- Ayla AÇIKGÖZ[1] · · · · · · · · · · · ID
- Selda YÖRÜK[2] · · · · · · · · · · ID
- Ayşe Gülay ŞAHAN[3] · · · · · · · · · ID
- Döndü SEVİMLİ GÜLER[4] · · · · · · · ID

CORRESPONDANCE

[1] Ayla AÇIKGÖZ

Phone : +902324124738
e-mail : ayla.acikgoz@deu.edu.tr

Received : Feb 14, 2022
Accepted : Sep 04, 2022

[1] Dokuz Eylul University, Vocational School of Health Services, Izmir, Turkey

[2] Balıkesir University, Faculty of Health Sciences, Balıkesir, Turkey

[3] Ege University, Institute of Health Sciences, Izmir, Turkey

[4] Sakarya University, Training and Research Hospital, Sakarya, Turkey

RESEARCH

RELATIONSHIP BETWEEN LONELINESS, PHYSICAL ACTIVITY, AND DEPRESSIVE SYMPTOMS AMONG OLDER ADULTS: A CROSS-SECTIONAL STUDY CONDUCTED DURING THE FOURTH WAVE OF THE COVID-19 PANDEMIC IN TURKEY

ABSTRACT

Introduction: This study aims to examine the prevalence of depressive symptoms, its influencing factors, and the relationship between loneliness, physical activity and depressive symptoms among individuals aged 65 years and above during the COVID-19 pandemic.

Materials and Method: This cross-sectional study was conducted on 1093 older adults in Turkey. A Descriptive Data Form, the Loneliness Scale for the Elderly, the Geriatric Depression Scale-15, and the Physical Activity Scale for the Elderly were used to collect data. In this study, the presence of depressive symptoms was the dependent variable; sociodemographic and individual characteristics, habits, history of chronic illness and COVID-19, perception of loneliness and physical activity level were independent variables.

Results: The prevalence of depressive symptoms among older adults was 66.8%. Depressive symptoms were 3.96 times higher among women, 8.06 times higher in urban areas, 2.56 times higher among those who had equal income and expenses, and 2.78 times higher among older adults who had less income than expenses. Depressive symptoms were further 1.98 times higher among those who had chronic diseases and 25.54 times higher among those diagnosed with COVID-19. Additionally, depressive symptoms increased by 23.24 times among those who did not have a hobby, and 1.53 times for each one-point increase in the level of loneliness. No relationship was found between physical activity levels and depressive symptoms.

Conclusion: The results show that two out of three older adults were depressed. Characteristics such as having had COVID-19, loneliness, and hobbies, were significant influencing factors of depressive symptoms among older adults. There is a need to adopt feasible and protective policies that cater to the needs and control the risk factors of older adults during the pandemic.

Keywords: Depression; Loneliness; Aged; Exercise.

INTRODUCTION

The coronavirus (COVID-19) pandemic has become a significant problem in Turkey as well as globally. The coronavirus pandemic poses a life-threatening risk to the older population with a weak immune system (1). Initially, Turkey enforced lockdown for older adults as one of the measures against the COVID-19 pandemic (1). However, the pandemic is still severe, given the number of infection cases and deaths and continues to affect life (2). The effect of social isolation on older adults is an important issue that needs to be examined multidimensionally. Literature states that 43% of older adults feel lonely (3). This age group, which feels lonely and experiences social isolation during the COVID-19 pandemic, is at risk of mental and physical health (1). Loneliness among older adults is the main risk factor of mental health problems such as depression (4,5).

The mental and physical health of older adults can affect each other. Older adults with health problems such as diabetes and heart diseases are at higher risk of depression (6). Some individuals are at risk of chronic depression. Older adults who experience negative life events are more likely to suffer depression as its source is the complex interaction of social, psychological, and biological factors (1,6). Depression is a common problem among older adults. However, it is not a standard part of aging. Hence, it is important to determine its prevalence among older adults by taking necessary public health measures. Depression, which entails negative consequences such as premature death, increased risk of suicide, and deterioration of the general health status of an individual, can be successfully treated (1,3,6).

