

UNIVERSITI TEKNOLOGI MARA

**VALIDATION OF MALAY-CHRONONUTRITION
QUESTIONNAIRE (M-CNQ) AMONG ADULTS IN MALAYSIA.**

FATIN NASUHA BINTI MOHD LOTFI

Bachelor (Hons.) of Dietetics

Faculty of Health Sciences

July 2025

ACKNOWLEDGEMENT

Firstly, I would like to express my gratitude to Allah SWT who gave me the strength, patience and perseverance to accomplish this thesis and enabled me to make a step forward on the crucial milestone of my academic path. I cannot imagine this study without the help, advice, and input of several people to whom I owe many thanks to.

On behalf of myself, I would like to express my heartfelt gratitude and utmost appreciation to my supervisor, Professor Madya Dr. Nur Islami binti Mohd Fahmi Teng. Without her caring guidance, constant encouragement, and valuable feedback, this research would never have come to fruition. Her advice and counsel have played a crucial role in determining the direction and quality of this thesis. I appreciate her patience, inspiration, and commitment to my educational process.

I also like to express my heart-felt gratitude to all of the people who participated in this study and kindly spent their time and experience. They were essential to the success of this research.

Special thanks to my coursemates, research peers, and friends who have provided support, shared knowledge, and offered encouragement during challenging times. Your kindness and camaraderie have made this journey more meaningful.

Lastly, my most profound appreciation goes to my beloved family, partner, and friends for their unconditional love, moral support, and understanding. Their constant encouragement has been my anchor and inspiration throughout this journey. This work is dedicated to all those who stood by me and believed in my potential. Thank you.

ABSTRACT

Chrononutrition relates food consumption to circadian cycles, which affect metabolism and health. Locally, there are not enough culturally and linguistically suitable methods to capture these behaviors. Malaysian adults' chrononutrition practices were examined using the self-administered Malay-Chrononutrition Questionnaire (M-CNQ). This multi-phase validation procedure included stage 1 forward & backward translation, stage 2 expert review & content validity, stage 3 face validity, and last stage are reliability testing. Ten experts assessed content validity, whereas 10 adults assessed face validity for clarity and relevance. A sample of Malaysian adults completed the questionnaire twice over a set time for reliability testing. CVI (Content Validity Index), FVI (Face Validity Index), Cronbach's alpha, ICC, and Bland–Altman plots were used in psychometric tests. An overall I-CVI of 0.97 and S-CVI/Ave of 0.98 indicated substantial expert agreement that the M-CNQ has excellent content and face validity. The item-level face validity index (FVI) ranged from 0.90 to 1.00, which was also outstanding. Instrument reliability testing demonstrated moderate to good internal consistency and test–retest reliability. Cronbach's alpha ranged from 0.20 to 0.67, and ICC scores across variables were 0.19 to 0.67, greater for meal time and frequency. Good behavioural category agreement between test and retest showed the tool's temporal stability. In conclusion, the Malay-Chrononutrition Questionnaire is reliable for studying time-based eating in Malaysian adults. It offers excellent potential for circadian health-based eating behavior therapies, public health surveillance, and academic study.

Keywords: Chrononutrition, Questionnaire Validation, Meal Timing, Eating Behaviour, Circadian Rhythm, Malay-Chrononutrition Questionnaire (M-CNQ), Malaysia

LIST OF CONTENTS

AUTHOR’S DECLARATION.....	i
ACKNOWLEDGEMENT.....	ii
LIST OF CONTENTS.....	iii
LIST OF FIGURES.....	vii
LIST OF TABLES.....	viii
LIST OF ABBREVIATIONS AND GLOSSARY.....	ix
ABSTRACT.....	x
CHAPTER 1: INTRODUCTION.....	1
1.1 Research Background.....	1
1.2 Problem Statement.....	2
1.3 Research Justification.....	3
1.4 Research Questions.....	3
1.5 Objective.....	4
CHAPTER 2: LITERATURE REVIEW.....	5
2.1 Introduction to Chrononutrition.....	5
2.1.2 Chrononutrition and its significance in health.....	5
2.1.2 The relationship between biological rhythms and nutritional habits.	7
2.1.3 Overview of existing research on chrononutrition globally and its relevance to Malaysian populations.	7
2.1.4 Chrononutrition Behaviours Among Malaysian Adults	8

CHAPTER 1: INTRODUCTION

1.1 Research Background

Chrononutrition examines the interactions between meal timing, frequency, regularity, and circadian rhythms, and why it is relevant to health research regarding metabolism. The absence of a consistent eating pattern, such as late-night snacking and missed or short-timed meals, is ritualistically related to the adverse cardiometabolic effects on the organism, including obesity, type 2 diabetes, and metabolic syndrome (Raji et al., 2024). The prevalence of metabolic syndrome has also increased to 35.9% in adults aged 18 to 60, according to a recent survey conducted in Malaysia, according to the Ministry of Health report for 2023 (Wan et al., 2025). The results imply an urgent need to develop adequate tools to measure behaviours related to chrononutrition, especially in non-Western regions with high differences in culture- and diet-related behaviours (Mentzelou et al., 2024).

The Malaysian population determines different eating habits, predetermined by various religious, cultural, and social standards. Whereas people are more likely to recognize the essentiality of chrononutrition in health, current assessment tools have mainly been developed using Western frameworks. Such devices can underestimate culturally distinctive behaviours such as the timing of meals during Ramadan and standard cultural dietary habits that Malaysian people embrace. Roughly 50 % of people who support pro-therapy have the problem of unpassable segmentation (Hairudin et al., 2023).

The Chrononutrition Questionnaire (CNQ) is a long-established scale to assess chrononutrition behaviours, which depends on aspects like timing, pattern, and periodical alignment of meals with daily circadian rhythms. The CNQ was created in Australia and is needed to link dietary behaviours and biological rhythms. It has been confirmed in various individuals, such as shift workers and non-shifters. The questionnaire focuses on the core areas such as the frequency of meals, the time of the first and last meals, and eating pattern variability, thus offering a complete tool in