

Food System as a Crucial Factor Defining Nutritional Status of Nursing Home Female Residents

Sweed HS¹, Mabrouk RR², Ali SH*¹, and Abd el mawla NM¹.

¹Geriatrics & Gerontology department, Faculty of Medicine, Ain Shams University, Cairo, Egypt.

²Clinical Pathology department, Faculty of Medicine, Ain Shams University. Cairo, Egypt.

Abstract

Background: Malnutrition in institutionalized elderly is of individual and public concern and should be evaluated

Aim: To assess the nutritional status and discuss the relation between malnutrition and food system among female residents of elderly homes in Cairo, Egypt.

Methods: From seven elderly homes in Cairo, two hundred female residents were randomly selected. Medical data was collected. The MNA was used to assess their nutritional status then a questionnaire assessing the feeding system in the elderly homes was applied to nursing home personnel.

Results: Among the 200 participants, 28(14%) of them were malnourished, 94 (47%) were at risk of malnutrition and 78 (39%) were well nourished. The nursing home characters decreasing the risk of malnutrition were the presence of dining room, food variability, availability of alternate food and the presence of dietician. Regarding food habits; nasogastric feeding, water cups <5.0 per day, non-fried food, presence of diet regimens, absence of snacks and absence of external food were associated with malnutrition.

Conclusions: Elderly homes play a crucial role in provision of a healthy environment for residents. To achieve better nutritional status, adjusting food system is needed. Presence of a dietician among the staff in elderly homes has a paramount role in residents' nutritional status.

Keywords: Malnutrition, Elderly females, Nursing homes, Egypt.

Background:

Malnutrition is a state of deficiency, imbalance or excess of energy, protein and other nutrients with adverse clinical outcomes¹.

Malnutrition, low body mass index (BMI) and unintentional weight loss are risk factors for mortality and have a negative influence on the functional status and psychosocial well-being of the elderly population². The research of Otero et al. proved a relation between malnutrition and mortality among the elderly and clarifies the crucial need to pay more attention to this population and intervene whenever necessary³.

Residing in nursing homes increases the risk of malnutrition due to a variety of factors including sensory loss, chewing and swallowing problems, a decrease in or loss of appetite, mobility restrictions,

cognitive impairment, depressed mood and acute or chronic diseases demanding the use of multiple medications⁴.

Environmental factors affect food intake and should be considered in nutritional evaluation. The food preferences, food consistency, food temperature, and availability of snacks should be addressed. Provision of pleasant, well-lighted, unhurried mealtimes in a social environment is associated with enhanced food intake⁵.

The institutional setting, which may have rigid routines, low staffing levels and un-homely environment, may exacerbate the existing medical problem, by minimizing the positive aspects of enjoyment and social contact. Similarly, a narrow range

of food choices is associated with poorer nutritional status⁶. As a vicious cycle this inadequate dietary intake and malnutrition contributes not only to the progression of already existing chronic diseases such as cardiovascular disease, osteoporosis or mental disorders but can also predispose the subject to various acute health problems such as infection or dehydration⁷. Regarding this problem, Egypt is of no exception, some studies searched nutrition in nursing homes; the study conducted by Khater and Mousa, 2012 on 84 resident in nursing homes in Cairo using MNA revealed that 11.9% are malnourished, 42.9% are at risk of malnutrition and 45.2% are well nourished⁸. Nevertheless, food system is rarely investigated as a risk factor for malnutrition. Therefore, the aim is of this study is to assess the nutritional status among female residents of elderly homes in Cairo and its relation to food system in nursing homes.

Methods

Through a stratified random sampling from public and private nursing homes in Cairo, Egypt, seven nursing homes were selected and 200 elderly female residents were chosen as the study population. The inclusion criteria were: being female, aged 60 years and older, living in elderly home for at least 6 months and accepting to participate in the study. The exclusion criteria were: having extreme illnesses (end stage diseases such as end stage liver disease and end stage renal disease) and intentional regimen to lose weight.

Data on the subjects' demographic characteristics and nutritional and health status were gathered. Demographic characteristics included age, gender, educational level, marital status, smoking status, alcohol consumption. Medical history and drug history were taken from the resident or caregiver to assess health status. Quick general and local examinations were done.

