The relationship between geriatric patients' nutritional status and depression: the case of Turkey

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Abstract. *Background:* Malnutrition and depression are the most common health problems in the older adult population. This study was planned to investigate the relationship between nutritional status and the development of depression in the older adult population living in their own settings in Eskisehir, Turkey. *Materials/Methods:* This study was carried out with 129 individuals aged 65 and over (40.3% male, 59.7% female) who visited a private health institution in Eskisehir, Turkey. This single-centre cross-sectional study was conducted between October 1 and December 1, 2021. The Mini Nutritional Assessment (MNA) and Geriatric Depression Scale (GDS) were applied to the older adults with the face-to-face interview technique after their anthropometric and biochemical measurements were taken. In the statistical analysis of the data, categorical variables were analyzed with the Chi-square test, normally distributed variables with the Anova test, continuous variables with normal distribution consisting of independent measurements with the Independent Samples T-Test, while the Mann-Whitney Rank Sum Test was used for the data that did not show normal distribution. *Results:* The mean age of the participants was found to be 71.15±5.95 (65-88) years. Among the participants, 2.3% of them were determined to have malnutrition, 34.2% were at malnutrition risk, and 63.5% had a normal nutritional status. As per the GDS results, 45.7% of the older adults participating in the study were found to have depression. *Conclusion:* Determining the nutritional status and providing solution options is an important parameter in terms of reducing the risk of disease in individuals aged 65 and over in societies. The results of our study showed that there is a linear relationship between malnutrition developing due to inadequate nutrition and the development of depression and that they might trigger each other. MNA and GDS should be used as routine screening tools for populations aged 65 and over in all societies, and emergency action plans should be implemented to improve the living comfort of older adults in line with the results.

Key words: older adults, malnutrition, depression, mini nutritional assessment (MNA), geriatric depression scale (GDS)

Introduction

Ageing is a biological process and includes a period in which the body functions of individuals slow down and the risk of disease development increases (1). According to the World Health Organization (WHO) data, the older adult population is increasing rapidly all over the world (2). Therefore, it has become extremely important to maintain the physical, spiritual and physical health of the older adult population (3-6). While the number of individuals aged 65 and over in the world was 9% in 2019, it is estimated that this number will be approximately 16% in 2050. Similarly, while the rate of the older adult population in our country was 9.1% in 2019 (7), it increased to 9.7% in 2021 and it is estimated to be 11% in 2025, 16.3% in

2040 and 25.7% in 2080 (8). Maintaining good nutrition and psychological health of the older adult population will improve their quality of life, as well as being extremely important for the prevention of many diseases (9-11). One of the most common health problems experienced by the older adult population besides chronic diseases is malnutrition (9-10). Malnutrition, which occurs as a poor nutrition problem, can develop due to many reasons. Some of these reasons are the triggering of chronic diseases, gastrointestinal complaints, chewing and swallowing difficulties, challenges in reaching and preparing food, loneliness, deterioration of psychology and depression (12). Malnutrition is a disease that increases mortality and morbidity (12-13). Studies indicate that the prevalence of malnutrition differs according to the place the older adults live (7,14). According to a meta-analysis of 240 studies, the prevalence of malnutrition was reported in 3% of the older adults continuing their life in the community, 6% of the elderly who visited the outpatient clinic, and 8.7% of those who received home care (14). In different studies, these rates were reported to reach almost 40% among older adults living in hospitals and/or nursing homes (7,14). Malnutrition is an important health problem that is frequently experienced among in-patient older adults and is associated with an increased risk of morbidity and mortality (15). Another common health problem in old age is depression (16-18). In ageing individuals, the place they live, slowing down of physical movements, alienation from the social environment, difficulty in fulfilling self-care, loneliness, diseases developing due to old age, and malnutrition are among the main factors considered of triggering depression (12,13,19,20).

This study was planned to investigate the relationship between the prevalence of malnutrition and depression in the older adult population who visited the outpatient clinic.

