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Original Article

Risk Factors for Depression in Hospitalized Elderly Patients with Malnutrition

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SUMMARY

Background: There is a lack of information about the factors that affect depression in hospitalized geriatric patients with malnutrition. We aimed to determine the risk and influencing factors of depression in these patients.

Methods: The prospective, descriptive study was conducted on 125 elderly patients with malnutrition in Istanbul, Turkey in 2018. The Mini Nutritional Assessment-short form was used in determining the nutritional statuses of the participants, and the Geriatric Depression Scale-short form was used for the status of depression.

Results: A negative relationship was found between nutritional status and risk of depression in the study ($p: 0.000$; $r: -0.558$). Depression was detected in 52.8% of the patients. 60.8% were women and 39.2% were men. It was also found that BMI scores, gender, marital status, level of education, lifestyle and location, the existence of chronic diseases, chronic medication use, hospital stay period, and mobilization affect the emergence and severity of depression in geriatric patients ($p < 0.005$). Multivariate regression analysis showed that increased risk of depression occurs with female gender (OR: 24.665, 95% CI: 5.83–104.34), marital status (OR = 11.97, 95% CI: 3.51–40.86), mobilization (OR: 9.52, 95% CI: 1.79–50.71) and malnutrition (OR = 0.49, 95% CI: 0.27–0.89).

Conclusions: Depression was frequent in elderly patients with malnutrition. Also, many factors (e.g. low BMI, female gender, mobilization etc.) affect it in hospital. Therefore, close follow-up of patients is important.

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1. Introduction

The elderly population is increasing every day because of the improvement of living conditions in the world. Metabolic functions deteriorate with aging; negative physical and psychological changes occur, and social relationships degrade.^{1,2}

Changes occur because of aging in body composition, organ function, nutrient requirements, and energy needs and use. One of the frequently observed health problems in old age is malnutrition due to inadequate and unbalanced nourishment.¹ The early detection and treatment of the risk of malnutrition are important in the elderly. As malnutrition in hospitalized elderly patients might lead to various complications and disorders like loss of cognitive function and depression, some factors such as living alone, eating alone, having more than one disease, depression, and mental disorders can lead to malnutrition, too.³

In elderly patients, depression is a psychiatric disorder that is generally undiagnosed or insufficiently treated with serious results.⁴ However, early diagnosis and effective treatment in the elderly is necessary to prevent worse consequences. It has been reported that between 30% and 78% of hospitalized geriatric patients have depression.^{5,6} With the deterioration of physical health and the reduc-

tion of movement, the elderly's dependence on others increases, also increasing the risk of depression.⁷ It has been also reported that factors such as gender, educational status, marital status, living environment, the presence of chronic diseases, and chronic use of medication increase the risk of depression.^{8,9} Depression leads to a decrease in quality of life, and, an increase in health expenditures, mortality, morbidity, and re-hospitalization in the elderly. Therefore, it is important to know the factors that lead to depression in elderly patients and to create suitable treatment protocols.

According to the literature review, there is a lack of information about the factors that affect depression in hospitalized geriatric patients with malnutrition. This study aimed to research the risks of depression development, which is a significant health problem in geriatric patients admitted with malnutrition, and predisposing factors.

2. Methods

This prospective, cross-sectional, descriptive study was approved by the ethics committee and conducted on the patients above the age of 65 in a third-level state hospital in Istanbul, Turkey between March and May 2018. (Decision no: HNEAH-KAEK 2017/106) Calculation of the study sampling was done by using the MedCalc Statistical Software version 12.7.7 (MedCalc Software bvba, Ostend, Belgium) program. A total of 125 people were included in the study.

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The patients over the age of 65 who had been hospitalized longer than 24 hours for acute or chronic diseases were included in the study. The patients with communication inability, and who were intubated, hospitalized in psychiatric or emergency clinics, or the ones having previous depression diagnosis and treatment were excluded.

