support from doctors 43. Having support from the company
Environmental context and resources	44. Shortage staff 45. Lack of time 46. High workload 47. Limited availability of the products 48. Non-Muslim populated areas 49. Customer demand 50. Availability of training and education 51. Availability of pharmacist resources 52. Adequate staff 53. Muslim populated areas

APPENDIX 8

Approval Letter – UiTM Research Ethics Committee for the Qualitative Study

UNIVERSITI TEKNOLOGI MARA

Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : 600-TNCPI(5/1/6)
Our reference : REC/02/2022 (PG/MR/12)
Date : 18 February 2022

Dr Mohd Shahezwan Abd Wahab
(Norazlin binti A. Kadir - 2020297528)
Faculty of Pharmacy
Level 11, FF1 Building
UiTM Puncak Alam Campus
42300 Puncak Alam
SELANGOR

Dear Dr Mohd Shahezwan,

APPROVAL LETTER - UiTM RESEARCH ETHICS COMMITTEE

Thank you for submitting your research proposal to the Research Ethics Committee (REC). After considering your application, the Committee approved your proposal entitled "A Qualitative Exploration of Practices and Beliefs of Community Pharmacists to Provide Pre-Travel Consultation to Prospective Hajj and Umrah Pilgrims" at selected community pharmacies in Selangor and Kuala Lumpur.

Details of the approval are as follows:

Ref. number:	REC/02/2022 (PG/MR/12)
Approval Period:	18 February 2022 until 31 August 2022
Authorised personnel:	1. Dr Mohd Shahezwan Abd Wahab 2. Norazlin binti A. Kadir 3. Professor Noordin bin Othman 4. Dr Azyyati Mohd Suhaimi

The UiTM Research Ethics Committee operates in accordance to the ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

We draw to your attention the requirement that a report on this research, must be submitted every 12 months from the date of the approval or on the completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to the REC for approval.

If you require further information, please contact the REC Secretariat at 03-55448069/03-55442794 or email at recsecretariat@uitm.edu.my.

Yours sincerely,

PROFESSOR EMERITUS DATO' DR RAYMOND AZMAN ALI
Chairman
UiTM Research Ethics Committee

c.c.: Dean, Faculty of Pharmacy, UiTM

Universiti Teknologi MARA
Aras 3, Bangunan Wawasan
40450 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 5544 2004/2255
Faks: (+603) 5544 2070

UiTM di hatiku

UNIVERSITI TEKNOLOGI MARA
Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : 600-TNCPI (5/1/6)
Our reference : REC/02/2022 (PG/MR/12)
Date : 19 September 2022

Dr Mohd Shahezwan bin Abd Wahab
(Norazlin binti A. Kadir – 2020297528)
Faculty of Pharmacy
Level 11, FF1 Building
UiTM Puncak Alam Campus
42300 Puncak Alam
SELANGOR

Dear Dr Mohd Shahezwan,

APPROVAL LETTER - UiTM RESEARCH ETHICS COMMITTEE

Thank you for submitting amendment for approval of your research proposal titled "A Qualitative Exploration of Practices and Belies of Community Pharmacists to Provide Pre-Travel Consultation to Prospective Hajj and Umrah Pilgrims" to the Research Ethics Committee (REC). After reviewing the amendment listed below, the Committee approved your application.

Details of the approval are as follows:

Ref. number:	REC/02/2022 (PG/MR/12)
Approval Period:	18 February 2022 until 28 February 2023
Authorised personnel:	1. Dr Mohd Shahezwan bin Abd Wahab 2. Norazlin binti A. Kadir 3. Professor Dr Noordin bin Othman 4. Dr Azyyati binti Mohd Suhaimi
Details of amendment:	Application for Extension of Research Duration

The UiTM Research Ethics Committee operates in accordance to the ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to the REC for approval.

If you require further information, please contact the REC Secretariat at 03-55448069/03-55442794 or email at recsecretariat@uitm.edu.my.

Yours sincerely,

EMERITUS PROFESSOR DATO' DR RAYMOND AZMAN ALI
Chairman
UiTM Research Ethics Committee

c.c.: Dean, Faculty of Pharmacy, UiTM

Universiti Teknologi MARA
Aras 3, Bangunan Wawasan
40450 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 5544 2004/2255
Faks: (+603) 5544 2070

APPENDIX 9

Table of STROBE Statement – Checklist of Items that should be Included in Reports of Cross-Sectional Studies

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2-3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4-5
Bias	9	Describe any efforts to address potential sources of bias	5
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	5
		(b) Describe any methods used to examine subgroups and interactions	5
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study – e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A

	Item No	Recommendation	Page No
Descriptive data	14*	(a) Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	7-13
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done – e.g., analyses of subgroups and interactions, and sensitivity analyses	12
Discussion			
Key results	18	Summarise key results with reference to study objectives	13-16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	16
Generalisability	21	Discuss the generalizability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at https://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

APPENDIX 10

Questionnaire

UNIVERSITI TEKNOLOGI MARA | Fakulti Farmasi

SERIAL NUMBER:

QUESTIONNAIRE
PRACTICES AND BELIEFS IN PRE-TRAVEL PHARMACIST CONSULTATION FOR PROSPECTIVE HAJJ AND UMRAH PILGRIMS BY COMMUNITY PHARMACISTS: A SURVEY IN SELANGOR AND KUALA LUMPUR, MALAYSIA

Dear community pharmacists,

You are invited to participate in this study which aims to investigate current practices and beliefs, including barriers and facilitators in pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims among community pharmacists. Your insights may support the development of future strategies and initiatives to improve the implementation of pre-travel pharmacist consultation in Malaysia.

This survey input is anonymous, will be treated with utmost confidentiality, and will take approximately 15-20 minutes of your time.

Background information:

Travel health problems and pharmaceutical care issues are common among Hajj and Umrah pilgrims, posing serious health risks to the pilgrims and worldwide communities. These issues should be addressed to protect the pilgrims' health, improve safety, minimise healthcare costs and other negative impacts. Community pharmacists are easily accessible and are conveniently consulted by travellers. Community pharmacists can provide pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims before departure. Providing pre-travel pharmacist consultation is in line with the Good Pharmacy Practice guidelines and travel health recommendations from the World Health Organization and the nations' health authorities. Therefore, investigating the current practices and factors influencing pre-travel pharmacist consultation is important to establish effective interventions and provide quality travel health care.

This survey will collect feedback about community pharmacists' current practices and beliefs, including barriers and facilitators in pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims and other related comments to enhance the provisions of the service. This study has been approved by the Research Ethics Committee of Universiti Teknologi MARA, Malaysia (REC/02/2024(PG/MR/85).

We greatly appreciate your time and opinion.

Thank you and with best regards,

Norazlin A. Kadir (2020297528),
PhD Candidate,
Faculty of Pharmacy, Universiti Teknologi MARA
2020297528@siswa.uitm.edu.my/norazlin6133@gmail.com

Supervised by,
Dr Mohd Shahezwan Abd Wahab,
Faculty of Pharmacy, Universiti Teknologi MARA

Definitions
Prospective Hajj and Umrah pilgrims:
Customers who consult community pharmacists for travel-related health needs before their departure to Saudi Arabia to perform Hajj/Umrah.

Pre-travel pharmacist consultation:
Pharmacist care activities conducted by community pharmacists when consulting prospective travellers in their community pharmacies such as assessing medication-related issues, providing tailored education, dispensing medications and others.

