ORIGINAL ARTICLE

Development and Feasibility Assessment of a Nutrition Screening Guideline in Older Patients for Use by Healthcare Staff in Health Clinic Setting: An Action Research Study

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ABSTRACT

Introduction: Older persons are more susceptible to malnutrition. However, malnutrition identification through nutrition screening is not routinely performed in Malaysia's health clinics due to no specific nutrition screening guideline and validated tool in this setting. This study aimed to develop a nutrition screening guideline for older patients and assess its feasibility for use by healthcare staff in health clinic setting. **Methods:** This study was conducted in three phases. In Phase I, needs assessment was conducted amongst healthcare staff. Development of nutrition screening guideline in Phase II involved scoping review and validation amongst six experts and twelve healthcare staff. In Phase III, twenty-two healthcare staff participated in feasibility assessment using in-depth interviews after completing nutrition screening in older patients. Interview data was analysed thematically using NVivo Software 12.0. **Results:** A Malay language version of nutrition screening guideline in A4-sized with 31 pages was developed and validated. Items with a content validity index ≥0.83 from experts review were retained, while <0.83 were revised accordingly. Validation amongst healthcare staff showed positive responses. The guideline was then assessed for feasibility, where 110 older patients (mean age= 68.7±6.1 years) were screened by healthcare staff using the newly developed nutrition screening guideline. Four themes emerged from in-depth interviews: 1) Ease of use; 2) Identification and management of malnutrition; 3) Acceptability; and 4) Implementation of nutrition screening. **Conclusion:** The newly developed and validated nutrition screening guideline is well-accepted and feasible for healthcare staff to screen older patients in health clinic setting for timely malnutrition identification and management.
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Keywords: Older persons, Health clinics, Healthcare staff, Malnutrition, Nutrition screening

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INTRODUCTION

Poor nutritional status and malnutrition are the critical areas of concern in older adults. Alterations in body composition, inappropriate and decreased dietary intake, and nutritional problems may lead to nutritional deficiencies (1). All the risk factors are affected by ageing, widely known as the biological process involving the older population (1,2). However, malnutrition is under-recognised and often undetected in older patients (3), leading to various adverse effects. Older adults at nutritional risk may have an increased risk of illness, poorer quality of life, delayed wound healing, and higher mortality than their well-nourished counterparts (4).

Malnutrition identification through nutrition screening needs to be performed routinely in various healthcare settings, including health clinic settings (5). Nutrition screening can be defined as an early step to identify at-risk and malnourished patients (6), which can be conducted

as part of a Comprehensive Geriatric Assessment as malnutrition is well-documented as a geriatric syndrome (2). Implementation of nutrition screening through a validated, easy-to-use and practical tool is needed for further intervention (7). Besides, nutrition screening is warranted to address malnutrition amongst older persons in a timely manner to further prevent poorer health outcomes (8).There are many nutrition screening tools available for use in older adults (9,10). The Mini Nutritional Assessment Short-Form (MNA®-SF) has been recognised as the most appropriate tool for older adults in the community (9,11). MNA®-SF is composed of 6-items and can be completed within 5 minutes (11).

The prevalence in the global community setting showed a range of 17% to 52.6% of those at-risk of malnutrition and 4.3% to 13% of the malnourished amongst older populations (2,12,13). Meanwhile, 34% to 43.1% and 56.9% to 66.0% of male and female older persons, respectively, have malnutrition risk in Malaysian community setting (14,15). All the aforementioned studies used a validated nutrition screening tool, the MNA®-SF, to identify the prevalence of malnutrition amongst older persons in the community setting.

In Malaysia's community health clinics, healthcare staff are required to complete a health screening form, namely "*Borang Saringan Status Kesihatan*" (BSSK/WE/2008 Pind 1/2014) for older patients. The main objective of BSSK is to improve health status in order to achieve a good quality of life amongst older persons. The form consists of many parts, including the nutrition part. However, the questions in the nutrition component are insufficient for malnutrition identification. Besides, there is no nutrition screening guideline available for malnutrition identification amongst older persons in a health clinic setting in Malaysia.

Previous studies have demonstrated barriers and opportunities to performing nutrition screening in healthcare setting. These include time constraints, organisational factors, lack of priority, and lack of knowledge (12,16,17). Therefore, an early phase of this present study (Phase I) was performed for needs assessment to identify barriers and opportunities for nutrition screening in the Malaysian health clinic setting (18). Based on the findings, the development of a comprehensive nutrition screening guideline is required to facilitate healthcare staff in performing nutrition screening.

This study aimed to develop a nutrition screening guideline for older patients and assess its feasibility for use by healthcare staff in Malaysian community health clinic setting. The researchers hypothesised that the newly developed nutrition screening guideline is well accepted and feasible for healthcare staff in performing nutrition screening amongst older adults in this setting.

MATERIALS AND METHODS

Study Design

This study utilised an action research study design. The aim of action research is to facilitate change and improve practise in a healthcare environment (19). The study was designed and conducted in three phases: Phase I) Needs assessment of nutrition screening; Phase II) Development of the newly developed nutrition screening guideline; and Phase III) Feasibility assessment of the newly developed nutrition screening guideline. As in action research, the involvement of participants in developing the guideline was essential (20). Therefore, healthcare staff have been involved in developing and evaluating the newly developed nutrition screening guideline.

Study Location

Four (n = 4) health clinics in the district of Kuantan, Pahang, Malaysia have been involved in this research. The health clinics located in two urban and two rural areas in Kuantan were selected from eleven health clinics in this research. The selection of these two urban and two rural government health clinics was to ensure that data was represented from different geographical areas.

Phase I: Needs Assessment of Nutrition Screening

A qualitative approach by using individual in-depth interviews amongst healthcare staff was performed in this phase. Besides, triangulation by non-participant observation has been conducted to further validate the interview findings. The detailed methodology and results for this phase have been reported elsewhere (18).

