DEVELOPMENT AND FEASIBILITY OF NUTRITION SCREENING GUIDELINE USING MINI NUTRITIONAL ASSESSMENT SHORT-FORM (MNA®-SF) IN ELDERLY ATTENDING HEALTH CLINICS FOR THE USE OF HEALTHCARE STAFF IN CLINIC SETTINGS

BY

SITI NUR AMIRAH BINTI SHEIKH HISHAMUDDIN

A thesis submitted in fulfilment of the requirement for the degree of (Master of Health Sciences)

Kulliyyah of Allied Health Sciences
International Islamic University Malaysia

August 2021

ABSTRACT

Elderly population are susceptible to malnutrition. However, malnutrition identification among community-living elderly through nutrition screening is not routinely performed in Malaysia health clinics; although it is recommended to be performed routinely in all healthcare setting. Major issue to this is due to no specific nutrition screening guideline and validated tool in this setting. Due to this gap, development of nutrition screening guideline is essential for use among healthcare staff. The aimed of this study are to develop a nutrition screening guideline for use by healthcare staff in health clinic setting and assess its feasibility. This study has taken a mixed-method approach and action research to address the research objectives. This study was divided into three phases; Phase 1: Identification of barriers and opportunities of nutrition screening in elderly patients in the health clinic setting; Phase 2: Development of nutrition screening guideline by using Mini Nutritional Assessment Short-Form (MNA® -SF) for healthcare staff in health clinic setting; and Phase 3: To assess the feasibility of newly developed nutrition screening guideline for health clinic setting among healthcare staff. Four health clinics from urban and rural areas in Kuantan, Pahang involved in this study.

In Phase 1, in-depth interviews were conducted among twenty healthcare staff. Non-participant observations that acted as triangulation were conducted among twenty-one elderly patients. Both data from interviews and observations were analysed thematically using NVivo software version 12. Four themes emerged for barriers and opportunities were Theme 1: Time; Theme 2: Patient factors; Theme 3: Organization factors and; Theme 4: Nutrition screening knowledge. Findings from Phase 1 has become guidance in content development of the nutrition screening guideline. In Phase 2, twenty-three documents have been included from conducted scoping review for the content development of the guideline. Following this, A4-sized guideline has been developed. The guideline has been validated among six experts by using Item-Content Validity Index (I-CVI). Items that have achieved ≥0.83 were remained. Meanwhile, items with a score <0.83 were revised accordingly. Next, face validity among twelve healthcare staff has been conducted and all participants showed positive responses. Amendment has been made based on provided suggestions. For Phase 3, 22 healthcare staff from similar health clinics participated and had screened five elderly patients each (total=110, mean age= 68.7±6.1 years). After completing nutrition screening, individual in-depth interviews were conducted with the healthcare staff. All data were analysed thematically. The themes obtained were Theme 1: Ease of use; Theme 2: Identification and management of malnutrition; Theme 3: Acceptability; and Theme 4: Implementation of nutrition screening. In summary, this multiphase study has identified appropriate approaches in implementing nutrition screening among elderly patients in health clinic setting. Provision of a comprehensive newly developed nutrition screening guideline tailored to this setting was well-accepted among healthcare staff and feasible in health clinic setting. This nutrition screening guideline is recommended to be adopted nationwide in Ministry of Health's health clinics towards optimum nutritional status of elderly population and achieving healthy ageing; whilst policy related to nutrition screening implementation in health clinics can be further enforced.

