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Malnutrition Risk and its Association with Appetite, Functional and Psychosocial Status among Elderly Malays in an Agricultural Settlement

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ABSTRACT

Introduction: Malnutrition is a common phenomenon among the elderly and quite often related to psychosocial problems. The objective of this study was to determine malnutrition risk and its association with appetite, functional and psychosocial status among elderlyMalays in an agricultural settlement, i.e. FELDA Sungai Tengi, Selangor. **Methods:** A cross-sectional study was conducted among 160 subjects (men=36.2%), with a mean age of 65.0 ± 3.9 years, who were interviewed to obtain information on malnutrition risk and appetite using Mini Nutritional Assessment Short Form and Simplified Nutritional Appetite Questionnaire, respectively. Functional status was determined using Instrumental Activities of Daily Living (IADL), Elderly Mobility Scale (EMS) and handgrip strength. Mini Mental Status Examination (MMSE), Geriatric Depression Scale and De Jong Gierveld Loneliness Scale were used to identify cognitive impairment, depressive symptoms and loneliness status of subjects respectively. A total of 42.5% of subjects were at risk of malnutrition and 61.2% had poor appetite. The mean scores of IADL and EMS were lower in subjects at risk of malnutrition, compared to those who were not at high risk ($p<0.05$ for both parameters). Multiple linear regression showed that 19.8% of malnutrition risk was predicted by poor appetite, decreased functional status (IADL) and depression. **Conclusion:** Malnutrition risk was prevalent and associated with poor appetite, functional status and psychosocial problems among the elderly subjects. The psychosocial aspect should also be incorporated in nutrition intervention programmes in order to improve mental well-being and functional independancy.

Keywords: Malnutrition, elderly, functional, psychosocial aspects, Malaysia

INTRODUCTION

Malnutrition is a concern among elderly individuals as it would lead to weight loss, muscle wasting, and prolonged hospitalisation, impaired immunity, delayed wound healing, and weakened respiratory and cardiac function, thereby

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contributing to morbidity and mortality (Sampson, 2009). The increased risk of malnutrition could be due to physiological and psychological changes in aging (DeCastro, 2002).

Elderly individuals who are functionally disabled face difficulties in food preparation and consumption which are important indicators for malnutrition risk (Schroll, 2003). Besides, the elderly are likely to experience psychosocial changes such as depression, isolation and loneliness which lead to malnutrition (Mamhidir *et al*., 2006). Depression affects appetite while poor appetite and inadequate food intake together with depression are associated with malnutrition (Suzana & Yow, 2009). In addition, Chen, Schilling & Lyder (2001) identified loneliness as an antecedent to malnutrition in the elderly. Ramic *et al.* (2011) state that loneliness is a significant predictor for anorexia nervosa, the risk of malnutrition and malnutrition; these are assumed to affect the mental status of elderly people and reduce the desire for meals and nutrition. According to Pearson *et al.* (2001), nutritional risk is associated with cognitive decline and lower self-care ability which doubles the risk of malnutrition. Cognitive impairment increases dependency in certain daily tasks related to food intake such as difficulty in preparing food and consuming food.

In Malaysia, the prevalence of malnutrition is higher among the rural elderly (17.7- 37.7%) as compared to their urban counterpart (2.0 - 3.9%)(Suzana *et al.*, 2007). Sherina *et al*. (2004) also found the prevalence of moderate and high nutritional risks among the elderly in a semi-urban area in Malaysia was 25.3% and 36.3%, respectively, and was associated with depression and functional disability. However, loneliness and appetite were not measured in this study. Interestingly, elderly individuals residing in an agricultural settlement (FELDA) in Negeri Sembilan had been reported to be prone towards obesity and had more abdominal fat (Mafauzy *et al.*, 2005). However, little is known about malnutrition risk among elderly individuals in a FELDA settlement. Thus, this cross-sectional study was conducted to determine malnutrition risk and its association with appetite, functional and psychosocial status among elderly Malays in FELDA Sungai Tengi, Selangor. The results could provide some baseline data about nutritional, functional and psychosocial status among older adults in FELDA settlements, for appropriate nutrition intervention programmes to be planned and executed.

