# PREVALENCE OF GERIATRIC DEPRESSION AND ASSOCIATED FACTORS AMONG ELDERLY PEOPLE IN FAMILY MEDICINE CLINIC

## AİLE HEKİMLİĞİ KLİNİĞİNDE YAŞLILARDA GERİATRİK DEPRESYON PREVALANSI VE İLİŞKİLİ FAKTÖRLER

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## Öz

**Amaç:** Önemli bir halk sağlığı sorunu ve hastalık yükü belirleyicisi olan depresyon, özellikle yaşlı popülasyonda en sık görülen ruhsal bozukluklardan biridir. Bu çalışmada aile hekimliği polikliniğine başvuran yaşlılarda geriatrik depresyon prevalansının ve depresyon ile ilişkili faktörlerin araştırılması amaçlanmıştır.

**Materyal ve Metot:** 60 yaşın üzerinde ki toplam 195 gönüllü çalışmaya dahil edilmiştir. Katılımcıların, depresyon ile ilişkili olabilecek demografik özellikleri, tıbbi geçmişleri, psikososyal faktörler ve bireylerin fiziksel sağlık durumları anket formu ile elde edildi. Depresif belirtiler 30 maddelik Geriatrik Depresyon Ölçeği (GDS) kullanılarak değerlendirilmiştir.

**Bulgular:** Çalışmaya dahil edilen 166 katılımcının %49,09'unda (n=81) depresyon yoktu, %4,24'ünde (n =7) olası depresyon ve %46,67'sinde (n =77) depresyon vardı. 75 yaş ve üstü katılımcıların depresyon anketi puanları diğer yaş gruplarından istatistiksel olarak daha yüksekti (p=0,001). Kendi günlük işini yapamama (OR: 19,78, Cl: 1,23-317,83, p=0,035), işitme problemi olma (OR: 2,74, CI: 1,20-6,27 p=0,017) ve orta uyku kalitesi (OR : 10,62, Cl: 2,37-42,70, p=0,002) veya kötü uyku kalitesi (OR: 4,24, Cl: 1,78-10,06, p=0,001) depresyon durumunu etkileyen bağımsız risk faktörleriydi.

**Sonuç:** Bu çalışma, sağlık çalışanlarına ve Aile hekimlerine geriatrik depresyonun yüksek prevalansı konusunda endişe verici bir sinyal vermektedir. Geriatrik depresyonun yaşlı popülasyonda hane halkı geliri, eğitim düzeyi, fiziksel sağlık, işitme sorunu, uyku durumu ve düşme öyküsü ile ilişkili olduğu saptanmıştır.

**Anahtar Kelimeler:** Geriatrik depresyon, yaşlı birey, aile hekimliği.

## Abstract

**Objectives:** Depression, which is an important public health problem and a determinant of disease burden, is one of the most common mental disorders, especially in the elderly population. The current study was aimed to investigate the prevalence of geriatric depression and associated factors among elderly people who admitted to the family medicine outpatient clinic.

**Materials and Methods:** A total of 195 elderly participants aged 60 years have enrolled in this study. Demographic characteristics, medical history, psychosocial factors, and physical health status of individuals that may be associated with depression were obtained with a questionnaire. Depressive symptoms were assessed using the 30-item Geriatric Depression Scale (GDS).

**Results:** Total of the 166 participants included in the study, 49.09% (n=81) had no depression, 4.24% (n=7) had probable depression, and 46.67% (n=77) had depression. Depression questionnaire scores of participants 75 years and over-aged were statistically higher than other age groups (p=0.001). Ability to make own daily work (OR: 19.78, Cl: 1.23-317.83, p=0.035), have a hearing problem (OR: 2.74, CI: 1:20 - 6:27 p=0.017) and fair sleep quality (OR : 10.62, Cl: 2.37-42.70, p=0.002) or poor sleep quality (OR: 4.24, Cl: 1.78-10.06, p=0.001) were independent risk factors that affecting the depression status.

