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## Determination of nutritional status and its effective factors among the elderly

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### ABSTRACT

Nutritional status is effective in individuals' health and ability. In fact, inappropriate food intake during old ages results in nutritional shortcomings, incidence of many special disorders, and consumption of many health services. This Cross sectional study was conducted to assessment nutritional status and assess impact of some medical and life style factor on nutritional status in Iranian Community-Dwelling Older Adults. Study was conducted on 240 individuals over 60 years of age Nutritional status was assessed using the short form of Mini Nutrition Assessment (MNA) questionnaire. Data were analyzed using chi-square test, ANOVA, and regression model. According to the results, 140(58.3%) of the samples were female, with the mean age of  $66.98 \pm 6.23$  years. Besides, 39(16.2%) of the participants had malnutrition, 162 (67.5%) were exposed to malnutrition, and 39(16.2%) had normal nutritional status. The results showed a significant relationship between nutritional status and some anthropometric measures, such as weight ( $P=0.050$ ), calf circumference ( $P=0.040$ ), and arm circumference ( $P=0.000$ ). Also, a significant relationship was found between the total score of the questionnaire and the subjects' sex ( $P=0.001$ ) and age ( $P=0.001$ ). This study indicated the necessity for the health system to pay more attention to the elderly's nutritional screening. In addition, nutritional status screening should be performed more carefully in geriatrics care programs.

**Keywords:** Aging, Nutritional status, Health promotion, Mini nutritional assessment

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## INTRODUCTION

Expansion of primary healthcare, improvement of socioeconomic status, and emergence of new preventive, diagnostic, and treatment technologies have resulted in increase in the population of individuals over 60 years of age. Such individuals are called the elderly by World Health organization [1]. In 2000, the elderly comprised nearly 10% of the world population, and this measure has been estimated to reach 21% by 2050 when 1 out of every 5 people will be aged [2]. Studies have indicated that malnutrition is an independent factor in the elderly's hospitalization [3]. Research has also demonstrated that a large number of elderly patients in hospitals and homes for the aged suffer from malnutrition. For instance, a cross-sectional study on 1144 patients in several centers in Portugal revealed that 36% of the elderly were exposed to malnutrition and 7.9% suffered from malnutrition [4]. Studies in Iran and other countries also showed that a high percentage of the elderly had malnutrition [5-6]. Nutritional status is effective in individuals' health and ability. In fact, inappropriate food intake during old ages results in nutritional shortcomings, incidence of many special disorders, and consumption of many health services. It can also have an impact on the improvement process of the hospitalized elderly without proper nutritional status [3-4]. Thus, the present study aims to determine the nutritional status of the elderly in Shiraz, Iran.

## MATERIALS AND METHODS

This study used a cross-sectional design. The research population included 240 old individuals in daily geriatric center selected through purposive sampling. The inclusion criteria of the study were being willing to take part in the research and not suffering from severe physical and mental disorders that would interfere with completion of the study questionnaire or measurement of height and weight. The study data were gathered using a questionnaire whose first part contained items regarding demographic variables and its second part included the short form of Mini Nutritional Assessment (MNA) questionnaire. MNA questionnaire is a reliable comprehensive instrument developed for evaluation of nutritional status among the elderly [8]. This instrument has been validated in numerous studies [9- 10]. MNA questionnaire consists of four sections, including anthropometric features (Body Mass Index (BMI), weight reduction, arm circumference, and calf circumference), overall characteristics (lifestyle, consumed medications, ability to move, and incidence of depression or dementia), nutritional evaluation (number of meals, food and fluid intake, and eating independently), and documented assessment (self-perception, health, and nutrition). In this scale, a score was assigned to each answer and the sum of scores represented the individuals' nutritional status. Accordingly, the individuals were categorized as normal (24-30), exposed to malnutrition (17-23), and suffering from malnutrition (< 17) [11]. After complete the questionnaire subjects' weight, height, arm circumference, and shin circumference were measured. Weight (kg) was measured using a scale made in Germany while the subjects were barefoot with minimum clothing. In addition, their height, waist circumference, arm circumference, and calf circumference (cm) were measured using a standard tape meter. In doing so, the subjects were asked to stand barefoot against a wall, such a way that the back of their head, shoulders, and feet touched the wall. After all, the data were entered into the SPSS statistical software (v. 16) and were analyzed using descriptive and analytic statistics, including chi-square test, ANOVA, and regression model.