The research data were collected through a face-to-face interview technique by the researchers. As a data-collection tool, a form containing sociodemographic properties of the patients, the Mini Nutritional Assessment form (MNA-short form), and Geriatric Depression Scale-short form (GDS-15) were used.

2.1. Data-collection tools

2.1.1. Sociodemographic Data Form

The form, which the researchers prepared, contains questions related to age, gender, weight, height, body mass index (BMI), education status, marital status, where the patients live and with whom, chronic diseases, constant use of drug, period of hospitalization, and mobilization status.

2.1.2. Mini Nutritional Assessment-Short Form (MNA-SF)

It is a method of validity and reliability used to evaluate the nutritional status of patients. The MNA-SF comprises six questions including verbal queries and anthropometric measurements. It was accepted that patients with less than 12 points carried a risk of malnutrition and the ones with less than seven points had malnutrition.¹⁰

2.1.3. Yesavage Geriatric Depression Scale-Short Form (GDS-15)

The GDS contains a total of 15 questions created for geriatric patients and its reliability was proven. Five questions (1, 5, 7, 11, and 13) were established as positive and the others as negative. The cutoff value for the diagnosis of depression ≥ 5 points. 5–8: Mild depression, 9–11: Moderate depression, 12–15: Severe depression.^{11,12}

2.2. Statistical analysis

The IBM SPSS Statistics 22 (IBM SPSS, Turkey) program was used for the statistical analysis. The normal distribution of the parameters was evaluated with the Shapiro-Wilks test. Oneway ANOVA test was used in the inter-group comparison of the parameters that showed normal distribution and in the comparison of the complementary statistical methods (Average, Standard deviation, frequency) as well as the quantitative data; and the Tukey HSD test was used to determine the group that shows the difference. In the comparison between the groups of the parameters not exhibited a normal distribution, the Kruskal Wallis test was used, and the Mann Whitney U test was used in determining the group showing the difference. In the comparison of the qualitative data, the Chi-Square test and Fisher Freeman Halton test were used. In the analysis of the relationships between the parameters that don't fit the normal distribution, the Spearman rho correlation analysis was used. Logistic regression analysis was performed for multivariate analysis. The significance was accepted as $p < 0.05$.

3. Results

The study was conducted on 125 geriatric patients with malnutrition, who had a mean age of 75.56 ± 5.06 (49 (39.2%) male and

76 (60.8%) female). The mean hospital stay period was 13.69 ± 11.29 (3–48) days. The mean BMI value was 20.23 ± 2.25 . Table 1 shows patients characteristics.

In spite of 47.2% (n: 59) of the patients did not have depression, 52.8% (n: 66) had. Twenty percent (n: 25) had mild, 19.2% (n: 24) had moderate, and 13.6% (n: 17) had severe depression. The mean depression score was 6.41 ± 4.22 (0–15).

All the patients had malnutrition. The MNA scores ranged between 3 and 7, and the mean was 5.23 ± 1.25 .

74.4% of the patients had chronic medication use, while 25.6% not. The number of medications they use ranges between 0 and 5 and the mean was 1.86 ± 1.54 .

A statistically significant difference is found between the status of depression and the mean BMI values ($p: 0.000$; $p < 0.05$). Depression and degree of depression were lower in patients with high BMI ($p_1: 0.012$; $p_{2-3}: 0.000$; $p < 0.05$). Table 2 shows the evaluation of the depression status with all parameters.

There was a statistically significant inverse association with the depression score and MNA score (Table 3).