The Mini Nutritional Assessment (MNA) was designed and validated to provide a single, rapid assessment of nutritional status in elderly patients in outpatient clinics, hospitals, and nursing homes.⁹ The MNA test is composed of simple measurements and brief questions that can be completed in about 10 min. The sum of the MNA scores distinguish between elderly patients with: adequate nutritional status, MNA ≥ 24 ; protein-calorie malnutrition, MNA < 17 ; at risk of malnutrition, MNA between 17 and 23.5. The MNA scale was also found to be predictive of mortality and hospital cost. Most important it is possible to identify people at risk for malnutrition, scores between 17 and 23.5, before severe changes in weight or albumin levels occur. These individuals can be easily corrected by nutritional intervention.

As regards food system in the elderly home, a questionnaire was designed including data about; if

the resident eats in dining room or not, if there is food variability more than 2 times per week, availability of providing an alternative meal if the resident requested, presence of dietician in the elderly home, if the food is served in an appropriate temperature, if the resident feeding is via nasogastric feeding, the number of water cups per day, presence of fried food, presence of diet regimens, if there are snacks and availability of external food.

Ethical consideration

Informed oral consent was taken from every patient after explanation of the study aim and procedure and the study methodology was reviewed and approved by the Research Review Board of the Geriatrics and Gerontology Department, Faculty of medicine, Ain Shams University.

Statistical Analysis

The collected data were coded, tabulated, and statistically analyzed using IBM SPSS statistics (Statistical Package for Social Sciences) software version 22.0, IBM Corp., Chicago, USA, 2013. The level of significance was taken at P value < 0.050 is significant, otherwise is non-significant. The p-value is a statistical measure for the probability that the results observed in a study could have occurred by chance.

Results

Two hundred elderly females from seven elderly homes in Cairo participated in this study. Among The 200 participants, 28 of them were malnourished, 94 were at risk of malnutrition and 78 were well nourished; this was done by using The Mini Nutritional Assessment. The mean age is 72 ± 8 , About one quarter of the studied cases were married, more than half of them had education ≥ 5.0 years, few cases were smokers (2.5%). [Table 1]

Presence of Dining room, food variability, availability of alternate food, presence of dietician, fresh food (vegetables and fruits) and proper food temperature were significantly highest in well-nourished, followed by at risk and lowest in malnourished. [Table 2]

Nasogastric feeding, water cups < 5.0 , non-fried food, presence of diet regimen (diabetic or low protein), absence of snacks and absence of external food (from outside the nursing home) were significantly highest in malnourished, followed by at risk and lowest in well nourished. [Table 3]

Significant factors were entered in regression analysis and we revealed that: age > 70 years, snacks between meals and presence of dietician were factors that significantly decrease the risk of malnutrition. [Table 4]

Table 1: Demographic characteristics of the participants:

Items	All (N=200)	Well (N=78)	At risk (N=94)	Mal. (N=28)	P
Age (years)	72.1±8.3	70.9±7.7	71.5±8.1	77.1±8.9	^0.002*
Married	54(27.0%)	24 (30.8%)	20 (21.3%)	10 (35.7%)	#0.202
Education					#0.011*
≥ 5 yr	110 (55.0%)	52 (66.7%) a	48 (51.1%)	10 (35.7%)	
<5 yr	90 (45.0%)	26 (33.3%)	46 (48.9%)	18 (64.3%)	
Smoking					&0.841
-Smoker	5 (2.5%)	2 (2.6%)	2 (2.1%)	1 (3.6%)	
-Non	195 (97.5%)	76 (97.4%)	92 (97.9)	27 (46.4%)	

^ANOVA test with post hoc tukey test, #Chi square test, &Fisher's Exact test, *Significant