خلاصة البحث

إن كبار السن من الناس معرضون لسوء التغذية. ومع ذلك، فإن تحديد سوء التغذية بين كبار السن الذين يعيشون في المجتمع من خلال فحص التغذية لا يتم بشكل روتيني في العيادات الصحية في ماليزيا؛ على الرغم أنه يوصى بإجراء ذلك بشكل روتيني في جميع أماكن الرعاية الصحية. ترجع المشكلة الرئيسية في هذه الحالة إلى عدم وجود الإرشادات المحددة لفحص التغذية وأداة التحقق من الصحة في هذه المجموعة. بسبب هذه الفجوة، يعد تطوير إرشادات فحص التغذية أمرا ضروريا للاستخدام بين موظفي الرعاية الصحية. الهدف من هذه الدراسة هو تطوير إرشادات فحص التغذية للاستخدام بين موظفي الرعاية الصحية في إعداد العيادة الصحية وتقييم جدواها. اتخذت هذه الدراسة منهجا مختلطا وبين البحث النظري والعملي الميداني لمعالجة أهداف البحث. قسمت هذه الدراسة إلى ثلاث مراحل؛ المرحلة الأولى: تحديد العوائق والفرص لفحص التغذية للمرضى المسنين في العيادة الصحية؛ المرحلة الثانية: تطوير إرشادات فحص التغذية باستخدام نموذج قصير للتقييم الغذائي الصغير (MNA® -SF) لموظفي الرعاية الصحية في إعداد العيادة الصحية؛ والمرحلة الثالثة: لتقييم جدوى الإرشادات لفحص التغذية المطورة حديثا لإعداد العيادة الصحية بين موظفي الرعاية الصحية. أربع العيادات الصحية من المناطق الحضرية والريفية في كوانتان، باهانج المشاركة في هذه الدراسة. في المرحلة الأولى، أجريت مقابلات معمقة بين عشرين من العاملين في مجال الرعاية الصحية. وأجريت ملاحظات غير المشاركين التي كانت بمثابة تثليث بين 21 مريضا مسنا. حللت كل من البيانات المأخوذة من المقابلات والملاحظات بشكل موضوعي باستخدام الإصدار 12 من برنامج NVivo. ظهرت أربعة محاور للحواجز والفرص؛ المحور 1: الزمن؛ المحور 2: عوامل المريض؛ المحور 3: عوامل التنظيم؛ والمحور 4: معرفة في فحص التغذية. أصبحت النتائج من المرحلة الأولى التوجيهات في تطوير الإرشادات لفحص التغذية. في المرحلة الثانية، تضمنت 23 وثيقة من المراجعة النطاق التي تم إجراؤها لتطوير محتوى الدليل الإرشادي. بعد ذلك، تم تطوير الإرشاد بحجم A4. باستخدام فهرس صلاحية المحتوى العنصر (I-CVI) يتم التحقق من صحة الإرشاد بين ستة خبراء. بقيت العناصر التي حققت 0.83≤. وفي الوقت نفسه، تمت مراجعة العناصر التي حصلت على درجة 0.83> وفقا لذلك. ثم، تم إجراء صدق الوجه بين اثني عشر من موظفي الرعاية الصحية وأظهر جميع المشاركين موفق إيجابي. وقامت بالتعديل بناء على الاقتراحات المقدمة. في المرحلة الثالثة، شارك 22 موظف الرعاية الصحية من العيادة الصحية المماثلة وقاموا بفحص خمسة مرضى مسنين لكل منهم (المجموع= 110، متوسط العمر=

68.7 ± 6.1 سنة). بعد الانتهاء من فحص التغذية، أجريت المقابلات الفردية المتعمقة مع موظفي الرعاية الصحية. تم تحليل جميع البيانات بشكل موضوعي. المحاور التي حصلت عليها؛ المحور 1: سهولة الاستعمال؛ المحور 2: تحديد وإدارة سوء التغذية؛ المحور 3: المقبولية؛ والمحور 4: انجاز فحص التغذية. باختصار، حددت هذه الدراسة المتعددة المراحل الأساليب المناسبة في انجاز فحص التغذية بين مرضى المسنين في إعداد العيادة الصحية. كان تقديم الإرشادات لفحص التغذية الشاملة المطورة حديثا مصمما خصيصا لهذا الإعداد مقبولا جيدا بين موظفي الرعاية الصحية وكان ممكنا في إعداد العيادة الصحية. يوصى باعتماد هذه الإرشادات فحص التغذية في جميع العيادات الصحية لوزارة الصحة أنحاء البلاد من أجل الوضع الغذائي الأمثل لكبار السن وتحقيق شيخوخة صحية؛ بينما يمكن تطبيق السياسة المتعلقة بتنفيذ فحص التغذية في العيادات الصحية بشكل أكبر.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Health Sciences (Nutrition Sciences)

