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NUTRITIONAL RISK ACCORDING TO MINI NUTRITIONAL ASSESSMENT– SHORT FORM AMONG COMMUNITY DWELLING ELDERLY IN KUANTAN, PAHANG: A PILOT STUDY

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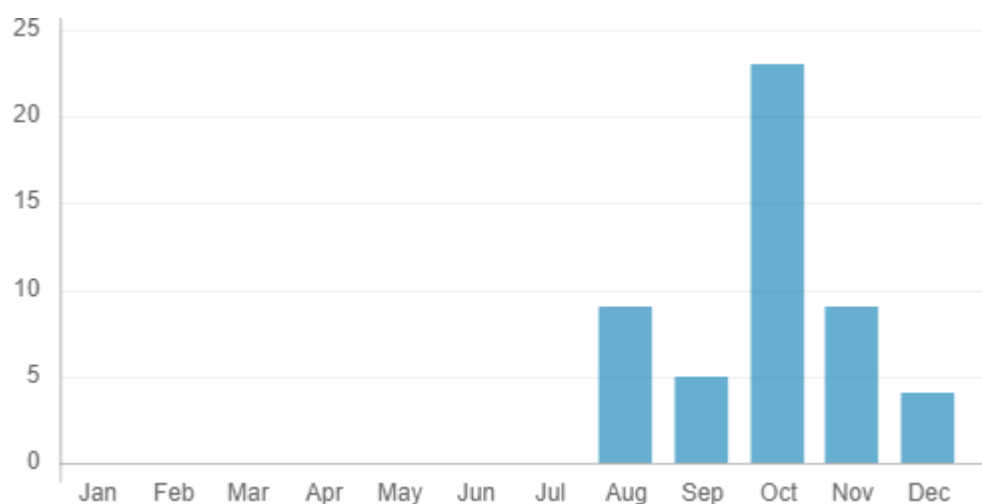
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ABSTRACT

Introduction: The risk of developing malnutrition increases with advancing age. It has the potential to place significant burdens on healthcare and other support services. However, studies with regards to malnutrition among community-dwelling elderly population in Malaysia is scarce specifically in Kuantan. The objective of this study was to determine malnutrition risk using the Mini Nutritional Assessment- Short Form (MNA-SF) among community-dwelling elderly people in Kuantan and to investigate its associated factors. **Methods:** A pilot study was conducted among 73 community-dwelling elderly in Kuantan, Pahang, Malaysia aged 60 years and above. Malnutrition risk of the elderly was evaluated by using Mini Nutritional Assessment– Short Form (MNA-SF). A standardized questionnaire was used to record the factors associated with malnutrition: demographic characteristics, income level, percentage of food expenditure per month, body mass index, physical activity level and disease status. Chi Square test was performed for statistical analysis. **Results:** The subjects comprised of 39 (53.4%) males and 34 (46.6%) females. Mean age of the subjects was 65.4 ± 5.4 years old. Among 73 subjects, 36.0% were well nourished and 64.0% were at malnutrition risk. Low income ($p= 0.045$) and physically inactive among elderly subjects ($p= 0.039$) appeared to be significantly associated with malnutrition risk. Other results were not statistically significant. **Conclusions:** The findings provide preliminary evidence that malnutrition risk was high among elderly living in Kuantan. Therefore, nutrition screening in a full-scale study is recommended for elderly in order to further identify those at risk of malnutrition in a timely manner. Hence, intervention can be implemented to improve the health status of this population.

