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The Association of Nutritional Risk with Physical and Mental Health Problems Among Elderly in a Semi-Urban Area of Mukim Kajang, Selangor, Malaysia

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ABSTRACT

Imbalances and deficiencies of nutrients are particularly prevalent among the elderly, resulting in increased risk of illness and impaired outcome, as well as reduced quality of life. A cross-sectional study was conducted to assess the nutritional risk and to determine its association with physical and mental health problems among the elderly in a semi-urban community in the District of Hulu Langat, Selangor. Elderly people aged 60 years and above were included in the study, conducted from 11th March to 10th May 2004. Data were collected using a questionnaire-guided interview method. The Nutrition Screening Initiative Checklist (NSI-13) was used to assess the level (low, moderate, high) of nutritional risk of the subjects. The questionnaire also included the Barthel Index, Geriatric Depression Scale (GDS-30) and Elderly Cognitive Assessment Questionnaire (ECAQ) to identify functional status, depressive symptoms and cognitive impairment respectively, among the respondents. Out of 316 elderly residents, 300 agreed to participate in the study (response rate 94.9%). Respondents aged from 60 to 93 years old and the mean age was 67.08±6.6. Prevalence of moderate and high nutritional risks were 25.3% and 36.3% respectively. Nutritional risks were found to be significantly associated with age (p=0.015), marital status (p=0.00), chronic illness (p=0.000), functional disability (p=0.000) and depressive symptoms (p=0.010). In conclusion, the health status of the elderly strongly depends on their nutritional risk. Age, marital status, chronic illness, functional disability and depressive symptoms are factors to be emphasised when assessing the nutritional risk of the elderly.

INTRODUCTION

Ageing is a progressive state, beginning with conception and ending with death, which is associated with physical, social and psychological changes. Of the approximately 580 million elderly people (60 years and above) in the world, around 335 million live in developing countries. Nowadays, the life expectancy in more than 20 developing countries is 72 years or above (Fahey *et al.,* 2003). Chronological definition of elderly in Malaysia includes people aged 60 years and older. The pro-

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portion of elderly in Malaysia is increasing due to significant socioeconomic and demographic transformations (Karim, 1997). The elderly population in the country increased from 5.6% in 1991 to 6.5% in 2002 (Department of Statistics Malaysia, 2002).

Without food or water, life on earth would cease to exist. Adequate nutrient intake is important to all living things (Visvanathan, 2003). Nutrition is a major component of good health and plays a critical role in disease prevention, chronic disease management, and health promotion (Curl & Warren, 1997). Deficiencies and imbalances of nutrients are particularly prevalent among the elderly, resulting not only in increased risk of illness and impaired outcome from it, but also reduced quality of life (Allison & Kinney, 2001).

Malnutrition in the elderly is a multidimensional concept encompassing physical and psychological elements. It is precipitated by loss, dependency, loneliness and chronic illness, and potentially impacts morbidity, mortality and quality of life (Chen *et al.,* 2001). Inadequate nutrition including malnutrition occurs in approximately 9% to 15% of community-dwelling elderly persons, 12% to 50% of older patients in acute care hospitals, and 25% to 60% of institutionalised elderly. Factors associated with inadequate intake of nutrients include inability to get food, poor desire to eat food (eg due to living situations, mental status, chronic illness), poor ability to absorb food and medications that interfere with appetite or nutrient metabolism (Rosenthal & Kavic, 2004).

According to a national survey conducted by Hart for the Nutrition Screening Initiative (NSI), 33% of all elderly Americans report that they live alone, 45% say they take multiple prescriptions, 30% report skipping meals almost daily, and 25% have annual incomes under USD10,000 (RM38,000). The reported prevalence of these factors in the sample correlated with increased risk of poor nutritional status in the elderly (Curl & Warren, 1997). Under-nutrition and poor diets have been reported to be prevalent among the elderly, especially those in developing countries. The early identification of those at greatest risk is essential to allow possible interventions to improve nutritional status, restore immune function, reduce the risk of illnesses and thus reduce care costs (Suzana, Dixon & Earland, 1999).