…….
Dr. Aliza Haslinda Binti Hamirudin
Supervisor

…….
Prof. Dr. Sakinah Binti Harith
Co-Supervisor

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Health Sciences (Nutrition Sciences)

…….
Assoc. Prof. Dr. Muhammad Muzaffar Bin Ali Khan Khatak
Internal Examiner

…….
Assoc. Prof. Dr. Siti Nur'Asyura Binti Adznam
External Examiner

This thesis was submitted to the Department of Nutrition Sciences and is accepted as a fulfilment of the requirement for the degree of Master of Health Sciences (Nutrition Sciences)

…….
Assoc. Prof. Dr. Muhammad Bin Ibrahim
Head, Department of Nutrition Sciences

This thesis was submitted to the Kulliyyah of Allied Health Sciences and is accepted as a fulfilment of the requirement for the degree of Master of Health Sciences (Nutrition Sciences)

…….
Prof. Suzanah Binti Abdul Rahman
Dean, Kulliyyah of Allied Health Sciences

DECLARATION

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Siti Nur Amirah Binti Sheikh Hishamuddin

Signature …….. Date: ……

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED RESEARCH

DEVELOPMENT AND FEASIBILITY OF NUTRITION SCREENING GUIDELINE USING MINI NUTRITIONAL ASSESSMENT SHORT-FORM (MNA®-SF) IN ELDERLY ATTENDING HEALTH CLINICS FOR THE USE OF HEALTHCARE STAFF IN CLINIC SETTINGS

I declare that the copyright holder of this thesis are jointly owned by the student and IIUM.

By signing this form, I acknowledged that I have read and understand the IIUM Intellectual Property Right and Commercialization policy.

Affirmed by Siti Nur Amirah Binti Sheikh Hishamuddin

..... ……..

Signature Date

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED RESEARCH

DEVELOPMENT AND FEASIBILITY OF NUTRITION SCREENING GUIDELINE USING MINI NUTRITIONAL ASSESSMENT SHORT-FORM (MNA®-SF) IN ELDERLY ATTENDING HEALTH CLINICS FOR THE USE OF HEALTHCARE STAFF IN CLINIC SETTINGS

Affirmed by Siti Nur Amirah Binti Sheikh Hishamuddin

..... ……..

Signature Date

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED RESEARCH

DEVELOPMENT AND FEASIBILITY OF NUTRITION SCREENING GUIDELINE USING MINI NUTRITIONAL ASSESSMENT SHORT-FORM (MNA®-SF) IN ELDERLY ATTENDING HEALTH CLINICS FOR THE USE OF HEALTHCARE STAFF IN CLINIC SETTINGS

ACKNOWLEDGEMENTS

All glory is due to Allah, the Almighty, whose Grace and Mercies have been with me throughout the duration of my study. Although, it has been tasking, His Mercies and Blessings on me ease the herculean task of completing this thesis.

This thesis is a contribution of work from all great people. Foremost, I would like to express my deep and sincere gratitude to my best supervisor; Dr Aliza Haslinda Binti Hamirudin for her continuous idea, support and encouragement in the execution of this research as well as writing process. I am also grateful to my co-supervisor, Prof. Dr. Sakinah Binti Harith, whose support and cooperation contributed to the outcome of this work. I also wish to express my sincere appreciation and thanks to all research team members, Prof. Dr. Mohd Aznan Bin Md. Aris, Dr. Karimah Hanim Binti Abd. Aziz and Dr. Nurul Syaireen Binti A. Rashid and Ms. Iman Nabihah Binti Noor Azam for their expert advice, valuable feedback and support in this journey.

I would like to extend my appreciation to Fundamental Research Grant Scheme, Ministry of Education, Malaysia (FRGS/1/2018/SKK06/UIAM/02/5) for funding this study. Also, I acknowledge Yayasan Bank Rakyat (YBR) for their financial support throughout my study. I offer special thanks to all health clinics involved as well as healthcare staff and elderly patients who had been involved directly or indirectly in this study. Many thanks for their cooperation and support throughout the study.