Participant Information Sheet

Research Title
Practices and Beliefs in Pre-Travel Pharmacist Consultation for Prospective Hajj and Umrah Pilgrims by Community Pharmacists: A Survey in Selangor and Kuala Lumpur, Malaysia

Introduction of Research
Travel health issues are common among Hajj and Umrah pilgrims, posing serious health risks to the pilgrims and worldwide communities. Additionally, pharmaceutical care issues are a rising concern. These issues should be addressed to protect pilgrims' health, improve safety, minimise healthcare costs and other negative impacts. Community pharmacists (CPs) are easily accessible and are conveniently consulted by travellers. CPs can provide pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims before departure. Providing pre-travel pharmacist consultation aligns with the Good Pharmacy Practice guidelines and travel health recommendations from the World Health Organization and the nations' health authorities. Therefore, investigating the current practices and factors influencing pre-travel pharmacist consultation is important to establish effective interventions and provide quality travel health care.

Purpose of Research
This survey will examine your current practices and beliefs related to the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. Your answers are crucial to identify factors to be targeted for future strategies to enhance the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in Malaysia.

Research Procedure
You are invited to participate in this study. It is important that you answer all the

questions asked in the questionnaire form honestly and completely which takes about 15 to 20 minutes of your time. The questionnaire consists of three sections: A) Demographics; B) Practices; and C) Beliefs in pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

Participation in Research
Your participation in this research is entirely voluntary. You may refuse to take part in the study, or you may withdraw yourself from participation in the research at any time without penalty.

Benefit of Research
Participating in this study will provide valuable insights into CPs' engagement in the provision of pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims. The findings of the study can serve as a foundation for developing future strategies to improve the practices of CPs to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims.

Research Risk
There is no risk involved by participating in this study. However, you may be asked questions about your practices in your premises. You may refuse to answer any questions you do not wish to answer.

Confidentiality
Your information will be kept confidential by the investigators and will not be made public unless disclosure is required by law. By signing this consent form**, you will authorize the review of records, analysis and use of the data arising from this research. If you have any questions about this research or your rights, please contact **Norazlin binti A. Kadir** at **019-3786133.**

By participating in this survey, I agree that:
1. I am 18 years old and above
2. I authorize the review of records, analysis and use of the data arising from this research
3. I understand the nature and scope of the research being undertaken
4. I have read and understood all the terms and conditions of my participation in the research
5. I voluntarily agree to participate in this research and follow the study procedures
6. I may at any time choose to withdraw from this research without giving any reason

1. Do you agree to participate in this survey?

    [ ] Yes *Proceed to question 2*

    [ ] No *End survey*

SCREENING QUESTIONS

2. Do you have less than one year of community pharmacy experience?

    [ ] No *Proceed to survey*

    [ ] Yes *End survey*

3. Do your current responsibilities comprise solely managerial duties and without service to customers?

[ ] No *Proceed to survey*

[ ] Yes *End survey*

SECTION A: DEMOGRAPHICS

No.	Item	
4.	Gender	[ ] Male [ ] Female
5.	Age	____ years
6.	Ethnicity	[ ] Malay [ ] Chinese [ ] Indian [ ] Others, please specify ….....
7.	Religion	[ ] Islam *Proceed to question 8* [ ] Buddhism *Proceed to question 9* [ ] Christianity *Proceed to question 9* [ ] Hinduism *Proceed to question 9* [ ] Others, please specify ……..... *Proceed to question 9*
8.	Have you performed Hajj/Umrah in Mecca, Saudi Arabia? (Select all that apply)	[ ] Yes, I have performed Hajj in Saudi Arabia [ ] Yes, I have performed Umrah in Saudi Arabia [ ] No
9.	Highest pharmacy qualification	[ ] BPharm / PharmD [ ] Master [ ] PhD [ ] Others, please specify_____
10.	How many years have you graduated from your first pharmacy degree?	____ years
11.	How many years have you been practicing as a community pharmacist?	____ years
12.	What is your current type of community pharmacy work setting?	[ ] Independent pharmacy [ ] Chain pharmacy [ ] Others, please specify_____

No.	Item		
13.	Are you the owner of the community pharmacy?	[ ] [ ] [ ]	Yes, I am the pharmacy owner Yes, I am the pharmacy part-owner No
14.	What is your current type of employment status?	[ ] [ ]	Full-time (work hours ≥ 40 hours/week) Part-time (work hours < 40 hours/week)
15.	What is the postcode of your current place of employment?		(free text)
16.	Have you attended any training on travel medicine/travel health?	[ ]	Yes (Select all that apply) [ ] Training organized by product suppliers [ ] Training organized by the Malaysian Pharmacists Society (MPS) [ ] Training organized by my company [ ] Training during my university education [ ] Others, please specify……. [ ] No

SECTION B: PRACTICES

For the following questions, please answer based on your experience in providing pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims in the past ONE (1) year

No.	Item		
17.	I have provided travel health education to prospective Hajj/Umrah pilgrims	[ ] [ ]	Yes *Proceed to question 18* No
18.	I have provided the following travel health education	[ ]	Medication management (e.g. medication storage, medication use, and regulations with regard to travelling with medicines)

No.	Item		
	topics to prospective Hajj/Umrah pilgrims (Select all that apply)	[ ]	Prevention of travel-related illnesses and self-care practices (e.g. destination-specific risk of illnesses, health and well-being/self-care, personal care, and post-travel on return)
		[ ]	Medical supplies (e.g. medical devices, and walking aids)
		[ ]	Vaccinations (e.g. mandatory meningococcal vaccine)
		[ ]	Others, please specify…….
19.	I have recommended health-related products to prospective Hajj/Umrah pilgrims	[ ]	Yes *Proceed to question 20*
		[ ]	No
20.	I have recommended the following health-related products to prospective Hajj/Umrah pilgrims (Select all that apply)	[ ]	Supplements and nutritional products (e.g. vitamins)
		[ ]	Medications (e.g. oral contraceptive pills and minor ailment medications)
		[ ]	Medical supplies (e.g. medical devices and walking aids)
		[ ]	Personal care products (e.g. skincare products)
		[ ]	Travel medical kit
		[ ]	Others, please specify…….
21.	I have dispensed medications to prospective Hajj/Umrah pilgrims to be used throughout their journey	[ ]	Yes *Proceed to question 22*
		[ ]	No
22.	I have dispensed the following medications to prospective Hajj/Umrah pilgrims (Select all that apply)	[ ]	Minor ailments medications (e.g. analgesics, antihistamines and antidiarrhoeals)
		[ ]	Oral contraceptive pills (indicated for menstrual management)
		[ ]	Chronic disease medications (e.g. antihypertensives, antidiabetics and antihyperlipidemics)
		[ ]	Others, please specify..……
23.	I have assessed medication-related issues (e.g. medication	[ ]	Yes
		[ ]	No

No.	Item	
	adherence, safety and appropriateness) to prospective Hajj/Umrah pilgrims	
24.	I have offered basic health tests (e.g. blood pressure, glucose and cholesterol tests) to prospective Hajj/Umrah pilgrims upon request	[ ] Yes [ ] No
25.	I have referred prospective Hajj/Umrah pilgrims to other medical professionals (e.g. doctors, nutritionists and dietitians) for health-related needs	[ ] Yes [ ] No
26.	I have prepared a medication list for prospective Hajj/Umrah pilgrims to be used as their official reference during their travel	[ ] Yes [ ] No

SECTION C: BELIEFS IN PRE-TRAVEL PHARMACIST CONSULTATION FOR PROSPECTIVE HAJJ AND UMRAH PILGRIMS

To what extent do you agree with the following statements? Please answer the following questions on a scale of 1=Strongly disagree to 5=Strongly agree