This study was undertaken to assess the nutritional risk, and to determine its association with physical and mental health problems, among elderly in a semi-urban community of Mukim Kajang, Selangor.

METHODS

This cross-sectional study was conducted in a semi-urban community area of Mukim Kajang in the District of Hulu Langat, Selangor. The information about the identified area was obtained from Majlis Perbandaran Kajang. The elderly respondents were identified with the help of the *Ketua Kampung* (village head) in the community. Data was collected using a questionnaire-guided interview method conducted at each respondent's home by one of the researchers and two trained personnel for a 2-month period from 11th March to 10th May 2004. All elderly aged 60 years and above who lived in the selected area were included in the study. All questionnaires were translated into Bahasa Malaysia. There were some problems using the questionnaire in Bahasa Malaysia among a few of the Chinese and Indian respondents. Those with difficulty in communication and who refused to participate in the study were excluded. The structured questionnaire consisted of three parts: Parts A, B and C.

Part A consists of questions on sociodemography and clinical data. Questions

on socio-demography included age, gender, ethnicity, marital status, living arrangement, occupational status, level of education and family income. For clinical data, questions included self-reported chronic illness (diagnosed and on treatment), functional disability (self-reported based on the Barthel Index) and cognitive function (based on the Cognitive Assessment Questionnaire (ECAQ)).

The Barthel Index consists of 10 items of Activities of Daily Living (ADL) such as feeding, dressing, grooming, bathing, control of urinary bladder, control of bowel, transfer to bed, using toilet, mobility and climbing stairs. A respondent was categorised as having 'normal function' in doing an activity if he or she could perform all 10 activities independently. A respondent was categorised as having 'functional disability' if he or she had difficulty or needed help in performing one or more of the activities (Collin, Wade & Davies, 1987)

The Elderly Cognitive Assessment Questionnaire (ECAQ) was introduced by Kua, Tan and Lee (1997) to screen for cognitive impairment among the elderly in the community. Respondents were categorised as normal in the cognitive assessment when their ECAQ scores were 6 or above. Scores of 5 and below were categorised a

Part B consists of the Nutritional Screening Initiative (NSI). The Nutrition Screening Initiative Checklist (NSI-13) was developed according to the Nutrition Screening Initiative adopted from the American Academy of Family Physicians. This brief questionnaire, which consists of 13 questions, has been tested among the elderly and found to be accurate in identifying non-institutionalised older persons at risk for low nutrient intake and health problems (Posner *et al.,* 1993). Cut-off scores for good nutrition was 0 to 2. Respondents were categorised as having "nutritional risk" if they had scores of 3 and above. This was further categorised to "moderate nutritional risk" if scores were between 3 to 5 and "high nutritional risk" if scores were 6 and above.

Posner *et al.* (1993) evaluated this tool for sensitivity and specificity to define low, moderate, and high nutritional risks scores. A cut-off score of 6, used to predict older persons who may be at nutritional risk (intake of three or more nutrients below 75% of the recommended dietary allowance), has a sensitivity of 36.2 and a specificity of 84.9. It is unusual to have a screening instrument with a sensitivity score this low, but Posner *et al.* justified it by stating that the cut-off level of 6 points was selected to balance sensitivity and specificity so that not too many persons (fewer than 15%) with higher estimated intakes of nutrients were misclassified as being at high nutritional risk. The selection of this cutoff point minimises unwarranted concern and treatment costs for elderly who have been misclassified (Curl & Warren, 1997).

Part C consisted of The Geriatric Depression Scale (GDS-30) created by Yegavage *et al.* (1983). The Geriatric Depression Scale (GDS) consists of 30 questions that extensively measure depression among elderly. Scores of more than 10 indicate positive depressive symptoms, and scores of 10 or less are considered to be negative for depressive symptoms.

