

The relationship between depression and vitamin D levels in the geriatric population

Depression and vitamin D in geriatri

Çiğdem Cindoğlu¹, Burcu Beyazgül², Şenay Koçakoğlu³¹Department of Internal Medicine²Department of Public Health³Department of Family Medicine, Faculty of Medicine, Harran University, Sanliurfa, Turkey

Abstract

Aim: The aim of this study is to evaluate the frequency of depression and vitamin D deficiency and the relationship between them in the geriatric population. **Material and Methods:** A cross-sectional and prospective study was carried out with 92 patients. Elderly patients who applied to the Internal Medicine Polyclinic of Harran University Hospital between October 2020 and July 2021, agreed to answer the GDS questionnaire and whose vitamin D levels were checked during examinations were included in the study.

Results: Of the 145 participants, 91 (66.8%) were women and 54 (37.2%) were men, with a mean age of 72.8 ± 6.2 years. According to the GDS results, the mean depression score of the participants was 6.3 ± 3.5 . Depression was present in 64.1% (n= 93) of the participants, and 72.5% of these 93 depressed patients were women. When the relationship between depression status and socio-demographic variables was examined, it was found that depression was significantly more common in those with poor income and living in large families ($p < 0.05$).

Discussion: According to the findings of this study, vitamin D deficiency can be regarded as a comorbidity of depression, and early detection and management of vitamin D deficiency and depression will improve both individual and public health.

Keywords

Geriatric, Depression, Vitamin D Deficiency, Elderly

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Corresponding Author: Çiğdem Cindoğlu, Department of Internal Medicine, Faculty of Medicine, Harran University, Sanliurfa, Turkey.

E-mail: ccindoglu@gmail.com P: +90 505 228 13 75

Corresponding Author ORCID ID: <https://orcid.org/0000-0002-1805-6438>

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Introduction

Adults aged 65 years and over are generally included in the elderly population. Depression in the elderly is an important public health problem due to its high prevalence, clinical consequences, and complications [1,2]. In 2014, it was reported that 8% of the population in Turkey is 65 years of age or older, and this rate is estimated to reach 10.2% in 2023, 20.8% in 2050, and 27.7% in 2075 [3]. In this group, symptoms should be carefully questioned, and depression should be diagnosed as early as possible. However, due to decreased daily activity and comorbidities in the elderly, depression symptoms, such as weight loss, low energy, and changes in appetite and sleep, might be overlooked. The Geriatric Depression Scale (GDS) is an instrument used to identify depression by identifying symptoms of depression and dementia in the elderly [4,5]. Vitamin D deficiency, which is also common in the elderly due to environmental and physiological changes, is an important public health problem in all age groups worldwide [6]. In the last decade, studies have focused on the effects of vitamin D on psychiatric disorders, especially depression. The results of some of them suggest that there is a significant relationship between them, and that the treatment of vitamin D deficiency may have positive effects on the development and treatment of depression [7-9].

Receptors and metabolites of vitamin D were shown in the cerebrospinal fluid, prefrontal cortex, and limbic system. Findings related to the central nervous system suggest that vitamin D, an important neurosteroid hormone, may play a role in emotional and cognitive functions [10-12].

Problems related to both depression and vitamin D deficiency are common in society and in the rapidly increasing elderly population. This study was planned to investigate the frequency and relationship between depression and vitamin D deficiency in the geriatric population in Turkey.

Material and Methods

A cross-sectional and prospective study was carried out among 92 patients. The elderly patients who applied to the Internal Medicine Polyclinic of Harran University Hospital between October 2020 and July 2021, who agreed to answer the GDS questionnaire and whose vitamin D levels were checked during examinations were included in the study. The GDS and a questionnaire created by the researchers were presented using a face-to-face survey method to collect data. The vitamin D values of the participants were obtained from the hospital data system. Vitamin D deficiency is accepted as “severe” for values below 10 ng/mL; between 10 and 20 ng/mL as “mild deficiency” and between 20 and 30 ng/mL as “insufficiency”, ≥ 30 ng/mL as “normal” [20]. The study was approved by the Ethics Committee of Harran University, Faculty of Medicine (approval no 76244175-050.04.04; dated 09.03.2020), and informed consent was obtained from all participants.

The Geriatric Depression Scale

The GDS is a 30-item scale developed by Yesavage et al. in 1983 [13]. A Turkish validity and reliability study of the 15-item short-form version of the scale for use with elderly populations was conducted by Durmaz et al. in 2018. The GDS-short form consists of 15 questions and is answered with “Yes” or “No”.

GDS- short form total score is 15. Depression levels are defined as “normal” for scores between 0-4, between 5 -8 as “mild”, between 9-11 as “moderate”, and between 12-15 as “severe” [14].

Statistical analysis

A pilot study was conducted to calculate the number of participants. In the pilot study, the short-form GDS was administered to the participants, and it was determined whether they were depressed according to the prediction score. The total number of participants who underwent GDS was 145. However, vitamin D analyses of 53 participants could not be performed due to external factors, including analyzer failure. Correlation analyses were performed with the measured vitamin D levels of 92 participants. The vitamin D levels were 20.6 ± 7.5 ng/mL in depressed patients and 13.3 ± 15.4 ng/mL in non-depressed patients. The sample size was calculated using these values and the G-power method. SPSS version 22.0 software (IBM Statistical Package for Social Sciences, IBM Corporation, NY, USA) was used. The significance level was accepted as $p < 0.05$. The Kolmogorov–Smirnov test was performed to evaluate the suitability of the data for normal distribution. Frequency, mean, and standard deviation values were calculated to determine the distribution, and chi-square and Student’s T tests were used for depression and the variables whose effects were assessed.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

Of the 145 participants, 91 (66.8%) were women and 54 (37.2%) were men, with a mean age of 72.8 ± 6.2 years. Other demographic details were as follows: 30.6% of the participants were literate and 69.4% were illiterate, 69% were married and 60.1% lived with an extended family, 22.4% had a low income, and 80% were using prescribed pharmaceuticals due to some diseases.