Materials and methods

This is a single-centre cross-sectional study that was conducted between October 1 and December 1, 2021, in a private health institution in Eskisehir, Turkey. Eskisehir is a city located in the centre of Turkey geographically, with a population of approximately 1 million and a surface area of 13,925 m² (8). The study population consisted of individuals over the age of 65 who visited a private health institution as an outpatient. On average, 12.2% of the population of the city is made up of individuals who are over 65 years of age (8). The study was carried out with 129 patients who agreed to complete the questionnaire, did not have any severe psychiatric disease, was not diagnosed with dementia, and had no communication issues (such as severe hearing, or visual).

Ethics Committee approval for the study (2021/526) was obtained on 05.11.2021 from the Clinical Research Ethics Committee of Afyonkarahisar Health Sciences University.

After the general information about the study was provided to the patients who accepted to participate in the study and met the inclusion criteria, their personal information such as age, education level, whom they lived with, their bed dependency status, and the presence of chronic disease was collected through the face-to-face interview technique. Anthropometric measurements required for the study such as height, weight, waist-hip and blood pressure measurements were performed by the same researcher and the data were recorded. The fasting blood glucose value was obtained from the routinely requested biochemical parameters after their examination. Furthermore, MNA and GDS were applied to the participants. In the MNA scale, there are questions about the participants' anthropometric measurements [Body Mass Index (BMI), upper-middle arm circumference, calf circumference and body weight loss], dietary changes (number of meals, nutrient and fluid intake, independent nutritional status), general evaluation (lifestyle, medication, mobility, stress, status of having dementia or depression) and personal evaluation (personal opinion about his/her own health and nutritional status).

MNA, whose validity and reliability studies were carried out by Guigoz et al. in 1994, is a questionnaire that can be used to detect malnutrition (21,22). It has been approved for use as a nutritional assessment tool for older adults around the world. If malnutrition risk is detected as per the result of scoring in the first-stage Mini Nutritional Assessment Short Form (MNA-SF) of the two-stage questionnaire, then it is moved on to

the second-stage MNA test. In our country, MNA and MNA-SF, whose validity and reliability studies were performed by Dr Derya Sarıkaya, are used as malnutrition screening tools in older patients (21).

The MNA consists of 18 questions, 15 of which are based on verbal questioning, 3 of which are based on anthropometric measurements, and is evaluated on 30 points. The first 6 questions are intended for screening with a value of 14 points (MNA-SF) (21,22). If the total MNA score of the patient is ≤17, it indicates the presence of malnutrition, while a score between 17-23.5 indicates the risk of malnutrition, and ≥23.5 indicates the presence of adequate nutritional status (21,22).

GDS is a scale developed by Yesavage et al. in 1983 to question the presence of depression in older adults. A score of 13 on the scale, which consists of 30 questions, was accepted as the cut-off value for depression. The scale includes mood changes, stagnation, withdrawal from social life, restless thoughts, and negative judgments about the past, present and future. In the scoring of the scale, 0-10 points indicate wellbeing, 11-13 indicate probable depression, and 14 and above indicate the presence of depression. The scale was adapted to Turkish after a validity and reliability study was carried out by Ertan et al. in 1997 (23).

Data Analysis and Statistical Method: While continuous quantitative variables (n) are shown as mean and standard deviation, qualitative or other variables (n) were expressed as median value, 25th and 75th percentile values. Continuous variables consisting of independent measurements and showing normal distribution were analyzed with the Independent Samples T-Test, while the Mann-Whitney Rank Sum Test was used for the data that did not show normal distribution. One-way ANOVA was used for continuous variables, and the Pearson chi-squared test was used for categorical variables. A p-value < 0.05 is considered statistically significant. All data analyses were performed with SPSS 21 package programs.