All instruments used in this study had been tested for validity and reliability among Malaysian elderly. Data was analysed using SPSS 11.5. Descriptive statistics were used for all the variables studied. Pearson Chi-square, Odds ratio and 95% Confidence Interval were used to test for the association and risk between each factor and nutritional risks. The significance level used was $p<0.05$.

RESULTS

Out of 316 elderly residents, 300 agreed to participate in the study giving a

response rate of 94.9%. The age of the respondents ranged from 60 to 93 years old and the mean age was 67.08±6.6. Ten residents refused to participate and another six were excluded due to stroke (n=1) and inability to communicate in Bahasa Malaysia or English (n=5).

Table 1 shows the socio-demography of the respondents. Fifty-two percent of the respondents were females and 48% were males. Most of the respondents were Malays (94.7%), married (67.7%), living with their spouses or children (98.7%), unemployed (50.3%), had primary education (56.3%), and had a family income per month of less than RM500 (40.7%).

Table 1. Socio-demographic profile of the elderly respondents (n = 300)

Profile of the respondents	*n*	*%*
Age		
60-69 years	216	72.0
70 years and above	84	28.0
Gender		
Male	144	48.0
Female	156	52.0
Ethnicity		
Malay	284	94.7
Chinese	4	1.3
Indian	12	4.0
Marital status		
Married	203	67.7
Not married (single/divorced/widowed)	97	32.3
Living arrangement		
With family	296	98.7
Alone	4	1.3
Working status		
Employed	28	9.3
Retired	121	40.3
Unemployed	151	50.3
Education level		
No formal education	53	17.7
Primary education	169	56.3
Secondary education	27	9.0
Tertiary education	51	17.0
Household income per month		
Less than RM 500	122	40.7
RM 501 - RM 1000	96	32.0
RM 1001 and above	82	27.3

Table 2 shows the physical and mental health status of the elderly respondents. The percentage of respondents with no chronic illness (50.7%) was only slightly higher than the respondents with chronic illness (49.3%). The self reported chronic illnesses present were diabetes mellitus (18.0%), hypertension (29.3%), ischaemic heart disease (11.7%), bronchial asthma (4.0%), gout (4.0%), arthritis (0.7%), breast cancer (0.3%), colon cancer (0.3%), kidney problems (1.3%), hypotension (0.3%), hernia (0.3%), liver cirrhosis (0.3%) and chronic pancreatitis (0.3%). Majority (76.7%) of the respondents had difficulty in one or more of the physical activities based on the Barthel Index. Based on the GDS-30, 6.3% of the respondents had depressive symptoms, and based on the ECAQ, 8.3% of the respondents had cognitive impairment.

Table 3 shows the nutritional risks among the elderly respondents. About one-third of the respondents (38.3%) had low nutritional risk. However, 36.3% had high nutritional risk and 25.3% had moderate nutritional risk.

The association between nutritional risks and age was statistically significant (p=0.0015, OR=0.79, 95% CI=0.66-0.94) (Table 4). The association between nutritional risks and marital status was also statistically significant (p=0.00, OR=0.72, 95% CI=0.61-0.85). Further analysis between

Table 2. Physical and mental health status of the elderly respondents (n = 300)

Profile of the respondents	*n*	*%*
Physical Health Status		
Chronic illness		
Absent	152	50.7
Present	148	49.3
Functional disability		
Absent	230	76.7
Present	70	23.3
Mental Health Status		
Depressive symptoms		
Absent	281	93.7
Present	19	6.3
Cognitive Impairment		
Absent	275	91.7
Present	25	8.3

Table 3. Nutritional risks of the elderly respondents (n = 300)

Profile of the respondents	*n*	*%*
Nutritional Risk		
Low Nutrition Risk (0-2)	115	38.3
Moderate Nutrition Risk (3-5)	76	25.3
High Nutrition Risk ($6)	109	36.3

Table 4. Association of socio-demography with nutritional risks of the elderly respondents (n = 300)