Phase II: Development of a Newly Developed Nutrition Screening Guideline

A scoping review was performed to develop suitable content for a newly developed nutrition screening guideline incorporating the most appropriate nutrition screening tool, the MNA®-SF. MNA®-SF in Malay language version was included in this guideline and it has been validated in community settings, particularly in health clinics in Malaysia (21). The integration of findings from needs assessment in Phase I and the scoping review became the basis for developing the guideline's content. Besides, a series of meetings amongst research team members were conducted to finalise the content and details in the guideline. The research team members consisted of academicians who have expertise in nutrition and dietetics, family medicine specialist and community medicine. Besides, an expert from the Primary Health Care Unit in Pahang Health District was also involved in this development. Then, the newly developed nutrition screening guideline with 31 pages was developed in A4-sized and in Malay language. The guideline has been developed in the Malay language because of the similar language used in most of the previous guidelines by the Ministry of Health (MOH) for use by its staff. The guideline has been proof-read by a

language expert who has experience in teaching Malay language (Bahasa Melayu) courses. After finalisation, the guideline was followed with editing and design by an editor.

Phase II: Validation by Experts Panel

A panel of experts evaluated the completed nutrition screening guideline for content relevance. It has been recommended to have at least five members in a particular field to validate the content (22). Therefore, six experts consisting of family medicine expert (n = 1), dietitians (n = 3), and experts from the older adults health sector and primary policy development sector, Ministry of Health (MOH), Malaysia (n = 2), were involved in this validation. The experts were selected from different specialisations in order to produce a comprehensive review according to their expertise.

The validation form used in this phase was adapted from previous studies (23,24). The form is composed of seven components. Two components (scientific accuracy and content of the guideline) are related to content validity, while five components (literary presentation, illustrations, ease of comprehension of the guideline, legibility and printing characteristics, and quality of information) are related to face validity.

The panel of experts were required to rate and examine the items on a scale (1 for "not relevant"; 2 for "some revision required"; 3 for "relevant but needs minor revision"; and 4 for "very relevant") (25). To obtain the content validity index (CVI), the relevance rating has been recorded either as 1 (relevance scale of 3 or 4) or 0 (relevance scale of 1 or 2) (26). All the scores from the six experts were calculated, and the results were presented mainly as CVI for item (I-CVI) and CVI for scale (S-CVI). Besides, calculation using the Kappa statistic formula was done as it provides a degree of agreement and was interpreted as excellent, good, fair, and poor (25). Meanwhile, the results for face validity were calculated descriptively and presented in frequency and percentage.

The acceptable CVI value for the six experts was 0.83. All the items that scored below the minimum value of 0.83 were revised accordingly. All comments and suggestions from this validation have been taken into consideration for the amendment of the guideline. The guideline has been revised and proceeded with face validity amongst healthcare staff.

Phase II: Face Validity by Healthcare Staff

The face validity aimed to determine whether the items in the guideline are relevant, reasonable, unambiguous, and clear (27). Therefore, a study suggests a minimum of seven people for face validity (28). Therefore, twelve (n = 12) healthcare staff in the selected health clinics representing urban and rural areas were recruited. The inclusion of both urban and rural areas ensures that both geographical areas' perspectives are represented. A written informed consent form was given to eligible participants before conducting this research. Once agreed, a newly developed nutrition screening guideline and a set of validity forms were provided. The validity form used was a similar form provided to the panel of experts. A duration of 2 to 3 days was given to participants to complete the form. Additional comments and suggestions were also collected to obtain more information. All of the data was descriptively analysed and presented in frequency and percentage.

Phase III: Feasibility Assessment of a Newly Developed Nutrition Screening Guideline

Sampling

Purposive sampling was utilised as the method to recruit informants in the selected health clinic setting. There is no sample size calculation for the number of healthcare staff due to the qualitative nature of this research. However, between 5 and 50 are needed in order to achieve data saturation (29). Besides, each healthcare staff is required to screen five (n = 5) older patients who attend the health clinic. This is to ensure that all healthcare staff have screened an equal number of participants. In addition, the sample size for qualitative research in a feasibility study is usually between 5 and 20 individuals (30).

Older participants were screened based on inclusion and exclusion criteria. The inclusion criteria are 60 years old and above with no apparent significant cognitive impairment and Malaysian citizenship, while the exclusion criteria are older persons with terminal illness (31). Meanwhile, healthcare staff who are responsible for managing older patients in the selected health clinics have been invited to participate in this study. Eligible participants have been provided with information about the study by the researcher to ensure their understanding. Then, an informed consent form from each participant was obtained after they agreed to participate before performing the nutrition screening.

Data Collection

A semi-structured interview guide (Table I) served as a guide during the in-depth interview session with the healthcare staff. The interview guide was adapted from a previous study (32). The in-depth interview session was performed once the healthcare staff had completed the nutrition screening procedure amongst five older patients attending the health clinic. The newly developed guideline was provided to each staff, which facilitated the nutrition screening process. Besides, the in-depth interview aimed to assess the feasibility of the newly developed nutrition screening guideline amongst healthcare staff in health clinic settings. The in-depth interviews have been chosen to explore the views and opinions of the topics in detail (33). The in-depth interviews were conducted in an allocated room in each

Table I: Semi-structured interview guide

Topics		Questions
1. Opinion	• Guideline	1. What is your overall opinion about this nutrition screening guideline?
2. Usage	• Malnutrition identification	1. What is your opinion about the use of this guideline in malnutrition identification? 2. Is this guideline able to identify malnutrition problem?
	• Malnutrition management	1. What is your opinion about the use of this guideline in managing malnutrition?
3. Acceptability	• Staff	1. How do you feel about this nutrition screening guideline?
	• Patient	1. Based on your opinion, how was the patient acceptability towards this guideline?
4. Improvement	• Guideline	1. Based on your opinion, what improvement can be done for this guideline? 2. Do you have any comment in certain sections?
5. Awareness	• Level of malnutrition	1. Based on your opinion, has the nutrition screening guideline increase your awareness towards malnutrition?

health clinic to avoid any distractions or noise. In-depth interviews were conducted in Malay language. The interviews were performed by a researcher (a research dietitian) from a university who was not holding any position in the health clinics. Then, only the researcher and participant were involved in the interview session. Before the interview session started, a set of demographic data forms were provided to the participants to obtain relevant data. Each interview was audio-recorded and transcribed verbatim by the researcher.

