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THE PREVALENCE OF GERIATRIC MALNUTRITION AND ITS FACTORS IN SAUDI ARABIA

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Abstract:

Background: *Malnutrition is highly prevalent among the elderly and is associated with poor clinical prognosis, decreased functional status, and increased morbidity and mortality.*

Objective: *To estimate the prevalence of geriatric malnutrition among outpatients of a geriatric clinic and to determine factors associated with malnutrition.*

Methods: *Cross-sectional study in Saudi Arabia All patients older than 60 years of age who attended the clinics during January to October 2018 was eligible for inclusion. Nutritional status was assessed using anthropometric data and by hemoglobin and albumin levels and lymphocyte count. The MNA was used to define malnutrition.*

Results: *According to the MNA results, 8 (5.3%) of 152 elderly patients suffered overt malnutrition and 50 (32.9%) were at risk of malnutrition (71 males and 41 females; aged 72.4 [8.6] years). The prevalence of malnutrition was significantly higher among females (44.6%; 95% CI, 1.01-4.08; P=0.044) than in males (28.3%). Malnourished patients were older than patients with normal nutritional status (mean 72.4 [8.6] years), and more common in patients who lived alone (62.5%). The malnourished patients had significantly smaller calf circumferences (63.4; 95% CI, 1.51-3.20; P=0.001), and lower albumin and hemoglobin levels (P=0.001). A significantly higher percentage of the malnourished patients compared with normal patients had experienced weight loss (37.9%; P<0.001) and decreased food intake (56.9%; P<0.001) during the previous three months. Binary logistic regression revealed that being female and living alone were significant predictors for being categorized as malnourished or at risk of malnutrition.*

Conclusion: *The prevalence of malnutrition is high among geriatric outpatients. Routine screening for malnutrition among geriatric patients would allow early diagnosis and prompt intervention.*

Limitations: *The heterogeneity of the study group (different diseases at different stages) could influence the generalizability of our findings. The relatively small number of patients (P=0.002) is a potential limitation.*

Keywords: *malnutrition, geriatric, elderly.*

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INTRODUCTION:

Malnutrition in the elderly is defined as "faulty or inadequate nutritional status (or) undernourishment characterized by insufficient dietary intake, poor appetite, muscle wasting and weight loss." If overlooked, malnutrition leads to poor health and decreased quality of life [1]. It is highly prevalent among geriatric outpatients, and is independently associated with defective functional status and poor quality of life [2]. Worldwide, geriatric malnutrition is a substantial problem [3]. The overall prevalence estimated from a pooled database was 22.8% [4]. Persons aged 60 years and older are the fastest growing age group in the world [5]. In 2014, the increase in the number of people in this group was triple that of the whole population [6]. Between 1994 and 2014, the number of elderly doubled, with two-thirds living in less developed regions of the world [7]. By 2050, it is expected that the number of dependent adults in Saudi Arabia will equal the number of dependent children for the first time [5]. Despite its high prevalence and well-documented adverse effects, malnutrition remains under-identified in this vulnerable group [8]. Nutritional assessment is not a routine part of patient clinical evaluation at most Saudi hospitals. The current study aimed to investigate the prevalence of malnutrition among elderly patients who attended geriatric outpatient clinics in Saudi Arabia hospitals and to determine factors associated with malnutrition.

PATIENTS AND METHODS:

This cross-sectional study was carried out at geriatric outpatient clinics in Saudi Arabia hospitals. The study included geriatric patients (older than 60 years) in the clinic appointments list in January to October 2018 who agreed to participate in the study and gave informed consent. Baseline demographic data were collected using a questionnaire that covered age, gender, marital status, living arrangement, income, chronic illness (diabetes, hypertension, cardiovascular diseases, bronchial asthma, renal diseases, chronic hepatic diseases and chronic neurological disorders), and education. Nutritional status was assessed using anthropometric data, including body mass index (BMI) and calf circumference. Weight was rounded to the nearest 0.1 kg, and measured while the patient was lightly clothed. Height was measured by the patient standing without shoes on a stadiometer, and rounded to the nearest 0.1 cm [9]. Body mass index was calculated as the patient's weight in kg divided by the square of the patient's height in cm 0.9 When height or weight could not be measured precisely due to body abnormalities, the calf circumference was measured at its largest diameter to the nearest 0.1 cm and used as an indicator of nutritional status [10]. Nutritional status was also assessed by hemoglobin and albumin levels, and lymphocyte count. The Mini Nutritional Assessment Short Form (MNASF) [11] was used as a screening tool (Table 1). This form was introduced in 1994 to assess nutritional and functional status, and to predict mortality among the elderly. A simple, inexpensive tool, with 96% sensitivity and 98% specificity, it has been widely used in research and clinical practice [11]. It was revised to include a "malnourished" category, which increased the applicability and rapid screening in clinical practice [12]. The maximum score on the MNA is 14 points. Malnourished subjects are those who score less than 8. The at-risk group scores between 8 and 11, and the well-nourished group scores above 12. Normally distributed variables were expressed as means and standard deviation (SD). Categorical variables were expressed as a number and percentage. A chi-square test of association was used to examine the significance of categorical variables, and odds ratios were calculated to evaluate the magnitude of the impact of significant variables. A binary logistic regression was carried out to identify predictors of malnourishment, introducing significant factors from the chi-square test as the first step in the model and omitting non-significant factors afterwards. All results were analyzed using SPSS version 20 software, with statistical significance set at $P<0.05$.

