

Artikel Asli/Original Article

Factors Affecting Compliance Rate towards Oral Nutritional Supplements Intake Among Geriatric Patients in Hospital Kuala Lumpur
(Faktor Mempengaruhi Kadar Kepatuhan Pengambilan Suplemen Pemakanan Oral dalam Kalangan Pesakit Geriatrik Hospital di Kuala Lumpur)

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ABSTRACT

Compliance rate towards consumption of oral nutritional supplement (ONS) is low among geriatric patients. Thus, this study aimed to examine factors affecting low compliance of ONS intake among a sample of geriatric patients. A cross-sectional survey was carried out involving 30 geriatric patients being prescribed with ONS during their stay in Hospital Kuala Lumpur. Information on compliance rate and influencing factors were collected through interview and observation. Nutritional status was assessed using anthropometry and Patient Generated Subjective Global Assessment (PG-SGA). 50.0% subjects were underweight and 70.0% and 30.0% were moderate and severely malnourished, respectively. A total of 43.3% were categorised as low, 53.4% medium and 3.3% high compliance towards consumption of ONS. Most of the subjects with low compliance agreed expressed that they need more nursing support (53.8%). Less than half perceived they had been given the needed nursing support (44.4%), and with respect to ONS: knowledgeable (38.5%), timely given (37.5%), understood the importance (35.7%), were able to finish it (35.0%), well-aware of the reasons of prescription (33.3%), satisfied with its taste (33.3%), received suitable volume (33.3%), satisfied with the texture (31.6%), and received suitable frequency (28.6%). In conclusion, approximately 40% of subjects had low compliance towards ONS. Awareness and nursing support were important factors associated with low compliance. There is a need to ensure adequate nursing support and education been given to patients prescribed with ONS in order to increase the compliance rate.

Keywords: Oral nutritional supplement; geriatric; compliance; malnutrition; nursing support

ABSTRAK

Kadar pematuhan terhadap pengambilan suplementasi pemakanan oral (ONS) adalah rendah, terutamanya dalam kalangan pesakit geriatrik. Oleh itu, kajian ini adalah bagi mengenal pasti faktor yang mempengaruhi pematuhan pengambilan ONS dalam kalangan pesakit geriatrik. Satu kajian keratan rentas dijalankan melibatkan 30 pesakit geriatrik yang diberi ONS semasa berada di Hospital Kuala Lumpur. Maklumat kadar pematuhan dan faktor yang mempengaruhinya diperolehi melalui kaedah temuduga dan pemerhatian semasa di wad. Status pemakanan dinilai melalui pengukuran antropometri dan Patient-Generated Subjective Global Assessment (PG-SGA). 50.0% subjek mengalami kekurangan berat badan dan 70.0% dan 30.0% mengalami malpemakanan sederhana dan teruk, masing-masing. Seramai 43.3% subjek dikenal pasti menunjukkan kadar pematuhan rendah, 53.4% sederhana dan 3.3% tinggi terhadap pengambilan ONS. Kebanyakan subjek dalam kategori kadar pematuhan rendah melaporkan mereka memerlukan lebih bantuan jururawat (53.8%). Kurang daripada separuh subjek dari kategori kadar pematuhan rendah menyatakan bahawa mereka mendapat bantuan yang diperlukan dari jururawat (44.4%), dan dari segi ONS, berpengetahuan (38.5%), diberi pada masanya (37.5%), memahami kepentingannya (35.7%), dapat menghabiskannya (35.0%), memahami sebab preskripsi (33.3%), berpuas hati terhadap rasanya (33.3%), menerima isi padu yang bersesuaian (33.3%), berpuas hati terhadap teksturnya (31.6%) dan menerima pada frekuensi yang sesuai (28.6%). Lebih kurang 40% subjek mempunyai tahap kepatuhan rendah dalam pengambilan ONS. Kesedaran dan bantuan kejururawatan adalah faktor penting berkaitan dengan tahap kepatuhan rendah. Terdapat keperluan untuk memberi bantuan kejururawatan yang cukup dan pendidikan terhadap pesakit yang dipreskripsi ONS bagi meningkatkan kadar kepatuhan.