Results

Among the 129 patients who participated in the study, 40.3% (n=52) were male and 59.7% (n=77) were female. The mean age of the participants was found to be 71.15±5.95 (65-88) years. While 2.3% (n=3) of the patients were found to have malnutrition, 34.2% (n=44) were at malnutrition risk, and 63.5% (n=82) had a normal nutritional status. As per the results of the GDS, 2 of the 3 patients diagnosed with malnutrition were in depression and 1 was in the probable depression group. Among the 44 patients who were at risk of malnutrition, 22 were in the group with depression and 6 were in the group with probable depression.

There was no significant difference between the BMI values of the participants and their gender. The risk of malnutrition was found to increase as the education level of the participants decreased. While 20.2% (n=26) of the participants were semi-bedbound, 57.7% (n=15) had signs of malnutrition. As the risk of malnutrition increases, the risk of depression increases, and a statistically significant difference was found. A significant difference was found between the group without nutritional problems, with the diastolic blood pressure value of those at risk of malnutrition being high. A significant difference was found between those with malnutrition and those who did not have nutritional problems in the BMI comparison between the groups. The BMI values of the group with malnutrition were found to be lower. The majority (85.2%) of the study participants were living either with their families or children (Table 1).

Among the older adults participating in the study, 45.7% of them were found to have the presence of depression (depression + probable depression), while 2.3% with malnutrition and 34.2% were at risk of malnutrition.

Discussion

The older adult population is increasing rapidly all over the world. This draws attention to the problems that older adults experience (5). Cognitive diseases, inability to perform self-care, physical inadequacies, age-related diseases, various losses of organs, malnutrition, which develops due to poor nutrition, and depression, which often accompany this picture, are problems that seriously lead to deterioration in the quality of life (5, 24-26). It has become extremely important

Table 1. Characteristics of the study participants.

Characteristics		Malnutrition (n=3, 2.3%) (women=1, men=2)	Malnutrition risk (n=44, 34.2%) (women=28, men=16)	Normal (n=82, 63.5%) (women=48, men=34)	p
Age (years)					
Gender	Women[a] (n=77)	73.00±0.00 73.00(73.00±73.00) p=1	72.00±6.45 70.00 (67.00-76.75) P=0.933	70,37±6.07 68.00 (66.00-72.75) p=0.424	
	Men[a] (n=52)	70.50±7.77 70.50(65,00±70,50) p=1	71,68±5.41 71.00 (67.00-76.50) p=0.933	71.29±5.81 70,00 (66.00-75.50) p=0.424	
Education level[d]					
No Education		1 (8.3)	6 (50.0)	5 (41.7)	**0,001**
Only read and write		0 (0.0)	17 (65.4)	9 (34.6)	
Primary school		1(1.5)	17 (25.4)	49 (73.1)	
High school		1 (4.8)	4 (19.0)	16 (76.2)	
University		0 (0.0)	0 (0.0)	3 (100.0)	
Comorbidities[d]					
None		0 (0.0)	8 (21.6)	29 (78.4)	0.352
Hypertension		1 (3.4)	8 (27.6)	20 (69.0)	
Diabetes		1 (2.6)	17 (44.7)	20 (52.6)	
CRF		0 (0.0)	1 (33.3)	2 (66.7)	
Others		1 (4.5)	10 (45.5)	11 (50.0)	
Place of residence[d]					
Single		1 (5.3)	4 (21.1)	14 (73.7)	0.275
Family		2 (1.8)	40 (36.4)	68 (61.8)	
Physical activity[d]					
Active		0 (0.0)	32 (31.1)	71 (68.9)	**0.001**
Semi-bedridden		3 (11.5)	12 (46.2)	11 (42.3)	
Biochemical markers					
Fasting blood sugar (FBS)		136.66±36.93 120.00 (111.00-0.0)	132.95±45.05 120.00 (96.50-162.50)	138.91±54.75 121.00 (96.50171.00)	0.889
Systolic blood pressure		130.00±10.00 130.00 (120.00-0.0)	134.54±19.10 130.00 (120.00-150.00)	126.42±15.94 120.00 (120.00130.00)	0.054
Diastolic blood pressure		83.33±5.77 80.00 (80.00-0.0)	88.13±20.79 87.50 (80.00-100.00)	82.19±17.07 80.00 (70.00-90.00)	**0.023**
		A significant difference was found between malnutrition risk and normal in diastolic blood pressure[f].			