According to the GDS results, the mean depression score of the participants was 6.3 ± 3.5 . Depression was present in 64.1% ($n = 93$) of the participants, and 72.5% of these 93 depressed patients were women. When the relationship between depression status and socio-demographic variables was examined, it was found that depression was significantly more common in those with poor income and living in large families ($p < 0.05$). The relationship between the other variables and depression is shown in detail in Table 1.

Vitamin D levels were below the normal range of 90.9% in the study participants: 32.7% showed severe deficiency, 42% showed mild deficiency, and 15.3% showed insufficiency. The correlation of deficiencies with GDS scores is shown in Table 2. Vitamin D levels were lower in the depressed elderly, but there was no significant difference between the depressed and non-depressed groups ($p = 0.85$) (Table 3).

Discussion

Depression is a psychiatric disorder that is common among geriatric patients and can reduce their quality of life, increasing morbidity and mortality. Vitamin D, an important neurosteroid hormone, may have an impact on depression, so many researchers have focused on its potential effects

Table 1. The relationship between the socio-demographic variables of the patients and depression.

Variables	Geriatric Depression Scale- Short Form Score				Statistical analysis	
	0-4		≥ 5		Ki kare	P
	N	%	N	%		
Age						
65-74 years	26	39,4	40	60,6	0,61	0,43
≥75	10	31,2	22	68,8		
Gender						
Female	19	29,7	45	70,3	3,11	0,07
Male	17	50	17	50		
Education status						
Illiterate	20	30,8	45	69,2	1,76	0,18
Literate	15	46,9	17	53,1		
Marital status						
Married	29	43,3	38	56,7	3,06	0,08
Widow	7	22,6	24	77,4		
Family type						
Nuclear family	21	58,3	15	41,7	9,29	0
Extended family	15	25	45	75		
Chronic disease						
Yes	29	36,7	50	63,3	0	1
No	7	36,8	12	63,2		
Multiple drug use						
≤ 4 drugs	25	32,9	51	67,1	1,47	0,22
> 4 drugs	11	50	11	50		
Income status						
Sufficient	12	38,7	19	61,3	6,48	0,04
Middle	21	46,7	24	53,3		
Insufficient *	3	14,3	18	85,7		
	36	36,7	62	63,3		

*The group that makes a difference

Table 2. Relationship between the Geriatric Depression Scale and vitamin D level.

	Geriatric Depression Scale	
	0-4 (n; %)	≥ 5 (n; %)
25(OH)D vitamin		
Severe deficiency <10 ng/mL	12 (%33,3)	20 (%32,3)
Moderate deficiency 10-20 ng/mL	15 (%41,7)	27 (%43,5)
Insufficiency 20-30 ng/mL	5 (%13,9)	10 (%16,1)
Normal >30ng/mL	4 (%11,1)	5 (%8,1)
	36 (%100)	62 (%100)

Figure 3. Relationship between patients' vitamin D levels and depression.

Variables	Geriatric Depression Scale- Short Form Score				Statistical analysis	
	0-4		≥ 5		T-test	P
	Median	Standard deviation	Median	Standard deviation		
25(OH)D (ng/mL)	15,23	9,48	14,87	8,86	0,18	0,85

on the geriatric population. According to this study, which evaluated the relationship between depression and vitamin D in the elderly, it was determined that depression was increased in the elderly population, especially among women, and that vitamin D levels were lower than the ideal range. However, the relationship between the level of vitamin D and depression was not significant.

Depressive disorders and symptoms affect 10% of geriatric individuals. A meta-analysis revealed that the rate of major depressive disorders was higher in women (5.8%). In our study, the rate of depression in women was 70.3%, which was higher than in men [15].

It has been observed that due to low D vitamin levels, a decrease in physical-mental performance and an increase in the incidence of falls, and also fracture risk occur [16,17].

A study from Korea reported an increased rate of deficiency of vitamin in the geriatric population up to 60%. Several studies reported the association of vitamin D with many chronic and autoimmune diseases, malignancy and depression. There is also strong evidence that it is associated with cognitive disorders [18,19].

Several studies have also revealed a significant relationship between depression [20,21].

However, according to the results of Toffanello et al.'s study, there was no significant relationship, and vitamin D deficiency showed no direct effect on the onset of late-life depressive symptoms [22].

The differences in the socio-demographic characteristics of participants and some problems affecting vitamin D synthesis, such as nutrition, sun exposure diversity in the elderly, and kidney function disorders in older ages can cause the difference between study results on this issue. In the selection of participants and the problems affecting vitamin D synthesis, such as nutrition, sun exposure diversity in the elderly, and kidney function disorders in older ages.

Conclusion

The elderly were found to have higher rates of depression in this study. Although vitamin D deficiency was more common in elderly patients who were depressed, there was no significant relationship between them. According to the findings of this study, vitamin D deficiency can be regarded as a comorbidity for depression, and early detection and management of vitamin D deficiency and depression will improve both individual and public health.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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