Data Analysis

Thematic analysis was used to analyse the interview data. The organisation and analysis of data followed the steps outlined inductively by Braun and Clarke (34). According to Braun and Clarke (34), the thematic analysis involves a few steps, which are: Familiarising with the results (Phase 1); Generating initial codes (Phase 2); Developing preliminary themes (Phase 3); Reviewing and modifying preliminary themes (Phase 4); Describing themes (Phase 5); and Write-up (Phase 6). Besides, nutrition screening data that has been obtained from healthcare staff was analysed statistically using the Statistical Package for the Social Sciences (SPSS) version 20.0. The normality test was performed to determine the distribution of the data. Therefore, a non-parametric test, Fisher's exact test, was conducted as the data was not normally distributed. Results were considered significant if the alpha value was below 0.05 ($p < 0.05$).

Ethical Approval

Ethical approval was obtained from the Medical Research and Ethics Committee (MREC), the Ministry of Health, Malaysia [Ethics no: NMRR-19-731-47602 (IIR)]. Permission from the Kuantan District Health Office and respective clinics was obtained prior to the commencement of data collection.

RESULTS

Phase I: Needs Assessment for Nutrition Screening

The needs assessment was performed in Phase I. Time, patient factors, organisation factors, and nutrition screening knowledge were identified as barriers and opportunities to performing nutrition screening (18). The findings from this phase became the basis for the development of a nutrition screening guideline.

Phase II: Development of Newly Developed Nutrition Screening Guideline

A comprehensive, newly developed nutrition screening guideline in A4 format with 31 pages written in Malay language was developed. The guideline has been divided into three components, which are: (A) Overview of nutrition screening guideline; (B) Implementation of nutrition screening; and (C) Guide to complete MNA®-SF and pathway after nutrition screening. Therefore, the topics that have been included under these three components are: introduction, aims and objectives of the guideline, definition of malnutrition, prevalence of malnutrition, consequences of malnutrition, implementation of nutrition screening, list of tools needed during nutrition screening, flow chart of nutrition screening, guidance on administering MNA®-SF, pathway after nutrition screening, and guidance on anthropometric measurements. The guideline aimed to facilitate healthcare staff in performing nutrition screening amongst older patients in a health clinic setting (Figure 1 and 2) with the inclusion of recommended nutritional care after nutrition screening according to MNA®-SF score (35).

Validation by Panel of Experts

A panel of six experts with a mean (SD) of 15.5 ± 6.72 years of service was involved in this study. Two (n = 2) experts are from the policy development and older person's health sectors in the Ministry of Health (MOH), Putrajaya, Malaysia; whilst two (n = 2) experts are dietitians from the Ministry of Health (MOH), Putrajaya and health clinic setting. Another two (n = 2) experts are academicians who have a background in the fields of family medicine and dietetics. They had returned the completed set of forms with their comments and suggestions to further improve the guideline.

The guideline's content has been divided into three components: Part A (Overview of nutrition screening guideline); Part B (Implementation of nutrition screening); and Part C (Guide to complete MNA®-SF and pathway after nutrition screening). Therefore, experts must rate the guideline by each component. From the findings, all the

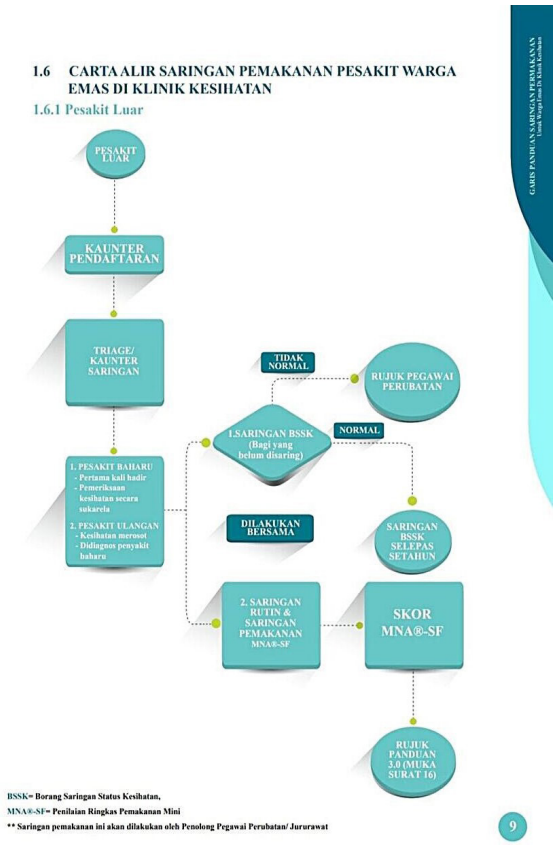

Figure 1: Flow Chart of Nutrition Screening in the Newly Developed Nutrition Screening Guideline (Malay language version)

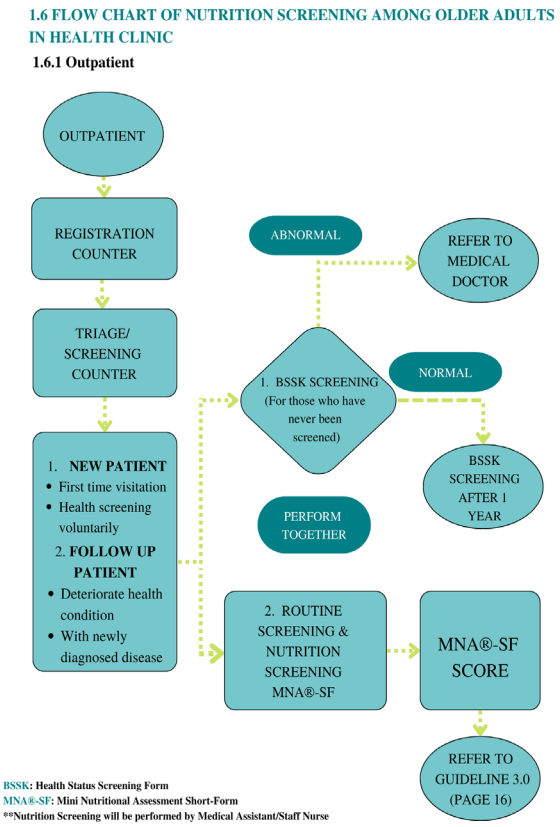

Figure 2: Flow Chart of Nutrition Screening in the Newly Developed Nutrition Screening Guideline (English Version)

components achieved a mean I-CVI of 0.87 (Part A), 0.89 (Part B), and 0.83 (Part C) (Table II). Besides, most Kappa agreement interpretations have shown excellent and good interpretation. In the face validity part by experts, the majority of the items received positive feedback. From the findings, an expert suggested including pictures of measuring the height of the Frankfurt position, calf circumference for bedridden patients, and knee height using measuring tape. In addition, a few suggestions, such as amendments related to sentences, headings, and subheadings, were received from the experts. Thus, the guideline was revised accordingly for improvement based on the comments and suggestions.