RESULTS:

Of 322 geriatric patients (older than 60 years) in the clinic appointments list in January to October 2018 152 agreed to participate in the study. Eighteen patients did not wish to participate in the study. The age of the 152 participants ranged between 60 to 91 years (mean 70.2 [8.1] years). Almost two-thirds (60.5%) of the subjects were female (n=92). The patients were mostly married (85.5%) or widowed (13.8%). Ninety-four patients (61.8%) were illiterate. The great majority (83.6%) had a monthly income of <SR 3000 (US $800), and 10.5% reported that they were living alone. Most of the patients (81.6%) reported that they had been diagnosed previously with a chronic disease; these included 79 (52%) diabetics, 84 (55.3%) hypertensive patients, 34 (22.4%) with ischemic heart disease, and 46 (30.3%) with dyslipidemia. Based on categorization of the MNA score, only 8 (5.3%) had overt malnutrition (0-7 points). One-third (32.9%) was at risk of being malnourished (Figure 1). Table 2 shows that the prevalence of malnutrition was significantly higher among females (44.6%) than males (28.3%, P=0.044), with an odds ratio (OR) of 2.0 and 95% confidence interval (CI) (1.01- 4.08). The malnourished patients were significantly older (mean

72.4 years [8.6] years) than the subjects who were categorized as having normal nutritional status (68.8 years [7.5]) P=0.007. Almost two thirds of those who were living alone (62.5%) were categorized as malnourished or at risk of malnutrition, which differed significantly from those who were living with others, among whom only one third was malnourished (35.3%; OR=3.1; 95% CI; 1.05-8.92, P=0.034). Table 3 shows that the proportion of those who had a calf circumference less than 31 cm was significantly higher among malnourished patients (63.4%) than those who had a calf circumference greater than 31 cm (28.8%; OR=2.2; 95% CI; 1.51-3.20; P=0.001); also, they had significantly lower mean (SD) albumin (29.6 mg/dL [7.1]) P=0.002 and mean (SD) hemoglobin (10.8 g/dL [1.8], P=0.001). As shown in Table 4, 56.9% of the malnourished patients reported that their food intake had decreased during the past three months, compared to 9.6% of the apparently normally nourished patients (P=0.001). Similarly, the percentage of patients who reported that they could walk without assistance was significantly lower among malnourished patients (63.8%) than the apparently normal patients (81.9%) (P=0.026). Moreover, a significantly higher percentage of the malnourished patients (37.9%) noted that they had lost weight in the past three months (P=0.001) (Table 4). Binary logistic regression analysis indicated that being an elderly female and living alone was significant predictors for being malnourished or at risk of malnutrition (Table 5).

Table 1: The Mini-Nutritional Assessment Short Form (MNA-SF).

Screening question	Answer score			
	0	1	2	3
(A) Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?	severe decrease in food intake	moderate decrease in food intake	no decrease in food intake	----------
(B) Weight loss during the last 3 months	weight loss greater than 3 kg (6.6 lbs)	does not know	weight loss between 1 and 3 kg (2.2 and 6.6 lbs)	no weight loss
(C) Mobility	bed or chair bound	Able to get out of bed/chair but does not go out	goes out	----------
(D) Has suffered psychological stress or acute disease in the past 3 months?	yes	----------	no	----------
(E) Neuropsychological problems	severe dementia or depression	mild dementia	no psychological problems	----------
± (F1) Body Mass Index (BMI) (weight in kg)/(height in m^2)	BMI less than 19	BMI 19 to less than 21	BMI 21 to less than 23	BMI 23 or greater
± (F2) Calf circumference (CC) in cm	CC less than 31	----------	----------	CC 31 or greater

± IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2. DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.
Screening scoring (max. 14 points) 12-14 points: Normal nutritional status, 8-11 points: At risk of malnutrition, 0-7 points: Malnourished

Table 2: Nutritional status of the geriatric patients according to their demographic characteristics (n=152).