Kata kunci: Suplementasi pemakanan oral; geriatrik; pematuhan; malpemakanan; bantuan kejururawatan

INTRODUCTION

The number of elderly population (65 years and above) in Malaysia is 5.0% of the total Malaysian population in the year 2017 and are expected to reach 7.2% by the year 2020 (Department of Statistics Malaysia 2016 & 2017). As the elderly population increases, the prevalence of malnutrition among elderly is also increasing. Impaired muscle function, decrease bone mass, anaemia, immune dysfunction, decline in functional status, higher hospital readmission rates, reduced cognitive function, delayed recovery from surgery, poor wound healing and mortality all contributed to malnutrition among elderly population (Ahmed & Haboubi 2010).

Oral nutritional status can provide macro and micronutrients through sterile liquids, semi-solids or powders form. In the acute and community health settings, individuals who are not able to meet their nutritional requirements through diet alone will be taking ONS (BAPEN 2016). Oral Nutritional Supplement is important in increasing the nutritional requirements especially protein and calories (Botella-Carretero et al. 2008). The main indicator for commencing nutritional supplements is malnutrition or having loss of weight unintentionally in small periods of time which is less than six months (Todorovic et al. 2011). The frequency of prescription of ONS is differ based on the conditions of the elderly patients.

Based on Stange et al. (2013), the method used to measure the compliance of ONS is by assigning the nursing staff to record daily as a proportion of either 1/1, 3/4, 1/2 or 1/4 consumed by the geriatric patients. Compliance rate is further calculated as a percentage of the provided amount. According to a study conducted by McCormick et al. (2007), mean compliance of ONS consumption was significantly greater in men (85.7%) than women (74%), and also more higher in acute wards (89.5%) compared to long stay (74.2%). The compliance towards ONS consumption improved from following intervention, from 74.2% to 93%.

There are many factors that could affect the compliance rate. Factors such as genetic, race, age, environmental, oral health problems, weight loss, chronic diseases, depression, and medications that affect the patients' sense of taste (Kizilarslanoglu et al. 2015). In the development of the risk of nutritional intake, biochemical assessment changes precede clinical signs of deficiency (Lee & Nieman 2010). Further, low quality in nursing support is associated with a higher rate of undernourished patients (Bourdel-Marchasson 2010). However, little information is available on compliance rate and a wide range of factors associated with it including biochemical parameters and nursing support among the geriatric patients.

Thus, the aim of this pilot study was to examine a wide range of factors associated with low compliance of ONS intake among geriatric patients. These factors included sociodemographic, anthropometric, biochemical, nutritional, functional status and nursing support. Findings

of this study is important to propose effective strategies such as usage of booklet to ensure that patient knows the importance of taking ONS or usage of an alertness board to increase the staff nurse in providing ONS to the patient that will surely lead to an improve of compliance rate of ONS among geriatric patients.

EXPERIMENTAL METHODS

STUDY DESIGN

A cross-sectional study was conducted among 30 geriatric patients aged 60 to 90 years old in Geriatric and General Wards of Hospital Kuala Lumpur who were prescribed with ONS during their stay (March to May 2018). Ethical approval was obtained from the Medical Research Ethics Committee of the Universiti Kebangsaan Malaysia (UKM PPI/111/8/JEP-2018-208) and Medical Research and Ethics Committee (MREC) (NMRR-18-145-39570). Informed consent was obtained from the subjects or their caregivers to conduct the interview session.

SAMPLING AND SUBJECTS

Subjects were selected through convenience sampling from the inpatient registration list of the Geriatric and General Wards of Hospital Kuala Lumpur, a main referral hospital in Klang Valley of Malaysia. Inclusion criteria included geriatric patients aged 60 to 90 years old, consumed ONS prescribed by dietitian or using his or her own ONS during their stay in the ward for at least one day, able to consume orally and does not have dysphagia, no requirement for tube or parenteral feeding, willing to participate in the study and answer the questions honestly, giving full cooperation and able to speak in English or Bahasa Malaysia. Exclusion criteria included those who were critically ill, on tube or parenteral feeding, receiving palliative care, diagnosed with dementia and admitted for less than 3 days.