**Conclusion:** This study provides an alarming signal for health professionals and family physicians about the high prevalence of geriatric depression. We found that geriatric depression is associated with household income, education level, physical health, hearing problem, sleep status and history of falls in the elderly population.

**Keywords:** Geriatric depression, elderly, family practice.

## Introduction

Depression, which is an important public health problem and a determinant of disease burden, is one of the most common mental disorders, especially in the elderly population.[1] It has been reported that the risk of chronic diseases, disability, suicide, and death increase in the elderly population with depression.[2] The increase in the elderly population in Turkey as all over the world in recent years, so it has become more important to fight against the negative effects of geriatric depression.

Geriatric depression is defined as late-life depression and as depression that starts after the age of 60. It is suggested that biological, social, psychological and environmental factors play a role in the etiology of geriatric depression. Studies have shown that many factors such as female gender, old age, single or widowed, smoking, drug use, low educational status, low-income level, unemployment, chronic illness, loneliness, lack of social support, stressful living conditions and malnutrition are the basis for geriatric depression.[3]

Geriatric depression is estimated to affect approximately 900 million elderly people. In a meta-analysis study conducted in India, it was reported that the prevalence of geriatric depression was 34.4%.[4] In a study conducted in Iran, the prevalence of geriatric depression was reported as 43%.[5] It was emphasized that the reason for the difference in the prevalence of geriatric depression might be related to cultural, genetic and environmental factors or even methodological / sampling differences, and that larger studies should be given importance in different societies to improve the quality of life and mental health of the elderly. The increasing elderly population in Turkey as well as all over the world has made geriatric depression a major problem. For this reason, researches on geriatric depression may be useful to protect the mental health of the community.

The current study was aimed to investigate the Prevalence of Geriatric Depression during routine family medicine practice. Additionally, we investigated associated factors with geriatric depression. The current study data can provide awareness and early diagnosis of geriatric depression in family medicine.

## Materials and Methods

*Study design and population*

The cross-sectional study was conducted with a population 60 years and over-aged who applied to the Family Medicine outpatient clinic between January and June 2020. The sample size was calculated by Power Analysis (G-Power 3.1 package program). The previous study conducted by Cong et al. reported geriatric depression prevalence 10.5%, and the mean score of the GDS was 5.12 ± 4.42 for men and 4.98 ± 4.30 for women.[6] Considering previous study data, the sample size was estimated as 147 persons for power=0.95 (beta=0.05),

alpha=0.05 and effect size (d)=0.3 based on independent samples t-test. An extra questionnaire of up to 20% of the sample size was applied, considering the possibility of missing data. Questionnaire forms were applied to 190 people who applied to the family medicine outpatient clinic and agreed to participate in the study between January and June 2020 with the systematic sampling method. After removing the missing data and participants who did not meet the study criteria, a total of 165 participants were included in the study (response rate: %86.8).

There were 195 elderly individuals aged 60 years or older admitted to the family medicine clinic between January and June 2020. Participants were included in the study if they were (i) aged 60 or older years old, (ii) participants were not currently suffering from any kind of illness or sickness on the day of the interview (excluding long-term chronic illnesses and (iii) capable of giving informed written (or verbal) consent. Elderly persons suffering from aphasia, articulation disorders currently receiving psychotropic drugs were excluded from the study due to difficulty in speech and communication.

*Data collection*

The data were collected utilizing a semi-structured face-to-face interview, which included (i) sociodemographic variables, (ii) psychosocial factors, (iii) physical health-related factors and (iv) the Geriatric Depression Scale. Questionnaire forms were applied to all participants by two researchers using face-to-face interviews. Questionnaires were administered over the first 15 participants, and incomprehensible questions revised questionnaire was applied after giving participants enough time to have a proper conversation in the room with all participants.

