

Kertas Asli/Original Article

**Factors Influencing Appetite and Depression among
Institutionalised Chinese Elderly in Penang**
(Faktor-faktor yang Mempengaruhi Selera Makan dan Kemurungan
di Kalangan Warga Tua Cina di Institusi di Pulau Pinang)

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ABSTRACT

Poor appetite and inadequate food intake together with depression are associated with malnutrition, that will increase risk of morbidity and mortality among elderly people. Identifying factors associated with these conditions are essential for formulation of preventive strategies. Therefore, a study was conducted to identify factors associated with poor appetite and depression among institutionalised Chinese elderly people in Butterworth, Penang. A total of 100 Chinese elderly (49 men and 51 women) aged 60 years and above, (mean age \pm SD of 74.7 ± 9.2 years), with no known terminal and mental illnesses from two nursing homes participated in this study. Subjects were interviewed to gather information on appetite using Council of Nutrition Appetite Questionnaire (CNAQ), depression using Geriatric Depression Scale (GDS) and also socio demographic and health status. Food intake was assessed using a combination of one-day food weighing and 24 hour diet recall. Body weight and height were measured. Results showed that the mean energy and nutrients intake did not achieve the Recommended Nutrient Intake of Malaysia (RNI), with the exception for vitamin C. Only 4% of the subjects were underweight and obese, 65% normal and 31% overweight. A total of 70% and 73% of subjects had poor appetite and depression, respectively. Subjects who had depression (adjusted OR = 2.78, 95% CI = 0.95-8.03), energy intake below RNI (adjusted OR = 2.34, 95% CI = 0.68-6.95) and difficulty to fall asleep at night (insomnia) (adjusted OR = 2.22, 95% CI = 0.72-6.82) were more likely to have poor appetite. Subjects who had poor appetite (adjusted OR = 3.36, 95% CI = 1.19-9.47) and insomnia (adjusted OR = 2.58, 95% CI = 0.83-7.98) were more likely to have depression. In conclusion, although the majority of subjects had normal body weight but the nutrient intake was inadequate. Poor appetite and depression were prevalent and interrelated and also strongly associated with insomnia.

Key words: Appetite, Depression, Food Intake, Elderly, Institution

ABSTRAK

Kekurangan selera makan dan pengambilan makanan yang tidak mencukupi bersama dengan kemurungan adalah berkait rapat dengan amalan pemakanan yang akan meningkatkan risiko morbiditi dan mortaliti di kalangan warga tua. Penentuan faktor yang mempengaruhi keadaan ini adalah penting bagi merangka strategi pencegahan. Oleh itu, satu kajian telah dijalankan bagi menentukan faktor yang mempengaruhi kekurangan selera makan dan kemurungan di kalangan warga tua Cina di dua buah institusi penjagaan warga tua di Butterworth, Pulau Pinang. Seramai 100 orang warga tua Cina (49 lelaki dan 51 wanita) berusia 60 tahun dan ke atas (purata umur \pm SP 74.7 ± 9.18 tahun), yang tidak mengalami penyakit terminal dan mental mengambil bahagian dalam kajian ini. Subjek ditemu ramah bagi mendapatkan maklumat mengenai selera makan menggunakan Council of Nutrition Appetite Questionnaire (CNAQ), kemurungan menggunakan Geriatric Depression Scale (GDS) dan sosiodemografi dan status kesihatan. Pengambilan makanan dinilai menggunakan kombinasi kaedah menimbang makanan satu hari dan ingatan diet 24 jam. Berat badan dan ketinggian juga diukur. Hasil kajian menunjukkan min pengambilan tenaga dan nutrien adalah tidak mencapai Saranan Pengambilan Makanan Malaysia (RNI), kecuali vitamin C. Hanya 4% subjek yang mengalami kekurangan berat badan dan obes, 65% normal dan 31% lebih berat badan. Seramai 70% dan 73% subjek mengalami masing-masing, kurang selera makan dan kemurungan. Manakala, subjek yang mengalami kemurungan (adjusted OR = 2.78, 95% CI = 0.95-8.03), pengambilan tenaga kurang dari RNI (adjusted OR = 2.34, 95% CI = 0.68-6.95) dan kesukaran untuk tidur malam (insomnia) (adjusted OR = 2.22, 95% CI = 0.72-6.82) berisiko tinggi mengalami kurang selera makan. Subjek yang mengalami kurang selera makan (adjusted OR = 3.36, 95% CI = 1.19-9.47) dan insomnia (adjusted OR = 2.58, 95% CI = 0.83-7.98) didapati berisiko tinggi mengalami kemurungan. Kesimpulannya, walaupun majoriti subjek mempunyai berat badan normal tetapi pengambilan nutrien adalah tidak mencukupi. Kurang selera makan dan kemurungan adalah prevalen dan saling berhubungrapat antara satu sama lain dan juga berkaitan dengan insomnia.