DATA COLLECTION

This is a cross sectional studies among geriatric patients admitted to medical and geriatric wards in HKL. Sociodemographic information includes personal information of patients and demographic data such as, age, gender, race, type of admission ward, and others were collected through interview or medical record. Compliance rate of ONS was obtained from the observation input/output chart. Furthermore, compliance rate was computed using the formula below:

$$\frac{\text{Volume consumed by the patient for 1 day}}{\text{Total volume prescription for 1 day}} \times 100\% \quad (1)$$

Then, the compliance rate was classified as low ($\leq 30\%$), medium ($> 30 - < 80\%$) and high ($\geq 80\%$) (Jobse

et al. 2015). Subjects were asked on acceptance and frequency of consumption (de Luis et al. 2015), understanding towards ONS and the need of nursing support (Bourdel-Marchasson 2010).

Nutritional status was assessed using anthropometry measurements including weight, height, mid upper arm circumference (MUAC), calf circumference (CC) and knee height (KH) as assessed using standard technique. In addition, patient generated subjective global assessment (PG-SGA) (Marshall et al. 2016) and appetite (SNAQ) (Kruizenga et al. 2005) were also assessed. In particular, weight was measured using a digital weighing scale (Tanita 319, Japan) to the nearest 0.1 kg. Height was assessed using a stadiometer (Leicester, Germany) to the nearest 0.1 cm, A Lufkin tape (Luftkin W606PM) was used to measure the circumferences. For bedridden subjects, weight was estimated from the equation based on MUAC and CC (Chumlea et al. 1988). Whereas, height was estimated from knee height assessment (Chumlea and Guo. 1992; Chumlea et al. 1985, 1994). Furthermore, body mass index was then calculated using the formula weight (kg)/ height (m²). Then, the subjects were classified according to BMI category based on the classification by Ministry of Health Malaysia, 2013.

Biochemical data (ie. Albumin, total protein, haemoglobin, calcium, sodium, potassium, magnesium, phosphate) and clinical data were obtained from the subjects' medical record. Only recent biochemical data (3 months) were considered only.

STATISTICAL ANALYSIS

IBM SPSS Statistics was used to carry out statistical analysis for the data collected. Shapiro-Wilk test was used to assess the normality of the data because of the sample size less than 100. In this study, non-parametric tests such as Pearson Chi Square test and Fisher's Exact test were used. The descriptive statistic was carried out to present data on socio-demographic, anthropometric and others. Mann-Whitney U test was carried out for ONS of prescription given, amount consumed and macronutrient distribution. Cross-tabulation were used to determine the association between factors influencing the compliance rate [prescription (timing, dilution, frequency)] acceptance (texture, taste, volume), patient's knowledge, nursing support) and compliance rate of ONS (%). The confidence interval of 95% ($p < 0.05$) will be indicated for the significant differences.

RESULTS

SOCIODEMOGRAPHIC AND NUTRITIONAL STATUS OF SUBJECTS

Out of 49 geriatric patients initially identified, 30 patients were able to be interviewed, (response rate of 61%). Non responses were due to early discharge, did not get the prescription from the nurse, refused to drink and hardly respond to interview session. As shown in Table 1, majority of the subjects were Chinese (43.3%), from medical ward

TABLE 1. Sociodemographic profile of subjects

Characteristics	Men (N = 15)	Women (N = 15)	Total (N = 30)	p value
Age				
Mean \pm standard deviation	74.8 \pm 7.7	76.4 \pm 8.8	75.6 \pm 8.2	0.585 ^a
60-74 years old	8 (66.7)	4 (38.9)	15 (50)	
\geq 75 years old	7 (38.9)	11 (61.1)	15 (50)	
Race				
Malay	5 (33.3)	5 (33.3)	10 (33.3)	
Chinese	7 (46.7)	6 (40.0)	13 (43.3)	0.896 ^b
Indian	3 (20.0)	4 (26.7)	7 (23.3)	
Admission ward				
Geriatric ward	5 (33.3)	5 (33.3)	10 (33.3)	1.000 ^c
Medical ward	10 (66.7)	10 (66.7)	20 (66.7)	
Educational level				
No formal education	1 (6.7)	3 (27.3)	4 (15.4)	
Primary school	2 (13.3)	3 (27.3)	5 (19.2)	0.269 ^b
Secondary school	11 (73.3)	5 (45.5)	16 (61.5)	
Tertiary education	1 (6.7)	0 (0)	1 (3.8)	
Living arrangement				
Living with spouse	1 (6.7)	1 (7.1)	2 (6.9)	
Living alone	0 (0)	1 (7.1)	1 (3.4)	0.690 ^b
Living with spouse and others	5 (33.3)	3 (21.4)	8 (27.6)	
Living with others	9 (60.0)	9 (64.3)	18 (62.1)	