Face Validity by Healthcare Staff

During this phase, all healthcare staff (n = 24) with related positions have been approached. However, only a total of twelve healthcare staff agreed to participate. Thus, twelve healthcare staff with a mean age of 36.6 ± 6.2 years participated in this face validity. Besides, this phase has involved important positions in a health clinic setting; 41.7% of medical officers (MO), 33.3% of medical assistants (MA), and 25.0% of staff nurses (SN). From the findings, all the healthcare staff have provided positive feedback except for one part. A member of the healthcare staff has suggested including a section for patient information in nutrition screening, which includes name, gender, age, weight (kg), and height (cm). Consequently, the information has been included.

Feasibility Assessment of a Newly Developed Nutrition Screening Guideline

Twenty-four healthcare staff have been invited for this phase. However, two of them had declined the invitation. Therefore, twenty-two healthcare staff participated in individual in-depth interviews involving medical officers (n = 8), medical assistants (n = 8), and staff nurses (n = 6). Data saturation was reached by the 17 interviews. The mean age of staff participants was 34.4 ± 5.5 years. Besides, 110 older patients with a mean age of 68.7 ± 6.1 years were screened by the healthcare staff (Table III) within 4 weeks. From the findings, age is associated with the MNA®-SF score ($p < 0.001$). Increasing age has increased the risk of malnutrition. According to the findings, a small number of elderly patients aged 80 years old and above were involved. None of them were found to have normal nutritional status. Furthermore, the majority of them were classified as at-risk, and one patient was categorised as malnourished. Besides, 35.3% of older persons aged 70–79 years old were at-risk of malnutrition compared to 64.7% who were well-nourished. However, there is no association between gender and the MNA®-SF score ($p = 0.418$). The results also showed that health clinics' classification (urban and rural areas) is significantly associated with the MNA®-SF score ($p = 0.001$). From the findings, older persons from rural areas (43.6%) were more at-risk of malnutrition than those from urban areas (14.5%). Based on the interview results amongst healthcare staff, four

Table II: The relevance ratings on item-scale by six (n=6) experts
(Part A)

	Expert										
Items	**1**	**2**	**3**	**4**	**5**	**6**		**Experts in agreement**	**I-CVI**	**Pc**	**K**	**Interpretation**
Scientific accuracy												
1. Contents are in agreement with the current knowledge	1	1	1	1	1	1		6	1.0	0.01563	1	Excellent
2. Contents are necessary and correct	1	0	1	0	1	1		4	0.67	0.23438	0.57	Fair
Content												
1. Objectives are evident	1	1	1	1	1	1		6	1.0	0.01563	1	Excellent
2. There is no unnecessary information	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
3. Important points are included	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
Proportion prevalence	0.6	0.8	1	0.8	1	1		**S-CVI/Ave**	0.87			
Average proportion of items judges as relevance across the six experts							**0.87**					

(Part B)

	Expert										
Items	**1**	**2**	**3**	**4**	**5**	**6**		**Experts in agreement**	**I-CVI**	**Pc**	**K**	**Interpretation**
Scientific accuracy												
1. Contents are in agreement with the current knowledge	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
2. Recommendation are necessary and are correctly approach	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
Content												
1. Objectives are evident	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
2. Recommendation about desired action is satisfactory	1	1	1	1	1	1		6	1.0	0.01563	1	Excellent
3. There is no unnecessary information	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
4. Important points are included	1	1	1	1	1	1		6	1.0	0.01563	1	Excellent
Proportion prevalence	0.33	1	1	1	1	1		**S-CVI/Ave**	0.89			
Average proportion of items judges as relevance across the six experts							**0.88**					

(Part C)

	Expert										
Items	**1**	**2**	**3**	**4**	**5**	**6**		**Experts in agreement**	**I-CVI**	**Pc**	**K**	**Interpretation**
Scientific accuracy												
1. Contents are in agreement with the current knowledge	1	1	1	1	1	1		6	1.0	0.01563	1	Excellent
2. Recommendation are necessary and are correctly approach	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
Content												
1. Objectives are evident	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
2. Recommendation about desired action is satisfactory	0	1	1	0	1	1		4	0.67	0.23438	0.57	Fair
3. There is no unnecessary information	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
4. Important points are included	0	1	1	1	1	1		5	0.83	0.09375	0.81	Excellent
Proportion prevalence	0.17	1	1	0.83	1	1		**S-CVI/Ave**	0.83			
Average proportion of items judges as relevance across the six experts							**0.83**					

themes emerged from the feasibility assessment: Theme 1: Ease of use; Theme 2: Identification and management of malnutrition; Theme 3: Acceptability; and Theme 4: Implementation of nutrition screening.

Theme 1: Ease of Use

The newly developed nutrition screening guideline and nutrition screening tool used in this phase, the MNA®-SF, were viewed by participants as accessible and comprehensive. Most of the healthcare staff mentioned that the newly developed nutrition screening guideline is easy to read and understand. The content of the guideline consisted of flow charts and pictures, which were perceived as nice and understandable.

"*Hmm ok, simple and concise. It is straightforward to understand for all healthcare staff. It is beneficial and has flow charts. Flow charts are understandable*" (P122, MO).