Kata kunci: Selera makan, Kemurungan, Pengambilan makanan, Warga tua, Institusi

INTRODUCTION

The aging population phenomenon exists worldwide, both in developing and developed countries (WHO 2002). Out of 580 million elderly people aged 60 years and above in the world, around 335 million live in developing countries

(Fahey et al. 2003). Malaysia is experiencing a demographic transition, one outcome of which is an increase in the number and proportion of elderly in the population (Prime Minister's Department 1996). In the year 2005, the percentage of elderly people aged ≥ 65 years was 4.6% compared to 3.9% in 2000. It is estimated that by the year 2050, the proportion will be increased by four-fold to 21% (7.9 million people) (Department of Statistics 2005).

The increasing number of elderly people in the population will probably lead to an increase in the number of nursing home patients (Jongenelis et al. 2004). Nutritional status of institutionalised elderly people was significantly poorer than the community-dwelling elderly (Chen et al. 2007). They were also more prone to be disabled and had functional impairments and diverse health problems that may compromise adequate nutrition, and thus at a high risk of malnutrition. Nursing staff members often did not recognise nutritional problems and the need for individualised nutritional care (Abbasi & Rudman 1993; Crogan et al. 2001).

Aging seems to be accompanied by a lower energy intake in nursing home residents (Eastwood et al. 2002). Poor energy intake is an important factor related to weight loss in elderly people (Blaum et al. 1995) and is associated with higher morbidity and mortality (Chapman et al. 2002). Poor appetite often associated with depression that may lead to reduction of food intake and consequently to malnutrition among elderly people (Darnton-Hill 1992). A study among elderly people residing public funded shelter homes in Malaysia indicated that undernutrition and depression were significant nutritional problems (Visvanathan et al. 2005). However, the magnitude of nutrient inadequacy and poor appetite was not assessed. Therefore, a cross sectional study was conducted to investigate factors affecting poor appetite and depression among noninstitutionalised Chinese elderly individuals in Butterworth, Penang. In addition, nutrient intake and plate waste were also investigated.

METHODS

SAMPLING

A total of 100 Chinese elderly people (49 men and 51 women), with mean age \pm *SD* of 74.7 ± 9.18 (71.7 ± 8.7 for men and 77.5 ± 8.8 for women) from two private nursing homes in Butterworth, Penang participated in this study through convenience sampling. The inclusion criteria were Chinese, aged 60 years and above, had resided in the institutions for at least 3 months, with no known terminal and mental health and able to communicate. Informed consent was obtained from all subjects. Ethics approval was obtained from Medical Research Secretariat Ethics Committee of Universiti Kebangsaan Malaysia.

DATA COLLECTION

Subjects were interviewed to obtain information on psychosocial and health, appetite using Council on Nutrition Appetite Questionnaire (CNAQ) and depression using Geriatric Depression Scale (GDS).

CNAQ is a simple and validated 8-item measure that identifies symptoms that could lead to weight loss in older peoples developed by Morley (2002) and further validated by Wilson et al. (2005). Each item has five possible response options (A to E). CNAQ score is the sum of scores on the 8 items, ranging from 8 (worst) to 40 (best), with score ≤ 28 indicated poor appetite and at risk of significant weight loss in six months. The questionnaire was back to back translated to Mandarin languages. A reliability test (second administration 2 days after the first) conducted in a subsample of 15 subjects in this study demonstrated that the questionnaire was reliable with Cronbach's alpha coefficient of 0.67.