continue

TABLE 1. Continued

Characteristics	Men (N = 15)	Women (N = 15)	Total (N = 30)	p value
Occupational status				
Not working	14 (93.3)	14 (100)	28 (96.6)	1.000c
Working	1 (6.7)	0 (0)	1 (3.4)	
Source of Income				
Pension	7 (46.7)	6 (42.9)	13 (44.8)	
Children	6 (40.0)	6 (42.9)	12 (41.4)	0.979b
Others	2 (13.3)	2 (14.3)	4 (13.8)	
Fluid Restriction				
Yes	4 (26.7)	2 (13.3)	6 (20.0)	0.326
No	11 (73.3)	13 (86.7)	24 (80.0)	
On Sedative Drugs				
Yes	0 (0)	0 (0)	0 (0)	*
No	15 (100)	15 (100)	30(100)	

^a Independent t-test, ^b Pearson Chi Square, ^c Fisher Exact Test, *no data is computed

(66.7%), had secondary school level of education (61.5%), living with others (62.1%), not working (96.6%) and source of income from pension (44.8%). As shown in Figure 1, half of subjects were underweight (50.0%), 32.1% normal, 3.6% overweight and 14.3% obese. As shown in Figure 2, total of 70% and 30% of the subjects were moderately and severely malnourished respectively. As shown in Table 4, a total of 96.7% and 73.3% subjects had low albumin, low hemoglobin, and low calcium respectively.

Men were more likely to be underweight compared to women as shown in Figure 1. Men had a lower mid-upper arm circumference measurement and calf circumference compared to women but had a higher SNAQ score indicating low appetite and risk of weight lost (Table not shown).

COMPLIANCE RATE AND ITS INFLUENCING FACTORS

The mean % of compliance rate based on volume were 39.3%. Majority of the subjects had medium compliance rate (53.4%), followed by low (43.3%) and high (3.3%). The compliance rate of medium and high were combined as in the table because there was only one subject had high compliance rate. Overall, men had a higher prevalence of low compliance rate (46.7%) as compared to women

(40.0%) but the difference was not significant. There were no significant different between compliance rate towards ONS with age, BMI, MUAC, CC and SNAQ Score (Table 3). Based on Table 2, those who had low compliance rate was found to have a lower potassium ($p < 0.01$) and phosphorus ($p < 0.05$) level, as compared to those at medium-high compliance rate.

Based on Table 6, subjects with low compliance rate agreed that they need more nursing support (53.8%). There were only 44.4% of them were given the needed nursing support, had knowledge towards ONS (38.5%), well-planned time in giving ONS (37.5%), understood the importance of ONS (35.7%), were able to finish the prescription of ONS (35.0%), well-informed of the reason taking ONS (33.3%), satisfied with the taste of ONS (33.3%) and satisfied with the volume of ONS (33.3%), satisfied with the texture of ONS (31.6%) and frequency of giving ONS (28.6%).

