

## Malnutrition and obesity prevalence in geriatric patients

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**Summary.** *Aim:* All societies, including Turkish society, are experiencing a dramatic growth in proportion of elderly individuals. Geriatric malnutrition and obesity are substantial health problems. The aim of this study is to investigate the prevalence of malnutrition and obesity in elderly individuals who attended a geriatric outpatient clinic in Turkey. *Methods:* This study included 520 elderly patients. All patients underwent Mini Nutritional Assessment–Short Form (MNA-SF) test via face to face interview. The participants were divided into four groups, as follows: underweight group (BMI < 20.0 kg/m<sup>2</sup>), normal weight group (BMI 20.0–24.9 kg/m<sup>2</sup>), overweight group (BMI 25.0–29.9 kg/m<sup>2</sup>) and obese group (BMI ≥ 30 kg/m<sup>2</sup>). *Results:* The mean age was 71.8 ± 5.8 and 285 patients (54.8%) were female. 11 (2.1%) of the patients were underweight, 91 (17.5%) were normal, 193 (37.1%) were overweight and 225 (43.3%) were obese. According to MNA-SF, 37 (7.1%) were diagnosed with malnutrition, 165 (31.7%) were at risk of malnutrition, and 318 (61.2%) displayed a good nutritional status. 43.3% of the whole were obese. 68.7% of them were obese or diagnosed with malnutrition or at risk of malnutrition. 33.7% were obese and either diagnosed with malnutrition or at the risk of malnutrition. 38.8% were either at risk of malnutrition or diagnosed with malnutrition. *Discussion:* Two of every three elderly patients exhibited malnutrition or risk of malnutrition or obesity. To prevent malnutrition and obesity in old age, elderly patients should be evaluated comprehensively through several domains including medical, nutritional, or social status and certain novel strategies should be devised to promote physical activity and to raise awareness about the nutrition throughout the society.

**Key words:** Elderly, obesity, malnutrition, prevalence.

### Introduction

All societies around the world, including Turkish society, are experiencing a dramatic growth in proportion of elderly individuals at an alarming rate. It is known that people aged 65 and over constitute 8.5% of the population in Turkey with reference to Turkish Statistical Institute's data (1). While assessing the percentage of elderly individuals worldwide, it is seen that the percentage has become substantially more critical

levels, as high as 15% in developed countries. The elderly population aged 60 years or over were 962 million in 2017, more than twice as large as it was in 1980. The population is expected to double again by 2050, it is estimated to reach nearly 2.1 billion (2).

Poor nutrition in elderly individuals has been considered as a weighty health problem for a long time. Actually, it is widely accepted that aging simply leads to some nutritional deficiencies because physiological competence of the body diminishes consistently

at later ages causing a reduction in appetite, energy expenditure and lean body mass and certain derangements in hormone–cytokine levels or fluid, electrolyte and acid–base balance, and so on. Nutritional status of an individual also directly affects the aging process. Moreover, malnutrition is mostly reported to have been associated with exacerbation of already present medical problems, a poor clinical course, a decline in functional independence and increased morbidity and mortality (3). So, a good nutritional status is a fundamental component of general well–being in elderly population. It is also known that malnutrition has a conspicuously high prevalence among elders. Many studies have all along aimed to determine prevalence of malnutrition in societies especially which are likely to suffer from high malnutrition prevalences and proclaimed prevalence outcomes ranging between 0% and 35%. An overall prevalence of malnutrition in elderly individuals compiled from a pooled database was 22.4% (4). Actually, that remarkable diversity in prevalence outcomes may be yielded by using many different malnutrition criteria or involving elderly populations living in a range of different settings (socio-economic status, marital status, household composition, place of residence, institutionalisation, hospitalisation etc.) (5–10).

Indeed, malnutrition may be caused by a lack or an excess in supply of nutrients to the body. So, both obesity and being overweight are absolutely variants of malnutrition. But, malnutrition generally refers to undernutrition as it is in this study. Nowadays, obesity is also a common public health problem not only in young adults and middle–aged people but also in elders with a steadily increasing prevalence (11). Despite the fact that obesity prevalence remarkably tends to rise in elderly population, eventual impacts of obesity on elderly health as a matter of scientific debate have accomplished to spotlight endeavors of researchers in medical sciences less than it virtually deserves. Also, there are a pile of conflicting findings about the effects of BMI on mortality at advanced ages and only a little knowledge about its effects on healthspan.

This study aimed to reveal the malnutrition and obesity prevalences in elderly patients of a geriatric outpatient clinic in Turkey.