Regular physical activity (PA) is important for maintaining overall health later in life. Older adults that engage in regular PA are less likely to experience depression (7). Physical activity has a protective effect against some health problems such as cardiovascular diseases, hypertension, diabetes, depression, and anxiety among older adults (8,9).

They are encouraged to exercise regularly at home, especially during the COVID-19 period, owing to its positive effects on the immune system (9,10). Restrictions imposed to protect individuals from COVID-19 and the prolonged pandemic period may affect their mental health and limit their PA practices, hence increasing the risk of more health problems (3). The COVID-19 pandemic may inhibit the control of the comorbidity of physical and mental diseases among older adults.

This study aims to examine the prevalence of depressive symptoms, its influencing factors, and the relationship between loneliness, physical activity and depressive symptoms among individuals aged 65 years and above during the COVID-19 pandemic.

MATERIAL AND METHOD

Study Sample

This cross-sectional study was conducted in Sakarya Province, Turkey, during the fourth wave of the COVID-19 pandemic (September 1-November 26, 2021). According to the Turkish Statistical Institute data, the population of Sakarya Province aged 65 and above totaled 105,605 people in 2020. The proportion of the prevalence of depression among older adults was 40% based on the studies conducted in Turkey (5,11,12). The minimum required sample size was calculated as 1015 on the OpenEpi software based on a 3% margin of error and a confidence level of 95%. The final sample size of the study was calculated as 1116 individuals by adding an extra 10% to the calculated sample size (n=101) in case some individuals refused to participate in the study or were not at home. There are 16 districts in Sakarya province. Sample selection was made in two stages. First, the number of people to be recruited from each district was calculated using the stratified sample method. Since the number of individuals aged 65 and over is not equal in each district, the minimum number of individuals to be

reached was stratified according to the district population. According to the size of the district, the participants were determined by cluster sampling and/or simple random sampling method.

Data Collection

The data were collected through face-to-face interviews conducted by five interviewers after obtaining the necessary permissions. Before data collection, the interviewers were enlightened on the purpose and method of the study, the necessary communication skills while working with older adults, and data collection techniques using a questionnaire. The data for this study were collected during the fourth wave of the COVID-19 pandemic. Until this date, individuals aged 65 and over in Turkey have had two doses of COVID-19 vaccine, and the "lockdown" process has ended, and the "gradual normalization" process has begun. In this study, the interviewers who collected data were trained on the symptoms of COVID-19 and the risk of transmission. Data were collected by allowing the elderly person to sit on a chair in the open area or in front of the door, paying attention to the rules of disease prevention and social distance.

The relevant speech and hearing-impaired individuals that were bedridden, had a history of dementia, or refused to participate in the study were excluded from the study. The data collection tools included a Descriptive Data Form, and the Loneliness Scale for the Elderly, Geriatric Depression Scale-15, and Physical Activity Scale for the Elderly self-assessment scales.

The Descriptive Data Form: This questionnaire included questions on the sociodemographic and individual characteristics, habits, history of chronic illness and COVID-19 and quarantine and the general health perception of individuals aged 65 and above. The form was created by the researchers following a review of the literature.

The Loneliness Scale for the Elderly (LSE): The LSE was developed to evaluate the loneliness level of older individuals and revised by Tilburg and John-Gierveld (13). It comprises 11 items and has a 3-point Likert-type scale. Five items of the scale, which evaluate the social loneliness of older individuals, are positive (0=Yes, 1=Maybe, 2=No); six items, which evaluate emotional loneliness, are negative (2=Yes, 1=Maybe, 0=No). The sum of the two sub-dimensions equals the overall loneliness score. The minimum and maximum scores range between 0 and 22. The Turkish validity study of the scale was conducted by Akgül and Yeşilyaprak, who found Cronbach's alpha value to be 0.85 (14).

