

Overnutrition Among Older Persons in a Maltese Nursing Home

Gerald Choon-Huat Koh

Abstract

Background: International studies on nursing home residents have demonstrated that undernutrition is a prevalent and serious health issue among this population of older persons. On the other hand, obesity is prevalent among the elderly in Malta. However, to date, there has been no published study on the nutritional status of elderly nursing home residents in Malta.

Objective: To assess the nutritional status of Maltese nursing home residents and determine the prevalence of underweight, overweight and obesity.

Method: Cross-sectional quantitative survey research was undertaken from 19 Jan to 23 Feb 04 using the full Mini-Nutritional Assessment (MNA) tool which includes Body Mass Index (BMI) measurement.

Subjects: 43 eligible residents (23 females and 19 males) from one female and one male ward of St Vincent de Paul Residence (SVPR).

Results: The prevalence of undernutrition was 9.5% and risk of undernutrition was 71.5%. The prevalence of underweight, overweight and obese residents was 7.1%, 35.7% and 26.2% respectively.

Conclusions: Overnutrition, instead of undernutrition, is a nutritional problem among nursing home residents in SVPR. However, a high proportion of residents remain at risk of undernutrition. Nutritional assessment is recommended to individualise diet to resident's needs.

Introduction

Malnutrition is defined as a condition that results from a deficit or excess of nutrients or energy in relation to metabolic and tissue needs. Hence, malnutrition can be divided into either undernutrition or overnutrition. Protein-Energy Undernutrition (PEU), a form of undernutrition, is particularly common among frail elderly people in nursing homes and its prevalence in such settings is estimated to be 30 – 60%.¹⁻³ Overnutrition is the other end of the spectrum of malnutrition with obesity being a consequence. Overweight and obesity are major health issues in Malta, where the prevalence of BMI exceeding the upper limit of normal (ie. >25 kg/m²) for women and men aged above 65 years and living in the community is 72.7% and 62.5% respectively.⁴ Among all the European Union Ascension Countries in Europe in 2004, Malta had the highest incidence of obesity.⁵ There has been no previously published data on the nutritional status of older persons in Maltese nursing homes and the prevalence of PEU, overnutrition and obesity is uncertain.

The MNA is a semi-quantitative, interviewer-administered assessment tool that has been validated and shown to be effective in detecting PEU among older persons in nursing homes in France and USA.⁶ The MNA has also been shown to predict morbidity and mortality. In the SENECA study (a longitudinal Europe-wide multi-centre study on nutrition and health in the elderly), Danish subjects determined by the MNA to be at risk of malnutrition or already malnourished had increased nutrition-related morbidity and mortality over a five-year follow-up period.⁷ A copy of the MNA is listed as Figure 1 and is available free from the website <http://www.mna-elderly.com/clinical-practice.htm>.

The MNA was redesigned in 1998 to have a screening stage to save time and enhance its usefulness which used 6 key parameters of its original 18 items.⁸ A screening score of <11 out of a maximum possible score of 14 suggests possible undernutrition and the rest of the 12 MNA items should subsequently be administered. The screening stage is only recommended for elderly populations with a low prevalence of

Keywords

MNA (Mini Nutritional Assessment), undernutrition, overnutrition, malnutrition, body-mass index, obesity, nursing home, older persons.

Gerald Choon-Huat Koh

Fellow, College of Family Physicians (Singapore)
European Institute of Gerontology, University of Malta.
Email: dr_gerald_koh@hotmail.com

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Informed Consent

Informed verbal consent was obtained from all participants prior to entry into study. The study did not pose any health risk to participants.

Table 1: Maltese translation of MNA questions which participants are asked directly

Qn	English	Maltese
A.	Has food intake declined over the past 3 months due to loss of appetite? 0 = severe loss of appetite 1 = moderate loss of appetite 2 = no loss of appetite	Dawn ¹ l'ahhar tlett xhur, naqqast mill-ikel minhabba naqqas ta' appet, jew diffikultajiet biex tickol jew tomghod? 0 = hafna 1 = inqas 2 = le
B.	Weight loss during the past 3 months? 0 = weight loss greater than 3 kg (6.6 lbs) 1 = does not know 2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs) 3 = no weight loss	Tahseb li ngast mill-piz dawn ² l'ahhar tlett xhur? 0 = inqast iktar minn 3 kg 1 = ma nafx 2 = inqast bejn 1 u 3 kg 3 = ma ngastx
M.	How much fluid (water, juice, tea, milk...) is consumed per day? 0.0 = less than 3 cups 0.5 = 3 to 5 cups 1.0 = more than 5 cups	Kemm tixrob kuljum, eżempju ilma, tē, kafē? 0.0 = inqas minn tlett tazzi 0.5 = tlieta sa hames tazzi 1.0 = iktar min hames tazzi
O.	Self view of nutritional status? 0 = views self as being malnourished 1 = is uncertain of nutritional status 2 = views self as having no nutritional problem	Tahseb li qod tickol bizzjod? 0 = ma niklox bizzjod 1 = ma nafx 2 = ma ghandiex problema
P.	In comparison with other people of the same age, how does the patient consider his/her health? 0.0 = not as good 0.5 = does not know 1.0 = as good 2.0 = better	Kif tara is-sahha tieghek meta tqabbilla ma ta xjuh l-oħra? 0.0 = mhux tajba hafna 0.5 = ma nafx 1.0 = bhal l-oħrajn 2.0 = aħjar