METHODS

This cross-sectional study was conducted among elderly people in an agricultural settlement, i.e. FELDA Sungai Tengi, Selangor. The settlement was selected due to its convenient location at the central area of Malaysia as well as its nearness to the study institution compared to other settlements. Inclusion criteria included those aged 60 years old and above, Malaysian citizens of Malay ethnicity and able to read, write and communicate in the Malay language. Exclusion criteria were psychiatric or mental disorder, terminal illness and handicapped as perceived by the interviewer and reported by subjects. The diagnosis of any psychiatric disorder was ruled out by the psychiatrist and clinical psychologist in the research team. The subjects were recruited from September to December 2011 through convenience sampling. All eligible subjects were invited to participate in the health screening at the respective community centres through an invitation sent through the headmen and local FELDA authorities. This study was approved by the Universiti Kebangsaan Malaysia Medical Research Ethics Committee and informed consent was obtained from all subjects.

The subjects were asked to provide socio-demographic and personal profile such as gender, age, source of income, job

status, education level, marital status, living arrangements and social activities. All subjects were screened for malnutrition risk by using the Mini Nutritional Assessment-Short Form (MNA-SF) (Rubenstein *et al*., 2001) which had been validated in Malaysia (Suzana & Saifa, 2007). A total score of 11 or lower indicated that the subject is at risk for malnutrition (Suzana & Saifa, 2007). Simplified Nutritional Appetite Questionnaire (SNAQ) was used to assess appetite. SNAQ contains 4 items and has been validated in Malaysia where subjects with a score of less than 15 being classified as having poor appetite (Hanisah, Suzana & Lee, 2012). Anthropometric assessments were conducted according to standard tecniques (Fidanza & Keller, 1991). These included body weight (SECA CLARA 803, Germany), height (SECA Portable Leicester Stadiometer), waist circumference (WC) (W606ME Lufkin metric tape, USA), mid upper arm circumference (MUAC) (W606ME Lufkin metric tape, USA) and calf circumference (CC) (W606ME Lufkin metric tape, USA). Body mass index was calculated from measured height and weight.

Physical abilities were determined by Instrumental Activities of Daily Living (IADL) (Fillenbaum *et al*., 1988), Elderly Mobility Scale (EMS) (Tinetti & Ginter, 1988) and handgrip strength measurement (GRIP 5401 Handgrip Dynamometer, London). For IADL, subjects who were unable to perform one out of the seven given daily tasks obtained 0 score for that particular task and would be classified as functionally dependent (Deschamps *et al*., 2002). Psychosocial status was determined by Mini Mental Status Examination (MMSE) for cognitive impairment, Geriatric Depression Scale Short form (GDS-15) for depression, and De Jong Gierveld Loneliness Scale (JGLS) for level of loneliness. The Malay version of MMSE was validated and found to be suitable for usage among the local elderly population (Zarina, Zahiruddin & Che Wan, 2007). Subjects were categorised as normal in the cognitive assessment if their MMSE scores were 24 and above. GDS-15 which is a shorter version of GDS-30 was used to assess depressive symptoms (Sheikh & Yesavage, 1986). Scores of 0 to 4 indicated no depression symptoms, 5 to 9 mild depression and 10 and above indicated severe depression (Sheikh & Yesavage, 1986). JGLS consisted of 5 positive items to assess belongingness and 6 negative items to assess social loss. One point would be given for each item if the subject gave a negative answer. Total loneliness score was categorised into four levels: not lonely (score 0 to 2), moderately lonely (score 3 to 8), severely lonely (score 9 to 10), and very severely lonely (score 11) (Gierveld & Tilburg, 1999).

The Statistical Package for Social Sciences (SPSS) program version 16.0 was used to analyse the data. Descriptive statistics were used for all the variables studied. Independent *t*-test/Mann Whitney test was used to differentiate between gender and malnutrition risk for numerical data. Chi-squared test was used to assess the relationship between gender and malnutrition risk with demographic data, appetite, functional and psychosocial status for categorical data. Pearson and Spearman correlation was used to assess the correlation of MNA-SF score with other continuous data (age, handgrip strength, score SNAQ, IADL, EMS, MMSE, GDS and JGLS). Multiple linear regression with stepwise method was carried out to explore the most parsimonious set of predictors that were most effective in predicting the malnutrition risk.