*Socio-demographics*

Information concerning sociodemographic variables included age, gender, family income, educational status, marital status and employment status. Family income was used as an indicator of social class: less than 2000 Turkish Lira (TL) (lower class), 2000 to 4000 TL (middle class), and more than 4000 TL (upper class). The marital status of being single included those who were divorced and widowed (because there were so few participants in these categories).

*Fall history*

Participants were asked, "Have you experienced any falls in the last year?" Participants were asked to answer the question as yes or no.

*Vision impairment*

Participants were asked, "Do you have a visual impairment that will negatively affect your daily routine life?"

*Hearing problem*

Participants were asked, "Do you have a hearing problem that will negatively affect your daily routine life and communication with other people?"

*Geriatric depression scale*

The 30-item Geriatric Depression Scale (GDS) was originally developed by Yesavage et al. in order to assess depressive symptoms in geriatric populations. The Geriatric Depression Scale was prepared from 30 questions based on self-reporting of individuals and in a way that the elderly could easily mark and answer "yes" or "no". On the scale, the 3rd, 4th, 5th, 6th, 8th, 10th, 11th, 12th, 13th, 14th, 16th, 17th, 18th, 20th, 22nd, 23rd, 24th, 25th, 26th and 28th questions contain a reverse expression. In the scoring of the scale, 1 point is given for each answer in favor of depression, and 0 points are given for the other answer, and the total score is accepted as the depression score. The potential total score of GDS is minimum 0, maximum 30 points (GDS total score ranged from 0 to 30). Scoring of the scale; A score of 0-10 was classified as "no depression", 11-13 points as "possible depression", and a score of 14 and above as "definite depression".[7] The total scale score for each elderly person was calculated by summing the scores of the elderly individuals from all items. The Turkish validity and reliability study of the GDS scale was conducted by Ertan et al., and the internal consistency coefficient of the scale was reported as 0.77. Participants in our study were divided into two groups as having depression and not having depression. Participants scoring 0-10 points on the depression questionnaire were classified as the non-depression group (no depression), and the participants scoring 11 and above as the group with depression (yes).[8]

*Statistical analysis*

Statistical analysis of the data was performed by IBM SPSS 22 statistics package software. The Shapiro-Wilk test was used to determine whether the data showed normal distribution. Descriptive statistics of the data were expressed as median (quartile 1-quartile 3) for non-normal distribution variables and frequency for categorical variables as percentage (n (%)). Categorical variables were compared using chi-squared tests. In the comparison of two independent groups, the Mann-Whitney U test was used for non-normal distributed

continuous data. In the comparison of more than two independent groups, the Kruskal-Wallis test and Dunn tests were used for post hoc testing for non-normally distributed continuous data. All the variables statistically significant in bivariate analysis were entered into the binary logistic regression models. The results of logistic regression are reported as unadjusted and adjusted odds ratios with 95% confidence intervals, and all associations with a p-value less than 0.05 were regarded as significant for this study.

## Results

The median value of the participants' depression scale score was 12.00 (min-max: 0-30). Of the participants, 49.09% (n=81) had no depression, 4.24% (n=7) had possible depression, and 46.67% (n=77) had depression. Depression questionnaire scores of participants 75 years and older were statistically higher than the other age groups (p=0.001) (Table 1).

**Table 1.** Sex and age differences in Geriatric Depression Scale score and prevalence of Depression

| Variables | Participants (n=165) | | | |
|---|---|---|---|---|
| **Depression scale** | n | % | | |
| 0-10 points | 81 | 49.09 | | |
| 11-13 points | 7 | 4.24 | | |
| ≥14 points | 77 | 46.67 | | |
| **Gender** | **Median** | **Q1-Q3*** | **p* value** | **p** value** |
| Female | 14.00 | (8.25-19.75) | 0.123 | |
| Male | 11.00 | (7.00-18.00) | | |
| **Age groups** | | | | |
| 65-69 years | 10.00 | (6.00-16.00)[a] | | a-b: >0.999 |
| 70-74 years | 11.00 | (7.25-18.25)[b] | **0.001** | a-c: **<0.001** |
| ≥ 75 years | 15.00 | (10.00-27.00)[c] | | b-c: **0.006** |