undernutrition and since the prevalence among Maltese nursing home residents was uncertain, the full MNA was used for this study.

Participants and Methods

St Vincent de Paul Residence (SVPR) was chosen as the study population. SVPR is a government-run nursing home institution with a bed complement of 1050 beds. It provides nursing home and respite care and offers medical, nursing, physiotherapy, occupational therapy, speech therapy, podology, dental and ophthalmic services.⁹

One female general ward (44 beds) and one male general ward (36 beds) in SVPR were selected. From each ward, all residents who satisfied the following inclusion criteria were invited to participate in the study:

1. 65 years old or above.
2. Able to give informed verbal consent.
3. No limb amputations (because it invalidates BMI measurement)
4. Eating meals orally.
5. Stays in residence >90% of the time.

The two wards selected were only general wards and the study excluded wards caring for residents with severe behavioural and psychological symptoms of dementia (eg. agitation, wandering), populations known to be at high risk of undernutrition.

To reduce inter-assessor variability, the MNA was only administered by the investigator. Height was measured using a calibrated, non-stretchable tape attached to a vertical point and weight was measured using a calibrated digital weighing

chair. Guidelines on how to administer the MNA (described in the MNA User Guide ¹⁰) were closely followed. A Maltese translation of the MNA was created to standardize the phrasing of questions (Table 1). It should be noted that the MNA has been validated with English and French speaking elderly but not with Maltese speaking elderly. Subtle nuances of questions (especially Items A, B, O and P) in the English version may have been lost in the Maltese translation. The study did not pose any health risk to participants. As part of the consent process, subjects were informed that they had been selected for a study and the purpose of the study explained to them. The study included residents with dementia but omitted those whose consent was not informed or whose relatives were not available to provide surrogate consent. The MNA can be used with demented persons (provided their answers are checked for accuracy with nursing staff or caregiver) and has been used in research with Alzheimer's dementia patients.¹¹

Results

Out of a total of 80 residents from both wards, only 42 satisfied the inclusion criteria and were enrolled into the study. The reasons for exclusion of residents from participating in the study are tabulated in Table 2.

The characteristics of the study population are presented in Table 3. SPSS statistical software (version 10.0) was used for analysis. The Student t-distribution was used for calculating confidence intervals and testing differences in means between genders. There was no significant difference in age between genders ($t = 0.54$ at 0.05 level of significance). The height and weight of males were significantly higher than females which are expected as males are generally taller and heavier. However,

Figure 1: The Mini-Nutritional Assessment (MNA) Form
(available from website <http://www.mna-elderly.com/clinical-practice.htm>)