Geriatric Depression Scale (GDS-30) initially developed by Yesavage et al. (1983) and further shortened (GDS-15R) by Sheikh & Yesavage (1986) has been tested and used extensively to assess depression among elderly people including in Malaysia (Sherina et al. 2005). The later was used to identify depression in this study. Subjects obtained maximum scores of 10 were classified as at high risk of experiencing clinically relevant depression, scores 5 to 9 as moderate depression and scores 4 and below were normal (Sheikh & Yesavage 1986).

Body weight was measured using a portable digital weighing scale (SECA 873, Germany) in light clothing (without shoes) to the nearest 0.1 kg. Height (SECA bodymeter) was measured while the patient was standing to the nearest 0.5 cm. Body mass index (BMI) was calculated [weight in kg/(height in m²)]. A combination of one day food weighing and 24 hour diet recall was used to determine a typical day intake of the subjects. Food served to each subjects during lunch and dinner and their plate waste were measured using a digital food weighing scale (Tanita, Japan) to the nearest 0.1 kg. Recall technique was used to estimate food and drinks consumed during other meal times, ie. breakfast, morning tea, afternoon tea, supper and snacks. Portion sizes were estimated using household measurements (ie. bowls, cups, plates, glass and spoons). Assistance from family members or staff at the institutions was obtained for subjects who were unable to recall exactly the amount of food consumed. Nutrient composition of food consumed by each subject was computed using Diet 4 programme based on the Malaysian Food Composition Table (Tee et al. 1997). In particular, percentage of plate waste was computed as [plate waste \div food served] \times 100.

STATISTICAL ANALYSIS

The Statistical Package For Sosial Sciences (SPSS) program version 15.0 was used to analyse the data. Independent sample t-test was used to determine

differences for continuous variables between sex. The association between CNAQ and GDS with demographic, socioeconomic, health status, anthropometric parameters and nutrient intake were explored using Chi-squared test and Pearson Correlation test. Logistic regression (stepwise at $p < 0.05$ for entry and $p < 0.01$ for removal) was used to determine risk factors of poor appetite and depression.

RESULTS

SOCIODEMOGRAPHIC AND HEALTH PROFILES

As shown in Table 1, 53% of subjects aged 60-74 years old and 47% aged 75 years and above, with half of them residing the nursing home for 1 to 4 years. There were more women than men were in the older age group (≥ 75 years) ($p < 0.05$). Almost half of the subjects were widow/ widowed (56%), particularly women. More than half of the women did not have any formal education (64.7%). The most common chronic diseases reported among subjects were diabetes mellitus (63%), high blood pressure/ hypertension (61%), joint problem/arthritis (31%) and stroke (29%). A significantly higher percentage of men had stroke (44.9%) as compared to women (13.7%) ($p < 0.05$). Besides chronic diseases, the most common health problems reported among subjects was insomnia (39%), particularly among women (49%) as compared to men (28.6%) ($p < 0.05$).

More than half of men (61.2%) were able to walk and move freely but 60.8% of women needed assistance when walking. Almost half of subjects (51%) wore dentures (either full or partial), 39% were edentulous with two complete dentures, and 10% of the subjects were edentulous without dentures.

As assessed using BMI categories (WHO 1998), 69.4% of men and 60.8% of women had normal BMI. Overweight problems (27% overweight and 4% obese) were more prominent among subjects as compared to underweight problems (4%) (Figure 1).

APPETITE, NUTRIENT INTAKE AND PLATE WASTE

A total of 70% of subjects (69.4% men and 70.6% women) had poor appetite (CNAQ score ≤ 28) and were at risk of significant weight loss in six months. Thus, intake of energy and nutrients of subjects did not achieve RNI, with an exception for vitamin C. However, percentages of calories from carbohydrate, protein and fat, as shown in Table 2, were within the recommendation of 55-70% for carbohydrate, 10-15% protein and 20-30% fat (NCCFN 2005).