Characteristics		Malnutrition (n=3, 2.3%) (women=1, men=2)	Malnutrition risk (n=44, 34.2%) (women=28, men=16)	Normal (n=82, 63.5%) (women=48, men=34)	p
BMI (kg/m²)[b]					
		21.76±3.64 23.58 (17.57-0.00)	27.25±5.23 26.34 (23.05-32.42)	29.74±7.07 29.13 (26.34-31.23)	ns
		In the comparison between groups, the difference between malnutrition and normal is the difference. **p=0.014[c]**			
MAC/CC (cm)[b]					
		0.93±0.86 0.08 (0.91-0.00)	0.85±0.15 0.87 (0.77-0.94)	0.90±0.14 0.91 (0.85-0.98)	0,105
MNA, GDS comparasion[e]					
GDS	Normal	0 (0.0)	16 (22.9)	54 (77.1)	**0.001**
	Mild depression	1 (5.2)	6 (31.6)	12 (63.2)	
	Depression	2 (5.0)	22 (55.0)	16 (40.0)	
GDS Skores (Mean)		16.33±4.93	13.88±6.93	9.02±5.73	
MNA Scores		13.16±2.88	20.88±1.92	26.23±1.43	
		Depression	**Mild depression**	**Normal**	
GDS Skores		19.0±3.57	12.26±0.87	5.81±2.86	

Baseline characteristics of the participants. Data presented as number (percent) for the following variables: educational level, specific comorbidities, place of residence, Physical activity and GDS. For other variables was used, Mean±Std. Deviation, Median (25%–75%). Mann-Whitney U test[a], Kruskal wallis test[b], Bonferroni düzeltmesi[c], Monte karlo-ki kare[d], Monte karlo-ki kare-trend[e], bonn fred düz ve mann whitney u[f]. During testing, p<0.05 was considered statistically significant. P-value[ℓ]. BMI: Body mass index, MAC/CC: Mid-arm circumference /calf circumference, MNA: Mini Nutritional Assessment, CRF: Chronic renal failure, GDS: Geriatric Depression Scale.

to identify the priority problems in the older adult population, take precautions and take action quickly (19,20). Nutrition is one of the most important elements necessary for an individual to have a healthy life (20). Not consuming enough nutrients, in addition to preventing the body from fulfilling its duties, also disrupts the psychology of the individual (19,20). This study was planned to determine the prevalence of malnutrition and depression developing due to poor nutrition in older individuals in Turkish society and was carried out to make contributions to this issue.

Smith et al. provided oral nutritional support to one group of the older adult population, randomized into two groups, for 12 weeks. As a result of their study, they reported that the weight of the group receiving oral nutritional support increased significantly, their health improved, their quality of life increased, and the use of health services decreased with potential savings (27). In another study conducted in Australia, recommendation letters were sent to the physicians, who provide primary health care for a group of elderly individuals, about the nutrition of older adults who receive home care services and are identified as malnutrition or at risk of malnutrition. They reported that at the end of 12 months, the health parameters during the controls were significantly positive and the risk of malnutrition decreased (28). Studies are showing that older adults receiving home care services do not receive nutrients well enough and malnutrition that develops due to this leads to functional slowdown

(6,28). Two studies similar to ours were conducted in Bangladesh in 2021. The first one was carried out with 400 older adults receiving home care services. In this particular study in which MNA and GDS were used, 25.5% of the participants were found to have malnutrition, and 58.8% were at risk of malnutrition (16). The second study was conducted in Dhaka with 125 participants, and 25.6% of the participants were found to have malnutrition while 58.4% were at risk of malnutrition (29). As the MNA score decreases, depression increases (16,29).