Last but not least, I would like to thank my family and close friends who have been my loyal supporter and source of inspiration.

Once again, we glorify Allah for His endless mercy on us one of which is enabling us to successfully round off the efforts of writing this thesis. Alhamdulillah.

TABLE OF CONTENT

Abstract ii
Abstract in Arabic iii
Approval Page v
Declaration vi
Acknowledgements x
List of Tables xv
List of Figures xvii

CHAPTER ONE: INTRODUCTION 1
1.1 Background of the Study 1
1.2 Statement of Research Problem 4
1.3 Significance of the Study 5
1.4 Research Questions 6
1.5 Hypothesis 6
1.6 Research Objectives 6
1.7 Conceptual Framework 7

CHAPTER TWO: LITERATURE REVIEW 9
2.1 Ageing 9
2.2 Malnutrition Among Elderly 11
2.2.1 Definition 11
2.2.2 Risk Factors of Malnutrition 13
2.2.3 Consequences of Malnutrition 15
2.2.4 Prevalence of Malnutrition 17
2.3 Nutrition Screening 23
2.3.1 Definition and Characteristics of Nutrition Screening 23
2.3.2 Types of Nutrition Screening Available 23
2.3.3 Comparison of Nutrition Screening Tools for Elderly 27
2.3.4 Current Practice of Nutrition Screening in Health Clinic 28
2.4 Barriers and Opportunities of Nutrition Screening 31
2.4.1 Barriers of Nutrition Screening 31

2.4.2 Facilitators and Opportunities of Nutrition Screening 32
2.5 Development Of Nutrition Screening Guideline 33
2.5.1 Definition of the Guideline 33
2.5.2 Development Process of the Guideline 33
2.5.3 Characteristics and Advantages of the Guidelines 35
2.6 Feasibility of Nutrition Screening 36
2.6.1 Feasibility of Mini Nutritional Assessment Short-Form (MNA®-SF) 36
2.7 Summary of Literature Review 37

CHAPTER THREE: METHODOLOGY 38
3.1 Introduction 38
3.2 Study Location 41
3.3 Ethics Approval 42
3.4 Methodology of Phase 1: To Identify Barriers and Opportunities of Nutrition Screening in Elderly Patients in the Health Clinic Setting 42
3.4.1 Overview of the Phase 42
3.4.2 Study Design 43
3.4.3 In-Depth Individual Interview 44
3.4.4 Non-Participant Observation 49
3.5 Methodology of Phase 2: To Develop Nutrition Screening Guideline Using MNA®-SF in Health Clinic Setting 54
3.5.1 Overview of the Phase 54
3.5.2 Study Design 54
3.5.3 Development Process of the Nutrition Screening Guideline 54
3.5.4 Guideline Development 58
3.5.5 Validation Process 61
3.6 Phase 3: To Assess the Feasibility of Newly Developed Nutrition Screening Guideline for Healthcare Staff in Health Clinic Setting 65
3.6.1 Overview of the Phase 65
3.6.2 Study Design 65
3.6.3 Study Participants and Study Locations 65
3.6.4 Sampling Method 66
3.6.5 Sample Size Calculation 66
3.6.6 Data Collection 66
3.6.7 Data Analysis 68

3.7 Summary of Overall Methodology 71

3.7.1 Phase 1: Barriers and Opportunities of Nutrition Screening in Elderly Patients in the Health Clinic Setting 71

3.7.2 Phase 2: Development of Nutrition Screening Guideline Using Mini Nutritional Assessment Short-Form (MNA®-SF) 72

3.7.3 Phase 3: Feasibility of Newly Developed Nutrition Screening Guideline for Health Clinic Setting Among Healthcare Staff 72

3.8 Research Flow 75

CHAPTER FOUR: RESULTS 76

4.1 Phase 1: Barriers and Opportunities of Nutrition Screening in Elderly Patients in the Health Clinic Setting 76

4.1.1 Overview of Phase 1 76

4.1.2 Socio-Demographic Characteristics 76

4.1.3 Barriers and Opportunities of Nutrition Screening 78

4.2 Phase 2: Development Of Nutrition Screening Guideline Using MNA® -SF for Healthcare Staff in Health Clinic Setting 92