No.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
27.	I am aware of the travel health requirements/ recommendations in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
28.	I am aware of the health-related problems/ issues related to Hajj/Umrah	1	2	3	4	5
29.	I am aware of the medication-related problems/issues related to Hajj/Umrah	1	2	3	4	5
30.	I have pharmaceutical care skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
31.	I have communication skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
32.	I have counselling skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
33.	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims is something that I do without being asked to	1	2	3	4	5
34.	Providing pre-travel pharmacist consultation to prospective Hajj/Umrah pilgrims is usual practice I do in my pharmacy	1	2	3	4	5
35.	I believe that a pharmacist has a professional role in providing pre-travel	1	2	3	4	5

No.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	pharmacist consultation for prospective Hajj/Umrah pilgrims					
36.	I believe it is my social responsibility to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims upon request	1	2	3	4	5
37.	I have a satisfactory level of self-confidence in my ability to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
38.	It is easy for me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
39.	I believe that there will be a continuous demand for pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
40.	I am optimistic that pharmacists' roles in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims will expand in the future	1	2	3	4	5
	The following questions are applicable to questions 41-44 I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims…,					
41.	I can help to ensure that the well-being of prospective Hajj/Umrah pilgrims is taken care of during their travel	1	2	3	4	5
42.	I can help prospective Hajj/Umrah pilgrims save their medication costs during their travel	1	2	3	4	5

No.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
43.	I can improve trust in community pharmacists	1	2	3	4	5
44.	I can enhance the reputation of community pharmacy	1	2	3	4	5
45.	I intend to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims in the coming Hajj/Umrah seasons	1	2	3	4	5
46.	I aim to provide prospective Hajj/Umrah pilgrims with pre-travel pharmacist consultation whenever possible	1	2	3	4	5
47.	I provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims because I would be rewarded e.g. recognition, incentives	1	2	3	4	5
48.	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me happy	1	2	3	4	5
49.	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel satisfied	1	2	3	4	5
50.	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel stressed	1	2	3	4	5
51.	Customers would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
52.	Doctors would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
53.	Other community pharmacists would support my role in providing pre-travel pharmacist	1	2	3	4	5

No.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	consultation for prospective Hajj/Umrah pilgrims					
54.	Other healthcare professionals e.g. nutritionists, dietitians and nurses would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
55.	National professional bodies e.g. Malaysian Pharmacists Society (MPS) would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
56.	My company would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
57.	Travel agencies would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
58.	I have sufficient staff supporting me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
59.	I have a manageable workload that allows me to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
60.	I have enough time to provide comprehensive services, including Hajj/Umrah pre-travel pharmacist consultation	1	2	3	4	5
61.	I receive many requests for consultation from prospective Hajj/Umrah pilgrims in the past one year	1	2	3	4	5

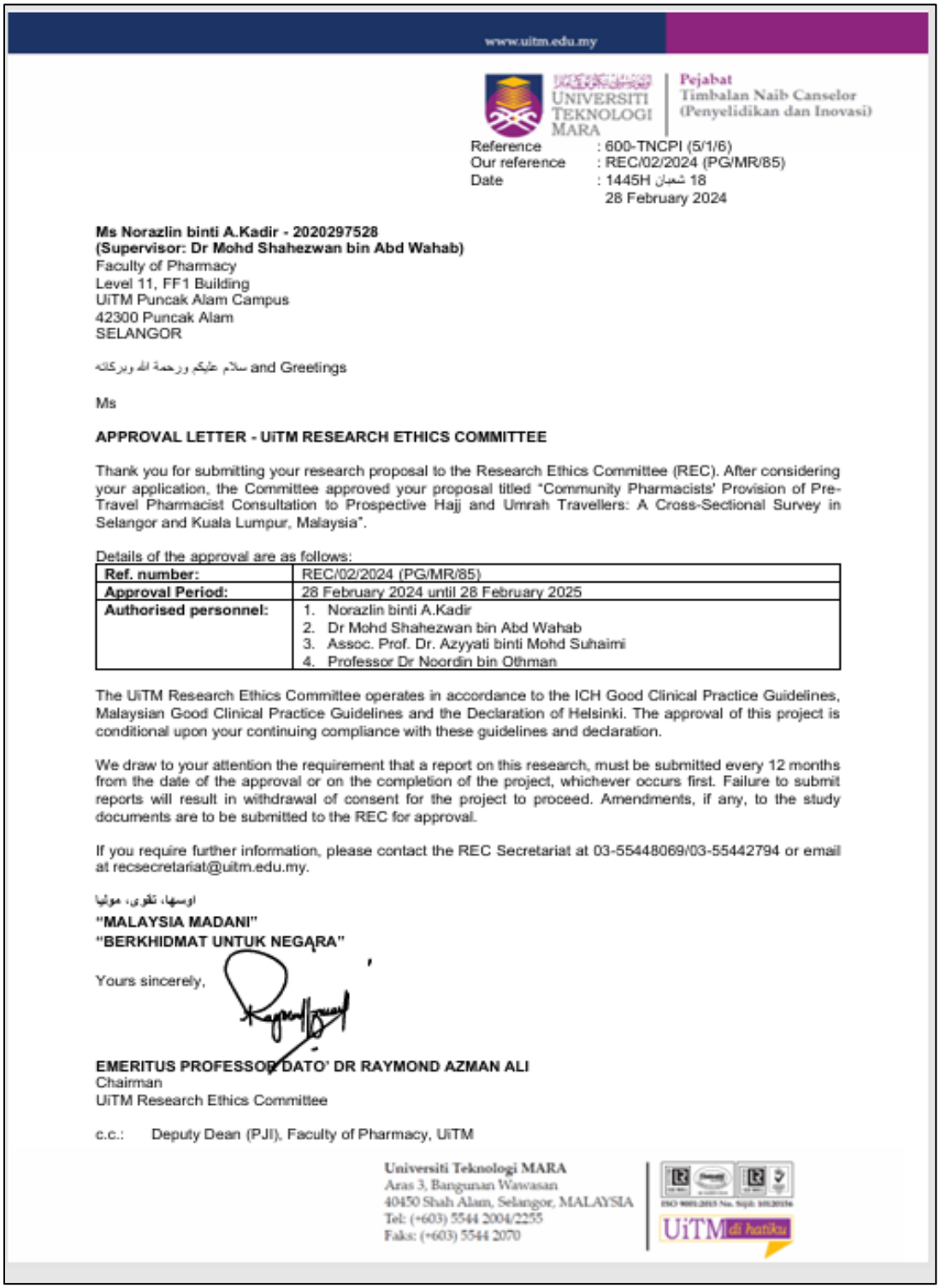
No.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
62.	I receive adequate training and education in travel health	1	2	3	4	5
63.	My premise serves predominantly Muslim customers	1	2	3	4	5
64.	My pharmacy has sufficient pharmacy-related information resources to support travel consultations	1	2	3	4	5
65.	There is a wide range of products that are suitable for Hajj/Umrah pilgrims at the pharmacy	1	2	3	4	5
66.	My pharmacy premise has adequate space to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	1	2	3	4	5
67.	We would appreciate any additional comments you may have on improving the provision of pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims. (free text)					

~End of the survey~

Thank you for your participation in this study. We sincerely appreciate your time and opinion towards our effort to strengthen the implementation of pre-travel pharmacist consultation among community pharmacists. If you need further information, kindly contact Ms Norazlin (norazlin6133@gmail.com/ 019-3786133).