Variable	Normal nutrition (n=94)	Malnourished or at risk of malnutrition (n=58)	*P*
Demographic/social characteristics			
Gender, n (%)			
Males	43 (71.1)	17 (28.3)	
Females	51 (55.4)	41 (44.6)	.044
Age, mean (SD)	68.8 (7.5)	72.4 (8.6)	.007
Living arrangement, n (%)			
Living with family/friends	88 (64.7)	48 (35.3)	.034
Living alone	6 (37.5)	10 (62.5)	
Monthly income, n (%)			
<US $800	78 (61.4)	49 (38.6)	
US $800+	16 (64.0)	9 (36.0)	.808

Chi-square test for categorical variables; the t test was used for age (malnourished females: 44.6%; 95% CI, 1.01–4.08; P=.044, living alone and malnourished 62.5%; 95% CI, 1.05–8.92; P=.034)

Table 3: Nutritional status of the geriatric patients according to anthropometric indicators and clinical characteristics (n=152).

Variable	Normal nutrition, n=94	Malnourished or at risk of malnutrition, n=58	*P*
Anthropometric indicators			
BMI categories, n (%)			
Underweight	0 (0.0)	1 (100.0)	
Within normal	16 (31.4)	35 (68.6)	
Overweight	33 (71.1)	13 (28.3)	
Obese	45 (83.3)	9 (16.7)	NA
Calf circumference, n (%)			
<31 cm	15 (36.6)	26 (63.4)	
31+ cm	79 (71.2)	32 (28.8)	<.001
Clinical characteristics			
Chronic illnesses, n (%)	75 (79.8)	49 (84.5)	.468
Albumin, mean (SD)	33.2 (6.3)	29.6 (7.1)	.002
Hemoglobin, mean (SD)	12.5 (1.5)	10.8 (1.8)	<.001
Lymphocytes mean (SD)	2.0 (0.81)	1.9 (0.97)	.730

Chi-square test for categorical variables; the t test was used for calf circumferences <31 cm (63.4; 95% CI, 1.51–3.20; P= .001).

Table 4: Nutritional status of the geriatric patients according to food intake and mobility (n=152).

Variable	Normal nutrition, n=94	Malnourished or at risk of malnutrition, n=58	*P*
Food intake, n (%)			<.001
Decrease in food intake	9 (9.6)	33 (56.9)	
No decrease in food intake	85 (90.4)	25 (43.1)	
Mobility and walking ability, n (%)			.026
Walk without assistance	77 (81.9)	37 (63.8)	
Walk with assistance	10 (10.6)	9 (15.5)	
Using wheelchair or bed bound	7 (7.4)	12 (20.7)	
Weight loss in the past 3 months, n (%)			<.001
Yes	6 (6.4)	22 (37.9)	
No	73 (77.6)	11 (19.0)	
Don't know	15 (16.0)	25 (43.1)	

Chi-square test for all comparisons.

Table 5: Predictors of malnutrition among geriatric inpatients.

Variables	B	S.E.	Wald	df	*P*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Living arrangement	1.081	.573	3.556	1	.059	2.948	.958	9.066
Sex	.844	.380	4.944	1	.026	2.327	1.105	4.897
Age	.067	.023	8.780	1	.003	.935	.894	.977
Constant	-7.802	1.983	15.474	1	.001			