NUTRITIONAL INTAKE OF ONS BY THE SUBJECTS

As shown in Table 5, the mean calories from ONS prescribed to the patients was 853 kcal/day, however, the mean calories of ONS consumed was only 339 kcal/day thus resulting in

TABLE 2. Anthropometric data of subjects

Parameter	Mean ± Standard Deviation			p value ^a
	Men	Women	Total Subject	
Height/cm	163.7 ± 9.5	152.2 ± 6.2	152.8 ± 13.4	0.001*
Weight/kg	58.2 ± 15.4	54.3 ± 14.2	56.4 ± 8.8	0.494
Body Mass Index /kgm ⁻²	21.6 ± 6.0	23.8 ± 7.5	22.6 ± 5.0	0.400
Mid-Upper Circumference	26.1 ± 4.0	28.3 ± 6.4 ^a	27.1 ± 4.6	0.307
Calf Circumference	30.3 ± 4.8	30.8 ± 5.4	30.5 ± 3.0	0.795
SNAQ Scores	12.2 ± 4.1	10.7 ± 2.9	11.5 ± 1.4	0.269

* $p < 0.01$, significance difference between men and women, ^aIndependent Sample T-Test

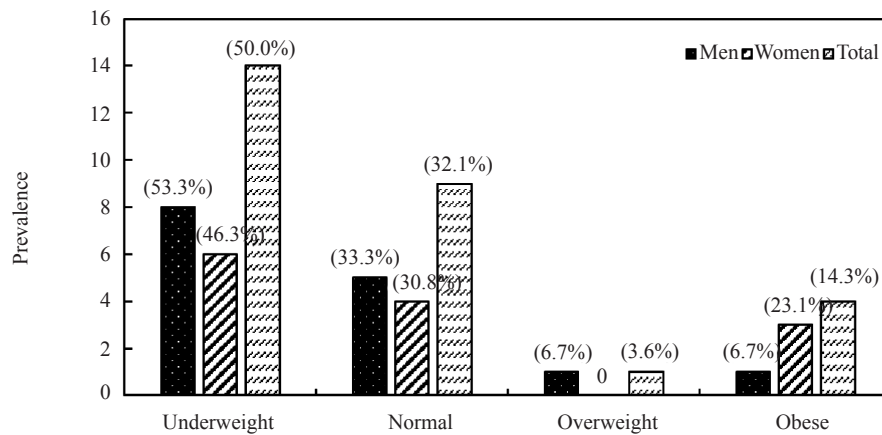


FIGURE 1. Prevalence of underweight, normal, overweight and obese according to gender

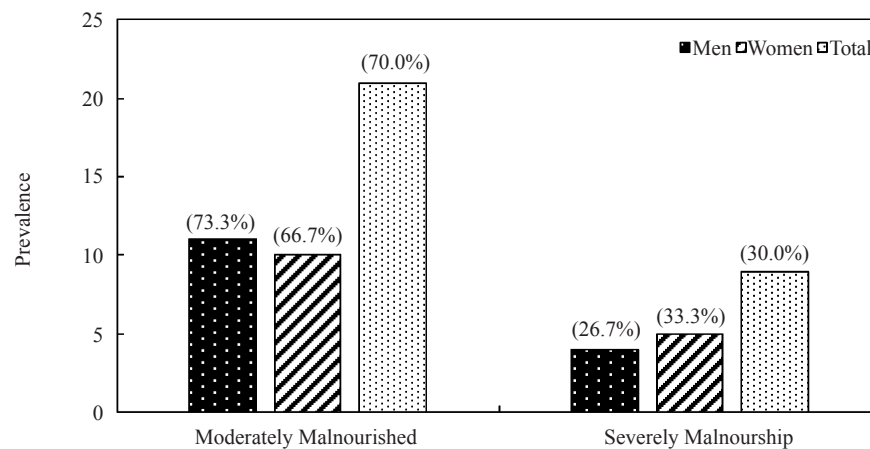


FIGURE 2. Prevalence malnutrition (PG-SGA scores) according to gender

TABLE 3. Mean of sociodemographic and nutritional parameters according to compliance rate towards ONS

Characteristics	Compliance Rate/%		<i>p</i> value*
	Low ($\leq 30\%$) (Mean \pm SD)	Medium and high (30.1-100.0%) (Mean \pm SD)	
Age ($n = 30$)	77.9 \pm 7.7	73.8 \pm 8.3	0.362
Body Mass Index/ BMI ($n = 28$)	22.5 \pm 6.4	22.6 \pm 7.1	0.701
Mid Upper Arm Circumference (MUAC) /cm ($n = 25$)	27.4 \pm 4.1	26.9 \pm 5.9	0.516
Calf circumference (CC) /cm ($n = 30$)	30.3 \pm 4.7	30.8 \pm 5.3	0.526
SNAQ score ($n = 30$)	11.7 \pm 3.6	11.6 \pm 3.5	0.818