## RESULTS

This study was conducted on 240 aged individuals with the mean age of  $66.98 \pm 6.23$  years. Most of the participants were female 140(58.3%) and 173 (72.1%) had above diploma education levels. Besides, the participants' mean weight was  $68.66 \pm 12.11$  kg (38-108 kg) and their mean height was  $158.07 \pm 15.58$  cm (142-179 cm). All, but one, of the participants lived in urban areas 239 (99.6%).

The study participants' nutritional status based on personal features and the effective variables in nutritional assessment has been presented in Table 1. The total score of MNA questionnaire ranged from 12.5 to 28 ( $20.06 \pm 3.47$ ) and the participants' BMI ranged from 16 to 37.7 ( $26.76 \pm 4.85$ ). Based on the total score of the questionnaire, 39(16.2%) of the subjects suffered from malnutrition, 162(67.5%) were exposed to malnutrition, and 39 (16.2%) had normal nutritional status. The results revealed a significant relationship between the elderly's nutritional status and some anthropometric measures, such as weight ( $P=0.050$ ), calf circumference ( $P=0.040$ ), and arm circumference ( $P=0.000$ ). In addition, the total score of the questionnaire was significantly associated with the participants' sex ( $P=0.001$ ) and age ( $P=0.001$ ). Furthermore, ability to live independently ( $P=0.041$ ), viewpoint about nutritional problems ( $P=0.024$ ), and comparison of oneself to one's

peers regarding nutritional status ( $P < 0.001$ ) were protective factors against nutritional problems. On the other hand, consumption of more than 3 pills per day ( $P = 0.031$ ) and suffering from psychological disorders ( $P < 0.001$ ) were risk factors for nutritional disorders (Table 2).

**Table 1: Elderly nutritional status effective variable in nutritional assessment**

Variables		malnutrition		undernutrition		Normal		Total N	
		MNA<17		MNA 17-22.99		MNA≥23		%	
BMI	<19	12.5%	5	4.3%	7	0%	0	100%	12
	19-20.99	5.1%	2	3.7%	6	2.6%	1	100%	9
	21-22.99	5.1%	2	80%	13	2.6%	1	100%	16
	23≥	76.9%	30	84%	136	94.9%	37	100%	203
Sex	Men	35.9%	14	37%	60	66.7%	26	100%	100
	women	64.1%	25	63%	102	33.3%	13	100%	140
Mobility bed or chair bound able to get out of bed goes out		2.6%	1	6%	1	0%	0	100%	2
		2.6%	1	3.1%	5	2.6%	1	100%	7
		94.9%	37	96.3%	156	97.4%	38	100%	231
Neuropsychologic.Pro blem severe dementia or depression mild dementia no problem		7.7%	3	2.5%	4	0%	0	100%	7
		74.4%	29	69.1%	112	23.1%	9	100%	150
		17.9%	7	28.4%	46	76.9%	30	100%	83
Lives independently Yes No		17.9%	7	19.8%	32	2.6%		100%	40
		82.1%	32	80.2%	130	97.4%	38	100%	200
Takes more than 3 drugs per day Yes No		76.9%	30	54.9%	19	25.6%	10	100%	129
		23.1%	9	45.1%	73	74.4%	29	100%	111
Mode of feeding unable to eat without assistance self-fed with some difficulty self fed without problem		12.8%	5	6.2%	10	7.7%	3	100%	18
		17.9%	7	7.4%	12	0%	0	100%	19
		69.2%	27	86.4%	140	92.3%	36	100%	203
Self view of nutrition View self as malnourished Uncertain View self as no problem		41%	16	7.4%	12	0%	0	100%	28
		41%	16	18.5%	30	5.1%	2	100%	48
		17.9%	7	74.1%	120	94.9%		100%	164

**Table 2: Association between some effective variable in elderly nutritional assessment**

variable	OR	CI	Sig
mobility	2.67	0.29-24.28	0.38
Psychological problem	8.23	3.11-27.78	0.001
live independently	10.1	1.08-94.32	0.041
more than 3 pills per day	0.34	0.13-0.91	0.03
Self feed	1.91	0.28-12.96	
viewpoint about nutritional problems	5.25	1.24-22.18	0.02
comparison of oneself to one's peers regarding nutritional status	5.27	2.23-12.43	0.00