RESULTS

A total of 160 subjects (men 36.2%, women 63.8%) participated in the study, with the mean age of 65.0 ± 3.9 (men 66.8 ± 3.6, women 63.9 ± 3.6). As shown in Table 1, almost all of the subjects had formal education (85.0%). Only 15.0% subjects did not have any formal education and this was more prevalent

Table 1. Socio-demographic characteristics, functional status (IADL) and psychosocial status of subjects according to gender [expressed as number (%)]

Characterictics	*Men (n=58)*	*Women (n=102)*	*Total (n=160)*
Education level			
No education	1 (1.7)	23 (22.5)	24 (15.0)[d]
Had education	57 (98.3)	79 (77.5)	136 (85.0)
Job status			
Working	20 (34.5)	8 (7.8)	28 (17.5)[b]
Not working	38 (65.5)	94 (92.2)	132 (82.5)
Source of income			
Dependent	4 (6.9)	14 (13.7)	18 (11.2)
Independent	54 (93.1)	88 (86.3)	142 (88.8)
Marital status			
Married	56 (96.6)	61 (59.8)	117 (73.1)[d]
Not married	2 (3.4)	41 (40.2)	43 (26.9)
Living arrangement			
Alone	1 (1.7)	12 (11.8)	13 (8.1)[c]
With family	57 (98.3)	90 (88.2)	147 (91.9)
Social activities			
Often	50 (86.2)	79 (77.5)	129 (80.6)
Seldom	8 (13.8)	23 (22.5)	31 (19.4)
Malnutrition risk			
With risk (MNA-SF <12)	25 (43.1)	43 (42.2)	68 (42.5)
Normal (MNA-SF ≥12)	33 (56.9)	59 (57.8)	92 (57.5)
Appetite classification			
Poor (SNAQ < 15)	34 (58.6)	64 (62.7)	98 (61.2)
Good (SNAQ ≥ 15)	24 (41.4)	38 (37.3)	62 (38.8)
Functional status			
IADL			
Dependent	12 (20.7)	56 (54.9)	68 (42.5)[b]
Independent	46 (79.3)	46 (45.1)	92 (57.5)
Psychosocial status			
Depression			
No depression (GDS < 5)	44 (75.9)	75 (73.5)	119 (74.4)
Depression (GDS ≥ 5)	14 (24.1)	27 (26.5)	41 (25.6)
Cognitive status			
Normal (MMSE ≥ 24)	50 (86.2)	67 (65.7)	117 (73.1)
Impairment (MMSE < 24)	8 (13.8)	35 (34.3)	43 (26.9)[a]
Loneliness			
Not lonely (JGLS< 3)	6 (10.3)	20 (19.6)	26 (16.2)
Lonely (JGLS ≥ 3)	52 (89.7)	82 (80.4)	134 (83.8)

[a]$p< 0.05$, [b]$p< 0.001$, significant difference between gender, Pearson Chi-square test
[c]$p< 0.05$, [d]$p< 0.001$, significant difference between gender, Fisher's Exact Test

among women (22.5%) compared to men (1.7%) (p<0.001). A high proportion of the women were not working (92.2%) as compared to men (65.5%) (p<0.001). Although not working, most of them were financially independent (88.8%) as they received an allowance from FELDA in the range of RM 1400 to RM1500. The majority of the subjects were married (73.1%), especially men compared to women (p<0.001). Most of the subjects lived with their spouse or their family members (91.9%). There were more women living alone (11.8%) as compared to men (1.7%) (p<0.05). The majority of the subjects were often involved in social activities (80.6%) such as religious activities.

The result showed that a total of 42.5% subjects were at risk of malnutrition as assessed by MNA-SF. The prevalence of poor appetite was 61.2%, with no significant differences between gender. More women (54.9%) were functionally dependent compared to men (20.7%) as assessed using IADL (p< 0.001). A total of 25.6% subjects was found to be depressed, while 83.8% of the subjects felt lonely in their life. There were no significant differences between male and female in terms of depression and loneliness. The prevalence of cognitive impairment was 26.9% and this was more prominent among women (34.3%) as compared to men (13.8%) (p<0.05).

Based on the World Health Organization (1998) BMI classification, most of the subjects were categorised as normal (37.5%) or pre-obese (36.9%) and only 1.9% of subjects were classified as underweight. A total of 1.3% and 5.0% of subjects had muscle wasting as assessed using MUAC and CC, respectively. The prevalence of abdominal obesity was 75.0% as assessed using waist circumference based on the classification of International Diabetes Federation (2005)(Alberti, Zimmet & Shaw, 2005). As shown in Table 2, women with risk of malnutrition had lower values for BMI (26.1 ± 4.8 kg/m^2 vs. 27.3 ± 4.4 kg/m^2), MUAC (27.3 ± 3.6 cm vs. 28.7 ± 2.4 cm) and CC (33.1 ± 4.1 cm vs. 34.7 ± 3.6 cm) compared to women without risk of malnutrition (p<0.05 for all parameters).