The Geriatric Depression Scale-15 (GDS-15): The GDS-15, which comprises 15 questions, was developed to evaluate the depressive symptoms of older adults (15). Participants consider their status in the last week while responding to the 15 'Yes/No' type questions. While evaluating the scale, points are given according to the answers in favour of depressive symptoms. When the total score is calculated, 'No' responses to positive questions and 'Yes' responses to negative questions are assigned 1 point and other responses are assigned 0 points. The recommended cutoff point of ≥5 was used to distinguish the presence of depressive symptoms (16). The Turkish validity and reliability study of GDS-15 was conducted by Durmaz et al., who found Cronbach's alpha value to be 0.92 (16).

The Physical Activity Scale for the Elderly (PASE): The PASE was developed to evaluate the PA level of older individuals. The PASE score is an integration of multiple scores that include leisure, household, and occupational activities. It comprises 12 questions on the frequency and duration of leisure, household, and occupational activities in the last seven days. The scoring of each question is different; the total score is calculated by summing all the activities. The overall PASE score can vary between 0 and 400 (17). Higher total scores indicate higher PA levels. The Turkish validity and reliability study of the scale was conducted by Ayvat et al., who found Cronbach's alpha coefficient to be 0.92 (18).

Ethical Considerations

This study was conducted in accordance with the principles of the World Medical Association Helsinki Declaration. Written permission was obtained from the Non-invasive Research Ethics Committee of the Sakarya University Medical Faculty (date: 01.08.2021, no: 47687).

STATISTICAL ANALYSIS

Descriptive data were presented as mean, standard deviation, number, and percentage values. Kolmogorov-Smirnov tests of normality were used to determine whether the data displayed normal distribution. Non-parametric tests were used to compare the groups for the data with non-normal distribution ($p<0.05$). The relationship between the depressive symptoms level of older adults and loneliness and physical activity level were determined Spearman correlation analysis. Crude and adjusted odds ratios and 95% CIs for determinants of depressive symptoms were calculated using logistic regression analysis. A multiple regression model was created with gender, marital status, place of residence, education, employment status, income, social security, cohabitant, chronic illness, COVID-19 history, presence of COVID-19 positive people, hobby, loneliness level, physical activity level. Statistical analysis was performed on the SPSS 24.0 statistical software package. The statistical significance level was set as $p<0.05$.

RESULTS

A total of 1093 older adults were included in this study (response rate, 97.9%). Of the participants, 684 (62.6%) were female, and the mean age was 71.9±5.9 (min=65, max=95) years. The prevalence of depressive symptoms among older adults was 66.8% (n=730).

The LSE and GDS-15 total scores were found to be moderately and very significantly positively correlated ($p<0.01$). In contrast, the PASE and the GDS-15 total scores were found to be very weakly and significantly negatively correlated ($p<0.05$) (Table 1).

Table 2 shows crude and adjusted odds ratios and 95% CIs for determinants of depressive symptoms among older adults. The presence of depressive symptoms was 3.96 times (CI 95%: 2.03-7.73) more common among women and 8.06 times (CI 95%: 4.41-14.70) more common among those living in urban areas. While it was 2.56 times (CI 95%: 1.43-4.59) more common among those who stated that their income and expenses were equal, it was 2.78 times (CI 95%: 1.33-5.79) more common among those who stated that their income was less than their expenses. The presence of depressive symptoms was 1.98 times (CI 95%: 1.10-3.58) more common among those who had chronic illnesses and 25.54 times (CI 95%: 5.69-114.56) more common among those who were diagnosed with COVID-19. It was 23.24 times (CI 95%: 11.66-46.31) more common among those who did not have any hobbies. It was found that a one-point increase in the LSE total score increased the presence of depressive symptoms by 1.53 times (CI 95%: 1.41-1.66) (Table 2).