APPENDIX 11

Approval Letter – UiTM Research Ethics Committee for the Quantitative Study



www.uitm.edu.my

UNIVERSITI TEKNOLOGI MARA

Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : 600-TNCPI (5/1/6)
Our reference : REC/02/2024 (PG/MR/85)
Date : 1445H شعبان 18
28 February 2024

Ms Norazlin binti A.Kadir - 2020297528
(Supervisor: Dr Mohd Shahezwan bin Abd Wahab)
Faculty of Pharmacy
Level 11, FF1 Building
UiTM Puncak Alam Campus
42300 Puncak Alam
SELANGOR

سلام عليكم ورحمة الله وبركاته and Greetings

Ms

APPROVAL LETTER - UiTM RESEARCH ETHICS COMMITTEE

Thank you for submitting your research proposal to the Research Ethics Committee (REC). After considering your application, the Committee approved your proposal titled "Community Pharmacists' Provision of Pre-Travel Pharmacist Consultation to Prospective Hajj and Umrah Travellers: A Cross-Sectional Survey in Selangor and Kuala Lumpur, Malaysia".

Details of the approval are as follows:

Ref. number:	REC/02/2024 (PG/MR/85)
Approval Period:	28 February 2024 until 28 February 2025
Authorised personnel:	1. Norazlin binti A.Kadir 2. Dr Mohd Shahezwan bin Abd Wahab 3. Assoc. Prof. Dr. Azyyati binti Mohd Suhaimi 4. Professor Dr Noordin bin Othman

The UiTM Research Ethics Committee operates in accordance to the ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

We draw to your attention the requirement that a report on this research, must be submitted every 12 months from the date of the approval or on the completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to the REC for approval.

If you require further information, please contact the REC Secretariat at 03-55448069/03-55442794 or email at recsecretariat@uitm.edu.my.

اوسهها، تقوى، موليا
"MALAYSIA MADANI"
"BERKHIDMAT UNTUK NEGARA"

Yours sincerely,

EMERITUS PROFESSOR DATO' DR RAYMOND AZMAN ALI
Chairman
UiTM Research Ethics Committee

c.c.: Deputy Dean (PJI), Faculty of Pharmacy, UiTM

Universiti Teknologi MARA
Aras 3, Bangunan Wawasan
40450 Shah Alam, Selangor, MALAYSIA
Tel: (+603) 5544 2004/2255
Faks: (+603) 5544 2070

UiTM di hatiku

APPENDIX 12

Table of Descriptive Summary of the Results that Align with the Scoping Review Objectives

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
Kodkani (1999) (Kodkani et al., 1999)	Switzerland	To assess frequency, general and specific knowledge, sources of information about travel advice, and cooperation between pharmacists and medical doctors	Quantitative, cross-sectional study; telephone interview (T) followed by questionnaire-survey (Q)	S: Random sampling SP: CPs in urban and rural areas SS: n = 120 (T); n = 101 (Q) RR: 88.0% (120/136) (T); 83.0% (101/120) (Q)	Pre-travel health advice Referring to information resources Provision of educational information resources Collaborating or cooperating with doctors and other healthcare professionals	*Barrier:* Lack of knowledge of travel health issues *Facilitators:* Knowledge of travel health issues Positive perceptions of the pharmacists' role in providing travel advice Educational resources for pharmacists	55
Teodósio (2006) (Teodósio et al., 2006)	Portugal (Lisbon)	To determine pharmacists' training, experience, and interest in travel medicine and to assess the technical quality of the information given on malaria, diarrhoea, and yellow fever	Quantitative, cross-sectional study, postal questionnaire-survey	S: Universal sampling SP: Pharmacists in Lisbon area SS: n = 251 RR: 40.0% (251/628)	Pre-travel health advice Referring to information resources	*Barrier:* Lack of knowledge of travel health issues *Facilitators:* Being informed or updated with current travel medicine knowledge Being recent graduates	60
Toovey (2006)	South Africa	To assess CPs'	Quantitative,	SP: CPs in	Pre-travel health	*Barrier:*	48

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
(Toovey, 2006)		knowledge and practices regarding provision of malaria chemoprophylaxis advice	cross-sectional study, covert survey	metropolitan areas of Johannesburg and Pretoria, South Africa SS: n = 68	advice Referring to information resources Pre-travel health risk assessment Collaborating or cooperation with doctors and other healthcare professionals	Lack of knowledge of malaria risk, antimalarial recommendations, effectiveness, and contraindications *Facilitator:* Knowledge of the risk of malaria and the requirement for malaria chemoprophylaxis	
Bascom (2015) (Bascom et al., 2015)	Canada (Alberta)	To evaluate pharmacists' knowledge of travel health and assess their confidence in providing travel-related advice to patients.	Quantitative study, cross-sectional study, web-based questionnaire-survey	S: Universal sampling SP: Full-time pharmacists in same community pharmacy chain in Alberta, Canada that generally located in urban centres SS: n = 53 RR: 63.0% (53/84)	Pre-travel health advice	*Barriers:* Lack of knowledge of travel health issues and clinical topics Lack of confidence (if unaided with travel health information) *Facilitators:* Knowledge of travel health issues and clinical topics Having confidence in the ability to search for sources of travel health information	68
Taha (2016) (Taha & See, 2016)	Malaysia (Kuala Lumpur)	To assess CPs' travel medicine knowledge, attitudes, and practices	Quantitative, cross-sectional study, questionnaire-survey)	S: Convenience sampling SP: CPs in Kuala Lumpur, Malaysia SS: n = 111 RR: 78.0% (111/143)	Pre-travel medicine advice Referring to information resources Pre-travel health risk assessment	*Facilitator:* Availability of patient information	70

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
Heslop (2018) (Heslop et al., 2018)	Australia	To examine the current and potential future practices and perceived barriers, including training needs for the provision of travel health services among pharmacists in Australia	Quantitative, cross-sectional study, electronic and postal survey	S: Universal sampling (e-survey), Systematic random sampling (postal survey) SP: Pharmacists in Australia RR: 78.4% (121/255)	Pre-travel health advice Referring to information resources Pre-travel health risk assessment Provision of educational information resources	*Development of pharmacy travel health service* *Potential barriers:* Lack of time Inadequate staff Inadequate training to provide travel health services *Potential facilitators:* Adequate time Adequate staff Interest in providing travel health services Belief that travels health services could be profitable Belief that pre-travel health advice can be offered without the authority to administer travel vaccines and prescription-only-medications Belief that there is no opposition from the medical community Belief that travellers would support pharmacist-provided travel health services Belief that pharmacists have roles in pre-travel health.	75
Houle (2019) (Houle et al., 2019)	Canada (Ontario)	To examine pharmacists' perceptions of their ability to provide travel health services, given the	Mixed-methods, quantitative study – online survey, followed by qualitative study	SP: Licensed CPs in Ontario, Canada *Quantitative (survey):* SS: n = 205	Pre-travel health advice Providing vaccinations Pre-travel health risk assessment	*Actual or potential barriers:* Lack of time Lack of training in travel medicine Lack of patient awareness of pharmacists' scope Lack of remuneration	75

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
		legislative change of pharmacist immunization scope expansion	– semi-structured interview	RR: 92.3% *Qualitative (semi-structured interview):* SS: n = 6	Collaborating or cooperating with doctors and other healthcare professionals Prescribing oral medications or vaccines Organising travel clinic days or event	Lack of patients' willingness to pay Lack of supporting staff Lack of demand from patients Uncertainty about ways to integrate the service into the existing workflow Lack of access to resources or materials Existence of similar services Lack of private space Desire to avoid interprofessional conflict Patient hesitation in having pharmacists providing vaccination Lack of prescribing authorization Risk of anaphylaxis or adverse reactions from vaccines Lack of training in injection administration Liability associated with vaccination Discomfort with administering injections Pharmacy owner unwilling to offer service Lack of clinical knowledge about travel health Lack of confidence Undesirable acceptance from other healthcare professionals who identified this expanded scope as overlapping or competing with their services	