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NUTRITIONAL RISK ACCORDING TO MINI NUTRITIONAL ASSESSMENT- SHORT FORM AMONG COMMUNITY DWELLING ELDERLY IN KUANTAN, PAHANG: A PILOT STUDY

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ABSTRACT

Introduction: The risk of developing malnutrition increases with advancing age. It has the potential to place significant burdens on healthcare and other support services. However, studies with regards to malnutrition among community-dwelling elderly population in Malaysia are scarce specifically in Kuantan. The objective of this study was to determine malnutrition risk using the Mini Nutritional Assessment- Short Form (MNA-SF) among community-dwelling elderly people in Kuantan and to investigate its associated factors. **Methods:** A pilot study was conducted among 73 community-dwelling elderly in Kuantan, Pahang, Malaysia aged 60 years and above. Malnutrition risk of the elderly was evaluated by using MNA-SF. A standardized questionnaire was used to record the factors associated with malnutrition: demographic characteristics, income level, percentage of food expenditure per month, body mass index, physical activity level and disease status. Chi Square test was performed for statistical analysis. **Results:** The subjects comprised of 39 (53.4%) males and 34 (46.6%) females. Mean age of the subjects was 65.4 ± 5.4 years old. Among 73 subjects, 36.0% were well nourished and 64.0% were at malnutrition risk. Low income ($p= 0.045$) and physically inactive among elderly subjects ($p= 0.039$) appeared to be significantly associated with malnutrition risk. Other results were not statistically significant. **Conclusions:** The findings provide preliminary evidence that malnutrition risk was high among elderly living in Kuantan. Therefore, nutrition screening in a full-scale study is recommended for elderly in order to further identify those at risk of

malnutrition in a timely manner. Consequently, intervention can be implemented to improve the health status of this population.

KEYWORDS: Malnutrition, Community-dwelling, Elderly, MNA-SF

INTRODUCTION

The number of elderly around the globe is increasing rapidly (Leslie & Hankey, 2015). It is expected to become more than double by 2050 and beyond triple by 2100; rising from 962 million in 2017 to 2.1 billion in 2050 and 3.1 billion in 2100 (United Nation, 2017). Referring to Malaysian context based on projections made by the Department of Statistics, ageing population status is expected to be reached by the year 2035, at which point 15% of the total population will be 60 years old and above. Meanwhile, according to Asian Urban Information Centre of Kobe (AUICK) (2009), Kuantan's population aged 60 years and above was about 4.2% in the 2001 census. The number of elderly was 19,300 in 2008, increased from 8,900 in the year 2000, and reached 28,960 by 2015. This projected growth of the elderly population has posed a concern about the possible impact of ageing on their health status, such as malnutrition (Mafauzy, 2000). Aging involves physiological, pathological, social, and psychological changes that may interfere with adequate nutrient intake and predispose them to malnutrition risk (Tucker & Buranapin, 2001; Amarya et al., 2015). This is a cause for concern considering malnutrition can have deleterious effects which are associated with longer recovery periods and hospital stay, high incidence of complications, poorer function and quality of life, and delayed wound healing resulting in high mortality rates (Heismayr et al, 2009; Meijers et al, 2012). Therefore, nutritional issues pertaining to elderly are important to be discussed which requires extensive and up-to-date information. This is essential to further plan for effective intervention strategies that would be important for both the elderly people and the health-care system (Agarwalla et al., 2015).

It is important and highly recommended to screen for malnutrition risk among elderly people for early identification (Kaiser et al., 2010). When this preventive measure has been taken, appropriate nutrition intervention can be further implemented. Furthermore, studies have shown that implementing nutritional screening in the older population, can result in positive influence on clinical outcome, improving health, reducing mortality and maintaining independence (Hamirudin et al., 2016). To the best of our knowledge, no studies have been reported on nutritional risk among community-dwelling elderly in Kuantan, Pahang. Hence, this pilot study examined the malnutrition risk prevalence among community-dwelling elderly people in Kuantan using the MNA-SF. In addition, associations between malnutrition risk and other factors such as gender, education level, body mass index (BMI), disease status, percentage of food expenditure per month, income per month and physical activity level were evaluated.