The items in the MNA®-SF were acknowledged as easy, concise, and straightforward. Patients were able to understand the questions being asked. Participants viewed the scoring in the MNA®-SF form as concise

Table III: Results of nutrition screening among older patients in health clinics (n=110)

Parameter	12-14 points	8-11 points	0-7 points	p-value
	Normal nutritional status (n=77)	At risk of malnutrition (n=32)	Malnourished (n=1)	
Age (year)				
60-69 (n=69)	55(79.7)	14(20.3)	0(0)	
70-79 (n=34)	22(64.7)	12(35.3)	0(0)	<0.001
≥80 (n=7)	0(0)	6(85.7)	1(14.3)	
Gender				
Male (n=40)	31(77.5)	9(22.5)	0(0)	0.418
Female (n=70)	46(65.7)	23(32.8)	1(1.4)	
Classification of health clinics				
Urban (n=55)	46(83.6)	8(14.5)	1(1.8)	0.001
Rural (n=55)	31(56.3)	24(43.6)	0(0)	

Data represented as n(%)
Fisher's exact test, p<0.05

and easy for them to categorise the patients. Most importantly, this nutrition screening did not take a long duration to perform.

"*I think the questions are very concise. Patients could easily understand once we explained to them. They were able to answer all the questions*". (P101, SN)

The newly developed nutrition screening guideline has been identified as comprehensive. Most healthcare staff stated that the nutrition screening guideline has acted as guidance, being simple, concise, complete, and very detailed.

"*It is good to follow this. That means we have a reference in the identification of malnourished patients*" (P108, SN).

Theme 2: Identification and Management of Malnutrition

The newly developed nutrition screening guideline was able to help in the identification and management of malnutrition. Most of them mentioned that the newly developed nutrition screening guideline was able to identify malnutrition. They perceived that all the six items of MNA®-SF can help in malnutrition identification.

"*For example, the first question we asked patients related to loss of appetite within 3 months. Therefore, we can describe it from there and know whether patients have malnutrition problems or not. Then, we can also observe from the patients' body mass index*" (P103, MA).

Besides, the nutrition screening was able to identify causes and other factors of malnutrition. The healthcare staff have stated that they could learn other reasons related to food from performing nutrition screening. For instance, they knew the patients' psychological status, swallowing issues, digestions, and mobility. They also realised the importance of malnutrition identification in health clinic setting.

"*Because all the questions asked are closely related. For example, stress. Patients also have to be informed regarding their appetite due to diseases. Sometimes they are in a depressed condition. Thus, I think the guideline helps a lot*" (P107, MA).

Management of malnutrition was also stated during the in-depth interviews. They found that nutrition screening guideline was able to manage malnutrition problems. Malnutrition identification can be performed and malnourished or at-risk older patients can be referred to a medical officer for further referral to a dietitian for nutritional management. The involvement of a multidisciplinary team is needed to ensure proper management of malnutrition amongst patients.

"*It will be easier and faster in terms of management. Therefore, we can overcome this malnutrition problem*" (P103, MA).

Theme 3: Acceptability

The newly developed nutrition screening guideline and nutrition screening were well-accepted by healthcare staff working in the health clinics. Based on the findings, the healthcare staff mentioned that nutrition screening can be performed in health clinic setting.

"*Haa ok. Can be performed. Because all the questions are simple. Hence, it can be performed*" (P109, MO).

They also believed that the newly developed nutrition screening guideline is needed in the health clinics.

"*This guideline is needed here. Every healthcare staff must know about it*" (P102, SN).

Besides, the nutrition screening procedure was also well-accepted by older patients, although they had never been screened using any nutrition screening tool.

"*Patients cooperated well. No problem. We have explained that this is a new screening that has never been conducted previously. We have also informed them that the questions are simple. Thus, they were OK and answered all the questions asked*" (P114, MA).

Theme 4: Implementation of Nutrition Screening

Another theme that has been identified is the implementation of nutrition screening. The information obtained from healthcare staff was related to incorporating the nutrition screening tool into the existing screening procedure, the role of nutrition screening, and the target number of nutrition screenings to be conducted. The healthcare staff stated that nutrition screening can be incorporated into the routine screening and can be done in the screening area. Emphasising healthcare staff's role

and involvement were also needed to ensure nutrition screening could be conducted.

"*There is no issue with administering this form. However, we need to emphasise the area and staff involved in this nutrition screening*" (P105, MO).

"*Hmm, I think we are able to perform it. Because the questions are simple. Yes, we can do it, but we need to have a target. It will depend on the situation. If we have a target, for example, how many patients per week? Therefore, we are able to know the percentage of the problem. We probably could not perform for all patients; we need to have a target by week, month, or year*" (P109, MO).

DISCUSSION

The feasibility of a newly developed nutrition screening guideline in health clinic setting was evaluated amongst healthcare staff in this study. The validation component is the essential phase in guideline development as the guideline should be reviewed, assessed, and revised based on comments and suggestions (25). Meanwhile, values for CVI, modified Kappa, and comments added rigour to the validation process of the guideline (36). The present findings showed that all the mean of CVI, which are: 1) Mean of Item Content Validity Index (I-CVI) and 2) Scale level content validity index across the experts (S-CVI/Ave), for all three components had achieved the minimum value of 0.83 (37).
However, there are individual items in the instruments that did not achieve a minimum value of I-CVI. The modified Kappa was calculated to measure the chance of agreement between the experts (25,38). Both the I-CVI and modified Kappa are required to assess content validity and do not aim to reject or modify the items (36). Besides, comments and suggestions from the panel of experts are required for a specific judgement. From the findings, an expert suggested including pictures of measuring the height of the Frankfurt position, calf circumference for bedridden patients, and knee height using measuring tape. Several studies have highlighted the method of measuring height by ensuring the head is aligned with the Frankfurt horizontal plane (39). Other pictures, as suggested, were included in the guideline. The validation findings also did not require any deletion or addition of topics, but only minor amendments to the specific section, such as the heading and sentences.

The guideline also has been validated amongst healthcare staff. The majority of them showed positive responses. Therefore, it shows that the guideline is well accepted amongst healthcare staff. Only a minor amendment related to the patient information was required, and it has been revised accordingly.