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
						Lack of doctor awareness of pharmacists' scope of practice *Actual or potential facilitators:* Additional training in travel medicine Prescribing authorization Patient demand Revenue generation for pharmacies Patient awareness of pharmacists' scope Collaboration with other health professionals or travel clinics Staffing – more support staff, designated pharmacist to perform travel services, full use of pharmacy technicians' scope of practice Confidence Feeling comfortable in identifying when a patient may need a referral to another healthcare professional Publicity activities to promote the service The existing relationship between pharmacists and patients Perceived benefits to patients, e.g., convenience	
Thidrickson (2019) (Thidrickson & Goodyer, 2019)	Canada	To explore the first adopters' (pharmacists') personal experiences of delivering a complete travel	Qualitative study, free text questionnaire survey	S: Purposive sampling SP: Pharmacists who were early adopters delivering travel	Pre-travel health education Providing vaccinations Pre-travel health risk assessment	*Barriers (challenges in developing/introducing the pharmacy-based travel health service):* Lack of prescribing authorization Lack of time	68

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
		health service, which involved risk assessment, vaccine administration, education to reduce travel risks, and post-travel follow-up		health services in Canada SS: n = 21		Belief that the integration of the services takes time High expectations for immediate response from patients Competition with other pharmacies and clinics Lack of support from other doctors Lack of resources, such as staffing Non-availability of items in stock, such as vaccines Patients' unwillingness to pay Lack of access to appropriate resources, such as provincial vaccination records for patients Access to routine/public health vaccines Difficulty in maintaining competence *Facilitators:* Perceived benefits to patients (convenience and clinical benefits) Knowledge of clinical topics Patient satisfaction Referrals from other patients and doctors Good cooperation or collaboration with local doctors and other health centres Marketing and promotion of services resources	
Della Polla (2020) (Della	Italy	To investigate the knowledge, attitudes,	Quantitative, cross-sectional	S: Random sampling	Pre-travel health advice	*Facilitators:* Knowledge of travel-related	78

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
Polla et al., 2020)		and practices towards travel-related infectious diseases among CPs in Italy.	study, telephone survey	SP: CPs in Italy SS: n = 390 RR: 70.9% (390/550)	Referring to information resources	infectious diseases Belief that travels medicine is part of a CP's professional responsibilityy Belief that travels medicine should be a competency for pharmacists Belief that CPs could provide travel medicine advice to the public Being informed or current about travel medicine	
Heslop (2020) (Heslop et al., 2020)	Australia	To examine the current level of knowledge about travel health among Australian pharmacists to inform training requirements	Quantitative, cross-sectional study, electronic and postal survey	S: Universal sampling (e-survey), Systematic random sampling (postal survey) SP: Pharmacists in Australia SS: n = 208 RR: postal survey 14.3% (86/601)	Pre-travel health advice	None	78
Kc (2020)(Kc et al., 2020)	Malaysia (Selangor)	To explore the nature and type of travel health-related activities and services provided by Malaysian community pharmacies	Quantitative, cross-sectional study, questionnaire survey	S: Stratified random sampling SP: CPs with type A licensed retail/wholesale pharmacies in Selangor, Malaysia SS: n = 101 RR: 90.2% (101/112)	Pre-travel health advice	*Barrier:* Lack of training on the global epidemiology of travel-related illness and health *Facilitators:* Perception that CPs were well positioned to provide travel health information and recommendations Training on travel health-related practice and services in community pharmacies	75

First author (Year) [Reference]	Country of origin	Objectives	Study design, data collection methods	Sampling (S), Study population (SP), Sample Size (SS), Response Rate (RR)	Pre-travel health practice	Barriers and facilitators	CCAT score (%)
Kc (2022) (Kc et al., 2022)	Malaysia, United States, United Kingdom, Canada, Germany, Undisclosed	To explore the type of professional services, medicines, pharmacists' experiences and views regarding practices at airport pharmacies	Qualitative descriptive study, questionnaire interview	S: Purposive sampling SP: Registered pharmacists who were working in airport pharmacies in different countries SS: n = 15	Pre-travel health advice Providing vaccinations Dispensing preventive medications Packaging and labelling regular medications for travellers Supplying travel-related health products	*Barriers (Challenges):* Language barriers Customer requests for various brands of medications that are only available in their native countries Financial issues	85

APPENDIX 13

Table demonstrating practice and belief statement occurrence and data saturation in analysed interviews

PRACTICE/ DOMAIN	THEME / SUBTHEME	PARTICIPANT																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
PROVISION OF TRAVEL HEALTH EDUCATION	Medication management	x	x	x	x	x		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
	Prevention of travel-related illnesses and self-care	x	x	x	x	x	x	x	x		x	x	x					x	x	x		x	x	x	x
	Medical supplies		x	x	x														x			x	x		
	Vaccinations			x																					
RECOMMENDATION OF HEALTH-RELATED PRODUCTS	Supplements and nutritional products	x	x	x	x	x	x	x	x		x					x	x			x		x	x		
	Medications	x	x	x	x			x		x	x	x			x			x	x	x		x			
	Medical supplies		x	x	x			x	x	x						x				x	x				
	Personal care products		x	x	x		x	x		x							x	x	x						
	Travel medical kits	x	x	x	x	x									x	x	x					x			
DISPENSING OF MEDICATIONS	Non-prescription medicines	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x		x	x	x		
	Prescription medicines	x	x	x	x	x	x				x	x			x						x	x	x		
ASSESSMENT OF PRE-TRAVEL HEALTH RISKS	Assessment of health and medication history, vaccination status, and travel-related risks	x	x		x	x	x										x	x	x		x	x			
REFERRAL ACTIVITIES	Referral to doctors for conditions beyond pharmacists' scope of practice		x	x			x	x	x	x	x	x									x				
BASIC HEALTH TESTS	Blood pressure and blood glucose monitoring		x									x								x					
PROVISION OF VERIFIED MEDICATION LISTS	Medication verification for customs and travel purposes	x							x																

PRACTICE/ DOMAIN	THEME / SUBTHEME	PARTICIPANT																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
KNOWLEDGE	Lack of knowledge or awareness of Hajj and Umrah travel guidelines/ recommendations			x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
	Lack of knowledge of health-related issues relevant to the Hajj and Umrah pilgrimage						x					x	x	x							x	x	x		x
	Having knowledge of health-related issues relevant to the Hajj and Umrah pilgrimage	x	x	x	x	x	x	x	x	x	x					x	x	x	x	x	x				
	Having knowledge or awareness of Hajj and Umrah travel guidelines/ recommendations		x	x												x	x			x	x				
	Having knowledge of the cultural aspects of the Hajj and Umrah pilgrimage		x			x														x					
SKILLS	Communication skills			x					x	x	x	x	x					x				x			
	Pharmaceutical care skills				x		x	x									x		x	x					
	Counselling skills	x												x									x		
MEMORY, ATTENTION AND DECISIONS	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is integrated into the usual practice	x	x	x	x	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
BEHAVIOURAL REGULATION	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is supported by the vision and mission of the company	x			x	x	x	x	x									x		x	x		x		
	Customer feedback system																	x							
SOCIAL/PROFESSIONAL ROLE AND IDENTITY	Pharmacist's professional role	x	x	x	x	x	x		x	x	x	x	x		x	x	x	x	x	x	x				
	Pharmacists' social responsibility		x											x						x			x		x