\* Multiple comparison p-value. ** binary comparison p-value, ***Q1-Q3: quartile 1-quartile 3

The mean age of 165 participants included in the study was 72.30 ± 6.09 years old. 38.78% of the participants were female (n=64) and 61.22% were male (n=101). Depressive symptoms were detected in 50.91% (n=84) of the participants. 73.94% of the participants stated that "they can do their daily work", and 70.30% of them "can do a physical activity outside the home" (Table 2).

Household income (p=0.009), higher education (0.019), ability to make the daily work (p <0.001), being the obstacle of physical illness do their daily work (p <0.001), hearing loss (p=0.001), having sleep problems (p < 0.001), history of falling (p=0.008) and can not do physical activity (p=0.008) were found to be associated with depression (Table 3).

**Table 2.** Sociodemographic characteristics of the participants

| Variables | n | % |
|---|---|---|
| **Gender** | | |
| Female | 64 | 38.78 |
| Male | 101 | 61.22 |
| **Income** | | |
| Low | 20 | 12.12 |
| Medium | 84 | 50.91 |
| Good | 61 | 36.97 |
| **Education level** | | |
| illiterate | 48 | 29.09 |
| literate | 41 | 24.84 |
| primary school | 33 | 20.00 |
| high school | 19 | 11.51 |
| university | 24 | 14.56 |
| **Marital status** | | |
| married | 118 | 71.51 |
| single | 7 | 4.24 |
| widow or divorced | 40 | 24.25 |
| **Ability to do daily routine work** | | |
| can do | 122 | 73.94 |
| Can do partially with help | 29 | 17.58 |
| can't do without help | 14 | 8.48 |
| **Chronic disease state** | | |
| Have | 116 | 70.30 |
| Have not | 49 | 29.70 |
| **Family history of psychiatric illness** | | |
| No | 157 | 95.15 |
| Yes | 8 | 4.85 |
| **Did your relative die in the last three months?** | | |
| No | 143 | 86.67 |
| Yes | 22 | 13.33 |
| **Change in business life in the last three months?** | | |
| No | 162 | 98.18 |
| Yes | 3 | 1.82 |
| **Physical illness that prevents daily routine?** | | |
| Have not | 114 | 69.09 |
| Have | 51 | 30.91 |
| **Vision impairment:** | | |
| No | 139 | 84.24 |
| Yes | 26 | 15.76 |
| **Hearing problem** | | |
| No | 107 | 64.85 |
| Yes | 58 | 35.15 |
| **Sleep quality** | | |
| Good | 87 | 52.73 |
| Fair | 16 | 9.69 |
| Poor | 62 | 37.58 |
| **Falling history** | | |
| Have not | 143 | 86.67 |
| Have | 22 | 13.33 |
| **Physical activity status** | | |
| can do physical activity outside the home | 116 | 70.30 |
| limited physical activity at home | 24 | 14.55 |
| unable to do physical activity | 25 | 15.15 |
| **Depression status** | | |
| No | 81 | 49.09 |
| Yes | 84 | 50.91 |