Among the socio-demographic factors, a high proportion of subjects with less social activities were found to be at risk of malnutrition (61.3%) as compared to 38.7% with no malnutrition risk (p<0.05) (Table 3). Besides, the majority of subjects with good appetite (69.4%) were not at risk of malnutrition as compared to those with risk of malnutrition (30.6%) (p<0.05). More than half of the subjects with depression (63.4%)

Table 2. Characteristics of anthropometric assessment according to malnutrition risk [expressed as mean ± SD]

Parameter	*Men*			*Women*		
	Malnutrition risk		*p value*	*Malnutrition risk*		p value
	Yes (MNA-SF <12) (n=25)	*No (MNA-SF ≥ 12) (n=33)*		*Yes (MNA-SF <12) (n=43)*	*No (MNA-SF ≥ 12) (n= 59)*	
Anthropometry						
BMI (kg/m^2)	25.3 ± 4.2	27.3 ± 4.4	0.056	26.1 ± 4.8	27.3 ± 4.4	0.039[a]
Waist Circumference (cm)	89.4 ± 12.2	92.8 ± 10.8	0.259	91.9 ± 13.8	92.8 ± 10.8	0.263
MUAC (cm)	27.7 ± 2.6	28.7 ± 2.4	0.146	27.3 ± 3.6	28.7 ± 2.4	0.014[a]
CC (cm)	34.2 ± 3.7	35.5 ± 3.2	0.155	33.1 ± 4.1	34.7 ± 3.6	0.032[a]

[a]p< 0.05, significant difference between groups with or without malnutrition risk, independent t-test

Table 3. Association of socio-demographic characteristics, appetite and psychosocial status with malnutrition risk [expressed as n(%)]

Parameters	*Malnutrition risk*		*p value*
	Yes (MNA-SF< 12)	*No (MNA-SF ≥ 12)*	
Age			0.637
60-74	67 (42.9)	89 (57.1)	
≥ 75	1 (25.0)	3 (25.0)	
Gender			0.907
Men	25 (43.1)	33 (56.9)	
Women	43 (42.2)	59 (57.8)	
Education level			0.420
No education	12 (50.0)	12 (50.0)	
Had education	56 (41.2)	80 (58.8)	
Job status			0.424
Working	10 (35.7)	18 (64.3)	
Not working	58 (43.9)	74 (56.1)	
Marital status			0.534
Married	48 (41.0)	69 (59.0)	
Not married	20 (46.5)	23 (53.5)	
Living arrangement			0.781
Alone	6 (46.2)	7 (53.8)	
With family	62 (42.2)	85 (57.8)	
Appetite classification			0.016[a]
Poor (SNAQ < 15)	49 (50.0)	49 (50.0)	
Good (SNAQ ≥ 15)	19 (30.6)	43 (69.4)	
Psychosocial status			
Depression			0.002[a]
No depression (GDS < 5)	42 (35.3)	77 (64.7)	
Depression (GDS ≥ 5)	26 (63.4)	15 (36.6)	
Cognitive status			0.179
Normal (MMSE ≥ 24)	46 (39.3)	71 (60.7)	
Impairment (MMSE < 24)	22 (51.2)	21 (48.8)	
Loneliness			0.680
Not lonely (JGLS< 3)	12 (46.2)	14 (53.8)	
Lonely (JGLS ≥ 3)	56 (41.8)	78 (58.2)	

[a]p< 0.05, significant difference between groups with or without risk of malnutrition with Pearson Chi-square test

had malnutrition risk compared to those with no malnutrition risk (36.6%) (p<0.001). In this study, subjects who were at risk of malnutrition had lower IADL score (10.3 ± 2.6) compared to those who were not at risk of malnutrition (11.5 ± 2.0) (p<0.05). A similar trend was observed in EMS scores in which subjects at risk of malnutrition had a lower EMS score (18.2 ± 2.2) compared to subjects without risk of malnutrition (18.9 ± 1.4) (p<0.05).