METHODS

In this pilot cross-sectional study, 73 subjects aged 60 years old and above were recruited from Pusat Aktiviti Warga Emas which was located in Kompleks Penyayang, Kampung Tiram, Kuantan, Pahang, Malaysia. Sample size calculation for this study was according to single proportion formula:

$$n = \frac{Z^2 P (1- P)}{d^2}, \text{ where}$$

n = estimated sample size

Z = standard value at confidence level at 95%

= 1.96

d = absolute precision set at 5%
= 0.05

P = expected prevalence of malnutrition of elderly in Kuantan based on previous study
= 5% (Kaiser et al., 2010)

$$\text{Thus, } n = \frac{1.96^2(0.05)(1-0.05)}{(0.05)^2}$$

$$= 72.94$$

Number of sample = 73

This study was conducted in the year 2016. Convenience sampling method was chosen due to accessibility and availability of elderly participants within short study duration (Martínez-Mesa et al., 2016).

Sociodemographic and anthropometric characteristics

Sociodemographic data which include age, gender, education level, disease status, percentage of food expenditure per month, income per month and physical activity level information were recorded using a questionnaire adopted from the Malaysian Ministry of Health (1997). Income per month of the elderly was classified into three categories (<RM899, RM900-RM1499 and >RM1500), adapted from the Malaysia's Minimal Salary Act 2012. The frequency of physical activity was categorized into three main groups which were frequent (every day and 2-3 times per week), less frequent (once per week, 2-3 times per month) and none. Each physical activity should be at least 30 minutes per session. Face-to-face interviews with the elderly were performed to obtain the required data. Association between the collected information with malnutrition risk was assessed. Height of participants was measured using portable stadiometer (SECA 213, Hamburg, Germany). Reading of height measurement was taken to the nearest 0.1cm. Weight of participants was measured using an electronics flat scale (SECA 803, Hamburg, Germany). Reading of weight was taken to the nearest 0.1kg. BMI was derived using the following equation: weight in kilogram divided by height in meter square (weight (kg)/height (m)²).

Nutrition screening

All elderly subjects were screened for malnutrition risk using the Mini Nutritional Assessment Short Form (MNA-SF). MNA-SF is a screening tool used to assess nutritional risk among elderly people. In this study, the newly revised MNA-SF was used as a valid nutritional screening tool (Kaiser et al., 2009). This revision was based on the original development and validation study of the MNA-SF, published by Rubenstein and colleagues in 2001. The first five questions of the revised MNA-SF were unchanged from the original MNA-SF, but the sixth question can either be BMI or calf circumference (CC) depending on the feasibility of taking these measurements (Kaiser et al., 2009). This tool has been identified as one of the most appropriate nutrition screening tools for community living elderly (Philips et al., 2010). MNA-SF has also been validated in Malaysia as a screening tool to identify malnutrition among elderly in community (Shahar & Hussain, 2007). MNA-SF scores were categorized into three different categories where score below eight indicates malnutrition, 8-11 indicates at risk of malnutrition and 12- 14 represents well-nourished status (Kaiser, 2009; Rubenstein et al., 2001). For statistical analysis, malnutrition and at risk of malnutrition categories were combined into a group referred as malnutrition risk (MNA-SF score ≤11). . Meanwhile, well-nourished group indicates MNA-SF score of 12 and above.

Statistical analysis

Data were analysed using IBM SPSS (Statistical Package for Social Sciences) version 12.0. Descriptive statistics including mean, percentage and standard deviation (SD) were reported for normally distributed variables of all demographic data such as age, gender, BMI, education level and MNA-SF score. The Chi-square test was carried out to determine the association between malnutrition risk and gender, education level, BMI, disease status, percentage of food expenditure per month, income per month and physical activity level. The level of significance $p < 0.05$ was used for all statistical tests.

Ethical consideration

Ethical approval for this study has been granted by the Research Ethics Committee of International Islamic University Malaysia (IIUM/504/14/11/2/IREC 618). Informed consent was obtained from each subject prior to data collection where the participation of the subjects was ensured to be voluntary. Their confidentiality was also protected by presenting the results in only the aggregate form without referring specifically to any individuals.