## DISCUSSION

Supplying the elderly's health, as one of the vulnerable groups of the society, is one of the health priorities. The results of the present study showed the elderly's exposure to malnutrition and revealed some effective variables in the elderly's nutritional status. In this study, 16.2% of the participants suffered from malnutrition and 67.5% were exposed to this condition. Nykanen et al. [12] also conducted a study on 695 aged individuals in Finland and reported that 15% were exposed to malnutrition. Similarly, Eide et al [13]. Performed a research on the elderly in Norway and indicated the prevalence of nutritional disorders to be 45.5 % In the study by Volkert et al. [14] in Germany, the rate of malnutrition was reported as 25.4% and 30.2% based on measurement scales. Additionally, Chan et al. [15] demonstrated the rate of exposure to malnutrition to be 52% in Singapore. Besides, the rates of suffering from and exposure to malnutrition were respectively reported as 5% and 50.4% in South Africa [16] and 13% and 31% in Turkey [17]. Therefore, it can be concluded that this problem exists all through the world and difference among the results may be due to difference in the samples' health status and mean age. The findings of the present study revealed a significant relationship between nutritional status and age. The results of the study by Mias et al. [18] in Spain also demonstrated that as age increased, risk of malnutrition, particularly regarding micronutrients, increased, as well Rodriguez et al. [19] also carried out a research to investigate malnutrition and its risk factors in New Mexico and found that increase in age was accompanied by the risk of malnutrition among the elderly. In the same line, Pablo et al. [20] conducted a study in Spain and came to the conclusion that age was significantly associated with incidence of malnutrition and that malnutrition was less detected in the individuals below 64 years of age. The results of the current study indicated that the females had lower nutritional statuses, which is in agreement with the results of the studies performed in Iran [21], Malaysia [22], and Hungary [23]. Nevertheless, the mean of BMI was higher among the females compared to the males. These differences might result from biological differences between males and females as well as higher probability of wrong nutritional habits in females. Castel et al. [24] also emphasized that the rate of disability resulting from inappropriate nutritional status was higher among female elderly. In our study, nutritional status was significantly associated with some anthropometric variables. Besides, ability to live independently, viewpoint about existence of nutritional problems, and comparison of oneself to one's peers regarding nutritional status were protective factors against nutritional problems. On the other hand, consumption of more than 3 pills per day, BMI, and suffering from mental disorders were risk factors for nutritional disorders. Torres et al. [25] compared nutritional status in the elderly living in urban and rural areas. Their study results disclosed that old age, female sex, low BMI, mental disorders such as amnesia and depression, reduction of independence, and consumption of more than 3 medications per day were associated with weak nutritional status. Ameral et al. [5] also investigated nutritional status and its effective factors in hospitalized aged individuals. The results of that study showed that dysfunction in daily activities and living alone were related to exposure to malnutrition. Van Nie-Visser et al. [26] conducted a study on the elderly living in homes for the aged in Germany, Austria, and the Netherlands. They found that age, sex, suffering from several diseases, suffering from a special disease, and dependence in care was effective in the incidence of malnutrition. Carvajal et al. [27] also mentioned health problems, low shin circumference, and perception of one's nutritional status as effective factors in malnutrition. Similarly, Tamura et al. [28] performed a systematic review on 16 articles and introduced mental status to be effective in nutrition. They also stated that motionlessness, eating disorders, sex, and old age played a role in reduction of the elderly's BMI. Nieuwenhuizen et al. [29] reviewed 123 articles on nutritional status of the elderly living in society and homes for the aged. Their study revealed 37 effective factors in nutritional status divided into personal, social, and environmental dimensions. In that study, living alone, needing help for nutrition, and mental problems such as depression were reported as risk factors for malnutrition among the elderly. Dupuy et al. [30] also assessed the effective factors in need for nutritional supplements among the elderly living in homes for the aged. The findings of that study indicated that old age, BMI <21, inability to live independently, and mental disorders were associated with the elderly's nutritional status. The results of the studies by Nykanen et al [12]. in Finland and Saka et al.[17] in Turkey also revealed old age, physical health status, consumption of several drugs, depression symptoms, and negative perception of one's health status to have an impact on exposure to malnutrition. Overall, the findings of the present study identified key points regarding nutritional status and its resultant disability and problems, indicating the advantage of using a reliable instrument, such as MNA questionnaire, in screening the elderly.

## CONCLUSION

Early diagnosis of malnutrition and need for nutritional support is highly essential among the elderly. Considering the importance of nutritional screening among patients, particularly the elderly, and the

relationship between nutritional status and age, sex, some anthropometric variables, and protective and risk factors of malnutrition, programs should be designed and implemented to improve the elderly's knowledge level regarding appropriate nutrition and modification of their eating pattern. Furthermore, due to the increasing prevalence of malnutrition, it seems that nutritional culture should be modified among the elderly. Hence, nutritional screening is recommended to be incorporated into the treatment plans and be performed while admission of the elderly in health clinics and hospitals.

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