When the effects of gender, marital status, education, life style and location, chronic disease, length of hospital stay, mobilization, BMI, constant drug use and MNA score which were found to be statistically significant on depression were evaluated with Backward stepwise logistic regression analysis. The model was found to be

Table 1
Characteristics of patients.

	n	%
Age (year)		
65–74	53	42.4
75–84	70	56
> 85	2	1.6
BMI (kg/m ²)		
< 19.99	63	50.4
20–24.99	58	46.4
25–29.99	4	3.2
Gender		
Male	49	39.2
Female	76	60.8
Marital status		
Married	52	41.6
Single	73	58.4
Education status		
Illiterate	39	31.2
Primary-middle school	40	32
High school	35	28
Undergraduate	11	8.8
Lifestyle and location		
Home with family	52	41.6
Home alone	48	38.4
Nursing home	25	20
Length of hospital stay (day)		
1–6	39	31.2
7–14	39	31.2
15–21	23	18.4
> 21	24	19.2
Chronic diseases		
At least 1	93	74.4
None	32	25.6
Constant medication use		
Yes	93	74.4
No	32	25.6
Mobilization		
Mobile	100	80
Immobile	25	20

BMI: body mass index.

Table 2
The evaluation of the depression status with all parameters.

	Depression				p value
	No Depression Mean ± SD	Mild Mean ± SD	Moderate Mean ± SD	Severe Mean ± SD	
BMI	21.46 ± 2.42	19.83 ± 1.9	19.05 ± 1.97	18.26 ± 2.05	¹ 0.000*
Number of drugs	1.29 ± 1.39 (1)	1.84 ± 1.49 (2)	2.58 ± 1.44 (2.5)	2.82 ± 1.42 (3)	² 0.000*
Age (year), n (%)				5 (29.4%)	³ 0.672
66–74	27 (45.8%)	11 (44%)	10 (41.7%)		
75–84	30 (50.8%)	14 (56%)	14 (58.3%)	12 (70.6%)	
> 85	2 (3.4%)	0 (0%)	0 (0%)	0 (0%)	
BMI (kg/m ²), n (%)					³ 0.001*
< 19.99	19 (32.2%)	12 (48%)	17 (70.8%)	15 (88.2%)	
20–24.99	36 (61%)	13 (52%)	7 (29.2%)	2 (11.8%)	
25–29.99	4 (6.8%)	0 (0%)	0 (0%)	0 (0%)	
Gender, n (%)					³ 0.000*
Male	42 (71.2%)	5 (20%)	0 (0%)	2 (11.8%)	
Female	17 (28.8%)	20 (80%)	24 (100%)	15 (88.2%)	
Marital status, n (%)					³ 0.000*
Married	43 (72.9%)	9 (36%)	0 (0%)	0 (0%)	
Single	16 (27.1%)	16 (64%)	24 (100%)	17 (100%)	
Education status, n (%)					³ 0.001*
Illiterate	9 (15.3%)	10 (40%)	9 (37.5%)	11 (64.7%)	
Primary-middle school	18 (30.5%)	6 (24%)	12 (50%)	4 (23.5%)	
High school	24 (40.7%)	6 (24%)	3 (12.5%)	2 (11.8%)	
Undergraduate	8 (13.6%)	3 (12%)	0 (0%)	0 (0%)	
Lifestyle and location, n (%)					³ 0.000*
Home with family	43 (72.9%)	9 (36%)	0 (0%)	0 (0%)	
Home alone	8 (13.6%)	13 (52%)	15 (62.5%)	12 (70.6%)	
Nursing home	8 (13.6%)	3 (12%)	9 (37.5%)	5 (29.4%)	
Length of hospital stay (day), n (%)					³ 0.000*
1–6	24 (40.7%)	12 (48%)	0 (0%)	4 (23.5%)	
7–14	14 (23.7%)	6 (24%)	9 (37.5%)	9 (52.9%)	
15–21	5 (8.5%)	6 (24%)	8 (33.3%)	4 (23.5%)	
> 21	16 (27.1%)	1 (4%)	7 (29.2%)	0 (0%)	
Chronic diseases, n (%)					³ 0.002*
At least 1	35 (59.3%)	20 (80%)	22 (91.7%)	16 (94.1%)	
None	24 (40.7%)	5 (20%)	2 (8.3%)	1 (5.9%)	
Constant medication use, n (%)					³ 0.002*
Yes	35 (59.3%)	20 (80%)	22 (91.7%)	16 (94.1%)	
No	24 (40.7%)	5 (20%)	2 (8.3%)	1 (5.9%)	
Mobilization, n (%)					⁴ 0.004*
Mobile	53 (89.8%)	15 (60%)	21 (87.5%)	11 (64.7%)	
Immobile	6 (10.2%)	10 (40%)	3 (12.5%)	6 (35.3%)	

¹Oneway anova test. ²Kruskal wallis test. ³Ki-kare test. ⁴Fisher freeman halton test. * p < 0.05.