Table 4 shows significant correlations between malnutrition risk as assessed using MNA-SF with age (r = -0.186, p<0.05), SNAQ (r = 0.279, p<0.001), IADL (r = 0.305, p<0.001), handgrip strength (r = 0.182, p<0.05), EMS (r = 0.182, p<0.05), GDS (r = -0.275, p<0.001), MMSE (r = 0.225, p<0.05),

Table 4. Score IADL, handgrip strength and Elderly Mobility Scale (EMS) according to malnutrition risk [expressed as mean ± SD]

Functional status	*Malnutrition risk*		*Total (n=160)*
	Yes (MNA-SF< 12) (n= 68)	*No (MNA-SF ≥ 12) (n= 92)*	
IADL	10.3 ± 2.6	11.5 ± 2.0	11.0 ± 2.4[a]
Handgrip strength	20.9 ± 7.5	22.5 ± 7.6	21.8 ± 7.6
Elderly Mobility Scale (EMS)	18.2 ± 2.2	18.9 ± 1.4	18.6 ± 1.8[a]

[a]$p< 0.05$, significant difference between group with or without malnutrition risk with independent t-test

Table 5. Correlation between MNA-SF score with age, appetite, functional and psychosocial status of the subjects

Parameter	*Correlation value (r) score MNA-SF*		
	Men (n=58)	*Women (n=102)*	*Total (n=160)*
Age	-0.101	-0.275[a]	-0.186[a]
Appetite	0.468[b]	0.146	0.279[b]
Functional status			
IADL score	0.115	0.405[b]	0.305[b]
Handgrip strength	0.304[a]	0.132	0.182[a]
EMS score	0.281[a]	0.134	0.182[a]
Psychosocial status			
GDS score	-0.491[c]	-0.152	-0.275[c]
MMSE score	0.042	0.297[a]	0.225[a]
JGLS score	-0.271[a]	-0.175	-0.197[a]

[a]$p<0.05$, [b]$p<0.001$, significant correlation, Pearson Correlation
[c]$p<0.001$, significant correaltion, Spearman Correlation

and JGLS (r = -0.197, $p<0.05$). When multiple linear regression analysis with stepwise method was used, GDS (ß = -0.250, $p<0.05$), IADL (ß = 0.205, $p<0.05$) and SNAQ (ß = 0.011, $p<0.05$) were found to be the best set of predictors of malnutrition risk (R^2=19.8%) (Tables 5 and 6).

DISCUSSION

Although one-third of the subjects was either normal (37.5%) or pre-obese (36.9%) according to BMI classification, approximately 43% were at risk of malnutrition based on the MNA-SF score. The malnutrition risk was much higher compared to the Chinese elderly in Singapore (30.1%) (Yap, Niti & Ng, 2007) as assessed by the Nutrition Screening Initiative Checklist (NSI-10). However, the prevalence of malnutrition risk in the present study was lower than those among Malaysian elderly in a semi-urban area (61.6%), as assessed using Nutrition Screening Initiative Checklist (NSI-13) (Sherina *et al.*, 2004). It should be noted that the discrepancy in the findings would probably be due to differences in sample characteristics and also screening tools used for assessment. It appears that BMI alone could not be used to assess the nutritional status of the elderly due to the presence of a wide range of underlying factors that increase the risk of malnutrition, beyond the body weight and height status (Langiano *et al.*, 2009).

Table 6. Association between malnutrition risk and age, appetite, functional and psychosocial status among subjects

Test	R^2	*Beta Coefficient*	*p value*
Multiple linear regression (enter)			
Model 1 :	22.9%		
- Age		-0.041	0.229
- SNAQ score		0.160	0.014[a]
- IADL score		0.118	0.063
- Handgrip strength		0.006	0.765
- EMS score		0.011	0.886
- GDS score		-0.143	0.026[a]
- MMSE score		0.050	0.176
- JGLS score		-0.085	0.248
Multiple linear regression (stepwise)			
Model 1	10.7%		
- GDS score		-0.253	0.000[b]
Model 2	16.4%		
- GDS score		-0.272	0.000[b]
- IADL score		0.245	0.001[a]
Model 3	19.8%		
- GDS score		-0.250	0.000[a]
- IADL score		0.205	0.007[a]
- SNAQ score		0.191	0.011[a]

[a]$p< 0.05$, [b]$p< 0.001$, significant using multiple linear regression

Of all socio-demographic parameters being investigated, only social activities were associated with malnutrition risk. This was supported by a study in Birmingham, USA which found that social isolation contributed to malnutrition risk (Locher *et al*., 2009). It is believed that good relations with one another are important in maintaining optimum food intake and appetite among the elderly (Wikby & Fagerskiold, 2004). Furthermore, an increase in social interaction at meal times improves dietary intake for the elderly people (De Castro, 2002). Elderly people are encouraged to increase socialising in order to maintain optimum food intake and nutritional status.