When nutrient density was computed, dietary intake of women were better than men. Nutrient density of thiamine among women (0.6 ± 0.2 mg/1000 kcal/day) was significantly higher than men (0.5 ± 0.1 mg/1000 kcal/day) ($p < 0.05$). Similar trend was noted for carbohydrate (% kcal/d), vitamin A ($\mu\text{gRE}/1000$ kcal/d), vitamin C (mg/1000 kcal/d), calcium (mg/1000 kcal/d). The only exception

TABLE 1. Sociodemographic and health profiles of subjects

Characteristics	Men (n = 49)		Women (n = 51)		Total (n = 100)	
	n	%	n	%	n	%
Age group						
60-74	32	65.3	21	41.2	53	53.0
≥ 75 years	17	34.7	30	58.8 ^a	47	47.0
Duration of staying at institution						
3 months-1 year	17	34.7	13	25.5	30	30.0
> 1 year-4 year	27	55.1	23	45.1	50	50.0
> 4 year-7 year	4	8.2	9	17.6	13	13.0
> 7 year	1	2.0	6	11.8	7	7.0
Marital status						
Single	10	20.4	4	7.8	14	14.0
Married	22	44.9	6	11.8	28	28.0
Divorced	2	4.1	0	0	2	2.0
Widowed	15	30.6	41	80.4	56	56.0
Educational level						
No schooling	10	20.4	33	64.7	43	43.0
Informal education	6	12.2	7	13.7	13	13.0
Primary education	19	38.8	8	15.7	27	27.0
Secondary education	13	26.5	3	5.9	16	16.0
Tertiary education	1	2.0	0	0	1	1.0
Financial support						
Pension	3	6.1	1	2.0	4	4.0
Children	33	67.3	45	88.2	78	78.0
Welfare	5	10.2	1	2.0	6	6.0
Others	8	16.3	4	7.8	12	12.0
Health problems						
Diabetes	29	59.2	34	66.7	63	63.0
High blood pressure	32	65.3	29	56.9	61	61.0
Arthritis	19	38.8	12	23.5	31	31.0
Stroke	22	44.9 ^a	7	13.7	29	29.0
Visual problem	16	32.7	21	41.2	37	37.0
Insomnia	14	28.6	25	49.0 ^a	39	39.0
Functional status						
Able to walk independently	30	61.2	17	33.3	47	47.0
Walk with assistance	16	32.7	31	60.8	47	47.0
Unable to walk	3	6.1	3	5.9	6	6.0
Oral status						
Edentulous without dentures	5	10.2	5	9.8	10	10.0
Edentulous with two complete dentures	16	32.7	23	45.1	39	39.0
Dentate with or without partial denture	28	57.1	23	45.1	51	51.0

^a p < 0.05, significance difference between genders (Pearson Chi squared test)

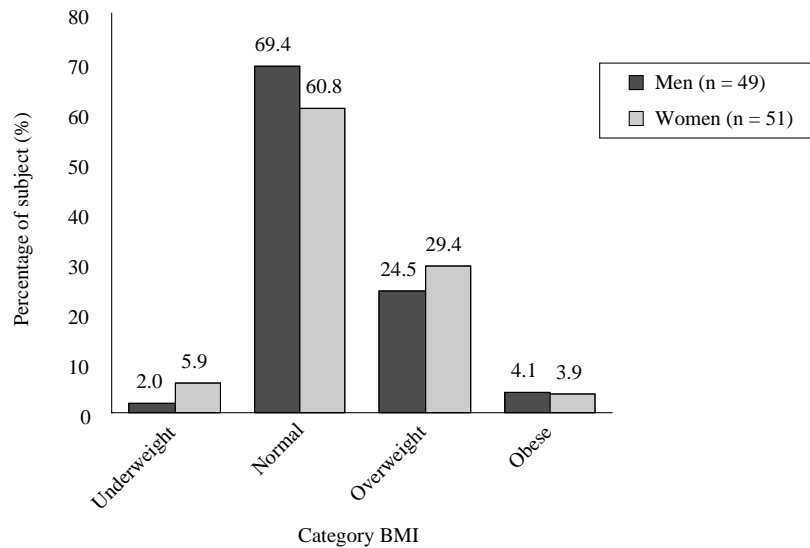


FIGURE 1. Percentage of subjects according to Body Mass Index (BMI) categories (WHO 1998)

was niacin, of which men (11.5 ± 3.1 mgNE/ 1000 kcal/d) had a higher nutrient density than women (9.6 ± 2.5 mgNE/1000 kcal/d) ($p < 0.05$).