Cox and Snell R square: 0.106, Nagelkerke R square=0.145

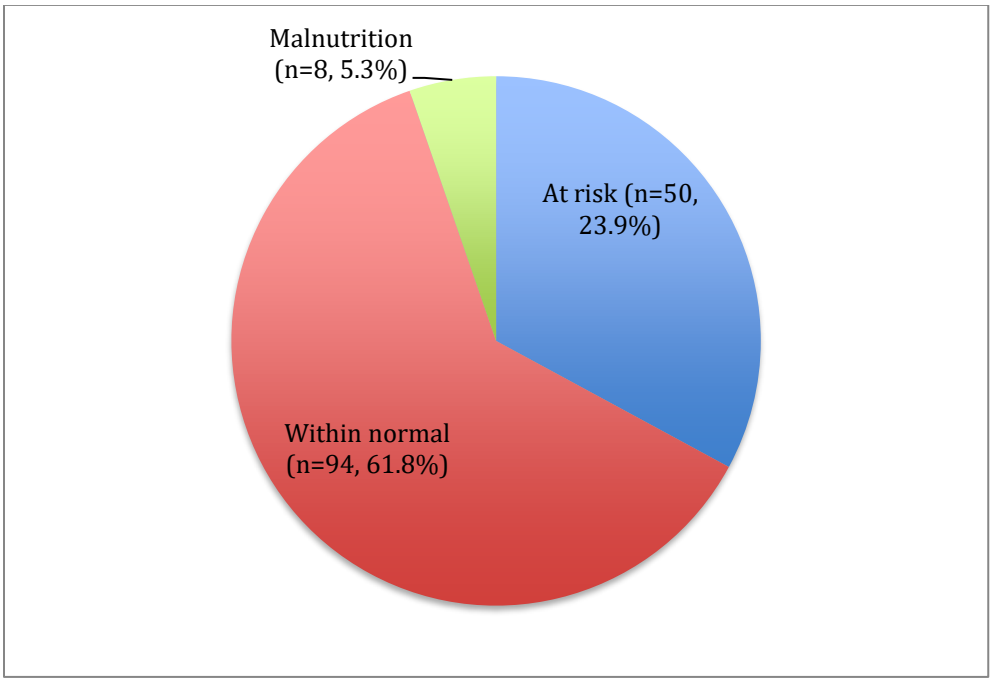

Figure 1. Malnutrition among elderly patients by nutritional status (n=152).

DISCUSSION:

In our study, almost two-thirds of the patients reported that they had decreased dietary intake, which may be due to loss of appetite and lower income among females. This is comparable to a report by Elmadbouly and Abdelhafez [13], who showed that 52.2% of the malnourished elderly had a severe decline in food intake. Similar results was observed by Oliveira et al who attributed decreased food intake to loss of appetite, digestive problems, or chewing or swallowing problems [14]. In this age group, poverty and cognitive impairment may affect eating habits and food choices [15]. Research in India pointed to the reciprocal relationship between reduced dietary intake and cognitive function in elderly patients [16]. In the present study, females were more prone to loss of appetite than males. Other studies reported that females suffered more frequently from loss of appetite and were more prone to be underweight than males; this was also observed in our study, as the prevalence of malnutrition was significantly higher in females after controlling for other factors [17]. In our study, 32.9% of the participants were at risk of malnutrition, which was lower than that detected at a teaching hospital in the Netherlands, where the prevalence among elderly outpatients was 56% [2]. In a study conducted in the geriatric outpatient clinic of a university hospital in England, the prevalence of malnutrition was 30%. The discrepancy might be attributed to the use of a different assessment tool (Malnutrition Universal Screening Tool; MUST) [18]. In the current study, almost one third of our patients were either bedridden or could not move without assistance. Impaired mobility was found in the present study to be associated with an increased risk of malnutrition. Like most geriatric problems, malnutrition is multifactorial and overlapping. Normal age-related changes in the neurological and musculoskeletal system are responsible for weakness elderly individuals; this weakness is exacerbated by malnutrition [19]. Other factors that contribute to malnutrition among the elderly are social isolation and financial deprivation [20]. In our study, the percentage of malnourished geriatric patients was significantly higher in those who were living alone than in those who were living with others (62.5% OR 3.1; 95% CI; 1.05-8.92), which emphasizes the important role of social support for this age group, as they are often unable to serve themselves and have no support for preparing food (2). Serum proteins are used as markers of nutritional status [21]. Although Nazemi et al found that the MNA detected risk of malnutrition in patients with normal albumin levels [13], the current study showed serum albumin levels were significantly lower among subjects with malnourishment detected by the MNA. In the current study, mean hemoglobin levels were significantly lower among patients who were either malnourished or at risk of malnutrition. Similarly, Sahin et al in Turkey stated, “malnutrition and malnutrition risk increased the incidence of anemia [22].” A limitation in the analysis is the heterogeneity of the study group with different diseases at different stages, which potentially could influence the generalizability of our findings. The relatively small number of patients available for the study is also a potential limitation. In conclusion, the prevalence of malnutrition in elderly patients who attended the geriatric clinics in Saudi Arabia Hospitals was high. Routine screening for malnutrition is essential for early detection and prompt treatment, and should be an integral part of the regular follow-up for outpatients. The MNA-SF is a valuable tool to determine the type and causes of malnutrition in elderly individuals, and it can be integrated into the management of geriatric outpatients to increase the quality of care and optimize outcomes.

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