## Materials and Methods

### *Subjects*

In this study, 520 patients who were aged 65 and over and applied to a geriatric outpatient clinic at least once were included. The study lasted a full year, from January to December in 2016. All patients received Mini Nutritional Assessment–Short Form (MNA–SF) test through face to face interview in outpatient clinic. The demographic features such as age, sex, height, weight, marital status, individuals with whom the patient lives (alone, spouse, children, relatives), educational background, whether the patient do regular exercise or not, comorbidities (diabetes mellitus, hypertension, cardiovascular diseases, neuropsychiatric disturbances, musculoskeletal disorders, respiratory tract diseases etc.) and polypharmacy (currently using  $\geq 4$  drugs) were noted down during this interview. Those of patients who live in a nursing home, have a malignant disease or a gastrointestinal disturbance causing malnutrition, a neuropsychiatric disorder such as schizophrenia or bipolar disorder, a kind of visual disability or hearing disorder which could influence adversely the interview or display a Mini Mental State Examination (MMSE) score less than 18 were excluded from the study (12). Each patient was informed accordingly and an informed consent was obtained from each patient. Local Ethical Committee of Gaziantep University approved the study.

### **Scales used in the study**

#### *Measurements*

Body mass index (BMI) was calculated for each participants by using measured weights and heights of the participants. The participants were divided into four groups, as follows: underweight group (BMI  $< 20.0$  kg/m<sup>2</sup>), normal weight group (BMI 20.0–24.9 kg/m<sup>2</sup>), overweight group (BMI 25.0–29.9 kg/m<sup>2</sup>) and obese group (BMI  $\geq 30$  kg/m<sup>2</sup>) (13).

#### *Mini Nutritional Assessment*

Nutritional state of each participant was appraised by using a modified form of Mini Nutritional Assessment questionnaire (14). Mini nutritional assessment

– short form (MNA–SF), an abbreviated and validated form of MNA that has been used in some other studies before, includes a six question subset of full MNA and BMI as an anthropometric measurement (8, 14). A participant is able to receive a maximum of 14 points from MNA–SF questionnaire. The participants were also divided into three consequent categories according to the MNA–SF scores, good nutritional status (12–14 points), risk of malnutrition (8–11 points) and malnutrition (0–7 points).

### *Statistical analysis*

Statistical analyses were performed by using SPSS 17 software. Foremost, it was determined whether continuous variables in each group were distributed normally or not. Descriptive statistics were presented by mean  $\pm$  standard deviation (SD) for groups exhibiting a normal distribution of continuous variables and median (minimum–maximum)  $\pm$  interquartile range for groups exhibiting a skewed distribution. Descriptive statistics with regard to categorical variables were produced in the form of frequencies and percentages. To be able to perform univariate analyses, Pearson's chi-square and Mann–Whitney U tests were applied. Spearman's test was used for correlation analysis of non-normally distributed variables. One way ANOVA was used to compare more than two independent samples displaying normal distribution. Levene test was used for assessment of homogeneity of variances. Tukey HSD and Tamhane  $T_2$  tests were performed for further multiple comparisons (Post hoc analyses).

## **Results**

The mean age of patients was  $71.8 \pm 5.8$  years, ranging from 65 to 91. Of 520 patients, 285 (54.8%) were female and 235 (45.2%) were male. The patients were inquired about their ongoing daily usage of prescription medicine and those of them using concurrently multiple medications were identified. The mean daily amount of concurrent multiple medication for each patient was  $4.35 \pm 2.7$  drugs and ranging between 0 and 20 units. The most prevalent diseases among the patients were cardiovascular diseases which were followed by diabetes mellitus, neuropsychiatric dis-

turbances, musculoskeletal disorders and respiratory system diseases in a decreasing order of prevalence. The patients were classified into four groups according to BMI measurement, including underweight group (n=11, 2.1%), normal weight group (n=91, 17.5%), overweight group (n=193, 37.1%), and obese group (n=225, 43.3%). The MNA–SF scores also distinguished between elderly patients as follows; 318 patients (61.2 %) displayed good nutritional status (good nutritional status group), 165 patients (31.7%) were at risk of malnutrition (malnutrition risk group) and 37 patients (7.1%) were diagnosed with malnutrition (malnutrition group). The demographic features of the patients were illustrated in Table 1. While 1.6% of the patients having a good nutritional status were underweight and 48.8% of those patients were obese, 2.9% of the patients who were at risk of malnutrition or exactly diagnosed with malnutrition were underweight and 33.7% of those were obese ( $p < 0.01$ ) (Table 2). In addition to that 68.7% of all patients were obese or diagnosed with malnutrition or at the risk of malnutrition, 33.7% of all patients were both obese and either diagnosed with malnutrition or at risk of malnutrition. 38.8% of the patients were either diagnosed with malnutrition or at the risk of malnutrition.