In the present study, malnutrition risk is explained by appetite, functional status as assessed using IADL and depression at around 20.0%. Depression alone explained 10.7% of malnutrition risk, while IADL increased the risk of malnutrition by an additional 5.7% and appetite further contributed 3.4% to the risk of malnutrition in the elderly at the FELDA scheme studied. It appeared that among these three significant predictors, depression contributed the highest to malnutrition risk. The occurrence of poor appetite of 61.2% observed in this study is comparable with other studies among the Malaysian elderly in a semi urban area (64.2%) (Mohammad *et al.*, 2010). The elderly experience loss of appetite with advancing age and it has been termed as anorexia of aging (Morley, 1997). The physiologic anorexia of aging places the elderly at a greater risk of developing a marked decrease in energy intake and subsequent development of malnutrition (Chen *et al.*, 2001). Early detection and treatment of poor appetite or anorexia may prevent weight loss, improve health outcomes, and reduce mortality (Wilson *et al.*, 2005).

A total of 42.5 % subjects were classified as functionally dependent as assessed using

IADL and this condition was associated with malnutrition risk. A similar trend was observed among the Turkish elderly (Saka *et al*., 2010) and another study in Malaysia (Sherina *et al*., 2004). Functional dependency in daily activities of living such as food preparation or food consumption may result in the elderly individual being vulnerable to malnutrition (Schroll 2003). Besides, functional ability is related to food quality and quantity. Physical limitations in purchasing or preparing food not only affect the quantity of food consumption but also the variety of food which may lead to unattractive, monotonous diets (Oliveira, Fogaca & Leandro- Merhi, 2009).

With respect to depression, a total of 25.6% of subjects was depressed and this prevalence was higher as compared to the study by Sherina *et al*. (2004) (6.3%). However, the results of the present study were lower than the prevalence of depression among low to moderate income older adults in the Klang Valley, Malaysia (32.8%) (Wong *et al*., 2010). This study also found that malnutrition risk, associated with depression, has also been reported by Sherina *et al.* (2004). Suzana & Yow (2009) also found poor appetite and inadequate food intake together with depression to be associated with malnutrition among institutionalised Chinese elderly in Penang, Malaysia. Depression could lead to loss of appetite and reduce food intake which in turn led to ketosis and further suppressed appetite contributing to malnutrition (Morley, Thomas & Kamel, 1998). A strong relationship between the body and mind emphasise the importance of emotional well-being in maintaining nutritional status among community dwelling elderly (Saka *et al*., 2010).

This study has some limitations. This study largely involved the elderly who were categorised as young elderly (60-74 years old) and only four subjects (2.5%) were 75 years old and above. Imbalance of the number of elderly in these two age groups did not allow for comparison of malnutrition risk between age groups. Efforts should be made to recruit more elderly from different age groups, ethnicity and FELDA settlements in order to obtain general results on malnutrition risk among the elderly. Also, this study included only one FELDA settlement and used a self-report technique. There is a need to conduct a larger scale study involving a few FELDA settlements with the incorporation of a more objective assessment of malnutrition risk and appetite. Nevertheless, this study was able to highlight the risk of malnutrition and psychosocial aspects among the elderly in a FELDA settlement. There is a need to investigate factors associated with abdominal obesity which has high prevalence. Results of this study can be used as a baseline for another larger study or future nutritional intervention programmes. The elderly should be given greater attention about their health status and psychosocial aspects to ensure healthy aging and a better quality of life.

CONCLUSION

In the present study, malnutrition risk had a high prevalence of 42.5% among the elderly in a FELDA settlement. About 19.8% of malnutrition risk was explained by poor appetite, decline in functional status and depression. There is a need to improve mental well-being and functional independence in order to reduce the risk of malnutrition. The psychosocial aspect should also be incorporated in nutrition intervention programmes. Measures towards alleviating poor appetite could be formulated in order to maintain optimum energy intake. Such measure could help reduce the incidence of malnutrition and prevent undesirable health outcomes among the elderly.

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