4.2.1 Overview of Phase 2 92

4.2.2 Development of Content in Nutrition Screening Guideline 93

4.2.3 Summary of Systematic Search 100

4.2.4 Integration of the Findings for a Newly Developed Nutrition Screening Guideline in Health Clinic Setting 123

4.2.5 Development Phase of the Newly Developed Nutrition Screening Guideline 125

4.2.6 Validation of Nutrition Screening Guideline 130

4.2.7 Face Validation by Healthcare Staff 142

4.3 Phase 3: To Assess Feasibility of Newly Developed Nutrition Screening Guideline for Health Clinic Setting Among Healthcare Staff 148

4.3.1 Overview of Phase 3 148

4.3.2 Socio-Demographic Characteristics 148

4.3.3 Assessing Feasibility of Newly Developed Nutrition Screening Guideline 150

4.4 Summary of the Results 161

CHAPTER FIVE: DISCUSSION 163

5.1 Phase 1: Barriers and Opportunities of Nutrition Screening In Elderly Patients In The Health Clinic Setting 164

5.1.1 Overview of the Phase 164
5.1.2 Socio-Demographic Characteristics 166
5.1.3 Barriers and Opportunities of Nutrition Screening in Elderly Patients in Health Clinic Setting..... 166
5.2 Phase 2: Development and Validation of the Nutrition Screening Guideline 174
5.2.1 Overview of the Phase 174
5.2.2 Analysis of Literature 175
5.2.3 Development of Content and Validation of the Nutrition Screening Guideline..... 181
5.3 Phase 3: To Assess the Feasibility of Newly Developed Nutrition Screening Guideline for Health Clinic Setting Among Healthcare Staff..... 186
5.3.1 Overview of The Phase..... 186
5.3.2 Socio-Demographic Characteristics 188
5.3.3 Feasibility of Nutrition Screening and Newly Developed Nutrition Screening Guideline..... 190
5.4 Summary of the Discussion..... 195

CHAPTER SIX: CONCLUSION 197
6.1 Summary of the Research..... 197
6.2 Implications of the Nutrition Screening Practice 199
6.3 Limitations, Strength and Future Research 200
6.4 Conclusions 202

REFERENCES 204

APPENDICES 226

LIST OF PUBLICATIONS ……..271

LIST OF CONFERENCE PRESENTATION ……272

LIST OF TABLES

Table 2.1	Definition of Malnutrition	12
Table 2.2	Prevalence of Malnutrition in the Community Setting	20
Table 3.1	Total Number of Elderly Registered in Selected Health Clinics	42
Table 3.2	Inclusion and Exclusion Criteria for Literature Search	56
Table 3.3	Summary of Methods and Materials Used in Each Study Phases	73
Table 4.1	Socio-Demographic Characteristics of Healthcare Staff	77
Table 4.2	Barriers to Implement Nutrition Screening	84
Table 4.3	Opportunities to Implement Nutrition Screening	90
Table 4.4	Summary of Suggested Topics to Be Included in Nutrition Screening Guideline (From Articles)	103
Table 4.5	Summary of Suggested Topics to Be Included in Nutrition Screening Guideline (From Established Guideline)	120
Table 4.6	Integration of Findings Between Needs Assessment (Phase 1) and Scoping Review (Phase 2) For Content Development	124
Table 4.7	Finalized Topics for the Newly Developed Nutrition Screening Guideline	125
Table 4.8	Socio-Demographic Data of Panel Experts for Content Validity	131
Table 4.9	The Relevance Ratings On Item-Scale By Six (n=6) Experts (Part A)	133
Table 4.10	The Relevance Ratings On Item-Scale By Six (n=6) Experts (Part B)	134
Table 4.11	The Relevance Ratings On Item-Scale By Six (n=6) Experts (Part C)	135
Table 4.12	Face Validity Among Experts (Part A)	137