RESULTS

The study was conducted on 73 elderly subjects. The subjects comprised of 39 (53.4%) males and 34 (46.6%) females. Table 1 shows the demographic characteristics of the subjects and their BMI status. The mean age of the subjects was 65.4 ± 5.4 years old, ranging from 60 until 84 years old. The mean age for males was 65 ± 4.9 years and 66 ± 5.9 years old for females. Age group of 60 to 74 years old made up the majority of the total subjects with 91.8%. Mean weight of the subjects was 63.9 ± 12.3 kg while their mean height was 1.57 ± 0.1 m. More than half of the subjects which is 43 (58.9%) fall into the BMI category of ≥ 25 kg/m². The mean BMI for males was 26.3 ± 4.2 kg/m² while for females was 25.7 ± 4.1 kg/m². Furthermore, nearly half of the subjects only had primary education which comprised of 35 (47.9%) out of total subjects. Besides, 27 (37%) subjects had secondary education whereas another 11 (15.1%) went for tertiary education.

Table 1 Socio-demographic characteristics and BMI status of the elderly subjects

Parameters	Males (n=39)	Females (n=34)	Total (n=73)
	No. (%)	No. (%)	No. (%)
Age			
60-74 years old	37 (94.9)	30 (88.2)	67 (91.8)
75-84 years old	2 (5.1)	4 (11.8)	6 (8.2)
Level of education			
Primary	13 (33.3)	22 (64.7)	35 (47.9)
Secondary	17 (43.6)	10 (29.4)	27 (37.0)
Tertiary	9 (23.1)	2 (5.9)	11 (15.1)
Body mass index (BMI)			
18.5-24.9 kg/m ²	17 (43.6)	13 (38.2)	30 (41.1)
≥ 25 kg/m ²	22 (56.4)	21 (61.8)	43 (58.9)

Figure 1 shows the nutritional risk of the elderly subjects measured using the MNA-SF questionnaire. As shown below, the nutritional risk of the subjects was classified into two main categories which were well-nourished group (MNA-SF score: 12 -14) and malnutrition risk group (MNA-SF score: ≤ 11). The result shows 47 subjects were in malnutrition risk group which comprised about 64.0% out of total subjects in this study. The remaining 26 subjects (36.0%) were in well-nourished category.