Table 2: Characteristics of food system in elderly homes

Items	All (N=200)	Well (N=78)	At risk (N=94)	Mal. (N=28)	#P
Dining Room	166 (83.0%)	71 (91.0%) a	79 (84.0%)b	16 (57.1%) c	<0.001*
Food variability	121 (60.5%)	64 (82.1%) a	53 (56.4%) b	4 (14.3%) c	<0.001*
Availability of alternate Food	112 (56.0%)	62 (79.5%) a	47 (50.0%) b	3 (10.7%) c	<0.001*
Presence of Dietician	96 (48.0%)	62 (79.5%) a	31 (33.0%) b	3 (10.7%) c	<0.001*
Fresh food	96 (48.0%)	62 (79.5%) a	31 (33.0%) b	3 (10.7%) c	<0.001*
Proper food temperature	96 (48.0%)	62 (79.5%) a	31 (33.0%) b	3 (10.7%) c	<0.001*

Chi square test with post hoc Boferroni test, *Significant

Table 3: Effects of food habits on nutritional status

Items	All (N=200)	Well (N=78)	At risk (N=94)	Mal. (N=28)	P
Nasogastric feeding	13 (6.5%)	1 (1.3%) ^a	8 (8.5%) ^{ab}	4 (14.3%) ^b	#0.032*
Usual food 'not NG'	23 (11.5%)	77 (98.7%) ^a	80(85.1%) ^b	20(71.4%) ^b	#<0.001*
Fried food [∞]	60 (30.0%)	32 (41.0%) ^a	22(23.4%) ^b	6 (21.4%) ^b	#0.024*
Water cups <5.0 /day	147 (73.5%)	43 (55.1%) ^a	78(83.0%) ^b	26(92.9%) ^b	#<0.001*
Special diet	59 (29.5%)	25 (32.1%) ^a	32 (34.0%) ^a	2 (7.1%) ^b	#0.019*
Snacks	72 (36.0%)	46 (59.0%) ^a	24(25.5%) ^b	2 (7.1%) ^c	#<0.001*
Tea after meals	93 (46.5%)	43 (55.1%)	38 (40.4%)	12 (42.9%)	#0.144
External food	48 (24.0%)	32 (41.0%) ^a	12(12.8%) ^b	4 (14.3%) ^b	#<0.001*
Vitamins	61 (30.5%)	25 (32.1%)	28 (29.8%)	8 (28.6%)	#0.923

^ANOVA test with post hoc tukey test, #Chi square test, &Fisher's Exact test with post hoc Boferroni test, *Significant, [∞] more than three days per week

Table 4: Logistic regression model for factors affecting malnutrition

Factors	β	SE	P	OR (95% CI)
Age > 70.0 yrs	1.261	0.635	0.047	3.528 (1.016–12.258)
Snacks between meals	-1.439	0.517	0.005	0.237 (0.086–0.654)
Dietician	-2.573	0.573	<0.001	0.076 (0.025–0.234)
External food	-0.550	0.498	0.269	0.577 (0.217–1.530)

β: Regression coefficient, SE: Standard error, CI: Confidence interval

Discussion

Malnutrition is associated with significantly increased morbidity and mortality in independently living elderly, as well as the residents of nursing homes and hospitalized patients¹⁰. The purpose of this study was to determine the relation between nutritional status and food system in elderly homes' female residents in Cairo, Egypt.

While age was marginally significant determinant of nutritional status in multivariate analysis ($P= 0.047$), snacks between meals and presence of dietician were factors that significantly decrease the risk of malnutrition. We may conclude that food system is essential in determination of the nutritional status. The current study showed that the mean age of malnourished group was significantly higher than those at risk and those who were well nourished. Kruizenge et al.¹¹ in their study showed a significant association between aging and malnutrition in elderly.

Age is a contributor to malnutrition due to the physiological factors influencing food intake in elderly like dental loss and dental problems that has an impact on both oral function and social interactions¹². Reductions in olfactory, gustatory and visual food perception lead to decrease in appetite and a lower diversity in meal composition and food choices¹³.

The current results displayed that eating in a dining room and serving food at an appropriate temperature had a protective role against malnutrition in elderly living in elderly homes. No doubt providing all residents' choice of food and beverages based on the available menu and in a manner suitable to each resident's ability and/or limitations e.g. visual, verbal or written, has an important role in improving resident's appetite and thus improving his nutritional status. Meanwhile, that may preserve their autonomy and feeling of dignity¹⁴.