DISCUSSION

This study examines the prevalence of the presence of depressive symptoms among individuals aged 65 years and above and the related factors during the fourth wave of the COVID-19 pandemic on a sample representing the province of Sakarya. This study shows that the presence of depressive symptoms is common among older adults. The presence of depressive symptoms was found in approximately 66.8% of older adults who participated in this study. Significant results were found between depressive symptoms and gender, place of residence, income status, presence of chronic diseases, history of COVID-19 diagnosis, presence of a hobby, and perception of loneliness of the participants.

This study further shows that two out of three older adults suffered depressive symptoms. This rate was quite high compared with the result in the

Table 1. The relationship between the depressive symptoms level of older adults and loneliness and physical activity level

n=1093		GDS-15 total score	LSE total score	PASE total score
GDS-15 total score	r	1.000		
	p	-		
LSE total score	r	.610**	1.000	
	p	<0.001	-	
PASE total score	r	-.071*	.144**	1.000
	p	0.019	<0.001	-

** p<0.01, * p<0.05, Spearman correlation analysis

GDS-15: Geriatric Depression Scale-15, LSE: Loneliness Scale for the Elderly, PASE: Physical Activity Scale for the Elderly

Table 2. Factors associated with depressive symptoms assessed by GDS-15 among older adults *

Factors		Bivariate analysis		Logistic regression (Enter) Model		
		cOR	CI 95%	Adj.† OR	CI 95%	p
Gender (n=1093)	Female (n=684)	1.37	1.06-1.77	**3.96**	**2.03-7.73**	**<0.001**
	Male (n=409)	1.00 (ref.)	-	1.00 (ref.)	-	
Age group (n=1093)	65-74 (n=788)	1.00 (ref.)	-	-	-	
	75-84 (n=246)	1.04	0.77-1.42	-	-	
	≥85 (n=59)	1.06	0.60-1.90	-	-	
Marital Status (n=1093)	Single (n=399)	1.59	1.21-2.09†	2.02	0.62-6.55	0.240
	Married (n=694)	1.00 (ref.)	-	1.00 (ref.)	-	
Residence (n=1093)	Urban area (n=775)	3.26	2.48-4.29†	**8.06**	**4.41-14.70**	**<0.001**
	Rural area (n=318)	1.00 (ref.)	-	1.00 (ref.)	-	
Education (n=1093)	≤Low/Moderate (n=687)	1.39	1.01-1.80†	0.52	0.30-1.00	0.053
	≥High school (n=406)	1.00 (ref.)	-	1.00 (ref.)	-	
Working status (n=1093)	Not working (n=312)	3.41	2.46-4.76†	0.71	0.34-1.46	0.358
	Working (n=106)	2.63	1.63-4.36†	0.43	0.16-1.16	0.097
	Retired (n=675)	1.00 (ref.)	-	1.00 (ref.)	-	
Income (n=1093)	Income< expenses (n=272)	1.76	1.25-2.49†	**2.78**	**1.33-5.79**	**0.006**
	Income= expenses (n=536)	2.47	1.82-3.34†	**2.56**	**1.43-4.59**	**0.001**
	Income>expenses (n=285)	1.00 (ref.)	-	1.00 (ref.)	-	