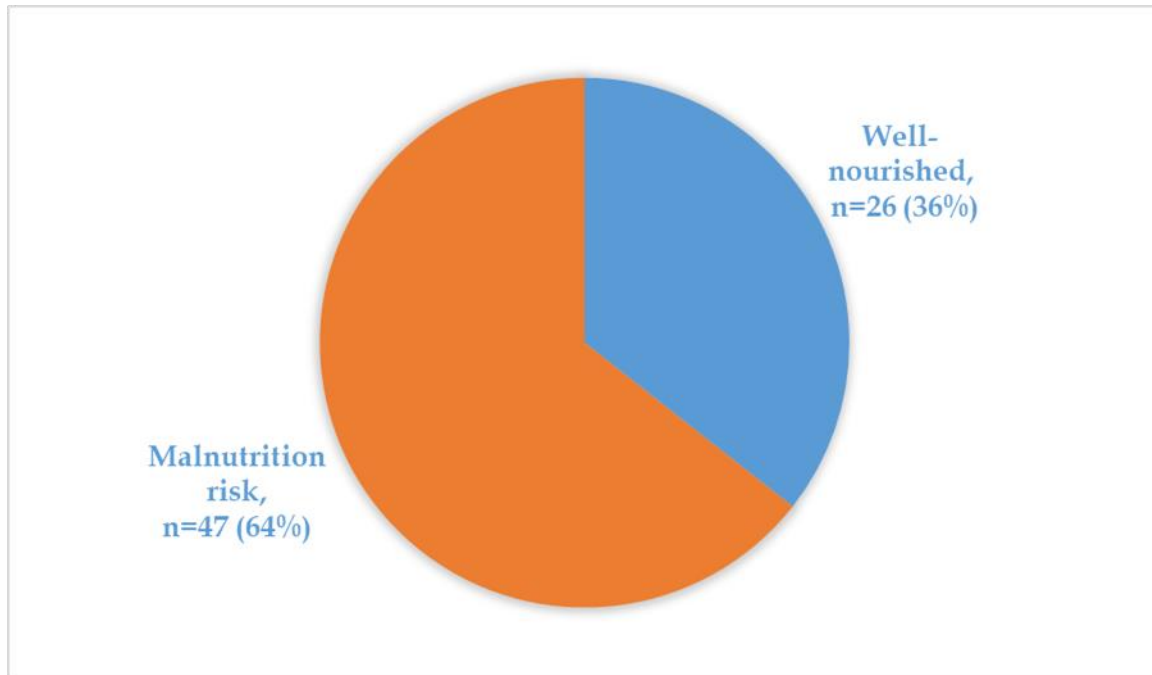


Figure 1. Distribution of nutritional risk among elderly subjects (n=73)

Table 2 reveals the relationship between factors associated with elderly subjects' nutritional risk. It can be observed that when the subjects had low income, they were vulnerable to have malnutrition risk ($p = 0.045$). This present study indicates that majority of the subjects who had low income of below RM899 per month fell into the malnutrition risk group (20 out of 31 subjects). Furthermore, risk of malnutrition was more prevalent in physically inactive older subjects ($p = 0.039$). It can be seen that 34 out of total subjects did not do any physical activity and about 79.4% of them were at malnutrition risk.

Meanwhile, the comparison of nutritional risk between males and females using the MNA-SF checklist showed no significant difference ($p = 0.301$). Also, education level did not show a significant difference between well-nourished and malnutrition risk subjects ($p = 0.187$). In addition, majority of subjects have BMI ≥ 25 kg/m² (overweight or obese) and 58.1% of them were at malnutrition risk. However, the result revealed that malnutrition was not significantly associated with BMI in this study ($p = 0.182$). Besides, there were no significant association between disease status ($p = 0.202$) and percentage of food expenditure in a month ($p = 0.911$) with malnutrition risk.

DISCUSSION

The study revealed that 64.0% of community-dwelling elderly people in Kuantan were at malnutrition risk. Our results were consistent with Damayanthi et al., (2018) and Naidoo et al., (2015) who found malnutrition was prevalent among community-dwelling elderly. Furthermore, the current study shows greater prevalence in comparison to previous study in Malaysia conducted by Suzana et al., (2013) that identified 42.5% of subjects were at malnutrition risk as evaluated using the MNA-SF. Furthermore, Sherina et al., (2004) reported that prevalence of malnutrition of older subjects living in Mukim Kajang was 36.3% with the use of Nutrition Screening Initiative Checklist (NSI-13); whereas Shahar et al., (2007) showed 6.1% of the elderly subjects were malnourished. The prevalence of malnutrition in the elderly varies considerably, depending on the population, settings, methodologies and measures used across studies (Andre et al., 2012).

Table 2. Factors associated with malnutrition risk among elderly subjects (n = 73)

Parameters	Well- Nourished (n=26) No. (%)	Malnutrition risk (n=47) No. (%)	p-value ^a
Gender			0.301
Male	16 (61.5)	23 (48.9)	
Female	10 (38.5)	24 (51.1)	
Level of education			0.187
Primary	9 (34.6)	26 (55.3)	
Secondary	13 (50.0)	14 (29.8)	
Tertiary	4 (15.4)	7 (14.9)	
Body mass index (BMI)			0.182
18.5-24.9 kg/m ²	8 (30.8)	22 (46.8)	
≥25 kg/m ²	18 (69.2)	25 (53.2)	
Disease status			0.202
Yes	15 (57.7)	34 (72.3)	
No	11 (42.3)	13 (27.7)	
Percentage of food expenditure per month			0.911
<30%	6 (23.1)	12 (25.5)	
31-49%	11 (42.3)	21 (44.7)	
>50%	9 (34.6)	14 (29.8)	
Income per month			0.045*
<RM899	11 (42.3)	20 (42.6)	
RM900-RM1499	4 (15.4)	18 (38.3)	
>RM1500	11 (42.3)	9 (19.1)	
Physical activity			0.039*
Frequent	13 (50.0)	15 (31.9)	
Less frequent	6 (23.1)	5 (10.6)	
None	7 (26.9)	27 (57.4)	