Screening	
<p>A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties? 0 = severe loss of appetite 1 = moderate loss of appetite 2 = no loss of appetite</p>	<input type="checkbox"/>
<p>B Weight loss during the last 3 months 0 = weight loss greater than 3 kg (6.6 lbs) 1 = does not know 2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs) 3 = no weight loss</p>	<input type="checkbox"/>
<p>C Mobility 0 = bed or chair bound 1 = able to get out of bed/chair but does not go out 2 = goes out</p>	<input type="checkbox"/>
<p>D Has suffered psychological stress or acute disease in the past 3 months 0 = yes 2 = no</p>	<input type="checkbox"/>
<p>E Neuropsychological problems 0 = severe dementia or depression 1 = mild dementia 2 = no psychological problems</p>	<input type="checkbox"/>
<p>F Body Mass Index (BMI) (weight in kg) / (height in m)² 0 = BMI less than 19 1 = BMI 19 to less than 21 2 = BMI 21 to less than 23 3 = BMI 23 or greater</p>	<input type="checkbox"/>
<p>Screening score (subtotal max. 14 points) <input type="checkbox"/> <input type="checkbox"/></p> <p>12 points or greater - Normal - not at risk - no need to complete assessment 11 points or below - Possible malnutrition - continue assessment</p>	
Assessment	
<p>G Lives independently (not in a nursing home or hospital) 0 = no 1 = yes</p>	<input type="checkbox"/>
<p>H Takes more than 3 prescription drugs per day 0 = yes 1 = no</p>	<input type="checkbox"/>
<p>I Pressure sores or skin ulcers 0 = yes 1 = no</p>	<input type="checkbox"/>
<p>J How many full meals does the patient eat daily? 0 = 1 meal 1 = 2 meals 2 = 3 meals</p>	<input type="checkbox"/>
<p>K Selected consumption markers for protein intake • At least one serving of dairy products (milk, cheese, yogurt) per day? yes <input type="checkbox"/> no <input type="checkbox"/> • Two or more servings of legumes or eggs per week? yes <input type="checkbox"/> no <input type="checkbox"/> • Meat, fish or poultry every day yes <input type="checkbox"/> no <input type="checkbox"/> 0.0 = if 0 or 1 yes 0.5 = if 2 yes 1.0 = if 3 yes</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>L Consumes two or more servings of fruits or vegetables per day? 0 = no 1 = yes</p>	<input type="checkbox"/>
<p>M How much fluid (water, juice, coffee, tea, milk...) is consumed per day? 0.0 = less than 3 cups 0.5 = 3 to 5 cups 1.0 = more than 5 cups</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>N Mode of feeding 0 = unable to eat without assistance 1 = self-fed with some difficulty 2 = self-fed without any problem</p>	<input type="checkbox"/>
<p>O Self view of nutritional status 0 = views self as being malnourished 1 = is uncertain of nutritional state 2 = views self as having no nutritional problem</p>	<input type="checkbox"/>
<p>P In comparison with other people of the same age, how does the patient consider his/her health status? 0.0 = not as good 0.5 = does not know 1.0 = as good 2.0 = better</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>Q Mid-arm circumference (MAC) in cm 0.0 = MAC less than 21 0.5 = MAC 21 to 22 1.0 = MAC 22 or greater</p>	<input type="checkbox"/> <input type="checkbox"/>
<p>R Calf circumference (CC) in cm 0 = CC less than 31 1 = CC 31 or greater</p>	<input type="checkbox"/>
<p>Assessment (max. 16 points) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Screening score <input type="checkbox"/> <input type="checkbox"/></p> <p>Total Assessment (max. 30 points) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Malnutrition Indicator Score</p> <p>17 to 23.5 points at risk of malnutrition <input type="checkbox"/></p> <p>Less than 17 points malnourished <input type="checkbox"/></p>	

the BMI scores for female subjects were significantly higher than males ($t = 2.17$ at 0.05 level of significance) and the MNA score for female subjects were significantly lower than males ($t = 4.01$ at 0.05 level of significance), using independent samples t-test. The BMI score correlated positively and significantly with MNA scores (simple linear regression, $F = 10.62$, $p = 0.02$).

The prevalence of undernutrition in the sample was 9.5% while nearly three-quarters of residents were at risk of undernutrition (71.5%). Only 7.1% of the study population was underweight but 35.7% were overweight and 26.2% were obese.

Discussion

The prevalence of undernutrition in the sample was only 9.5% whereas published data on undernutrition among nursing home residents in other countries is estimated to be 30% to 60%. There are many possible reasons why the prevalence of undernutrition in the study was low. The menu for residents was highly adequate for protein, fruits and vegetables. This is supported by a 100% response rate for the full score for selected consumption markers for protein intake (Item K of MNA) and 95.2% response rate for adequate consumption of fruit and

Table 2: Reasons for exclusion of residents from study

	Female Ward	Male Ward
Total no. of residents	44	36
Reasons for exclusion		
Younger than 65 years	2	5
Unable to give consent because of dementia	13	4
Unable to give consent because resident was deaf and illiterate	3	1
Unable to give consent because resident was too ill	0	1
Refused consent	1	2
Has lower limb amputations	1	1
On non-oral feeding	1	0
In ward < 90% of the time	0	3
Total no. of residents excluded	21	17
Total no. of study participants	23	19

vegetables (Item L of MNA). Residents with dementia severe enough to preclude informed consent made up 44.7% of residents who were excluded from the study. This group of elderly is at higher risk of undernutrition and their exclusion could have lowered the prevalence of undernutrition in the study population. The high functional status of SVPR residents is another possible contributing factor to the low prevalence of undernutrition as only 14.3% were either bed or chair bound (Item C of MNA). When compared to a study by Yap et al where 48% of Singaporean nursing home residents were non-ambulant or bedridden, the prevalence of undernutrition was correspondingly higher at 22%.¹² The final sample of 42 participants may be too small to represent a 1050 bedded institution. It must also be noted that including residents from other nursing homes would

have provided more information for comparison because nursing homes are heterogeneous and the study nursing home is an unusually large residential institution.