**Table 3**. Association between sociodemographic factors and geriatric depression

| Variables | Depression status | | Total | p |
|---|---|---|---|---|
| | No (n=81) | Yes (n=84) | | |
| **Gender** | n (%) | n (%) | | |
| Female | 27 (42.19) | 37 (57.81) | 64 (38.78) | 0.158 |
| Male | 54 (53.47) | 47 (46.53) | 101 (61.22) | |
| **Age** | | | | |
| 65-69 year | 38 (55.88) | 30 (44.12) | 68 (41.21) | |
| 70-74 year | 27 (51.92) | 25 (48.08) | 52 (31.51) | 0.094 |
| ≥75 year | 16 (35.56) | 29 (64.44) | 45 (27.28) | |
| **Income** | | | | |
| Low | 5 (25.00) | 15 (75.00) | 20 (12.12) | |
| Medium | 38 (45.23) | 46 (54.77) | 84 (50.91) | *0.009* |
| Good | 38 (62.30) | 23 (37.70) | 61 (36.97) | |
| **Education level** | | | | |
| illiterate | 17 (35.42) | 31 (64.58) | 48 (29.09) | |
| literate | 19 (46.34) | 22 (53.66) | 41 (24.84) | |
| primary school | 15 (45.45) | 18 (54.55) | 33 (20.00) | *0.019* |
| high school | 12 (63.16) | 7 (36.84) | 19 (11.52) | |
| university | 18 (75.00) | 6 (25.00) | 24 (14.55) | |
| **Marital status** | | | | |
| married | 63 (53.39) | 55 (46.61) | 118 (71.51) | |
| Single, widow or divorced | 18 (38.30) | 29 (61.70) | 47 (28.49) | 0.080 |
| **Ability to do daily work** | | | | |
| can do | 70 (57.37) | 52 (42.63) | 122 (73.93) | |
| Can do partial with help | 10 (34.48) | 19 (65.52) | 29 (17.58) | *<0.001* |
| can't do without help | 1 (7.14) | 13 (92.86) | 14 (8.49) | |
| **Chronic disease state** | | | | |
| Have | 53 (45.69) | 63 (54.31) | 116 (70.30) | 0.179 |
| Have not | 28 (57.14) | 21 (42.86) | 49 (29.70) | |
| **Family history of psychiatric illness** | | | | |
| no | 77 (49.04) | 80 (50.96) | 157 (95.15) | * |
| yes | 4 (50.00) | 4 (50.00) | 8 (4.85) | |
| **Did your relative die in the last 3 months?** | | | | |
| No | 70 (49.00) | 73 (51.00) | 143 (86.67) | 0.927 |
| Yes | 11 (50.00) | 11 (50.00) | 22 (13.33) | |
| **Change in business life in the last 3 months?** | | | | |
| No | 81 (50.00) | 81 (50.00) | 162 (98.18) | * |
| Yes | 0 (0.00) | 3 (100.00) | 3 (1.82) | |
| **Physical illness that prevents daily work?** | | | | |
| Have not | 67 (58.77) | 47 (41.23) | 114 (69.09) | *<0.001* |
| Have | 14 (27.45) | 37 (72.55) | 51 (30.91) | |
| **Vision impairment** | | | | |
| No | 72 (51.79) | 67 (48.21) | 139 (84.24) | 0.108 |
| Yes | 9 (34.62) | 17 (65.38) | 26 (15.76) | |
| **Hearing problem** | | | | |
| No | 63 (58.87) | 44 (41.13) | 107 (64.85) | *0.001* |
| Yes | 18 (31.03) | 40 (68.97) | 58 (35.15) | |
| **Sleep quality** | | | | |
| Good | 59 (67.82) | 28 (32.18) | 87 (52.72) | |
| Fair | 3 (18.75) | 13 (81.25) | 16 (9.70) | *<0.001* |
| Poor | 19 (30.65) | 43 (69.35) | 62 (37.58) | |
| **Fall history** | | | | |
| Have not | 76 (53.15) | 67 (46.85) | 143 (86.67) | *0.008* |
| Have | 5 (22.74) | 17 (77.26) | 22 (13.33) | |
| **Physical activity status** | | | | |
| 3 or more days per week | 66 (56.90) | 50 (43.10) | 106 (64.24) | |
| 1-2 days per week | 8 (33.33) | 16 (66.67) | 24 (14.55) | |
| No | 7 (28.00) | 18 (72.00) | 25 (15.15) | *0.008* |

* statistical evaluation of the data could not be made because there were so few participants in these categories

Ability to do own daily work (OR: 19.78, Cl: 1.23-317.83, p=0.035),  have a hearing problem (OR: 2.74, CI: 1:20 - 6:27 p=0.017) and fair sleep quality (OR : 10.62, Cl: 2.37-42.70, p=0.002) or poor sleep quality (OR: 4.24, Cl: 1.78-10.06, p=0.001) were independent risk factors that affecting the depression status (Table 4).