*Independent *t*-test

compliance rate of $39.3 \pm 21.05\%$, percentage ranging from 11.5% to 100%. Those in the low compliance rate category had a significantly lower calories, carbohydrate, protein and fat from ONS as compared that those in the medium-high category ($p < 0.05$) for all parameters.

DISCUSSION

About a third of geriatric patients being recruited in this study were underweight and all of them were malnourished based on clinical assessment of PG-SGA. These findings were higher than the prevalence in other studies among hospitalised geriatric patients locally (Sakinah & Tan 2012; Shahar et al. 2002) and other countries including Portugal and Japan (Amaral et al. 2010; Matsumura et al. 2015). This could be due to the fact subjects in this study were candidates of ONS, who had a higher risk of malnutrition as compared to general geriatric patients as in other studies. Lower limb muscle wasting as assessed using CC (43.3%) was higher than upper limb (16.0%), probably due to immobility and low physical activity among subjects. Furthermore, over two third had low

TABLE 4. Biochemical profile of subjects

Parameter	Normal Range	Compliance Rate		<i>p</i> value ^a
		Low (≤ 30%)	Medium and high (30.1-100.0%)	
Albumin/gl ⁻¹	35-52			
Low-Within Range		13(44.8)	16(55.2)	1.000
Within Range-High		0(0)	1(100.0)	
Total Protein/gl ⁻¹	64-83			
Low-Within Range		6(50.0)	6(50.0)	0.711
Within Range-High		7(38.9)	11(61.1)	
Haemoglobin/mmol ⁻¹	13-17			
Low-Within Range		12(41.4)	17(58.6)	0.433
Within Range-High		1(100.0)	0(0)	
Calcium/mmol ⁻¹	2.20-2.55			
Low-Within Range		11(50.0)	11(50.0)	0.407
Within Range-High		2(25.0)	6(75.0)	
Sodium/mmol ⁻¹	136-145			
Low-Within Range		6(42.9)	8(57.1)	1.000
Within Range-High		7(43.8)	9(56.2)	
Potassium/mmol ⁻¹	3.4-4.5			
Low-Within Range		1(12.5)	7(87.5)	0.092
Within Range-High		12(54.5)	10(45.5)	
Magnesium/mmol ⁻¹	0.66-0.99			
Low-Within Range		2(100.0)	0(0)	0.179
Within Range-High		11(39.3)	17(60.7)	
Phosphate/mmol ⁻¹	0.81-1.45			
Low-Within Range		3(23.1)	10(76.9)	0.071
Within Range-High		10(58.8)	7(41.2)	

^aFisher Exact Test

TABLE 5. Prescription given, amount consumed and macronutrient distribution (Mean ± standard Deviation)

Parameter	Low (<i>N</i> = 13)	Medium-High (<i>N</i> = 17)	Total (<i>N</i> = 30)	<i>p</i> value
ONS Prescribed/kcal ⁻¹	861 ± 380	848 ± 338	853 ± 351	0.503
ONS Consumed/kcal ⁻¹	188 ± 83	454 ± 250	339 ± 235	0.001*
Compliance rate/%	21.3 ± 4.6	53.1 ± 17.9	39.3 ± 21.1	□
Protein/gd ⁻¹				
Carbohydrate/gd ⁻¹	9.4 ± 4.6	39.0 ± 15.1	16.0 ± 10.7	0.003*
Fat/gd ⁻¹	22.4 ± 10.1	56.8 ± 36.4	41.9 ± 32.8	0.000*
	6.8 ± 3.2	15.9 ± 8.8	12.0 ± 8.3	0.002*

*Significant at *p* < 0.05 (Mann-Whitney U Test), □ Dependant variable

albumin and haemoglobin due to malnutrition and chronic or acute illnesses caused by inflammation (de Francisco et al. 2009; Don & Kaysen 2004). According to Table 3, the prevalence of low appetite of 80% in this study by referring to SNAQ score was also higher than other local studies among geriatric outpatients (45.7%) (Hanisah et al. 2012) and community dwelling older adults (64.2%) (Mohamad et al. 2010). Poor appetite assessment using

SNAQ as adopted in this study indicated significant risk of at least 5% weight loss within six months, if no intervention plan being executed.