Profile of the respondents	*Nutritinoal risk ($3) n (%)*	*No nutritional risk (0-2) n (%)*	*p value*	*OR*	*95% CI*
Age					
60-69 years	124 (57.4)	92 (42.6)	0.015*	0.79	0.66-0.94
70 years and above	61 (72.6)	23 (27.4)			
Gender					
Male	84 (58.3)	60 (41.7)	0.254	0.90	0.75-1.08
Female	101 (64.7)	55 (35.3)			
Ethnicity					
Malay vs	172 (60.6)	112 (39.4)	0.650		
Chinese	2 (50.0)	2 (50.0)			
Malay vs	172 (60.6)	112 (39.4)	0.034**		
Indian	11 (91.7)	1 (8.3)			
Chinese vs	2 (50.0)	2 (50.0)	0.136		
Indian	11 (91.7)	1 (8.3)			
Marital status					
Married	111 (54.7)	92 (45.3)	0.00*	0.72	0.61-0.85
Not married	74 (76.3)	23 (23.7)			
Living arrangement					
With family	181 (61.1)	115 (38.9)	0.112	1.64	1.49-1.79
Alone	4 (100.0)	0 (0.0)			
Working status					
Employed	16 (57.1)	12 (42.9)	0.605	0.92	0.66-1.28
Not employed	169 (62.1)	103 (37.9)			
Education level					
No formal education	36 (67.9)	17 (32.1)	0.302	1.13	0.91-1.39
Formal education	149 (60.3)	98 (39.7)			
Household income per month					
Less than RM 500	78 (63.9)	44 (36.1)	0.504	1.06	0.89-1.27
RM 501 and above	106 (60.1)	71 (39.9)			

* $p < 0.05$ significant using Pearson Chi square test
** $p < 0.05$ significant using Fisher's Exact test

nutritional risk and ethnicity shows that there was significant association between the Malay and Indian ethnic groups. However, there was no significant association between nutritional risks and gender, living arrangement, occupational status, education level, and household income per month.

Table 5 shows that there was a significant association between nutritional risk and chronic illness (p value =0.000, OR=0.43 95% CI=0.31-0.60). There was also significant association between nutritional risks and functional disability status (p=0.000, OR=0.67, 95% CI=0.58-0.78). Table 5 also shows the association between mental health and nutritional risks among the elderly respondents. Only depressive symptoms showed significant association with nutritional risks (p=0.010, OR 0.67, 95% CI=0.56-0.80). There was no significant association between cognitive impairment and nutritional risks.

Table 6 shows the positive responses of the elderly respondents to each of the question in the 'Nutrition Screening Initiative Checklist' (NSI). About half of the elderly respondents (51.5%) reported having medical problems which interfered with their eating habits. 41.7% reported suffering from mouth or teeth problems and 36.7% reported having problems in swallowing. Less than 25% of the elderly respondents responded positively in the following items: (1) losing weight in the last 6 months (23.7%), (2) taking three or more different prescribed drugs a day (21.7%), (3) consuming less milk or milk products (21.3%), (4) eating alone most of the time (19.3%), (5) always physically unable to shop, cook or be mobile (19.0%), and (6) aged 75 years old and above (14.3%). Only a few of the elderly respondents reported having gained weight in the last 6 months (10.7%), consuming less fruit or vegetables (10.0%), needing to take

Table 5. Association of nutritional risks with physical and mental health status of the respondents (n = 300)

Profile of the respondents	*Nutritinoal risk ($3) n (%)*	*No nutritional risk (0-2) n (%)*	*p value*	*OR*	*95% CI*
Physical Health Status					
Chronic illness					
Absent	71 (46.7)	81 (53.3)	0.000*	0.43	0.31-0.60
Present	114 (77.0)	34 (23.0)			
Functional disability					
Absent	127 (55.2)	103 (44.8)	0.000*	0.67	0.58-0.78
Present	58 (82.9)	12 (17.1)			
Mental Health Status					
Depressive symptom					
Absent	168 (59.8)	113 (40.2)	0.010*	0.67	0.56-0.80
Present	17 (89.5)	2 (10.5)			
Cognitive Impairment					
Absent	167 (60.7)	108 (39.3)	0.267	0.84	0.65-1.10
Present	18 (72.0)	7 (28.0)			