Social security status (n=1093)	No (n=87)	1.53	0.98-2.43	0.63	0.13-3.03	0.566
	Yes (n=1006)	1.00 (ref.)	-	1.00 (ref.)	-	
Living together (n=1093)	Alone (n=267)	1.49	1.10-2.03†	0.41	0.12-1.38	0.151
	Children (n=147)	2.48	1.62-3.83†	1.16	0.29-4.49	0.831
	Spouse and children (n=123)	8.13	4.30-16.72†	0.62	0.23-1.61	0.327
	Spouse (n=556)	1.00 (ref.)	-	1.00 (ref.)	-	
Smoking (n=1093)	Yes (n=145)	1.25	0.85-1.85	-	-	-
	No (n=948)	1.00 (ref.)	-	-	-	
Having any chronic disease (n=1093)	Yes (n=788)	1.60	1.21-2.11†	**1.98**	**1.10-3.58**	**0.024**
	No (n=305)	1.00 (ref.)	-	1.00 (ref.)	-	
COVID-19 diagnosis (n=1093)	Yes (n=102)	7.59	3.66-17.97†	**25.54**	**5.69-114.56**	**<0.001**
	No (n=991)	1.00 (ref.)	-	1.00 (ref.)	-	
Quarantine owing to COVID-19 (n=1093)	Yes (n=117)	1.3	0.85-2.01	-	-	
	No (n=976)	1.00 (ref.)	-	-	-	
History of COVID-19 infection in people around (n=1093)	Yes (n=292)	1.44	1.08-1.95†	0.85	0.46-1.57	0.612
	No (n=801)	1.00 (ref.)	-	1.00 (ref.)	-	
Have any hobbies (n=1093)	No (n=638)	19.68	14.2-27.58†	**23.24**	**11.66-46.31**	**<0.001**
	Yes (n=455)	1.00 (ref.)	-	1.00 (ref.)	-	
**LSE total score (n=1093)	*Every 1-point increment*		**1.53**	**1.41-1.66**	**<0.001**	
**PASE total score (n=1093)	*Every 1-point increment*		1.01	1.00-1.01	0.057	

R^2= 0.764; Constant B= -7.791; S.E=0.679; Wald=131.5 ($p < 0.001$)

* Independent variables entered in the Logistic regression model: gender, marital status, place of residence, education, employment status, income, social security, cohabitant, chronic illness, COVID-19 history, presence of COVID-19 positive people, hobby, loneliness level, physical activity level.

†Statistically significant (p<0.01); cOR: Crude Odds Ratio; Adj. OR: Adjusted Odds Ratio CI 95%: confidence interval 95%.

**LSE: Loneliness Scale for the Elderly, PASE: Physical Activity Scale for the Elderly

literature. Studies conducted in Turkey before the pandemic showed that the prevalence of depressive symptoms among older adults ranged from 27% to 53% (5,11,12,19). A study conducted on older adults aged 60 years and above and living in rural areas in Brazil showed that the incidence of depressive symptoms was 8% (20). In another study conducted in China during the COVID-19 pandemic, 37% of older adults were found to suffer the symptoms of depression or anxiety (10). A study conducted on individuals aged 65 years and above during the COVID-19 pandemic in Turkey showed that the prevalence of depressive symptoms was 44% (21). In Spain, this rate was found to be 25% among individuals aged 60 years and above (22). It was determined that the COVID-19 pandemic and the lockdown period increased the presence of depressive symptoms among older adults (21,22).

It is stated that depressed older people are more worried about contracting the virus than the risks of isolation (3). The high prevalence of depressive symptoms in this study may be due to the fact that the study period was in the fourth wave of the COVID-19 pandemic. Studies with a low prevalence of depressive symptoms were conducted in the first wave of the pandemic (21,22). The prolongation of the pandemic may have resulted in an increased prevalence of depressive symptoms in the elderly. Another reason for the differences in prevalence rates may be the use of different scales to evaluate the presence of depressive symptoms. The Geriatric Depression Scale used in this study is administered using a smaller cut-off point (≥ 5).

This study shows that women suffered depressive symptoms more than men. This finding corresponds with the literature. Studies conducted in different countries show that depressive symptoms are more common among women (5,7,11,12,19,20). It is stated that the biological structure and personality, mental characteristics, coping styles, and social and cultural positions in the environment they live in make them more prone to depression (6,20). A study conducted during the pandemic in Turkey showed that the prevalence of depressive symptoms did not change according to gender and that the living conditions brought about by the pandemic influenced depressive symptoms more among both genders (21). During the COVID-19 pandemic in China, women aged 60 years and above were found to suffer the symptoms of anxiety and depression more than men (10). This shows that in addition to other aging-related problems, the COVID-19 pandemic has a more traumatic effect on women.