Table 4.13	Face Validity Among Experts (Part B)	138
Table 4.14	Face Validity Among Experts (Part C)	139
Table 4.15	Summary Of Revision Based On Experts Comments/Suggestions	141
Table 4.16	Socio-Demographic and Characteristics of Participated Healthcare Staff for Face Validity	143
Table 4.17	Face Validation Among Healthcare Staff (Part A)	145
Table 4.18	Face Validation Among Healthcare Staff (Part B)	146
Table 4.19	Face Validation Among Healthcare Staff (Part C)	147
Table 4.20	Socio-Demographic Characteristics Of Research Participants	149
Table 4.21	Results of Nutrition Screening Among Elderly Patients in Health Clinics (n=110)	151
Table 4.22	Themes and Sub-Themes Identified For Feasibility of The Newly Developed Nutrition Screening Guideline	160

LIST OF FIGURES

Figure 1.1	Conceptual Framework based on Action Research	8
Figure 2.1	The Graph of Elderly Population Globally	10
Figure 2.2	The Graph of Elderly Population in Malaysia	11
Figure 2.3	Flow Chart of Performing *Borang Saringan Status Kesihatan (BSSK*) in Health Clinic.	30
Figure 3.1	O'Leary's Model of Action Research	39
Figure 3.2	Flow Chart for Phase 1	53
Figure 3.3	Search Term Used to Identify the Related and Eligible Studies	55
Figure 3.4	Flow Chart for Phase 2	64
Figure 3.5	Flow Chart for Phase 3	70
Figure 3.6	Overall Research Flow	75
Figure 4.1	Themes Identified for Barriers and Opportunities of Nutrition Screening	79
Figure 4.2	Flow Chart Illustrating the Selection Process of Documents to Be Included In This Review Guided By PRISMA Extension for Scoping Reviews (PRISMA-Scr)	102
Figure 4.3	Example of Flow Chart for Nutrition Screening	126
Figure 4.4	Pathway after Nutrition Screening Based On MNA®-SF Score	128
Figure 4.5	Example of Picture Included in the Guideline	129
Figure 4.6	Front and Back Page of the Newly Developed Nutrition Screening Guideline	130
Figure 4.7	Revised Version of MNA®-SF	144
Figure 4.8	Themes Identified For the Feasibility of Newly Developed Nutrition Screening Guideline	152

LIST OF APPENDICES

APPENDIX A	Mini Nutritional Assessment Short-Form (MNA®-SF)
APPENDIX B	Pathway for Nutrition Intervention
APPENDIX C	Ethical Approval and Renewal from Medical Research & Ethics Committee (MREC)
APPENDIX D	Approval Letter from Pahang Health State Department
APPENDIX E	Approval Letter from Kuantan District Health Office
APPENDIX F	Written Informed Consent Form
APPENDIX G	Semi-Structured Interview Guide
APPENDIX H	Non-Participant Observation Form
APPENDIX I	Validation Form for Panel Experts
APPENDIX J	Face Validity Form for Research Participants
APPENDIX K	Written Inform Consent Form
APPENDIX L	Semi-Structured Interview Guide

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Poor nutritional status and malnutrition in the elderly are the important areas of concern. Alteration in body composition, organ functions, adequate energy intake and ability to eat and access food are affected by ageing (Amarya, Singh, & Sabharwal, 2015; Saka, Kaya, Ozturk, Erten, & Karan, 2010). Ageing is a biological process that involved elderly. According to United Nations (UN), elderly are people aged of 60 years and olders (United Nations, 2019). Ageing or normal ageing can be known as chronological ageing that occurs with age and unaffected by diseases and environmental influences (Samarakoon, Ravishankar, & Chandola, 2011; WHO, 2001). By contrast, the process of ageing is not due to ageing itself but may strongly be affected by the environment, lifestyle and disease state (Samarakoon et al., 2011).