*p < 0.05 significant using Pearson Chi square test

Table 6. Positive responses of the elderly respondents (responding 'Yes') to each question in the 'Nutrition Screening Initiative Checklist (NSI) (n = 300)

	Nutrition Screening Initiative Checklist	*n*	*%*
1.	Do you have any medical problems interfering with appetite	154	51.3
2.	Do you consume less than two meals per day	12	4.0
3.	Do you consume less fruit or vegetables	30	10.0
4.	Do you consume less milk or milk products	64	21.3
5.	Do you have mouth or teeth problems	125	41.7
6.	Do you have problems in swallowing	110	36.7
7.	Do you eat alone most of the time	58	19.3
8.	Do you take three or more different prescribed drugs a day	65	21.7
9.	Do you need to take three or more different vitamins and mineral pills per day	22	7.3
10.	Have you lost weight in the last 6 months	71	23.7
11.	Have you gained weight in the last 6 months	32	10.7
12.	Are you always physically not able to shop, cook or be mobile	57	19.0
13.	Are you aged 75 years and more	43	14.3

three or more different vitamins and mineral pills per day (7.3%), and having less than two meals per day (4.0%).

DISCUSSION

Poor and inadequate nutrition is a frequent and serious problem in the elderly (Chen, Schilling & Lyder, 2001). In this study, the prevalence of high nutritional risk among the elderly was 36.3%. This result is much higher than the prevalence of 9-15% among community-dwelling elderly as reported by Rosenthal and Kavic (2004). This study also shows that almost two-thirds of the elderly respondents (61.6%) were at nutritional risk, whereby 25.3% were at moderate risk and 36.3% were at high risk. This finding therefore shows that the magnitude of nutritional risk is indeed large as noted in other studies (Curl & Warren, 1997; Suzana, Dixon & Earland, 1999)

Respondents classified as 70 years and above had higher prevalence of nutritional risk (moderate and high risk) compared to respondents aged between 60-69 years old (p=0.015). A study by Visvanathan *et al.,* (2004) among elderly in publicly funded shelter homes in Malaysia also found that the mean age of elderly at-risk of undernutrition was higher than the mean age of elderly who were nourished, where the mean age of those at-risk were 72.1, and the mean age for those who were nourished was 71.4. This finding was however not statistically significant.

This study found that marital status was significantly associated with nutritional risks (p=0.00). A review article by Dhar (2001) stated that living with a spouse/partner is important for the healthy well-being of the elderly especially for older men. Living with a spouse/partner provides social support, and supportive relationships are associated with decreased risk of mortality and lower rates of illnesses.

This study also found that nutritional risk was significantly associated with the presence of chronic illness among the elderly respondents (p=0.000). The results in this study differ from the study done by

Sahyoun *et al.,* (1997), which showed that there was no significant association between nutritional risk and chronic illness among community-dwelling elderly. However, another study showed that there was association between nutritional risk and chronic illness especially if the elderly respondent was living in the hospital or was institutionalised (Saletti *et al.,* 1999).

There was also a significant association between nutritional risk and functional disability in this study (p=0.000). In their study, Gee, Palk and Thatcher (1998) also reported that under-nutrition in the elderly is associated with reduced functional ability.

Depressive symptoms were also found to be significantly associated with nutritional risk among the respondents in this study (p=0.010). This finding is also supported by a study by Ahn and Kim (2004), which found that elderly with poor nutritional state had high levels of depression.

CONCLUSION

This study found that nutritional risks among the elderly respondents is indeed a major problem, with a high prevalence of 36.3% and 25.3% for high and moderate nutritional risks respectively. Nutritional risks were significantly associated with chronic illness (p=0.000), functional disability (p=0.000), depressive symptoms (p=0.010), age (p=0.015) and marital status (p=0.00). These factors should be emphasised when assessing the nutritional risk of the elderly in our community.

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