This study further asserts that the prevalence of depressive symptoms was higher among older adults living in urban areas. The prevalence of depressive symptoms was found to be quite low among those living in rural areas in Brazil (20). It is stated that the place of residence and mental health of an individual during the COVID-19 pandemic are related and that living in urban areas is a predictive factor of depressive symptoms (6). People living in urban areas may have less sleep, worse living conditions and suffer more risk factors of mental health (20). Crowded areas pose a greater risk of the spread and infection of COVID-19, which spreads through droplets. Such viruses can be transmitted more easily in urban areas with a higher human population. Majority of the COVID-19 cases in Turkey are considered to occur in urban areas (2). For this reason, the mental health of older adults living in urban areas is at risk of getting more affected. Since the individual's mental health is affected by the psychosocial environment, environmental and socio-cultural factors should also be taken into account. Due to the lockdown practices during the pandemic, the elderly living in the city could not go out of their homes, while those living in the rural areas were able to go out to the open area more easily. For this reason, as social isolation is more intense in the city, the elderly may have difficulties in meeting their psychosocial needs.

This study shows that depressive symptoms was more common among the older adults who stated that their income was equal to or less than their expenses. Although some studies in the literature show that there is a relationship between economic level and depressive symptoms among older adults (6,7,12), some other related studies contradict this assertion (19,20). A study conducted in Spain stated that the prevalence of depressive symptoms increased among older adults who had incurred economic losses during the COVID-19 pandemic (22). This population is susceptible to economic losses and can suffer increased emotional distress.

A study conducted in Turkey before the pandemic showed that the presence of depressive symptoms was more common among older adults who suffered chronic diseases (12). In Brazil, it was reported that the presence of depressive symptoms was 2.4 times more common among patients who suffered two or more chronic diseases (20). Studies

conducted in Turkey and Korea showed that the presence of depressive symptoms was more common among older adults who had been experiencing constant pain and discomfort (7,19). Consistent with our findings, studies conducted during the COVID-19 pandemic show that depressive symptoms are more common among older adults with chronic diseases (6,21). In old age, an increase in drug consumption and withdrawal from working life in conjunction with chronic diseases may result in less interaction with others, a worse perception of health, and depressive symptoms (20).

In addition to the panic, uncertainty, and the feeling of being out of control during pandemics, the prolongation of the pandemic period may negatively affect the psychology of older adults. This study shows that the presence of depressive symptoms was more common among older adults who had been diagnosed with COVID-19. It is stated that the risk of depression is high among those who take inadequate personal preventive measures to protect themselves from COVID-19 (6). It has been reported that the presence of depressive symptoms in Turkey is more common among older adults who are afraid of contracting COVID-19 (21). Our study data were collected during the fourth wave of the COVID-19 pandemic. The mutation of the virus and the prolongation of the pandemic may have brought about concerns about contracting the disease again among older adults.

According to the loneliness scale used in this study, the level of depressive symptoms increased as the loneliness level increased. Loneliness is common among older adults and can result in an increased prevalence of depression and suicide. It has been suggested that loneliness reduces psychological resilience and impairs social integration, hence increasing isolation (1,4). Social isolation also reduces the anti-viral immune response among the older population (1). Literature shows that there is a positive relationship between depressive symptoms and living alone and an increased feeling of loneliness among older adults (5,21,23,24). A study conducted in Turkey showed that the level of depressive symptoms decreased as the perceived social support level of older individuals increased (12). It is stated that those who receive enough psychological and social support from the family or social environment during the pandemic are less mentally affected by the COVID-19 pandemic (6). Emotional and social support may be important for reducing the feeling of loneliness among older adults during the pandemic.