**Table 4.** Logistic regression analysis of the variables with depression.

| Variables | Odds ratio (OR) | 95% Confidence Interval (CI) | p-value |
|---|---|---|---|
| **Age** | 1.03 | 0.96-1.11 | 0.440 |
| **Income** | | | |
| Low | 2.06 | 0.81-5.20 | 0.128 |
| Medium | 2.81 | 0.60-13.13 | 0.190 |
| Good | *Ref.* | | |
| **Education level** | | | |
| illiterate | 1.67 | 0.41-6.91 | 0.477 |
| literate | 2.84 | 0.72-11.19 | 0.136 |
| primary school | 2.02 | 0.51-8.08 | 0.319 |
| high school | 1.07 | 0.22-5.18 | |
| university | *Ref.* | | |
| **Ability to do daily work** | | | |
| can do | *Ref.* | | |
| Can do partial with help | 1.39 | 0.33-5.96 | 0.656 |
| can't do without help | 19.78 | 1.23-317.83 | *0.035* |
| **Physical illness that prevents daily work?** | | | |
| Have not | *Ref.* | | |
| Have | 0.66 | 0.28-1.56 | 0.345 |
| **Hearing problem** | | | |
| No | *Ref.* | | |
| Yes | 2.74 | 1.20-6.27 | *0.017* |
| **Sleep quality** | | | |
| Good | *Ref.* | | |
| Fair | 10.62 | 2.37-42.70 | *0.002* |
| Poor | 4.24 | 1.78-10.06 | *0.001* |
| **Fall history** | | | |
| Have not | *Ref.* | | |
| Have | 2.30 | 0.57-9.25 | 0.241 |
| **Physical activity status** | | | |
| 3 or more days per week | *Ref.* | | |
| 1-2 days per week | 1.51 | 0.36-6.30 | 0.576 |
| No | 1.05 | 0.19-5.75 | 0.953 |

Ref: Reference category

## Discussion

The current study found a geriatric depression (GD) prevalence rate of 50.9%. There are various data on the prevalence of geriatric depression according to the location and population of the studies. A meta-analysis study conducted by Djernes was reported that clinically relevant depressive symptom 'cases' varied between 7.2% and 49%.[9] Compared to other worldwide studies, GD rates have been reported to be 36.9% in Bangladesh,[10]  42.5% in Indonesia,[11]  44.4% in Egypt[12], 18.5% in Turkey[13] and 23.7% in Thailand[14]. The GD

prevalence in the present study was higher than in the previous study. It was thought that the depression scale, the age range and the location where the study was conducted might be the reasons for the different prevalence rates. El-Gilany et al. were reported the GD prevalence of 44.4%, which study conducted with geriatric depression scale and the population over 60 years in Egypt.[12] The study conducted by El-Gilany et al. is similar to our current study in terms of socio-cultural, economic and study method. The GD prevalence of 44.4% obtained in the previous study was similar to the GD prevalence of 50.91% we obtained in the current study. This current study suggests that geriatric depression is a common public health problem.

The current study showed that the prevalence of depressive symptoms significantly differed with household income, and the prevalence in low-income status was significantly higher than high-income status. A meta-analysis conducted by Lorant et al. showed that socioeconomic status and household income were significantly associated with depression.[15] In the current study, it was found that in addition to household income, education level was also associated with depressive symptoms. Lahelma et al. were reported that a poor education leads to a low-skilled occupation and, consequently, to a low income that could help to explain a poorer health status.[16] In literature, several studies were reported that low income and educational level are associated with geriatric depression.[10, 17, 18] The current study data between education and income level and geriatric depression were similar to the literature data.