PRACTICE/ DOMAIN	THEME / SUBTHEME	PARTICIPANT																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BELIEFS ABOUT CAPABILITIES	Limited confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims regarding regulations				x	x	x	x	x				x	x	x	x		x	x	x					
	Belief that pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is not easy to provide						x	x	x				x	x									x		
	Limited confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims regarding the management of disease	x						x						x					x						
	Having confidence in providing pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims on medicine-related matters	x	x	x	x			x		x	x	x					x	x			x	x			
OPTIMISM	Being optimist with pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims	x	x	x	x	x	x	x	x	x					x			x			x	x	x	x	x
REINFORCEMENT	Incentives or rewards																						x		
BELIEFS ABOUT CONSEQUENCES	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can ensure pilgrims' well-being	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x		x	x	x	x			x
	Belief that pre-travel pharmacist consultations for prospective	x	x	x		x	x		x	x	x	x	x	x	x			x	x	x			x	x		

PRACTICE/ DOMAIN	THEME / SUBTHEME	PARTICIPANT																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Hajj and Umrah pilgrims can lead to increased sales																								
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can enhance customers' trust and loyalty		x					x			x				x	x								
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims can lead to patients/customers' cost-savings														x								x		
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, reduces pharmacists' reputations				x	x	x		x					x			x	x	x			x	x		
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, causes a loss of customers' trust	x		x	x	x				x	x	x				x		x							
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided does not cause any disadvantages							x						x			x			x					
	Belief that pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims, if not provided, impairs patients' well-being			x							x														

PRACTICE/ DOMAIN	THEME / SUBTHEME	PARTICIPANT																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
INTENTIONS	Willing to provide pre-travel pharmacist consultations for prospective Hajj and Umrah pilgrims in the future	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
GOALS	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim to equipping patients with relevant knowledge		x	x	x	x	x	x			x	x	x	x			x	x	x		x	x	x		
	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of improving their well-being	x	x	x					x	x					x				x						
	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of equipping them with medications or products				x	x	x			x											x				x
	Pre-travel pharmacist consultation for prospective Hajj and Umrah pilgrims is provided with the aim of enhancing customer satisfaction and trust															x		x					x		
EMOTION	Feeling happy	x	x	x	x	x	x	x	x			x	x				x	x	x	x	x		x		x
	Feeling satisfied	x	x	x			x	x	x	x	x				x		x		x	x	x	x	x	x	x
	Stress and tiredness		x	x															x						
SOCIAL INFLUENCES	Having support from the public/patients/customers	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
	Having support from national professional organisations	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x

PRACTICE/ DOMAIN	THEME / SUBTHEME	PARTICIPANT																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Having support from other community pharmacists	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	x		
	Having support from travel agencies		x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	
	Having support from doctors	x		x	x	x	x	x	x	x			x			x			x	x	x	x	x	x	x
	Having support from other healthcare professionals (e.g., nutritionists, nurses)	x	x		x	x			x		x	x			x	x	x	x	x	x		x	x	x	
	Lack of support from doctors		x								x	x		x			x	x							
	Having support from the company		x	x		x									x						x				
ENVIRONMENTAL CONTEXT AND RESOURCES	Shortage staff				x	x	x	x				x	x	x			x	x		x					
	Lack of time			x		x			x	x	x				x	x		x	x						
	High workload			x		x	x	x	x							x	x	x	x						
	Limited availability of the products			x					x	x		x	x	x					x	x	x				
	Non-Muslim populated areas						x	x						x											x
	Customer demand	x	x	x		x	x	x	x	x	x	x	x		x	x	x		x	x	x	x	x	x	x
	Availability of training and education		x	x	x	x	x	x	x	x	x				x	x		x	x	x	x	x	x	x	
	Availability of pharmacist resources	x	x	x	x	x	x	x				x	x				x	x	x						x
	Adequate staff	x	x	x				x	x	x	x				x	x			x		x				
	Muslim populated areas	x	x	x					x	x	x	x											x		

APPENDIX 14

Final questionnaire

Item No.	Questionnaire Item	TDF Domain/ Section	Source of Item Generation
1	I have provided travel health education to prospective Hajj/Umrah pilgrims	Practices	Scoping review and Qualitative study
2	I have recommended health-related products to prospective Hajj/Umrah pilgrims	Practices	Qualitative study
3	I have dispensed medications to prospective Hajj/Umrah pilgrims to be used throughout their journey	Practices	Scoping review and Qualitative study
4	I have assessed medication-related issues (e.g. medication adherence, safety and appropriateness) to prospective Hajj/Umrah pilgrims	Practices	Scoping review and Qualitative study
5	I have offered basic health tests (e.g. blood pressure, glucose and cholesterol tests) to prospective Hajj/Umrah pilgrims upon request	Practices	Qualitative study
6	I have referred prospective Hajj/Umrah pilgrims to other medical professionals (e.g. doctors, nutritionists and dietitians) for health-related needs	Practices	Scoping review and Qualitative study
7	I have prepared a medication list for prospective Hajj/Umrah pilgrims to be used as their official reference during their travel	Practices	Qualitative study
8	I am aware of the travel health requirements/recommendations in providing pre-travel pharmacist consultations for prospective Hajj/Umrah pilgrims	Knowledge	Scoping review and Qualitative study

Item No.	Questionnaire Item	TDF Domain/ Section	Source of Item Generation
9	I am aware of the health-related problems/issues related to Hajj/Umrah	Knowledge	Scoping review and Qualitative study
10	I am aware of the medication-related problems/issues related to Hajj/Umrah	Knowledge	Scoping review and Qualitative study
11	I have pharmaceutical care skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Skills	Scoping review and Qualitative study
12	I have communication skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Skills	Qualitative study
13	I have counselling skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Skills	Qualitative study
14	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims is something that I do without being asked to	Memory, Attention and Decision Processes	Qualitative study
15	Providing pre-travel pharmacist consultation to prospective Hajj/Umrah pilgrims is a usual practice I do in my pharmacy	Behavioural Regulation	Qualitative study
16	I believe that a pharmacist has a professional role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social/Professional Role and Identity	Scoping review and Qualitative study
17	I believe it is my social responsibility to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims upon request	Social/Professional Role and Identity	Qualitative study
18	I have a satisfactory level of self-confidence in my ability to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Beliefs about Capabilities	Scoping review and Qualitative study
19	It is easy for me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Beliefs about Capabilities	Qualitative study

Item No.	Questionnaire Item	TDF Domain/ Section	Source of Item Generation
20	I believe that there will be a continuous demand for pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Optimism	Qualitative study
21	I am optimistic that pharmacists' roles in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims will expand in the future	Optimism	Qualitative study
22	I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims, I can help to ensure that the well-being of prospective Hajj/Umrah pilgrims is taken care of during their travel	Beliefs about Consequences	Scoping review and Qualitative study
23	I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims, I can help prospective Hajj/Umrah pilgrims save their medication costs during their travel	Beliefs about Consequences	Qualitative study
24	I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims, I can improve trust in community pharmacists	Beliefs about Consequences	Qualitative study
25	I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims, I can enhance the reputation of community pharmacy	Beliefs about Consequences	Qualitative study
26	I intend to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims in the coming Hajj/Umrah seasons	Intentions	Qualitative study
27	I aim to provide prospective Hajj/Umrah pilgrims with pre-travel pharmacist consultation whenever possible	Goals	Qualitative study

Item No.	Questionnaire Item	TDF Domain/ Section	Source of Item Generation
28	I provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims because I would be rewarded e.g. recognition, incentives	Reinforcement	Scoping review and Qualitative study
29	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me happy	Emotion	Qualitative study
30	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel satisfied	Emotion	Qualitative study
31	Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel stressed	Emotion	Qualitative study
32	Customers would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Qualitative study
33	Doctors would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Scoping review and Qualitative study
34	Other community pharmacists would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Qualitative study
35	Other healthcare professionals e.g. nutritionists, dietitians and nurses would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Scoping review and Qualitative study
36	National professional bodies e.g. Malaysian Pharmacists Society (MPS) would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Qualitative study
37	My company would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Qualitative study