Due to this, most of the elderly are susceptible to malnutrition. Malnutrition is a state of nutrition in which a deficiency or excess (or imbalance) of nutrients causes adverse effects on body composition, function and clinical outcome (Elia, 2000; Nur Fazimah, Sakinah, & Rosminah, 2013). In this research, malnutrition is referred as undernutrition. In addition, this research is based in health clinic setting. It can be defined as a centre that provides services that are usually the first point of contact with a healthcare professional (Shi, 2012).

Based on previous studies, a range from 5.3% to 52.6% of elderly are at risk and malnourished in community setting (Cereda et al., 2016; Kaiser et al., 2010; Winter, Flanagan, Mcnaughton, & Nowson, 2013). Meanwhile, recent studies in Malaysia

showed alarming rate of 43.1 to 48.9.% and 4.2 to 56.9% of male and female elderly respectively were at risk of malnutrition (Muhamad, Hamirudin, Zainudin, Sidek, & Rahman, 2019; Suzana, Boon, Chan, & Normah, 2013; Zainudin, Hamirudin, Nor, & Sidek, 2019).

Therefore, early detection of malnutrition should be performed by nutrition screening. Nutrition screening is the first step in identifying patients who are at risk for nutritional problems or who have undetected malnutrition (Mathew & Funderburg, 2007). There are various types of nutrition screening tools exist based on the systematic literature review. For example, Mini Nutritional Assessment Short-Form (MNA®-SF), Malnutrition Universal Screening Tool (MUST), Malnutrition Screening Tool (MST), Elderly Nutrition Screening (ENS®), Nutrition Screening Initiative (NSI), Nutritional Risk Index (NRI), Seniors in the Community: Risk Evaluation for Eating and Nutrition I (SCREEN©) and Seniors in the Community: Risk Evaluation for Eating and Nutrition II (SCREEN© II) (Hamirudin, Charlton, & Walton, 2016; Van Bokhorst-de van der Schueren, Guaitoli, Jansma, & Vet, 2014). From all the nutrition screening tools available, MNA®-SF is a valid nutrition screening tool for use in community-living elderly to identify malnutrition globally (Kaiser et al., 2009; Philips, Foley, Barnard, Isenring, & Miller, 2010).

MNA®-SF is a validated nutrition screening tool that has been adapted from full Mini Nutritional Assessment (MNA®). Six questions of MNA®-SF has been developed from full Mini Nutritional Assessment (MNA®) based on its specificity and sensitivity; and had a full correlation with full MNA® (Rubenstein, Harker, Salvà, Guigoz, & Vellas, 2001). In addition, MNA®-SF can be completed within five minutes (Kaiser et al., 2009; Skates & Anthony, 2012). As this research is performed in community setting, MNA®-SF is the most valid and suitable tool to be used. Most importantly, this tool has

been validated in community settings particularly in health clinics in Malaysia (Shahar & Siti Saifa, 2007).

Nutrition screening is a procedure that can be administered by any healthcare staff including staff nurses, healthcare assistants, doctors, or other staff on their first contact with patients (Power et al., 2018; Todorovic, 2004). They have expertise and responsibility to ensure that patients' nutritional needs are met (Xu, Parker, Ferguson, & Hickman, 2017). Therefore, in the healthcare setting, nurses play important roles as healthcare team members to support dietitian's role to ensure good nutrition among patients (Jefferies, Johnson, & Ravens, 2011; McClinchy, Williams, Gordon, Cairns, & Fairey, 2015). Effective management is required by collaboration among multidisciplinary healthcare team members including dietitian. They are responsible for developing innovative strategies to facilitate patient compliance in improving nutritional status (Morley & Cashell, 2017; Tappenden et al., 2013).

Furthermore, this research aims to assess the feasibility of nutrition screening guideline using MNA®-SF in elderly among healthcare staff in health clinic setting in Kuantan, Pahang, Malaysia. This study was conducted phase by phase with a total of three phases. During phase 1, the researcher aimed to identify barriers and opportunities of nutrition screening in elderly among healthcare staff in health clinic setting. In this phase, in-depth interview was conducted with healthcare staff. The non-participant observation was performed as triangulation by observing health clinic workflow and time taken by elderly patients in the health clinic. Findings from phase 1 become guidance in developing content for a newly developed nutrition screening guideline. The nutrition screening guideline involved in the validation process among experts and healthcare staff. The last phase (phase 3) aimed to assess feasibility of the newly developed nutrition screening guideline, including MNA®-SF for health clinic setting

among healthcare staff. The newly developed nutrition screening guideline had been used by healthcare staff in health clinics. Each healthcare staff is required to screen five elderly patients attending the respective health clinics using MNA®-SF. All of the healthcare staff involved were interviewed to assess the feasibility of nutrition screening guideline.