As shown in Figure 2 and Figure 3, soup dishes had the highest percentage of wastage during lunch and dinner, respectively. Subjects preferred cruciferous vegetables as opposed to tubers, thus tubers had the highest percentage of plate waste during lunch and dinner. It was found that men had more plate waste of vegetables compared to women, thus their vitamin C intake was lower than women. Subjects preferred fish and chicken than tofu products and meat analog, thus the plate waste of fish and chicken were lower as compared to the later.

FACTORS ASSOCIATED WITH POOR APPETITE AND DEPRESSION

A total of 73% of subjects had depression (46% mild to moderate depression, 27% serious depression). Higher percentage of women as compared to men were classified as having mild to moderate depression (47.1% vs 44.9%) and serious depression (31.4% vs 22.4%).

Using univariate analysis, poor appetite was associated with low energy intake, depression and insomnia ($p < 0.05$ for all parameters) (Table 3). Multivariate analysis indicated that energy intake less than RNI (Adjusted OR 2.34, 95% CI 0.68-6.95, $p < 0.05$), insomnia (Adjusted OR 2.22, 95% CI 0.72-6.82, $p < 0.05$) and depression (Adjusted OR 2.78, 95% CI 0.95-8.03, $p < 0.05$) were

TABLE 2. Mean (\pm SD) energy and nutrient intake according to sex

Nutrient (unit)	Men (n = 49)	Women (n = 51)	Malaysian RNI (NCCFN 2005)
Energy (kcal/d)	1550 \pm 281	1343 \pm 251 ^b	Men = 2010 kcal/d Women = 1780 kcal/d
Protein (g/d)	53.7 \pm 14.5	43.2 \pm 14.6	Men = 59 g/d Women = 51 g/d
(g/kg body weight/d)	0.9 \pm 0.3	0.9 \pm 0.3	
(% kcal/d)	13.9 \pm 3.4	12.9 \pm 3.6	10-15%
Fat (g/d)	34.9 \pm 10.6	29.8 \pm 6.9	Men = 45-67g/d Women = 40-59g/d
(% kcal/d)	20.2 \pm 4.5	20.1 \pm 3.8	20-30%
CHO (g/d)	256 \pm 46.1	228.8 \pm 43.4	
(% kcal/d)	66.2 \pm 5.1	68.2 \pm 4.4 ^a	55-70%
Vitamin A (μ g RE/d)	347 \pm 221.5	337.9 \pm 169.8	Men = 600 μ g RE/day Women = 500 μ g RE/day
(μ g RE/1000kcal/d)	232.0 \pm 166.2	262.0 \pm 150.1	
Thiamine (mg/d)	0.8 \pm 0.2	0.8 \pm 0.2	Men = 1.2 mg/d Women = 1.1 mg/d
(mg/1000kcal/d)	0.5 \pm 0.1	0.6 \pm 0.2 ^a	
Riboflavin (mg/d)	1.1 \pm 0.4	0.9 \pm 0.3	Men = 1.3 mg/d Women = 1.1 mg/d
(mg/1000kcal/d)	0.7 \pm 0.2	0.7 \pm 0.2	
Niacin (mg NE/d)	17.7 \pm 5.2	13.0 \pm 4.6	Men = 16 mg NE/d Women = 14 mg NE/d
(mg NE/1000kcal/d)	11.5 \pm 3.1 ^c	9.6 \pm 2.5	
Vitamin C (mg/d)	94.4 \pm 51.2	100.8 \pm 42.4	70 mg/d
(mg/1000kcal/d)	67.0 \pm 37.6	71.1 \pm 33.6	
Calcium (mg/d)	375.6 \pm 92.9	367.4 \pm 149.1	Men = 800 mg/d Women = 1000 mg/d
(mg/1000kcal/d)	244.4 \pm 53.0	274.2 \pm 110.8	
Iron (mg/day)	12.5 \pm 3.4	10.8 \pm 4.1	Men = 14 mg/d Women = 11 mg/d
(mg/1000kcal/day)	8.2 \pm 2.1	8.2 \pm 3.0	

^ap < 0.05, significant difference between genders (independent sample t-test)

^bp < 0.001, significant difference between genders (independent sample t-test)

^cp < 0.05, significant difference between genders (Mann-Whitney U)

important determinants of poor appetite (Table 4). Insomnia (Adjusted OR 2.58, 95% CI 0.83-7.98, p < 0.05) and poor appetite (Adjusted OR 3.36, 95% CI 1.19-9.47, p < 0.05) were important factors influencing depression using both univariate (Table 5) and multivariate analysis (Table 6). Being a resident at the institution of more than a year was also marginally associated with depression (Adjusted OR 3.14, 95% CI 1.05-9.35, p = 0.068).