Another study conducted in Nepal evaluated the nutritional status, depression and quality of life of a group of older adults (n=279), mostly living in their homes either with their families or children. A total of 10.4% of the participants were found to have malnutrition, while 37.7% were at risk of malnutrition, and as the risk of malnutrition increased, depression also increased. A total of 57.4% of the participants were diagnosed with depression (17). Furthermore, as the education level decreases, malnutrition increases (17,18,29). Our study data also showed that the risk of malnutrition increased as the level of education decreased. A study conducted in China also reported results that support our findings, participants with malnutrition, illiterate and older women were found to have lower cognitive functions (29,30).

In a study that included 2092 elderly individuals from seven different regions of Greece, 11.3% of the participants were found to have malnutrition and 35% were at risk of malnutrition. A total of 32.3% of the participants were found to have symptoms of depression. Malnutrition has been reported to be more common in individuals with cognitive impairment and depressive symptoms. A high prevalence of malnutrition, directly related to depression, has been noted. They strongly recommended that diagnostic tools such as MNA and GDS should be routinely used on older adults in the clinics (18).

In a study conducted with 262 elderly participants in Mexico City, 21.1% of them were found to have malnutrition, 59.9% were at malnutrition risk, and 39.3% were depression. More than 50% of the participants had hypertension (31). On the other hand, diabetes was found in 29.5% and hypertension in 22.5% of the participants of our study.

Studies on older adults have also been conducted in European countries. In a study conducted in Germany, 22.8% of the participants had malnutrition, and 57.9% were at malnutrition risk (32), while 7.9% of the participants had malnutrition, 28.9% were at malnutrition risk, and the presence of depression was found in 28.9% of them in a study conducted in Spain (33).

In a study conducted with older adults in Iran (n=184), 6% of the participants had malnutrition, 46.7% were at malnutrition risk, and the presence of depression was found in 42.4% of them (34).

When we look at the studies conducted in our country, 37.2% of the participants were found to have malnutrition, 50% were at malnutrition risk, and 79.1% had depression in the study conducted with 86 participants receiving home healthcare services in Malatya (35), 2.3% of the participants were found to have malnutrition, 15.8% were at malnutrition risk, 5.7% had depression in the study conducted with 289 participants who visited the family health centre in Konya (36), and in a study conducted in Ankara with 872 older adults, the risk of malnutrition and/or malnutrition was reported to be 80% among the participants living alone and 70% among those living with their families (37). The risk of malnutrition development was observed to be higher in individuals living alone. When our study results are compared with the above studies, the incidence of malnutrition was lower than all of them (2.3%) and similar to the study results only conducted in Konya in our country (Turkey).

According to the studies we reviewed, the countries with the highest prevalence of malnutrition are Bangladesh and Germany. The countries with the highest risk of malnutrition are Mexico, Bangladesh, Germany, Nepal, Greece and Turkey (our study) from high to low. In regards to the prevalence of depression, Nepal, Turkey (our study), Iran, Mexico, Greece, and Spain are listed from high to low.

Conclusions

In conclusion, our study results showed that malnutrition and depression accompany each other in older adults. Although malnutrition has been reported to trigger depression in some studies, depression

symptoms have been found in one out of every three older adults who participated in our study and who were not at risk of malnutrition. In other words, one out of every three older adults, not at risk of malnutrition, is under depression. Our results indicated that the needs of the older population should be determined well and measures should be taken in line with these needs. Despite the small sample size of our study, our results revealed that the older population is suffering from malnutrition and depression. MNA and GDS should be used as routine screening tools for populations aged 65 and over in all societies, and emergency action plans should be implemented to improve the living comfort of older adults in line with the results.

Conflict of Interest: None.

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Received: 23 December 2022
Accepted: 31 May 2023
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