

UNIVERSITI TEKNOLOGI MARA

**ADAPTATION AND VALIDATION
OF ASTHMA ACTION PLAN
USABILITY QUESTIONNAIRE
(AAPU-Q) AMONG ADULTS WITH
ASTHMA**

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ABSTRACT

Introduction: Asthma action plan has been outlined in respiratory guidelines as a self- management tool to assist patient in the event of worsening of asthma symptoms. The format and methods of delivery for asthma action plan changes over time but the usability assessment of this tool is still not well known. Evaluating the usability of an asthma action plan is crucial to guarantee its efficacy for asthma patient during acute event. This study aims to adapt, validate and assess the reliability of Asthma Action Plan Usability Questionnaire (AAPU-Q) in assessing the usability of an asthma diary among adult patients with asthma.

Methods: The study was conducted in three phases. The first phase was divided into adaptation and content validation stages. During the adaptation stage, items from the Malay version of the mHealth App Usability Questionnaire (M-MAUQ) were adapted into the AAPU-Q and reallocated into four new domains. The adapted questionnaires then underwent two rounds of domain validation by three experts and two rounds of item content validation by seven experts. The second phase involved face validation with ten asthma patients who attended the primary care and respiratory clinic, followed by construct validation and test-retest reliability assessment. For this, 115 asthma patients from the primary care and respiratory clinic were recruited to complete the AAPU-Q questionnaire, and 62 of these patients were asked to fill out the same questionnaire again after two weeks. The psychometric properties were determined using exploratory factor analysis (EFA) with promax rotation. Reliability testing was conducted using Cronbach's Alpha and the intraclass correlation coefficient (ICC).

Results: A total of 18 items were adapted from M-MAUQ into ADU-Q. In adaptation stage, 11 items were reworded, 5 items were rephrased, and two items were deleted. For domain reallocation, three items were reallocated to the Learnability domain, four items to the Efficiency domain, eight items to the Satisfaction domain, and one item to the Error domain. In content validation, the domains were reduced from four to three and the item content validity index (I-CVI) was 1.0. All items had face validity index (I-FV1) of 1.0. The exploratory factor analysis (EFA) produced 3 factor solution. All items had factor loading of >0.5 . One item cross load on Factor 1 and 3 but was retained due to high communality value and insignificant effect on Cronbach Alpha if deleted. The cross-load item was allocated under Factor 3 due to higher factor loading value leading to a total of 3 items for Factor 3. A total of 7 items loaded to Factor 1, 6 items onto Factor 2, and 3 items onto Factor 3. The corrected item-total correlation (CITC) value ranged between 0.791 to 0.917 and Cronbach's Alpha value was 0.982, indicating good internal consistency. The intraclass correlation coefficient (ICC) value was 0.989, indicating good test-retest reliability.

Conclusion: AAPU-Q is a valid, reliable highly reproducible over time to assess the usability of an asthma action plan among adults with asthma.

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TABLE OF CONTENT

Table of Contents

CONFIRMATION BY PANEL OF EXAMINERS 2

AUTHOR’S DECLARATION..... 3

ABSTRACT..... 4

ACKNOWLEDGEMENT 5

CHAPTER 1 13

INTRODUCTION 13

CHAPTER 2 15

2.1 STUDY DESIGN AND POPULATION..... 15

2.2 THE STUDY TOOL 17

2.3 PHASE 1: ADAPTATION AND CONTENT VALIDATION..... 17

2.3.1 Adaptation..... 17

2.3.2 Content validation..... 18

2.4 PHASE 2: FACE VALIDATION 20

2.4.1 Study tool: Asthma action plan..... 20

2.4.2 Face validation process 21

2.5 PHASE 3: FIELD TESTING AND PSYCHOMETRIC EVALUATION 23

2.5.1 Sample size determination 23

2.5.2 Sampling method, patient recruitment and data collection 23

2.5.3 Data Collection for Test and Retest 24

2.6 STATISTICAL ANALYSIS 24

2.6.1 Step 1 EFA : Assessment of data suitability 25

CHAPTER 1

INTRODUCTION

Asthma is one of the common obstructive respiratory diseases affecting people worldwide with the prevalence of 262 million in 2024 (1). In South East Asia, Malaysia has lower asthma prevalence, 1.0 to 7.6%, compared to its neighboring countries, 7.7 to 12.1% (2). Nevertheless, more than 60% of asthma patient in a local study were shown to have uncontrolled asthma (3). Poorly controlled asthma will lead to more frequent hospital visits (4) and poor quality of life (5).

Asthma action plan (AAP) is one of the self-management tools highlighted in asthma guidelines since 1990's to improve asthma management care. Asthma action plan was developed aiming to guide patient to assess their asthma severity and adjust their treatment when their symptoms deteriorated (6). Despite having good objective, studies have shown mixed outcome regarding the effectiveness of using AAPs in asthma management (7, 8). Recent local study found that more than 60% asthma patient had never used the AAP (3). Some of the issues identified related to the mixed outcome were variability in format and content of AAP (9), patient poor ability to understand the AAP and the plan was not user friendly (10). Therefore, it is crucial to assess the usability of the AAP among adult asthma patients.

Usability, as per International Organization for Standardization (ISO), is defined as "the extent to which a product can be used to achieve specific goals with the effectiveness, efficiency, and satisfaction in a specified context of use" (11). This definition was further broadened up by Jakob Nielsen, one of the main figures in usability world who later developed Nielsen Usability Model which comprised of learnability, efficiency, errors, satisfaction and