Then, the feasibility assessment of the newly developed nutrition screening guideline demonstrated that the guideline was feasible amongst healthcare staff in a health clinic setting. A previous study in Australian General Practices that utilised a mixed-method approach examined the feasibility of using MNA®-SF, a similar tool used in this study (32). The qualitative approach of in-depth interviews was conducted after completing the nutrition screening and is also parallel to the methodology used in the present study (32).

A total of 110 older patients with a mean age of 68.7 ± 6.1 years old have been screened by healthcare staff in four health clinics. From the findings (Table III), 20.3% of older persons aged 60–69 years old, 35.3% of older persons aged 70–79 years old, and 85.7% of older persons aged ≥ 80 years old are classified as at-risk of malnutrition. Meanwhile, only one older patient (aged ≥ 80) is categorised as malnourished. Participation of older patients aged 80 years old and above was the lowest due to the low number of them attending health clinics. A previous study conducted in Kuantan, Pahang, showed a higher percentage of malnutrition risk increasing with age, where 68.0% of older persons aged > 75 years old were identified as malnutrition risk compared to 32.1% of older persons aged 60–74 years old (14). Furthermore, a higher number of females (32.8%) are categorised as at-risk for malnutrition than males (22.5%). Previous studies have also demonstrated similar findings of a higher percentage amongst females than males (14,40). However, the findings of this study revealed no association between gender and nutrition risk, which is consistent with the findings of other studies (14,40).

Besides, a greater number of older persons from rural areas have been identified as at-risk of malnutrition than those from urban areas, with a documented lower number of well-nourished elderly in rural areas compared to urban areas. The findings also showed an association between the classification of health clinics and the malnutrition risk score. This is due to the population's nutritional status being heavily influenced by socioeconomic status (41).

From the interview findings, the healthcare staff perceived the MNA®-SF and nutrition screening guideline as easy to understand, easy-to-use, simple and straightforward. The findings are consistent with other studies which also identified MNA®-SF as an easy-to-use tool, systematic and quick (32,42,43). Besides, MNA®-SF can also be completed within a short time. It takes 5 minutes to complete, as opposed to a full MNA®, which takes 10 to 15 minutes (11). Six items in MNA®-SF are easy to understand; hence, patients can understand the administered questions. The findings also highlighted that the scoring in the tool is simple and easy to categorise the patient according to malnutrition risk category. It was also highlighted by Green and Watson (7) that screening tools needed to be

acceptable, simple to administer by staff and tolerable to patients. Healthcare staff perceived that the newly developed guideline is comprehensive, systematic, and suitable for the health clinic setting. Thus, it shows that the guideline is feasible as a good guideline must be easy to follow and compatible with current practise (44).

In addition, the healthcare staff stated that identification and management of malnutrition can be done through nutrition screening. The use of a nutrition screening tool facilitated by nutrition screening guideline was recognised as easy to use and able to identify nutritionally at-risk patients. A few previous studies also stated that nutrition screening tools are easy to use, systematic and quick in malnutrition identification (32,43,45). Nutrition screening could enable identification of causes and other factors of malnutrition. This is due to the inclusion of other parameters in MNA®-SF, such as mobility, psychological stress, and neuropsychological problems (46). Therefore, malnutrition management can be implemented after early identification. Involvement of a multidisciplinary healthcare team can further assist in managing this issue (47). Referral to a medical officer or dietitian can be done subsequently for at-risk and malnourished patients in a health clinic.

The newly developed nutrition screening has shown positive acceptance amongst healthcare staff and older patients as well. The healthcare staff perceived that nutrition screening can be conducted routinely in health clinic setting. Besides, this procedure was also well-received among patients, as they were willing to cooperate and responded well during nutrition screening. This is in line with a study that stated a positive impression amongst nurses who stated that nutrition screening had a minimal impact on their current workflow and was easy-to-use and efficient (42). Items in MNA®-SF are constantly asked of patients, indirectly by the healthcare staff. Thus, it reflected that MNA®-SF was recognised as non-invasive and well-received by patients (32). In addition, it requires no training and can be performed in a short period of time (43).

The findings also highlighted that the most feasible way to perform nutrition screening is by incorporating this tool into existing practice. This approach has been emphasised in several previous studies (32,42), which enables nutrition screening to be performed routinely (13,32,47). Besides, it leads to early malnutrition identification and intervention for at-risk and malnourished patients (13). Moreover, the role of healthcare personnel should be emphasised for nutrition screening as they are commonly the first point of contact that patients seek for medical advice (48,49). Therefore, involvement of a multidisciplinary healthcare staff is greatly needed in the identification and overcoming of nutritional issues (50).

The limitation of this study is that it was conducted in a single state of Peninsular Malaysia, and thus the findings may not be generalizable to other states. The strength of this study is demonstrated through the rigorous process involved in the guideline development. The guideline has been validated amongst experts and healthcare staff with good validity. Besides, the participation of healthcare staff is voluntary, and they were given an acceptable 4-week duration to perform the nutrition screening. Thus, informative perspectives related to feasibility have been obtained based on their own experience. Most importantly, the qualitative data analysis was performed based on the established framework.

CONCLUSION

The newly developed nutrition screening guideline was well accepted by both healthcare staff and older patients. Besides, it was also feasible to perform it in health clinic setting. The implementation of nutrition screening in health clinics is feasible through the use of an easy and systematic tool, the MNA®-SF. Besides, the provision of MNA®-SF guided by the newly developed nutrition screening guideline is able to increase the rate of nutrition screening uptake. Therefore, timely malnutrition identification could help at-risk and malnourished patients acquire subsequent intervention. Incorporation of a nutrition screening tool into current practise was viewed as the most feasible way to perform nutrition screening. For future research, the effectiveness of this newly developed nutrition screening guideline and nutrition screening outcome in older patients can be further examined. Nutrition intervention is also warranted to be conducted as part of the study.