## **Discussion**

The elderly population is persisting in expanding dramatically all around the globe. Malnutrition and obesity are the most important major health problems in the world that cause a series of severe complications and a decline in the quality of life. An adequate and well-balanced nutrition is the essence of a quality life for elderly. Optimal nutrition not only provides maintenance of functional physical fitness and everyday cognitive competence but also contributes to prevention and treatment of the chronic diseases in elderly. This study found that two out of every three patients referred to our geriatrics outpatient clinic (68.7%) were obese or at risk of malnutrition or strictly exposed to malnutrition.

Malnutrition is a relatively comprehensive concept used to define different deviations from a normal nutritional state. Both undernutrition in which an indi-

**Table 1.** The demographic characteristics of the geriatric patients

n:520	
Age	71.8 ± 5.8
Gender	
· Male	235 (45.2%)
· Female	285 (54.8%)
Education	
· Primary School Graduate or uneducated or illiterate	454 (87.3%)
· Secondary School Graduate	32 (%6.2)
· Above Secondary School	34 (%6.5)
Marital Status	
· Married	381 (%73.3)
· Other status	139 (26.7%)
Regular Exercise	
· Yes	111 (%21.3)
· No	409 (%78.7)
Tobacco	
· Yes	99 (%19)
· No	421 (%81)
Alcohol	
· Yes	20 (%3.8)
· No	500 (%96.2)
Chronic Diseases	
· Tipe 2 DM	146 (%35.2)
· Cardiovascular Diseases	155 (%37.4)
· NeuropsychiatricDiseases	50 (%12.1)
· MusculoskeletalDiseases	14 (%3.3)
· RespiratorySystemDiseases	50 (%12.2)
PatientLives(Wholiveswiththeelderly)	
· Spouse	377 (%72.5)
· Alone	66 (%12.7)
· Children	73 (%14)
· Relatives	4 (%0.8)
BMI(kg/m2)	
· <20	11 (2.1%)
· 20-25	91 (17.5%)
· 25-30	193 (37,1%)
· >30	225 (43.3%)
MNA-SF	
· MalnutritionGroup	37 (7.1%)
· Malnutrition Risk Group	165 (31.7%)
· GoodNutritionStatus	318 (61.2%)

vidual's diet is deficient in calories, carbohydrates, proteins, micronutrients etc. and overnutrition in which the amount of nutrients in an individual's diet exceeds the amount that meets the physiological requirements lead to malnutrition (15, 16). In our study, malnutrition was diagnosed in 7.1% of patients and 31.7% of those determined as being at the risk of malnutrition indicating that at least one out of every three elderly patients were either diagnosed with malnutrition or at the risk of malnutrition. Guigoz et al. reported that the prevalence of malnutrition was 2±0.1% and prevalence of malnutrition risk was 24±0.4% in community-dwelling elderly individuals in a meta-analysis composed of 21 studies (n=14.149 elderly) involving MNA as a method to assess the nutritional status of participants (17, 18). Recently Cereda et al reported that the prevalence of malnutrition among elderly differed significantly across distinct healthcare settings considered: community, 3.1%; outpatients, 6.0%; home-care services, 8.7%; hospital, 22.0%; nursing homes 17.5%; long-term care, 28.7%; rehabilitation/sub-acute care, 29.4% (19).

There are also some studies from Turkey with regard to malnutrition prevalence in elders. In one of those studies which was performed with 140 elderly admitted to internal medicine outpatient clinic in Turkey, Saka et al. reported that either malnutrition or the risk of malnutrition were detected in 16% of the patients (20). In addition, Kucukerdonmez et al. declared that the malnutrition prevalence was 5% and the risk of malnutrition was detected in 67% of participants in a recent study which was conducted with 872 elderly living in Ankara, capital city of Turkey (21). In another study from Turkey, Sahin et al. diagnosed 8.2% of elderly nursing home residents with malnutrition and encountered the risk of malnutrition in 35.8% of them (22).

Such a broad range of prevalence outcomes may be manifested as a consequence of using different mal-

**Table 2.** Comparison of patients having good nutritional status with those of patients diagnosed with malnutrition or at the risk of malnutrition in terms of BMI, exercise, marital status and polypharmacy.