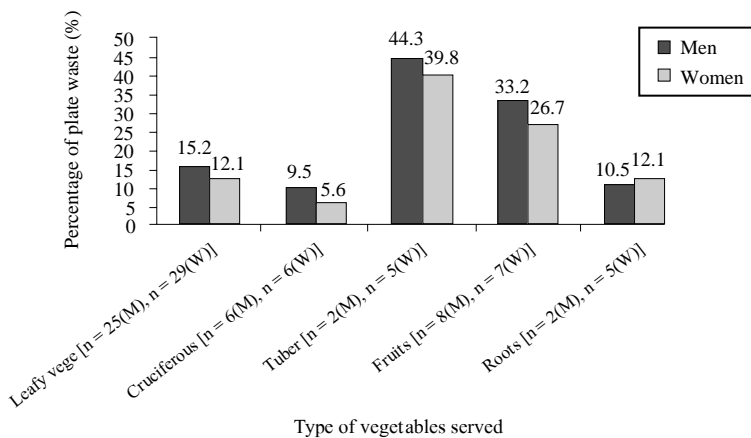
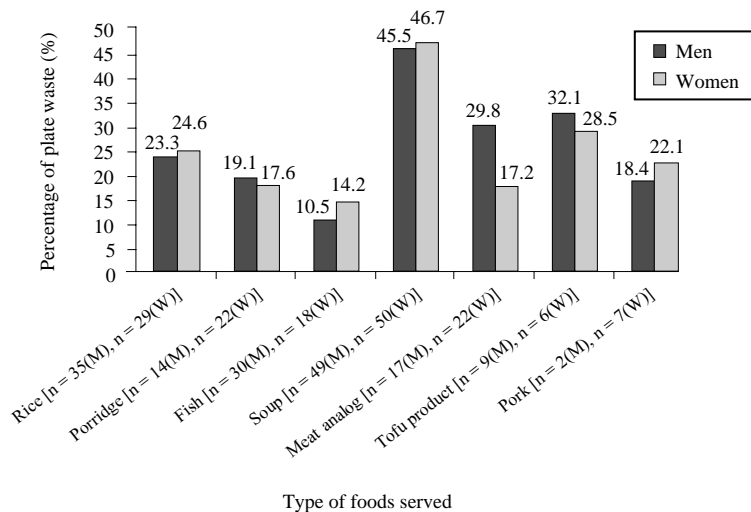


FIGURE 2. Percentage of plate waste (%) during lunch according to sex

DISCUSSION

The findings of the study showed that chronic diseases including diabetes mellitus, hypertension, joint problem or arthritis and stroke were common health problems among subjects were consistent with other studies among residents of old folks homes in Taiwan (Chen et al. 2007) and Italy (Zanocchi et al. 2008). Chronic diseases had detrimental effect on quality of life of elderly people (Zanocchi et al. 2007). In this study, more men had stroke as compared to

TABLE 3. Association between social and health factors with appetite rating

Parameters	Poor Appetite (CNAQ score \leq 28) (n = 70)		Good Appetite(CNAQ score $>$ 28) (n = 30)	
	n	%	n	%
Sex				
Men	34	69.4	15	30.6
Women	36	70.6	15	29.4
Age group				
60-74 years	39	73.6	14	26.4
\geq 75 years	31	66.0	16	34.0
Depression				
GDS $<$ 5	13	48.1	14	51.9
GDS $>$ 5	57	78.1	16	21.9 ^a
Energy intake				
$<$ RNI	70	84.3	13	15.7
\geq RNI	0	0	7	100 ^a
Insomnia				
Yes	32	82.1	7	17.9
No	38	62.3	23	37.7 ^a
Oral status				
Edentulous	34	69.4	15	30.6
Dentate	36	70.6	15	29.4
Diabetes mellitus				
Yes	45	71.4	18	28.6
No	25	67.6	12	32.4
High blood pressure/ hypertension				
Yes	46	75.4	15	24.6
No	24	61.5	15	38.5
Stroke				
Yes	20	69.0	9	31.0
No	50	70.4	21	29.6