This study highlights the factors affecting the compliance of ONS intake among the geriatric patients of Hospital Kuala Lumpur. The mean compliance rate was 39.3%, with 43.3% of the subjects were classified as low and 53.4% medium compliance rate of ONS consumption

TABLE 6. Association between acceptance of ONS and compliance rate

		Acceptance Level Towards ONS			
Like Texture ONS		Compliance Status		Total	<i>p</i> -value
		Low (≤ 30%)	Medium and high (30.1-100.0%)	(<i>n</i> , %)	0.173 ^a
	Disagree	6 (60.0)	4 (40.0)	10 (100.0)	
	Uncertain	1 (100.0)	0 (0.0)	1 (100.0)	
	Agree	6 (31.6)	13 (68.4)	19 (100.0)	
Like Taste ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.387 ^b
	Disagree	6 (60.0)	4 (40.0)	10 (100.0)	
	Uncertain	1 (50.0)	1 (50.0)	2 (100.0)	
	Agree	6 (33.3)	12 (66.7)	18 (100.0)	
Suitable Volume ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.272 ^c
	Disagree	6 (54.5)	5 (45.5)	11 (100.0)	
	Uncertain	1 (100.0)	0 (0.0)	1 (100.0)	
	Agree	6 (33.3)	12 (66.7)	18 (100.0)	
Frequency and Timing of ONS Given					
Suitable Frequency of ONS		Low (≤ 30%)	Medium and high (30.1-100.0 %)		0.044 ^d
	Disagree	3 (75.0)	1 (25.0)	4 (100.0)	
	Uncertain	4 (80.0)	1 (20.0)	5 (100.0)	
	Agree	6 (28.6)	15 (71.4)	21 (100.0)	
Well-Planned Time in giving ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.435 ^e
	Disagree	2 (66.7)	1 (33.3)	3 (100.0)	
	Uncertain	2 (66.7)	1 (33.3)	3 (100.0)	
	Agree	9 (37.5)	15 (62.5)	24 (100.0)	
Finished Prescription of ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.230 ^f
	Disagree	5 (71.4)	2 (28.6)	7 (100.0)	
	Uncertain	1 (33.3)	2 (66.7)	3 (100.0)	
	Agree	7 (35.0)	13 (65.0)	20 (100.0)	
Understanding Towards ONS					
Well Aware of the Reason Taking ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.292 ^g
	Disagree	8 (57.1)	6 (42.9)	14 (100.0)	
	Uncertain	0 (0.0)	1 (100.0)	1 (100.0)	
	Agree	5 (33.3)	10 (66.7)	15 (100.0)	
Understand The Importance of Taking ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.484 ^h
	Disagree	8 (50.0)	8 (50.0)	16 (100.0)	
	Uncertain	0 (0.0)	0 (0.0)	0 (0.0)	
	Agree	5 (35.7)	9 (64.3)	14 (100.0)	
Knowledge Towards ONS		Low (≤ 30%)	Medium and high (30.1-100.0%)		0.721 ⁱ
	Disagree	8 (47.1)	9 (52.9)	17 (100.0)	