The high prevalence of obesity among subjects may have “protected” residents from undernutrition because of greater initial nutritional reserve. The prevalence of BMI exceeding the upper limit of normal was 73.9% for females and 47.3% for males. The BMI for female elderly residents may have been unfairly high because females experience loss in height from post-menopausal osteoporotic vertebral fractures and height measured may be lower than the true height. Nevertheless, it appears that undernutrition is not as large a problem in Maltese nursing homes as overnutrition. Obesity has its associated morbidity such as coronary heart disease, diabetes,

Table 3: Characteristics of study population

	Females	Males	All
Mean value (95% Confidence Interval)			
Age (years)	83.0 (80.2 – 85.8)	81.9 (78.9 – 84.9)	82.5 (80.5 – 84.5)
Height (m)	1.46 (1.44 – 1.49)	1.65 (1.60 – 1.70)	1.55 (1.51 – 1.59)
Weight (kg)	60.1 (55.1 – 65.1)	68.0 (62.8 – 73.2)	63.7 (60.1 – 67.3)
Number (and %) of subjects by BMI (kg/m²)			
Underweight (< 20)	2 (8.7%)	1 (5.3%)	3 (7.1%)
Normal (20 – 24.9)	4 (17.4%)	9 (47.4%)	13 (31.0%)
Overweight (25 – 30)	8 (34.8%)	7 (36.8%)	15 (35.7%)
Obese (>30)	9 (39.1%)	2 (10.5%)	11 (26.2%)
Number (and %) of subjects by MNA Score			
Normal (24 - 30)	6 (26.1%)	2 (10.5%)	8 (19.0%)
At Risk of Undernutrition (17 – 23.5)	14 (60.9%)	16 (84.2%)	30 (71.5%)
Undernourished (0 – 16.5)	3 (13.0%)	1 (5.3%)	4 (9.5%)

osteoarthritis, disability and breast cancer in postmenopausal women.¹³ In dependent residents who require assistance in ambulation and ADLs, obesity increases physical demands on nursing care staff and increases difficulty in utilizing exercise as a weight-loss tool. The SENECA study has confirmed the presence of obesity in community-living elderly men and women in Malta and it appears that this extends to elderly nursing home residents. With increasing numbers of older persons and obesity becoming an increasingly common health problem in Europe, the nutritional status of nursing home residents may change from undernutrition to overnutrition. Further research involving a larger sample size and other Maltese nursing homes is needed to fully elucidate the extent of this problem.

The finding of a high proportion of elderly residents at high risk of undernutrition seems to contradict the finding of a high prevalence of overweight and obesity. Many residents were assessed to be at risk of undernutrition because of their concurrent medical problems, evidenced by the high positive response to MNA questions on recent psychological stress or acute disease (Item D = 45.2%), neuropsychological problems (Item E = 54.8%) and taking more than 3 prescription drugs a day (Item H = 73.7%). It appears that while the residents are at risk of undernutrition, their current nutritional status is over-compensated. A possible reason could be the caloric value of the diet provided may be too high for the low activity level of residents, many of whom are functionally impaired. Given the heterogeneity of medical problems and nutritional needs of older persons, individual nutritional assessment and tailoring of diet provided is needed.

Four out of the six items in the screening stage retained their close correlation with the final MNA score [Item A (p = 0.028), B (p = 0.014), E (p = 0.008) and F (p = 0.002)]. With the low prevalence of undernutrition in study nursing home, validity of the screening stage of MNA is expected. Thus, nutritional screening using the 2 stages of the MNA is appropriate in SVPR.

Conclusion

The prevalence of undernutrition among older persons in a Maltese nursing home is estimated to be 9.5% and the prevalence of risk of undernutrition is 71.5%. The prevalence of underweight, overweight and obese residents is 7.1%, 35.7% and 26.2% respectively. Overnutrition appears to be more prevalent than undernutrition among older persons in Maltese nursing homes. This may be related to the high prevalence of

obesity in Malta. However, many older persons remain at risk of undernutrition and individualisation of diet to nutritional need is recommended.

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