The presence of dining room is protective against malnutrition since it increases the resident's social activity. A frequent problem among the elderly is the emotional isolation due to loss of a partner or close friend. This emotional isolation is detrimental to health, and mortality has been well demonstrated¹⁵.

Presence of a dietician is of paramount significance in nursing homes. In the present study, existence of dietician was a protective factor against malnutrition in univariate and multivariate analysis. Dieticians are the lifestyle coaches. They help changing the patients eating and exercise behaviors through a combination of individual counseling and development programs.

Regarding food habits, nasogastric feeding, water cups

<5.0 per day, non-fried food, absence of diet regimens, absence of snacks, and absence of external food are variables associated with malnutrition. We can see that elderly need small frequent meals rather than large few meals. Snacks help to augment nutrition and avoid the common anorexia experienced by elderly residents. External food implies that the resident has a good appetite, a strong social network, in addition to the variability of served food which encourages desire for food. Nasogastric feeding indicate poor health status, moreover, the resident will be dependent upon the staff for feeding.

Conclusion

Elderly homes play a crucial role in provision of comfortable environment for residents to achieve better nutritional health. Food system may be as important as age and other resident characters in determining nutritional status. Dietician has a paramount role in residents' nutritional status.

Acknowledgment

This research has been supported by a grant from Ain shams university, Faculty of medicine, Department of Geriatrics and Gerontology. The authors would like to thank Dr. Eman Ahmed Sultan Lecturer of endocrinology and Metabolism National Nutrition Institute for her great help, outstanding support, active participation and guidance.

References

1. Stratton RJ, Green CJ, Elia M. Disease-related malnutrition: an evidence-based approach to treatment. 1st ed. CABI, United States, 2003:31-38.
2. Crogan NL, Pasvogel A. The influence of protein-calorie malnutrition on quality of life in nursing homes. *J Gerontol A Biol Sci Med Sci.*2003; 58:159–164.
3. Otero UB, Rozenfeld S, Gadelha AMJ, Carvalho MS. (2002): Mortalidade por desnutrição em idosos, região Sudeste do Brasil, 1980–1997. *Rev Saude Publica.*2002; 36:141–148.
4. Macintosh C, Morley JE, Chapman IM. The anorexia of aging. *Nutrition.*2000; 16:983–995.
5. Kayser-Jones J. Mealtime in nursing homes: the importance of individualized care. *J Gerontol Nurs.*1996; 22:26–31.
6. Hickson M and Frost G. An investigation into the relationships between quality of life, nutritional status and physical function. *Clinical Nutrition.*2004; 23: 213–221.
7. Volkert D, Kreuel K, Heseker H, Stehle P. Energy and nutrient intake of young-old, old-old and very-old elderly in Germany. *Eur J Clin Nutr.*2004; 58: 1190–1200.
8. Khater MS and Mousa SM. Predicting falls among Egyptian nursing home residents: a year longitudinal study. *Journal of clinical gerontology and geriatrics.*2012, 3(2), 73-76.
9. Guigoz Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us? *J Nutr Health Aging.*2006; 10:466-487.
10. Hickson M. Malnutrition and ageing. *Postgrad Med J.*2006; 82 (963):2–8.
11. Kruizenge HM, Wierdsma NJ, Vanbokhorst MAE, et al. Screening of nutritional status in The Netherlands. *Clinical Nutrition.*2003; 22(2): 147–152.
12. Polzer, I., Schimmel, M., Müller, F., & Biffar, R. Edentulism as part of the general health problems of elderly adults. *International dental journal.*2010, 60(3), 143-155.
13. De Boer, A., Ter Horst, G. J., & Lorst, M. M. Physiological and psychosocial age-related changes associated with reduced food

- intake in older persons. *Ageing research reviews*.2013, 12(1), 316-328.
14. Delahanty, L., Simkins, S. W., Camelon, K., & DCCT Research Group. Expanded role of the dietitian in the Diabetes Control and Complications Trial: implications for clinical practice. *Journal of the American Dietetic Association*.1993, 93(7), 758-767.
 15. Markson EW. Functional, social, and psychological disability as causes of loss of weight and independence in older community-living people. *Clin Geriatr Med*.1997; 13(4):639-652.