continue

TABLE 6. Continued

Acceptance Level Towards ONS				
Like Texture ONS	Compliance Status		Total (n, %)	<i>p</i> -value
	Low (≤ 30%)	Medium and high (30.1-100.0%)		
Uncertain	0 (0.0)	0 (0.0)	0 (0.0)	0.173 ^a
Agree	5 (38.5)	8 (61.5)	13 (100.0)	
Needs of Nursing Support				
Need Nursing Support	Low (≤ 30%)	Medium and high (30.1-100.0%)		0.460 ^j
Disagree	6 (35.3)	11 (64.7)	17 (100.0)	
Uncertain	0 (0.0)	0 (0.0)	0 (0.0)	
Agree	7 (53.8)	6 (46.2)	13 (100.0)	
Given Needed Nursing Support	Low (≤ 30%)	Medium and high (30.1-100.0%)		0.672 ^k
Disagree	5 (45.5)	6 (54.5)	11 (100.0)	
Uncertain	0 (0.0)	1 (100.0)	1 (100.0)	
Agree	8 (44.4)	10 (55.6)	18 (100.0)	
Given ONS on a Regular Basis with Nursing Support	Low (≤ 30%)	Medium and high (30.1-100.0%)		0.288 ^l
Disagree	7 (53.8)	6 (46.2)	13 (100.0)	
Uncertain	2 (66.7)	1 (33.3)	3 (100.0)	
Agree	4 (28.6)	10 (71.4)	14 (100.0)	

^{a,h,c,d,e,f,g,k,l} Chi-Square Test, ^{h,j,j} Fisher's Exact Test

(53.4%). Only 3.3% had high compliance rate. The ONS intake averaged about 339 kcal/d, which was lower than previous studies that reported a higher intake of roughly 400 kcal/d (Allen et al. 2013). The later study by (Allen et al. 2013) reported that nursing and care staff were found to be too busy to give the supplement drinks prescribed, and this aspect was observed as the main reason for the omission of ONS (76%). The present study found that low compliance rate also was mainly due to the lack of nursing support resulting in the patients did not receive the ONS prescribed. Lack of compliance of care personnel is one of the factors that will result in the reduce serving of ONS (Jobse et al. 2015).

A study by Gosney (2003) among hospitalized older adult also reported low compliance rate of 37%. One third of the patients consumed more than 50% of the supplement drinks, while the remaining two thirds drank less than half of the provided carton. Similar situation can be seen in this research as only 36.7% of the patient consumed more than 50% of the ONS prescribed to them.

Low compliance towards ONS intake could probably due to the low palatability, monotony effects and taste changes (De Luis et al. 2015), as observed in this study that the taste of ONS is dislike or not the most agreeable factor by the geriatric patients with low compliance rate. Sweetness is one of the many factors that contribute to the dislike of the ONS (Kennedy et al. 2010) as proven by

our study whereby there are three geriatric patients from our study reported that the ONS was too sweet for them to consume. It should be borne in mind that taste sensation altered with aging, as Kennedy et al. (2010) reported that there were differences in both sweetness detection and recognition thresholds between young and older adults, with older adults more likely to identify the taste incorrectly (Kennedy et al. 2010).

There were no significant difference between disease and nutritional factors with compliance towards ONS probably due to small sample size. A study by Jobse et al. (2015) reported that high compliance rate towards low volume, nutrient and energy dense ONS would significantly improve the nutritional status among the nursing home geriatric patients. There are lack of study that report about the association between disease and compliance towards ONS. However, in the present study those with poor compliance rate was found to have a lower phosphorus and potassium levels, indicating inadequacy of nutrient intake.

The limitation of this study was the sample size only represents the population of geriatric patients in the geriatric and medical wards taking ONS in Hospital Kuala Lumpur in the central of Malaysia. The findings may not represent the overall population of geriatric patients taking ONS in Malaysia. Small sample size due to difficulties in getting enough sample during the study period which was

conducted near fasting month, ie. Ramadan, high turnover rate, changing wards without our acknowledgement and patients did not receive ONS that has been prescribed by the dietitians due to nursing factor. Anthropometric data obtained from the measurement may have some technical error, especially when dealing with geriatric patients with flabby muscle. Besides, most of them were bedridden, weak, and on Intravenous (IV). There were some missing anthropometric data such as MUAC due to IV which leads to the missing data of weight and height calculation.

CONCLUSION

Approximately a third of subjects had malnutrition and 40% had low compliance rate. Low compliance was associated with the lack of awareness towards ONS followed by insufficient nursing support. There is a need to increase awareness and education about ONS. Human resource aspect and training should be looked upon in increasing the nursing support towards improving ONS compliance.

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