Item No.	Questionnaire Item	TDF Domain/ Section	Source of Item Generation
38	Travel agencies would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Social Influences	Qualitative study
39	I have sufficient staff supporting me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Environmental Context and Resources	Scoping review and Qualitative study
40	I have a manageable workload that allows me to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Environmental Context and Resources	Scoping review and Qualitative study
41	I have enough time to provide comprehensive services, including Hajj/Umrah pre-travel pharmacist consultation	Environmental Context and Resources	Scoping review and Qualitative study
42	I receive many requests for consultations from prospective Hajj/Umrah pilgrims in the past one year	Environmental Context and Resources	Qualitative study
43	I receive adequate training and education in travel health	Environmental Context and Resources	Scoping review and Qualitative study
44	My premise serves predominantly Muslim customers	Environmental Context and Resources	Qualitative study
45	My pharmacy has sufficient pharmacy-related information resources to support travel consultations	Environmental Context and Resources	Scoping review and Qualitative study
46	There is a wide range of products that are suitable for Hajj/Umrah pilgrims at the pharmacy	Environmental Context and Resources	Qualitative study
47	My pharmacy premise has adequate space to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	Environmental Context and Resources	Scoping review and Qualitative study

Note: Questionnaire items were developed deductively based on findings from the scoping review and qualitative study, guided by the Theoretical Domains Framework (TDF).

APPENDIX 15

Table of Differences between Respondents' Sociodemographic and Professional Characteristics and Their Beliefs in TDF Domains by Data Collection Methods

Respondent characteristics	Online survey n (%) n = 125	Face-to-face survey n (%) n = 198	p-value
Age group (years)			0.654
29 or below	38 (35.5)	69 (64.5)	
30-39	71 (39.7)	108 (60.3)	
40 and above	16 (43.2)	21 (56.8)	
Gender			0.773
Male	36 (37.5)	60 (62.5)	
Female	89 (39.2)	138 (60.8)	
Ethnicity			0.196
Malays	59 (42.8)	79 (57.2)	
Non-Malays	66 (35.7)	119 (64.3)	
Religious affiliation			0.230
Islam	59 (42.4)	80 (57.6)	
Others	66 (35.9)	118 (64.1)	
Highest academic qualification			0.439
Undergraduate (BPharm / PharmD)	115 (39.4)	117 (60.6)	
Postgraduate	10 (32.3)	21 (67.7)	
Hajj/Umrah travel experience			0.292
Yes	24 (48.0)	26 (52.0)	
No	35 (39.3)	54 (60.7)	
Not applicable	66 (35.9)	118 (64.1)	
Duration since graduation (years)			0.084
Less than 5	21 (28.0)	54 (72.0)	
5-9	70 (40.9)	101 (59.1)	
10 and above	34 (44.2)	43 (55.8)	
Duration in community pharmacy practice (years)			0.214
Less than 5	60 (34.5)	114 (65.5)	
5-9	44 (42.3)	60 (57.7)	
10 and above	21 (46.7)	24 (53.3)	
Type of community pharmacy			0.552
Independent	47 (40.9)	68 (59.1)	
Chain	78 (37.5)	130 (62.5)	
Current position			0.345
Owner	16 (32.7)	33 (67.3)	
Employee	109 (39.8)	165 (60.2)	
Type of employment status			0.902
Full-time	117 (38.6)	186 (61.4)	
Part-time	8 (40.0)	12 (60.0)	
Training in travel medicine			<0.001*
Yes	58 (54.7)	48 (45.3)	
No	67 (30.9)	150 (69.1)	

Pearson's chi-square test was applied
**Significant at p < 0.05*

APPENDIX 16

Table of Community Pharmacists' Beliefs Pre-Travel Pharmacist Consultations for Prospective Hajj/Umrah Pilgrims

Item/Statement	Frequency (%) (n=323)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
D1 - Knowledge					
I am aware of the travel health requirements/recommendations in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	7 (2.2)	22 (6.8)	90 (27.9)	156 (48.3)	48 (14.9)
I am aware of the health-related problems/issues related to Hajj/Umrah	8 (2.5)	8 (2.5)	81 (25.1)	178 (55.1)	48 (14.9)
I am aware of the medication-related problems/issues related to Hajj/Umrah	7 (2.2)	14 (4.3)	79 (24.5)	185 (57.3)	38 (11.8)
D2 - Skills					
I have pharmaceutical care skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	4 (1.2)	19 (5.9)	97 (30.0)	175 (54.2)	28 (8.7)
I have communication skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (0.9)	7 (2.2)	88 (27.2)	184 (57.0)	41 (12.7)
I have counselling skills to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (0.9)	17 (5.3)	90 (27.9)	177 (54.8)	36 (11.1)
D3 - Memory, attention and decision processes					
Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims is something that I do without being asked to	4 (1.2)	27 (8.4)	111 (34.4)	145 (44.9)	36 (11.1)
D4 - Behavioural regulation					
Providing pre-travel pharmacist consultation to prospective Hajj/Umrah pilgrims is a usual practice I do in my pharmacy	9 (2.8)	53 (16.4)	109 (33.7)	119 (36.8)	33 (10.2)
D5 - Social/ professional role and identity					
I believe that a pharmacist has a professional role in	2 (0.6)	1 (0.3)	34 (10.5)	183 (56.7)	103 (31.9)

Item/Statement	Frequency (%) (n=323)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims					
I believe it is my social responsibility to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims upon request	3 (0.9)	2 (0.6)	48 (14.9)	189 (58.5)	81 (25.1)
D6 - Beliefs about capabilities					
I have a satisfactory level of self-confidence in my ability to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	5 (1.5)	8 (2.5)	108 (33.4)	177 (54.8)	25 (7.7)
It is easy for me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	5 (1.5)	18 (5.6)	116 (35.9)	158 (48.9)	26 (8.0)
D7 - Optimism					
I believe that there will be a continuous demand for pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (0.9)	2 (0.6)	51 (15.8)	192 (59.4)	75 (23.2)
I am optimistic that pharmacists' roles in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims will expand in the future	3 (0.9)	1 (0.3)	54 (16.7)	179 (55.4)	86 (26.6)
D8 - Beliefs about consequences					
I believe that by providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims,					
I can help to ensure that the well-being of prospective Hajj/Umrah pilgrims is taken care of during their travel	3 (0.9)	2 (0.6)	34 (10.5)	190 (58.8)	94 (29.1)
I can help prospective Hajj/Umrah pilgrims to save their medication costs during their travel	3 (0.9)	3 (0.9)	36 (11.1)	195 (60.4)	86 (26.6)
I can improve the trust to community pharmacists	3 (0.9)	0 (0)	25 (7.7)	181 (56.0)	114 (35.3)
I can enhance the reputation of community pharmacy	3 (0.9)	1 (0.3)	28 (8.7)	175 (54.2)	116 (35.9)
D9 - Intentions					