In the current study, it was found that depressive symptoms were higher in those who were unable to do their daily work, do not do physical activity and have a physical disease that restricts activity. Bhamani et al. reported that elderly individuals performing physical activities more than 5.2 hours per week were 60% less likely to be depressed compared to those who spent less than 2 hours per week.[19] T.R. Disu, et al. reported that elderly individuals that have engaged in physical activities (i.e., performing daily household activities, engaging in regular exercise, etc.) had lower levels of depression.[10] In literature, reported that having no leisure time activities or hobbies was associated with depression.[20] Wang et al. reported that performing such activities mediates the release of various bodily chemicals (i.e., endorphins, norepinephrine, serotonin, etc.), which help prevent depression from occurring.[20] The data we obtained suggest that health professionals can protect elderly individuals from depression by improving their physical health.

In the current study, it was found that hearing problems were an independent risk factor for geriatric depression. Numerous studies have reported a negative association between hearing impairment and depression and social isolation.[15] Ameiva et al. were reported that hearing problems cause depression such as similar to our findings.[21] Some longitudinal studies have reported hearing-aid use a positive impact on quality of life, better physical health and cognitive decline.[22, 23] The relationship between hearing problems and depression suggests that it is important to evaluate hearing in the routine geriatric examination. In the geriatric

population, it can contribute to the reduction of geriatric depression if intervened early to individuals with hearing problems.

In the current study, it was found that sleeping problems were an independent risk factor for geriatric depression. El-Gilany et al. reported that geriatric depression is seen six times more in patients with insomnia.[12] Taylor et al. have reported that people with insomnia were 9.82 times more likely than people not having insomnia to have clinically significant depression.[24] Liu and Liu have reported that old aged people of 75 years or more with poor perceived health were associated with elevated risk for insomnia.[25] Consistent with previous literature, we also confirmed that sleep problems were positively related to a higher depression rate for elderly Turkish residents.

Falling represents a major public health problem among older persons because it leads to premature mortality, loss of independence, and placement in assisted-living facilities.[26] The current study showed that the prevalence of depressive symptoms was significantly more in participants with fall experience. Moreira et al. have reported that Participants with a fear of falling were frailer and presented more depressive symptoms.[27] Shin KR et al. have reported that depressive symptoms may lead the individual to a less-confident state about his/her physical ability and may become more afraid of falling.[28] A prospective observational study has reported that depressive disorder was associated with improvement in falls efficacy, and among participants with a depressive disorder, improvement in falls efficacy was significantly correlated with improvement in depressive symptoms.[29] Lien Quach et al. have reported that Depression increased the risk of indoor and outdoor falls.[30] Consistent with previous literature, we also confirmed that geriatric depression was associated with fall history for elderly Turkish residents. Clinicians should carefully consider the role of geriatric depression in the risk of falls in the geriatric population.

*Limitations*

The current study has Some limitations. First, the cross-sectional nature of this study limits the ability to infer causal directions. The current study's data were obtained from the eastern part of Turkey, therefore the non-representative findings of all over Turkey. The small sample size and the use of self-report are other limitations of the current study. The current study population included elderly individuals who were admitted to the hospital, which restricted our ability to sample a community-based population. Nevertheless, the present study revealed that geriatric depression is common in the elderly population admitted for different symptoms in Family Medicine Clinic.

This current study provides an alarming signal for health professionals and family physicians about the high prevalence of geriatric depression. We found that geriatric depression is associated with household income,

education level, physical health, hearing problem, sleep status and history of falls in the elderly population. We believe that the findings of this study may be useful in preventing geriatric depression and early diagnosis.

*Ethical Considerations*

Ethical approval was obtained from Fırat University, Non-Interventional Research Ethics Committee (date: 20.02.2020, number:2020/04-01). Written informed consent was obtained from each study subject.

*Conflict of interest*

The authors declare no conflict of interest.

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