Table 3
Depression score and MNA score correlations.

	Depression score
MNA score	
r	-0.588
p	0.000*

Spearman Rho correlation analysis. * p < 0.05.

significant (p: 0.000; p < 0.05), and Negelkerke R square value was 0.731, and the explanatory coefficient (89.6%) of the model was good. The effects of gender, marital status, mobilization and MNA score parameters on the model were found to be statistically significant (p < 0.05) (Table 4).

4. Discussion

The study was planned to research the risk and influencing factors of depression in geriatric patients hospitalized with malnutrition. It was determined that 52.8% of the participants had depression and that there was a positive correlation between the

Table 4
Logistic regression analysis of parameters affecting depression.

	OR	95% C.I. for EXP (B)		p
		Lower	Upper	
Gender (female)	24.665	5.830	104.347	0.000*
Marital status (single)	11.969	3.506	40.860	0.000*
Mobilization (immobil)	9.518	1.786	50.714	0.008*
MNA score	0.490	0.270	0.887	0.019*

CI: confidence Interval; MNA: Mini Nutritional Assessment; OR: odds ratio.

increased degree of malnutrition and severity of depression. In similar previous studies, Mantzorou et al., Saka et al., Sherina et al. reported the rate of depression as 32%, 45%, and 89.5%, respectively.^{13–15}

Malnutrition is an independent risk factor for depression.^{13–17} These results emphasize that depression is prevalent in elderly patients and the necessity to take preventive measures.

The poor nutritional status of hospitalized geriatric patients along with increasing the risk of depression prevents the treatment of depression and other existing diseases, prolongs hospital stay, and

decreases individuals quality of life.⁵ For these reasons, the early diagnosis and treatment of malnutrition and depression in the geriatric population are important.

BMI score is frequently used in determining nutritional status. A low BMI score increases the risk of malnutrition. It is known that there is a relationship between impairment in cognitive function, depressive symptoms and low weight in the elderly. Previous studies reported that the rate of depression is high in geriatric individuals with low-weight.^{18,19} We found that the more decrease in BMI score (< 20 kg/m²), the more increase in the severity of depression.

The level of depression is different between genders and is more frequent in women than men. The reasons for this have been proposed as genetic differences, hormonal fluctuations, loss of husbands at advanced ages, and financial dependence on husbands in some societies.^{20,21} One study reported that depression was seen four times more frequently in elderly women than in men.²¹ Another study reported that it was 1.8 times more frequent in women.¹⁴ Similar to the literature, we also found the incidence difference between the genders, which was more frequent and severe in elderly female patients.

Depression is frequently seen in elderly individuals with low level of education. Girma et al. (2016) reported that depression occurred more frequently in elderly individuals without a formal education compared with those who have been educated.²¹ Another study found that depression was more prevalent in illiterate, hypertensive elderly individuals.²² Manav et al. (2018) determined that the level of education and depression were correlated and that depression scores occurred more frequently in illiterate individuals compared with those with better levels of education.²³ We also found that as the education level gets decreased, the incidence of severe depression gets increased. It might be thought that this is due to the increased ability of the well-educated individuals accessing information on existing diseases, aiming to find alternative solution ways to change their lifestyle and to cope with stress.

The results relating to marital status and depression are inconsistent. A previous study reported that unmarried individuals are 10 times more likely to suffer from depression than married individuals.²¹ Similarly, Ma et al. (2015) stated that unmarried individuals experienced depression at higher rates.²² Manav et al., however, found no relationship between marital status and depression.²³ The present study reported that depression risk was more prevalent in single than married people and that moderate and severe depression were more common. The important element regarding marital status is whether the individual lives alone.