Item/Statement	Frequency (%) (n=323)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I intend to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims in the coming Hajj/Umrah seasons	3 (0.9)	3 (0.9)	92 (28.5)	158 (48.9)	67 (20.7)
D10 - Goals					
I aim to provide prospective Hajj/Umrah pilgrims with pre-travel pharmacist consultation whenever possible	2 (0.6)	1 (0.3)	79 (24.5)	179 (55.4)	62 (19.2)
D11 - Reinforcement					
I provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims because I would be rewarded e.g. recognition, incentives	46 (14.2)	88 (27.2)	134 (41.5)	46 (14.2)	9 (2.8)
D12 - Emotions					
Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me happy	3 (0.9)	4 (1.2)	121 (37.5)	145 (44.9)	50 (15.5)
Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel satisfied	3 (0.9)	1 (0.3)	92 (28.5)	170 (52.6)	57 (17.6)
Providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims makes me feel stressed	88 (27.2)	137 (42.4)	75 (23.2)	19 (5.9)	4 (1.2)
D13 – Social influences					
Customers would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	2 (0.6)	0 (0)	69 (21.4)	193 (59.8)	59 (18.3)
Doctors would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (0.9)	9 (2.8)	126 (39.0)	157 (48.6)	28 (8.7)
Other community pharmacists would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	2 (0.6)	5 (1.5)	82 (25.4)	194 (60.1)	40 (12.4)
Other health care professionals (e.g. nutritionists, dietitians and nurses) would support	2 (0.6)	6 (1.9)	102 (31.6)	178 (55.1)	35 (10.8)

Item/Statement	Frequency (%) (n=323)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims					
National professional bodies such as Malaysian Pharmacists Society (MPS) would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	2 (0.6)	3 (0.9)	78 (24.1)	185 (57.3)	55 (17.0)
My company would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	2 (0.6)	2 (0.6)	65 (20.1)	179 (55.4)	75 (23.2)
Travel agencies would support my role in providing pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (0.9)	7 (2.2)	129 (39.9)	142 (44.0)	42 (13.0)
D14 - Environmental context and resources					
I have sufficient staffs supporting me to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	7 (2.2)	23 (7.1)	121 (37.5)	144 (44.6)	28 (8.7)
I have a manageable workload that allows me to offer pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	3 (0.9)	36 (11.1)	124 (38.4)	135 (41.8)	25 (7.7)
I have enough time to provide comprehensive services, including Hajj/Umrah pre-travel pharmacist consultation	3 (0.9)	41 (12.7)	128 (39.6)	122 (37.8)	29 (9.0)
I receive many requests for consultation from prospective Hajj/Umrah pilgrims in the past one year	24 (7.4)	86 (26.6)	125 (38.7)	77 (23.8)	11 (3.4)
I receive adequate training and education in travel health	11 (3.4)	87 (26.9)	141 (43.7)	74 (22.9)	10 (3.1)
My premise serves predominantly Muslim customers	9 (2.8)	47 (14.6)	108 (33.4)	101 (31.3)	58 (18.0)
My pharmacy has sufficient pharmacy-related information resources to support travel consultation	3 (0.9)	27 (8.4)	111 (34.4)	157 (48.6)	25 (7.7)
There is a wide range of	2 (0.6)	7 (2.2)	46 (14.2)	216 (66.9)	52 (16.1)

Item/Statement	Frequency (%) (n=323)				
	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
products that are suitable for Hajj/Umrah pilgrims at the pharmacy					
My pharmacy premise has adequate space to provide pre-travel pharmacist consultation for prospective Hajj/Umrah pilgrims	2 (0.6)	14 (4.3)	99 (30.7)	175 (54.2)	33 (10.2)

AUTHOR'S PROFILE



Norazlin binti A Kadir obtained Bachelor of Pharmacy (Hons.) in 1999 from University Malaya, Kuala Lumpur, Master Social and Administrative Pharmacy (2010) from Universiti Sains Malaysia, Penang and Doctor of Philosophy (2026) from the Universiti Teknologi MARA, Selangor. Her PhD thesis involves several methods in Pharmacy Practice including Scoping Review, Qualitative, Survey Instrument Development and Quantitative Methodology. Currently, she is working on theory-based insights of service provision utilising the Theoretical Domains Framework regarding pre-travel health services for prospective Hajj and Umrah pilgrims in the community pharmacy setting.

LIST OF PUBLICATIONS

Abdul Kadir, N., Wahab, M. S. A., Mohd Suhaimi, A., & Othman, N. (2023). Practices, Barriers and Facilitators to The Delivery of Pretravel Health Services by Community Pharmacists: A Scoping Review Using The Theoretical Domains Framework Res Social Adm Pharm;19(11):1412-1423. https://doi.org/10.1016/j.sapharm.2023.08.004

Abdul Kadir, N., Wahab, M. S. A., Mohd Suhaimi, A., & Othman, N. A Scoping Review of Practices, Barriers and Facilitators in Providing Pre-Travel Health Services by Community Pharmacists. 28th Federation of Asian Pharmaceutical Associations (FAPA) Congress and National Pharmacists Convention 2022. Kuala Lumpur, Malaysia (oral presentation)

Norazlin Abdul Kadir, Mohd Shahezwan Abd Wahab, Azyyati Mohd Suhaimi, Noordin Othman. Exploring the Practices and Factors Influencing Pre Travel Consultations for Prospective Hajj and Umrah Pilgrims by Community Pharmacists: A Qualitative Study in Malaysia (2024) Abstracts from the 1st Journal of Pharmaceutical Policy and Practice (JoPPP)-Borneo International Pharmaceutical Conference, Sarawak, Malaysia 20 22 September 2024, Journal of Pharmaceutical Policy and Practice, 17:sup2, 2403936, DOI: 10.1080/20523211.2024.2403936

Norazlin A.Kadir, Mohd Shahezwan Abd Wahab, Kamaliah Mohd Saman, Azyyati Mohd Suhaimi, Noordin Othman. NOR-CP Questionnaire: An Innovation Towards Community Pharmacists' Engagement in Pre-Travel Consultations for Prospective Hajj and Umrah Pilgrims. Pharmacy Invention Innovation & Technology Exhibition 2024 (PHIITEX 2024) Faculty of Pharmacy, UiTM

Kadir NA, Wahab MSA, Suhaimi AM, Othman N. A qualitative exploration of community pharmacists' practices and beliefs of pretravel pharmacist consultations for prospective Hajj and Umrah pilgrims. Pharmacy Practice 2025 Apr-Jun;23(2):3188. https://doi.org/10.18549/PharmPract.2025.2.3188

Norazlin Abdul Kadir, Azyyati Mohd Suhaimi, Noordin Othman, Mohd Shahezwan Abd Wahab. Development and Validation of a Theoretical Domains Framework-Based Survey Instrument to Investigate Malaysian Community Pharmacists' Practices and Beliefs in Pre-Travel Consultations for Prospective Hajj and Umrah Pilgrims (2025). Abstracts from the 4th Journal of Pharmaceutical Policy and Practice 2025 Conference, Thailand 12-14 November 2025, Journal of Pharmaceutical Policy and Practice (Poster presentation)

Norazlin Abdul Kadir, Azyyati Mohd Suhaimi, Noordin Othman, Mohd Shahezwan Abd Wahab. Community Pharmacists' Involvement in Pre-Travel Consultations for Prospective Hajj and Umrah Pilgrims in Central Malaysia: A Cross-Sectional Study Using the Theoretical Domains Framework. 6th International Pharmaceutical Research Conference. 19-21 September 2025. University of Cyberjaya (Poster presentation)

Kadir NA, Suhaimi AM, Othman N, Wahab MSA. Assessment of Malaysian Community Pharmacists' Involvement in Pre-Travel Consultations for

Prospective Hajj and Umrah Pilgrims: A Cross-Sectional Study Using the Theoretical Domains Framework in Selangor and Kuala Lumpur, Malaysia. Journal of Pharmacy Practice and Research (Under Review)

Norazlin Abdul Kadir, Azyyati Mohd Suhaimi, Noordin Othman, Mohd Shahezwan Abd Wahab. Factors Influencing Community Pharmacists' Provision of Travel Health Education for Prospective Hajj and Umrah Pilgrims in Central Malaysia. 2nd IMU University Travel Medicine Seminar 2026. 20-21 June 2026. IMU University (Poster presentation)