^a p < 0.05, significance difference between sex (Pearson Chi-squared test)

women. Other study reported that stroke incidents occurred highly among men aged between 75-84 years old and women aged 85 years old and above (Rosamond et al. 2007). As reported in other study (Romoren & Blekescaune 2003), women subjects in the present study had a higher risk of having functional disability as assessed using walking ability.

Nutrients intake of subjects in this study were inadequate as compared to the Malaysian RNI (NCCFN 2005). An early study among elderly people in Cheras

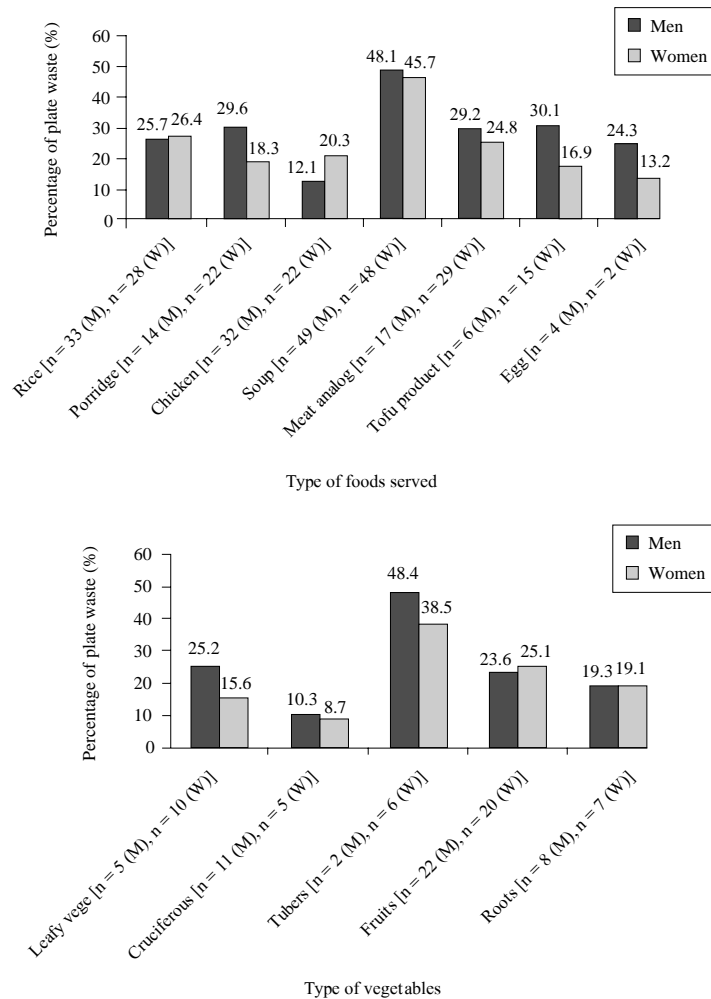


FIGURE 3. Percentage of plate waste during dinner according to sex

TABLE 4. Determinants of poor appetite

Determinant	Adjusted OR	95% CI	P value
Women	0.84	0.29-2.4	0.743
Age group \geq 75 years	0.62	0.22-1.75	0.365
Energy intake < % RNI	2.34	0.68-6.95	0.016 ^a
Insomnia	2.22	0.72-6.82	0.045 ^a
Depression	2.78	0.95-8.03	0.013 ^a