It is known that living alone is one of the factors that lead to depression in the elderly, and similar results have been found in studies conducted in different countries. A study on elderly people in Spain reported that those with weaker social relationships are more depressed.²⁴ Another study conducted in America found that in elderly individuals living alone, depression was seen more than in people living with any family member.²⁵ In a study on elderly individuals living in nursing homes in Turkey, a high prevalence of depression was reported.²³ We also found that depression was more prevalent and more severe among the elderly who live alone compared to one's living with their families or in a nursing home. Social interaction reduces the risk and severity of depression in elderly. While the duration of hospital stay increases the risk of depression, the existence of depression leads to the prolongation of hospitalization and increase of readmittance.²⁶ In this study, we determined that hospital stay period was a risk factor for depression and that the patients with a hospital stay between 15–21 days had moderate depression at a higher rate. In a study conducted on patients with

strokes, it was determined that there was a higher risk of depression in those with a hospital stay duration longer than 30 days.²⁷ The provision of social support to elderly patients after hospitalization can decrease the risk of depression and thus the duration of stay in the hospital related to depression is shortened, and the costs necessary for care and treatment can be reduced.

The prevalence of chronic diseases increases as the age increases which increases the risk of depression. We found that a large majority of the patients in our study had at least one chronic disease and that this was a risk factor for depression. In another study from Turkey, a positive relationship was found between the number of chronic diseases and depression score.²⁸ A study on elderly Koreans reported that the existence and number of chronic diseases affect depression.²⁹ It can be said that such factors as the frequency of hospitalization because of chronic disease, the existence of disease-related pain, and social limitations increase the risk of depression. The good observation and treatment of individuals with chronic diseases in terms of the presence of depression are important for the treatment of existing diseases.

The chronic use of medications due to a chronic illness can decrease the quality of life by creating feelings of restriction, pressure, and stress in individuals, and this can increase the risk of depression. Ines et al. (2010) determined that individuals with depression used more and more types of medications.³⁰ A vast majority of the elderly patients in our study were found to have chronic use of medication, and it was also found that this situation increases the prevalence and severity of depression.

It is known that there is an inverse correlation to physical activity and depression. Being physically active is recommended to reduce the risk or treat depression.^{4,31} Vancampfort et al. (2018) in their study conducted in low-income countries reported that elderly individuals with symptoms of depression have lower physical activity.³² Veronese et al. (2017) reported that the risk of depression in physically inactive elderly individuals increases and the status of the physical activity is a predictor of depression.³¹ Rajani et al. (2018) determined that immobility is a risk factor for elderly people.⁹ We also found similarly that a higher rate of depression exists in immobile patients compared with those who are mobile.

The logistic regression analysis showed that female gender, marital status, mobilization and MNA score had independent effects on the incidence of depression in elderly patients with malnutrition (p: 0.000, p: 0.000, p: 0.008 and p: 0.019, respectively). In a previous study, education status, lifestyle, sleep quality, and functionality were shown to be independently effective on depression in geriatric patients with hypertension.²² This suggest that there is a need for better health conditions and more close supportive care for elderly patients.

5. Conclusion

We found that malnutrition is related to depression and that the BMI scores, gender, marital status, level of education, lifestyle and location, the existence of chronic diseases, chronic medication use, hospital stay period, and mobilization contribute to the emergence and severity of depression in malnourished geriatric patients. In addition depression risk is more common in malnourished geriatric patients, especially women, immobilized and single. For the early diagnosis and treatment of depression, frequent monitoring and creating the necessary protocol will be beneficial in terms of these specified risk factors as of the hospitalizations of elderly patients.

5.1. The limitations

The study was conducted at one center. The questionnaires were used as data collection tool.

Conflicts of interest

The authors report no conflicts of interest.

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