This study shows that having a hobby was very effective in preventing depressive symptoms among older adults. The presence of depressive symptoms was more common among those who did not have any hobbies. A study conducted during the COVID-19 period showed that older adults managed to overcome the negative emotions they experienced following their regular hobbies, exercise, and daily occupations (3). Spain during the COVID-19 pandemic, the association of low PA with depressive symptoms among in the elderly were revealed (25). Therefore, moderate or vigorous regular physical activity done by older adults may be a protective measure against their psychological health during social isolation (9,24). The results regarding the relationship between PA and depression in some studies in the literature are similar to our findings (20,22). In Korea, regular PA was shown to be directly effective in preventing depressive symptoms among older adults (7). They are encouraged to engage in regular PA owing to its positive effect on maintaining physical health and strengthening the immune system during the COVID-19 pandemic (8,9,10).

This study has some limitations. First, the generalizability of the findings is limited; these findings can only be generalised to the province where the research data were obtained. Approximately two-thirds of the participants of this study were women. The prevalence of depressive symptoms is higher among women. Therefore, this study may have found a higher the prevalence of depressive symp-

toms than it actually is. However, this study is important because it reflects a province in general during the pandemic, given that it was conducted on older adults living in a developed province of Turkey. Another strength of this study was that the overall response rate was high.

In conclusion, the presence of depressive symptoms was determined in two out of three older adults in this study. Psychological characteristics such as a history of COVID-19 and perceived loneliness among older adults who were at risk of contracting the virus were significant influencing factors of depressive symptoms. The presence of depressive symptoms was more common among women, those living in urban areas, those who stated that

their income was equal to or less than their expenses, those with a history of a chronic disease, and those who did not have a hobby. During the pandemic period, feasible, and protective policies that cater for the needs and control the risk factors of older adults, who are a vulnerable group, should be adopted. Home care services including a multidisciplinary team can be increased to reduce the feeling of loneliness among older adults and protect their mental health.

Conflict of interest

The authors declare that they have no conflict of interest.

REFERENCES

1. Aki ÖE. COVID-19 pandemic and the mental health of elderly. Turkish Journal of Geriatrics 2020; 23 (3): 291-8. (DOI: 10.31086/tjgeri.2020.165).

2. Republic of Turkey Ministry of Health. Covid-19 Information Page, General Coronovirus Table. [Internet]. Available from: https://covid19.saglik.gov.tr/TR-66935/genel-koronavirus-tablosu.html# Accessed: 12.12.2021.

3. Hamm ME, Brown PJ, Karp JF et al. Experiences of American older adults with pre-existing depression during the beginnings of the COVID-19 pandemic: a multicity, mixed-methods study. Am J of Geriatric Psychiatry 2020; 28 (9): 924-32. (PMID:32682619).

4. Steinman MA, Perry L, Perissinotto CM. Meeting the care needs of older adults isolated at home during the COVID-19 pandemic. *JAMA Intern Med* 2020; 180 (6): 819-20. (PMID: 32297903).

5. Ağırman E, Gençer MZ, Arıca S, Kaya E, Eğici MT. Depression and loneliness levels among the older people, a comparison between living alone, living with family or living at nursing home. Contemp Med 2017; 7 (3): 234-40. (In Turkish)

6. Hossain MM, Tasnim S, Sultana A et al. Epidemiology of mental health problems in COVID-19: a review. F1000Res 2020; 9: 636. (PMID: 33093946).

7. Byeon H, Relationship between physical activity level and depression of elderly people living alone. Int J Environ Res Public Health 2019; 16 (20): 4051.

(PMID: 31652619).

8. Schuch FB, Bulzing RA, Meyer J et al. Associations of moderate to vigorous physical activity and sedentary behavior with depressive and anxiety symptoms in self-isolating people during the COVID-19 pandemic: A cross-sectional survey in Brazil. Psychiatry Res 2020; 292: 113339. (PMID: 32745795).

9. Meyer J, McDowell C, Lansing J et al. Changes in physical activity and sedentary behavior in response to COVID-19 and their associations with mental health in 3052 US adults. Int J Environ Res Public Health 2020; 17 (18): 6469. (PMID: 32899495).

10. Meng H, Xu Y, Dai J, Zhang Y, Liu B, Yang H. Analyze the psychological impact of COVID-19 among the elderly population in China and make corresponding suggestions. Psychiatry Res 2020; 289: 112983. (PMID: 33242819).