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REFERENCES

1. Amarya S, Singh K, Sabharwal M. Changes during aging and their association with malnutrition. J Clin Gerontol Geriatr. 2015;6(3):78–84. doi:10.1016/j.jcgg.2015.05.003
2. Saka B, Kaya O, Ozturk GB, Erten N, Karan MA. Malnutrition in the elderly and its relationship with other geriatric syndromes. Clin Nutr. 2010;29(6):745–8. doi:10.1016/j.clnu.2010.04.006
3. Davidson J, Getz M. Nutritional risk and body composition in free-living elderly participating in congregate meal-site programs. J Nutr Elder. 2004;24(1):53–68. doi:10.1300/J052v24n01_04
4. Volkert D, Beck AM, Cederholm T, Cereda E, Cruz-jentoft A, Goisser S, et al. Management

of Malnutrition in Older Patients — Current Approaches , Evidence and Open Questions. J Clin Med. 2019;8(7):974. doi:10.3390/jcm8070974
5. Watterson C, Fraser A, Banks M, Isenring E, Miller M, C S, et al. Evidence based practice guidelines for the nutritional management of malnutrition in adult patients across the continuum of care. Nutr Diet. 2009;66(s3). doi:10.1111/j.1747-0080.2009.01383.x
6. Mueller, C., Compher, C., Ellen, D. M., & American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors (2011). A.S.P.E.N. clinical guidelines: Nutrition screening, assessment, and intervention in adults. JPEN. Journal of parenteral and enteral nutrition, 35(1), 16–24. doi:10.1177/0148607110389335
7. Green S., Watson R. Nutritional screening and assessment tools for use by nurses: Literature review. J Adv Nurs. 2005;50(1):69–83. doi:10.1111/j.1365-2648.2004.03350.x
8. Kondrup J, Allison SP, Elia M, Vellas B, Plauth M. SPECIAL ARTICLE ESPEN Guidelines for Nutrition Screening 2002. Clin Nutr. 2003;22(4):415–21. doi:10.1016/s0261-5614(03)00098-0
9. Philips MB, Foley AL, Barnard R, Isenring EA, Miller MD. Nutritional screening in community-dwelling older adults: A systematic literature review. Asia Pac J Clin Nutr 2010;19(3):440–9.
10. Hamirudin AH, Charlton K, Walton K. Outcomes related to nutrition screening in community living older adults: A systematic literature review. Arch Gerontol Geriatr. 2016;62:9–25. doi:10.1016/j.archger.2015.09.007
11. Kaiser MJ, Bauer JM, Ramsch C, Uter W, Guigoz Y, Cederholm T, et al. Validation of the Mini Nutritional Assessment short-form (MNA®-SF): A practical tool for identification of nutritional status. J Nutr Heal Aging. 2009;13(9):782–8. doi:10.1007/s12603-009-0214-7
12. Mays LC, Drummonds J., Powers S, Buys DR, Watts P. Identifying Geriatric Patients at Risk for Malnutrition: A Quality Improvement Project. J Nutr Gerontol Geriatr 2019;38(2):115–29.doi:10.1080/21551197.2019.1604464
13. Winter J, Flanagan D, Mcnaughton SA, Nowson C. Nutrition screening of older people in a community general practice, using the MNA-SF. J Nutr Health Aging. 2013;17(4):322–5. doi:10.1007/s12603-013-0020-0
14. Zainudin N, Hamirudin AH, Nor NA, Sidek S. Malnutrition risk and perception on dietary practices among elderly living in agricultural settlements: A mixed-methods research. Nutr Food Sci. 2019;49(4):617–27. doi: 10.1108/NFS-07-2018-0218
15. Suzana S, Boon PC, Chan PP, Normah CD. Malnutrition risk and its association with appetite, functional and psychosocial status among elderly malays in an agricultural settlement. Malays J Nutr. 2013;19(1):65–76.
16. Craven DL, Pelly FE, Isenring E, Lovell GP. Barriers and enablers to malnutrition screening of community-living older adults : a content analysis of survey data by Australian dietitians. Aust J Prim Health. 2017;23(2):196–201. doi:10.1071/PY16054
17. Hamirudin AH, Charlton K, Walton K, Bonney A, Albert G, Hodgkins A, et al. "We are all time poor": Is routine nutrition screening of older patients feasible? Aust Fam Physician. 2013;42(5):321–6.
18. Sheikh Hishamuddin SNA, Hamirudin AH, Harith S, Aris M, Hanim K, Syaireen N. Barriers and Opportunities of Nutrition Screening in Elderly Patients in Health Clinic Settings in Kuantan , Pahang : A Qualitative Study. Malaysian J Med Heal Sci. 2021;17:21–9.
19. Lingard L, Albert M, Levinson W. Grounded theory , mixed methods , and action research. BMJ. 2008;337(August):459–61. doi:10.1136/bmj.39602.690162.47
20. Burns A. Action Research. First. Brown J., Coombe C, editors. The Cambridge Guide to Research in Language Teaching and Learning. Cambridge: Cambridge University Press; 2015. 99–104 p.
21. Shahar S, Siti Saifa H. Validation of nutritional screening tools against anthropometric and functional assessments among elderly people in Selangor. Malays J Nutr. 2007;13(1):29–44.
22. Yaghmaie F. Content validity and its estimation. J Med Educ Spring. 2003;3(1):25–7. doi: 10.22037/jme.v3i1.870.
23. de Castro MS, Pilger D, Fuchs FD, Ferreira MBC. Development and validity of a method for the evaluation of printed education material. Pharm Pract (Granada). 2007;5(2):89–94. doi:10.4321/s1886-36552007000200007
24. Lau XC, Wong YL, Wong JE, Koh D, Sedek R, Jamil AT, et al. Development and Validation of a Physical Activity Educational Module for Overweight and Obese Adolescents: CERGAS Programme. Int J Environ Res Public Health. 2019;16(9):1–16. doi:10.3390/ijerph16091506
25. Zamanzadeh V, Ghahramaniah A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar A. Design and Implementation Content Validity Study: Development of an instrument for measuring Patient-Centered Communication. J Caring Sci. 2015;4(2):165–78. doi:10.15171/jcs.2015.017
26. Yusoff MSB. ABC of Content Validation and Content Validity Index Calculation. Educ Med J. 2019;11(2):49–54. doi:10.21315/eimj2019.11.2.6
27. Masuwai A, Tajudin M, Saad NS. Evaluating the face and content validity of a Teaching and Learning Guiding Principles Instrument (TLGPI): A perspective study of Malaysian teacher educators. 2016;3(3):11–21.
28. Lam KW, Hassan A, Sulaiman T, Lam KW, Hassan A, Sulaiman T. Evaluating the Face and Content