OR: odds ratio; CI: confidence interval

^a p < 0.05, binary logistic regression at 2-tailed significance

TABLE 5. Associations between social and health factors and depression

Factor	No depression (GDS < 5) (n = 27)		Depression (GDS ≥ 5) (n = 73)	
	n	%	n	%
Sex				
Men	16	32.7	33	67.3
Women	11	21.6	40	78.4
Age group				
60-74 years	13	24.5	40	75.5
≥ 75 years	14	29.8	33	70.2
Duration of staying at institution				
< 1 year	12	40.0	18	60.0
≥ 1 year	15	21.4	55	78.6
Social activity				
Yes	26	32.5	54	67.5
No	1	5.0	19	95.0
Functional status				
Able to walk freely	15	31.9	32	68.1
Walk with assistant/unable to walk	12	22.6	41	77.4
Visual problem				
Yes	6	16.2	31	83.8
No	21	33.3	42	66.7
Insomnia				
Yes	6	15.4	33	84.6
No	21	34.4	40	65.6 ^a
Diabetes mellitus				
Yes	13	20.6	50	79.4
No	14	37.8	23	62.2
Stroke				
Yes	8	27.6	21	72.4
No	19	26.8	52	73.2
Status of appetite				
CNAQ score ≤ 28	13	18.6	57	81.4
CNAQ score > 28	14	46.7	16	53.3 ^a

^a p < 0.05, significance difference between sex (Pearson Chi-squared test)

TABLE 6. Determinants of depression

Determinant	<i>Adjusted</i> OR	95% CI	P value
Women	1.51	0.52-4.39	0.449
Age group \geq 75 tahun	0.49	0.16-1.48	0.206
Duration of staying at institution > 1 year	3.14	1.05-9.35	0.068
Insomnia	2.58	0.83-7.98	0.040 ^a
Poor appetite	3.36	1.19-9.47	0.012 ^a

OR: Odds ratio; CI: Confidence interval

^a p < 0.05, binary logistic regression at 2-tailed significance

and Seremban old folks homes aged 50 years and above also reported that their food intake were inadequate (Norimah et al. 1990). Similar findings were also reported among rural elderly Malays (Suriah et al. 1996; Suzana et al. 2007). In this study it was found that low energy intake was associated with poor appetite which was reported in 70% of subjects. This figure was much higher than the 38% reported among institutionalised elderly people in Canada (Keller 1993). Deterioration in appetite could be the risk indicator for nutritional problems (Keller & McKenzie 2003) and related to reduced intake of foods among elderly people (Rolls 1994). Old folks institutions should provide a variety of foods, with emphasise on nutrient density and food preferences to increase the nutrient intake of elderly people.

Depression among subjects was higher than those reported among elderly people in insitutions in Peninsular Malaysia, ie. 65% (Visvanathan et al. 2005), and was three to four times higher than the rate observe among community-dwelling elderly people (Jongenelis et al. 2004).

In this study, poor appetite and depression were interrelated and related to insomnia. An early study among noninstitutionalised elderly people in Finland had reported that 22% of the elderly who were depressed have poor appetite (Kivela et al. 1986). According to Livingston et al. (1993), insomnia occur commonly among elderly people and it was related to being a woman, depression, disability, unmarried and living alone, but was not related to dementia and old age. However, Chiu et al. (1999) stated that insomnia was related to old age. Nevertheless, both studies agreed that insomnia was more common among women.

Jongenelis et al. (2004) indicated that age, pain, visual impairment, stroke, functional limitations, negative life events, loneliness, lack of social support and perceived inadequacy of care were found to be risk indicators for depression. Meanwhile a local study by Sherina et al. (2005) showed that gender, ethnicity, presence of chronic illness, functional disability and cognitive impairment were identified as important factors for depression in elderly people. However, the

present study could not demonstrate the association between these factors and depression due to small sample size.

Another limitation of the study was the used of CNAQ as appetite assessment tool, which was developed and validated in US but not Malaysia. Efforts should be carried out to validate this tool and assess the food intake of older people at a longer duration than the single day food weighing and recall as used in this study. Nevertheless, this study was able to highlight the nutrition and health problems among Chinese elderly people in two institutions in Penang. Results of this study can be used as a baseline for a larger scale study and future interventions not only including nutrition and health components but also psychosocial aspects.

CONCLUSION

Nutrient intake of subjects were inadequate and related to poor appetite. Approximately three quarter of subjects had poor appetite. Poor appetite and depression were interrelated and associated with insomnia. There is a need to diagnose and treat these psychosocial problems in order to increase food intake and thus prevent undesirable health outcomes associated with nutrient inadequacy and deficiency.

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Received: August 2009
Accepted for publication: October 2009