11. Balcı E, Şenol V, Eşel E, Günay O, Elmalı F. The relationship between malnutrition and depression in people aged over 65 years. Turkish Journal of Public Health 2012; 10 (1): 37-43. (In Turkish). [Internet] Available from: https://dergipark.org.tr/tr/download/article-file/153030 Accessed: 12.12.2021.

12. Türkseven E, Öner C, Şimşek EE. The relationship between geriatric derpession and perceived social support in elderly: a field study. TJFMPC 2020; 14 (2): 203-9. (In Turkish)

13. Van Tilburg TG, de Jong Gierveld J. Reference standards for the loneliness scale. Tijdschr Gerontol

Geriatr 1999;30(4):158-63. (PMID:10486620).

14. Akgül H, Yeşilyaprak B. Adaption of loneliness scale for elderly into Turkish culture: Validity and reliability study. Elderly Issues Research Journal 2015; (1): 34-45. (In Turkish)

15. Burke WJ, Roccaforte WH, Wengel SP. The short form of the Geriatric Depression Scale: a comparison with the 30-item form. J Geriatr Psychiatry Neurol 1991; 4 (3): 173-8. (PMID: 1953971).

16. Durmaz B, Soysal P, Ellidokuz H, Isik AT. Validity and reliability of geriatric depression scale-15 (short form) in Turkish older adults. North Clin Istanb 2018; 5 (3): 216-20. (PMID: 30688929).

17. Washburn RA, Smith KW, Jette AM, Janney CA. The physical activity scale for the elderly (PASE): Development and evaluation. J Clin Epidemiol 1993; 46 (2): 153-62. (PMID: 8437031).

18. Ayvat E, Kilinc M, Kirdi N. The Turkish version of the Physical Activity Scale for the Elderly (PASE): its cultural adaptation, validation, and reliability. Turk J Med Sci 2017: 47 (3): 908-15. (PMID: 28618742).

19. Demirci K, Özer Z. Factors affecting pain beliefs and depression levels of elderly individuals. Gevher Nesibe Journal of Medical & Health Sciences 2020; 5 (9): 91-103. (In Turkish)

20. Correa ML, Carpena MX, Meucci RD, Neiva-Silva L. Depression in the elderly of a rural region in South-ern Brazil. Cien Saude Colet 2020; 25 (6): 2083-92. (PMID: 32520256).

21. Deger TB, Gonderen Cakmak HS, Bozkurt E, Eminsoy B. Depression in older people during the COVID-19 curfew. J Basic Clin Health Sci 2021; 2: 6-14. (DOI:10.30621/jbachs.843941).

22. Garcia-Fernandez L, Romero-Ferreiro V, Lopez-Roldan PD, Padilla S, Rodriguez-Jimenez R. Mental health in elderly Spanish people in times of COVID-19 Outbreak. Am J of Geriatric Psychiatry 2020; 28 (10): 1040-5. (PMID: 32718855).

23. Polat F, Karasu F. The Relationshıp between Perceived Loneliness Level and Depression Among Elderly Individuals. Journal of Inonu University Health Services Vocational School 2020; 8 (1): 72-82. (In Turkish)

24. Parlar Kılıç S, Karadağ G, Koçak HS, Korhan EA. Investigation of the old age perceptions with the loneliness and depression levels of the elderly living at home. Turkish Journal of Geriatrics 2014; 17 (1): 70-6. [Internet] Available from: http://www.geriatri.dergisi.org/uploads/pdf/pdf_TJG_795.pdf Accessed: 16.01.2022.

25. Carriedo A, Ceccbini JA, Fernandez-Rio J, Mendez-Gimenez A. COVID-19, psychological well-being and physical activity levels in older adults during the nationwide lockdown in Spain. Am J of Geriatric Psychiatry 2020; 28 (11): 1146-55. (PMID: 32919872).