^aChi-square test**p*<0.05 shows statistical significance

Our study demonstrated a statistically significant association between malnutrition risk with income level and physical activity, but not with other factors. Similar findings were reported by Boulus et al., (2013) and Torres et al., (2014) that low income level increases the risk of malnutrition. Income level is an important economic factor that can affect nutritional status in community-dwelling elderly as it limits the availability of access to various food (Donini et al., 2003). Elderly with low socioeconomic status can be at risk of malnutrition even if they consume a high energy diet (Kirkpatrick & Tarasuk, 2008). This probably because they consume foods with lower nutrient content due to inability to afford the food rich in nutrients (Lee & Frongillo, 2001). Bowman (2007) found that elderly people who had low income consumed less than total daily energy requirement and were less likely to meet recommended intakes for micronutrients including fibre, calcium and potassium. Wham and Bowden (2011) reported that some people considered they had insufficient money to spend on food, therefore were less likely to purchase high nutrient rich foods such as vegetables and fruit. This is related to the fact that elderly people with scarce economic resources often have to decide what foods to be given priority to be purchased, with an increased risk of having a non-balanced diet in terms of macro and micronutrients (Wolfe, Frongillo & Valois, 2003). As a result, this situation may put them at nutritional risk as they might not be meeting the nutrient requirements.

Moreover, this present study indicated that physically inactive subjects were associated with malnutrition risk which was consistent with findings by Saeidlou et al. (2011) and Al-Zeidaneen et al., (2017). Apart from good nutritional status, sustaining active lifestyle can also delay the rate of functional decline with age. In addition, physical activity is a viable strategy for improving functional

status which includes physical ability and dexterity cognition, and activities of daily living which can improve nutritional status of elderly people (Rejeski & Mihalko, 2001). This is particularly significant because impairment in personal mobility necessary to perform routine activities can affect food preparation or food consumption; which may result in the elderly individual being vulnerable to malnutrition (Schroll, 2003). According to Oliveira, Fogaca & Leandro-Merhi (2009), limitation and decline in functional status may affect their ability to purchase, prepare, cook and eat meals which lead to unattractive and monotonous diets. An inability to cook for oneself affects food choices, quantity of food consumption and also the variety of food which is a factor that can result in malnutrition (de Souza, Papini & Corrente, 2015).

However, the current study failed to observe an association between BMI and malnutrition risk in line with the existing literature by Sugiura et al., (2016). Considering almost half of elderly subjects in current study with poor nutritional status had normal BMI, this may have contributed to no association between these two variables. Besides, it is also not advisable to use BMI as the only parameter to detect nutritional risk. Contrary to the results of this study, other authors have mentioned that participants in underweight category have more possibilities to be malnourished (Konda & Giri, 2018).

The strength of the present study was inclusion of MNA-SF as nutrition screening tool. It was a validated and reliable tool for elderly and used extensively within community living elderly. Furthermore, face-to-face interview to complete the questionnaire increased the reliability of the results as questions can be further explained for clarity. Limitations of the study include convenience sampling which is not the gold standard compared to random sampling. This pilot study provides important information that malnutrition exists among elderly population in Kuantan which can be underrated if nutrition screening was not conducted. Further strategies to enhance elderly people's nutritional status in this setting should become a priority to prevent further adverse health outcomes.

CONCLUSIONS

In conclusion, this study identified high prevalence of malnutrition risk among community-dwelling elderly people in Kuantan. Monthly income and physical activity level were factors significantly associated with malnutrition risk. Nutrition screening in a full-scale study is therefore recommended to further identify malnutrition risk in elderly population; in order to allow for appropriate nutrition intervention. Encouragement to be physically active among elderly people can further minimize risk of malnutrition. Maintaining good nutritional status and healthy ageing should be targeted in in this population.

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