Validity of an Instructional Technology Competency Instrument for University Lecturers in Malaysia. Int J Acad Res Bus Soc Sci. 2018;8(5):367–85. doi:10.6007/IJARBSS/v8-i5/4108
29. Dworkin SL. Sample Size Policy for Qualitative Studies Using In-Depth Interviews. 2012;1319–20. https://doi.org/10.1007/s10508-012-0016-6
30. O' Cathain A, Hoddinott P, Lewin S, Thomas KJ, Young B, Adamson J, et al. Maximising the impact of qualitative research in feasibility studies for randomised controlled trials : guidance for researchers. Pilot Feasibility Stud. 2015;1(32):1–13. doi:10.1186/s40814-015-0026-y
31. Adznam SN, Rahman SA, Arshad F, Salleh M, Sakian NIM, Yusoff NAM, et al. Development and analysis of acceptance of a nutrition education package among a rural elderly population: an action research study. BMC Geriatr. 2012;12(1). doi:10.1186/1471-2318-12-24
32. Hamirudin AH, Charlton K, Walton K, Bonney A, Potter J, Milosavljevic M, et al. Feasibility of implementing routine nutritional screening for older adults in Australian general practices: a mixed-methods study. BMC Fam Pract. 2014 Nov;15:186. doi:10.1186/s12875-014-0186-5
33. Jamshed S. Qualitative research method-interviewing and observation. J Basic Clin Pharm. 2014;5(4):87. doi:10.4103/0976-0105.141942
34. Braun V, Clarke V. Using thematic analysis in psycology. Qual Res Psychol. 2006;3(2):77–101. doi: 10.1191/1478088706qp063oa
35. Nestle Nutrition Institute. A guide to completing the Mini Nutritional Assessment – Short Form (MNA®-SF) [Online]. [Internet]. 2014. Available from: http://www.mna-elderly.com/forms/mna_guide_english_sf.pdf
36. Halek M, Holle D, Bartholomeyczik S. Development and evaluation of the content validity, practicability and feasibility of the Innovative dementia-oriented Assessment system for challenging behaviour in residents with dementia. BMC Health Serv Res. 2017;17(1):554. doi:10.1186/s12913-017-2469-8
37. Polit DF, Beck CT, Owen S V. Focus on research methods: Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. Res Nurs Heal. 2007;30(4):459–67. https://doi.org/10.1002/nur.20199
38. Wynd CA, Schmidt B, Schaefer MA. Two quantitative approaches for estimating content validity. West J Nurs Res. 2003;25(5):508–18. doi:10.1177/0193945903252998
39. Goswami A, Kalaivani M, Gupta S, Nongkynrih B, Pandav C. Relationship between height and arm span of elderly persons in an urban colony of New Delhi. Indian J Public Health. 2018;62(2):159–62. doi:10.4103/ijph.IJPH_378_16
40. Muhamad AR, Hamirudin AH, Zainudin N, Sidek S, Rahman NA. NUTRITIONAL RISK ACCORDING TO MINI NUTRITIONAL ASSESSMENT– SHORT FORM AMONG COMMUNITY DWELLING ELDERLY IN KUANTAN, PAHANG: A PILOT STUDY. Int J ALLIED Heal Sci. 2019;3(2):658–67.
41. Shahar S, Vanoh D, Mat Ludin AF, Singh DKA, Hamid TA. Factors associated with poor socioeconomic status among Malaysian older adults: An analysis according to urban and rural settings. BMC Public Health. 2019;19(Suppl 4):1–12. doi:10.1186/s12889-019-6866-2
42. Mays LC, Drummonds J., Powers S, Buys DR, Watts P. Identifying Geriatric Patients at Risk for Malnutrition : A Quality Improvement Project Identifying Geriatric Patients at Risk for Malnutrition : J Nutr Gerontol Geriatr. 2019;38(2):115–29. doi:10.1080/21551197.2019.1604464
43. Skates JJ, Anthony PS. Identifying Geriatric Malnutrition in Nursing Practice_The Mini Nutritional Assessment (MNA®)—An Evidence-Based Screening Tool. J Gerontol Nurs. 2012;38(3):18–27. doi:10.3928/00989134-20120207-50
44. Burgers J., Grol RP, Zaat JO., Spies T., Van der Bij A., Mokkink HG. Characteristics of effective clinical guidelines for general practice. Br J Gen Pract. 2003;53:15–9.
45. Vellas B, Villars H, Abellan G, Soto ME, Rolland Y, Guigoz Y, et al. Overview of the MNA® - Its history and challenges. J Nutr Heal Aging. 2006;10(6):456–63.
46. Rodrigues GM, Ferreira DB, Santiago LM, Luz LL, Mattos IE. SHORT-FORM MINI NUTRITIONAL ASSESSMENT AS A TOOL FOR NUTRITION EVALUATION IN ELDERLY INDIVIDUALS WITH CANCER IN BRAZIL. J Aging Res Clin Pract. 2014;3(4):211–7.
47. Flanagan D, Fisher T, Murray M, Visvanathan R, Charlton K, Thesing C, et al. Managing undernutrition in the elderly: Prevention is better than cure. Aust Fam Physician. 2012 Sep;41(9):695–9. Available from: http://210.48.222.80/proxy.pac/docview/1041257220?accountid=44024
48. Power L, Mullally D, Gibney ER, Clarke M, Visser M, Volkert D, et al. A review of the validity of malnutrition screening tools used in older adults in community and healthcare settings – A MaNuEL study. Clin Nutr ESPEN. 2018;24:1–13. doi:10.1016/j.clnesp.2018.02.005
49. Todorovic V. Nutritional screening in the community: developing strategies. Br J Community Nurs. 2004;9(11):464–70. doi:10.12968/bjcn.2004.9.11.16879
50. Endevelt R, Werner P, Goldman D, Karpati T. NURSES' KNOWLEDGE AND ATTITUDES REGARDING NUTRITION IN THE ELDERLY. J Nutr Health Aging. 2009 Jun;13(6):485–9. doi:10.1007/s12603-009-0098-6