1.2 STATEMENT OF RESEARCH PROBLEM

Malnutrition identification in community-living elderly through nutrition screening is not a routine practice in Malaysia health clinics; although it is recommended to be performed in all healthcare setting (Watterson et al., 2009). Major issue to this is due to no specific nutrition screening guideline and validated tool available for malnutrition identification in this setting in Malaysia.

Currently, in Malaysia health clinics, *Borang Saringan Status Kesihatan (BSSK/WE/2008 Pind 1/2014)* is used by healthcare staff for health screening among elderly patients. This form consists of 14 parts, including a nutrition section. Questions in the nutrition section only inquire whether the elderly patient consumes three main meals and whether they consume milk, vegetables and fruits. The questions provided within *BSSK* are not well-structured and systematic to identify elderly who are at risk or malnourished. Besides, this form is only required to be completed during the patients' first visit to the health clinics. Appropriate malnutrition identification through the use of validated nutrition screening tool is essential to classify patients' malnutrition risk status; and further provide appropriate malnutrition management which include nutrition intervention (Kondrup, Allison, Elia, Vellas, & Plauth, 2003; Reber, Gomes, Vasiloglou, Schuetz, & Stanga, 2019). The dietitian is responsible in providing nutrition

intervention for the improvement of patient's nutritional status. Thus, early malnutrition identification through nutrition screening is essential in health clinic settings to enable timely nutrition intervention among the elderly patients.

Hence, it is vital to develop a nutrition screening guideline for health clinic setting; it can further improve patients' nutritional status, leading to healthy ageing and quality of life among the elderly (Hamirudin et al., 2016; Ramage-Morin, Gilmour, & Rotermann, 2017).

1.3 SIGNIFICANCE OF THE STUDY

The significance of this research is to help in identifying the risk of malnutrition among community-living elderly in health clinic setting in a timely manner. Further health complications related to malnutrition can be prevented with the use of newly developed nutrition screening guideline.

This research in line with the initiative of Ministry of Health's Plan of Action for the year 2016-2020 and with the Ministry of Health 10th Malaysia Health Plan. The aims are to address the issues regarding health services delivery, health awareness, healthy lifestyle and empowerment of the individuals' responsibility for own health. This research will be one of the efforts to provide the cost effective and sustainable healthcare service to the population specifically elderly.

Therefore, this research is warranted due to the number of elderly population who are increasing year by year; as reported that a total of 5.0% by the year 2010 to 14.5% by the year 2040 (Department of Statistics Malaysia, 2016). Hence, the newly developed nutrition screening guideline would provide benefits to elderly patients and healthcare professionals. The availability of this guideline in health clinic is able to

improve clinical decisions, consistency of care and support quality improvement (Woolf, Grol, Hutchinson, Eccles, & Grimshaw, 1999). It will be served as a guide for healthcare staff in performing nutrition screening and subsequently facilitate in further appropriate malnutrition management.

1.4 RESEARCH QUESTIONS

This research addresses several research questions as follow:

1. What are the barriers and opportunities of nutrition screening in elderly patients attending health clinic?
2. What is the process involved in the development of nutrition screening guideline using MNA®-SF in health clinic setting?
3. How feasible is the newly developed nutrition screening guideline for health clinic setting to healthcare staff?

1.5 HYPOTHESIS

The newly developed nutrition screening guideline using MNA®-SF for health clinic setting is feasible to healthcare staff.

1.6 RESEARCH OBJECTIVES

This research embarks on the following objectives:

1. To identify barriers and opportunities of nutrition screening in elderly patients in health clinic setting. (Phase 1)