	BMI		Exercise	Marital Status	Polypharmacy
	BMI<20	BMI>30	Regular Exercise	Married	Number of drug usage
Malnutrition/Malnutrition Risk	2.9%	33.7%	18.3%	70.4%	4,45±2,83
NormalNutritionStatus	1.6%	48.8%	26.7%	75.2%	4,26±2,62
P	P=0.009		P=0.032	P=0.417	P=0.483

nutrition criteria in each study or conducting studies with elderly individuals having intrinsically distinct features from each other such as staying in a private household or in a nursing home, living with relatives or alone and staying socially active or not etc. Recently Leij-Halfwerk declared that; 223 study samples from 24 European countries and 583.972 older adults; prevalence of high malnutrition risk across all European countries is 28% among hospitalized elderly patients, 17.5% among elders who benefit from any residential care service and 8.5% among community-dwelling elders. It also differs with country, from 15.2% in Spain to 37.7% in Switzerland, and with screening tool, 14.9% when MNA-SF is applied to 40.6% when Nutritional Risk Screening 2002 is applied (23). In the present study, the combined prevalence of malnutrition and the risk of malnutrition is 38.8%, consistent with the results of previous studies in Turkey. Moreover, our results indicates that the risk of malnutrition is significantly higher in elderly individuals who are not married or don't exercise regularly ( $p < 0.05$ ). In addition, BMI measurements and MNA-SF test scores in present study display a significant positive correlation ( $r: 0.225$ ,  $p < 0.01$ ).

Obesity is a serious public health concern which causes chronic morbidities, functional disabilities and premature death by contributing to initiation or progression of many chronic diseases such as cardiovascular diseases, diabetes mellitus, gastrointestinal disturbances, malignancies and so on. In addition to overeating, sedentary life style, drugs (sulfonylureas, steroids), hormone replacement therapy, low levels of micronutrients, hypothyroidism, excessive supplementation of vitamin/minerals are all causing obesity. Obesity prevalence is constantly increasing in both Turkey and all around the world. This upward tendency of obesity prevalence is more particularly seen among middle or old aged individuals of the industrial or developing countries. Obesity prevalence among individuals aged 60 and over increased from 31% in 2004 to 35.4% in 2012 in USA. In Europe, obesity prevalence in geriatric population also continues to grow unfaillingly although to a lesser extent than it is in USA. When we assess studies investigating obesity prevalence in European societies aged 60 and over, it is found out that 24% of males and 24.1% of females in Finland, 23.6% of males and 23.1% of females

in Germany, 23.2% of males and 21.6% of females in Sweden and 25.3% of males and 15.1% of females in England are obese (24-26).

According to the published data of Prevalences of Heart Diseases and Risk Factors in Turkish Adults which is a long-standing study conducted by Turkish Society of Cardiology, the prevalence of obesity in the year 2002 was 26.7% for men in 60-69 years of age group and 21.1% for men aged 70 and over, while it was 54.2% for women in 60-69 years of age group and 35.1% for aged 70 and over (27). On the other hand, obesity prevalences were found as 25.8% in men and 53.5% in women aged 65 and over in Nutrition and Health Survey in Turkey 2010 (28). In addition, according to Chronic Diseases and Risk Factors Prevalence in Turkey, obesity prevalences were 20.4% for men aged 65-74 and 12.3% for men aged 75 and over, while 49.8% for women aged 65-74 and 34.6% for women aged 75 and over (29). The obesity prevalence in elderly patients was determined as 43.3% in our study, a compatibly high value as in previous studies.

Population aging in 21st century, leads to a multitude of social and economic dilemmas all around the world as well as in Turkey. As population grows older, they need more health care service utilization. An inadequate or imbalanced nutrition underlies many chronic diseases during lifetime and aging is a noteworthy cause of malnutrition on its own. In the present study, the malnutrition prevalence is 7.1%, the prevalence of risk of malnutrition is 31.7% and the obesity prevalence is 43.3%. Only 31.3% of the patients were diagnosed with neither malnutrition nor risk of malnutrition nor obesity in our study. In other words, at least every two of three elderly patients in our study exhibited malnutrition or malnutrition risk or obesity as a consequence of disequilibrium in nutrition.

Cross-sectional and single-centered study design is an outstanding limiting factor for the present study. So, there is still a vital need of further prospective studies with a larger number of participants over a longer period of time to be performed concurrently by different centers to corroborate our results.

A comprehensive evaluation through several domains including physiological, psychological, nutritional, cognitive, social or economic status is the best first step to assess medical condition of an elderly in-

dividual in primary health care services or in geriatric outpatient clinics. It is also widely accepted that maintenance of a good nutritional status in elderly individuals is essential to prevent and treat illnesses much more effectively and provide a long and healthy life. Developing novel strategies to promote physical activity throughout the society and to raise the awareness about the worthiness of an adequate and well-balanced nutrition especially in elderly population and implementing nutritional programmes to reduce the metabolic risk factors of chronic diseases are of prime importance for both public health and the quality of life in old age. In addition, advanced therapeutic guidelines for malnutrition should be formulated and immediately applied to diagnosed patients by the primary health care providers.

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