

# Evaluation of the relationship between the geriatric anxiety and COVID-19 anxiety and fear levels in geriatric dental patients during the COVID-19 pandemic

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## Abstract

**Background.** Illness, social isolation and loneliness may cause different psychological problems in the geriatric population, including depression and anxiety. Factors such as anxiety and fear can negatively affect dental treatment processes and prognoses. Thus, in terms of dental approach to geriatric individuals, it is important to be aware of the emotional processes the elderly may have experienced during the pandemic.

**Objectives.** This study aimed to determine the relationship between the geriatric anxiety levels and the coronavirus disease 2019 (COVID-19) anxiety and fear levels in the geriatric population.

**Material and methods.** In this correlational study, 129 geriatric individuals were selected through the convenience sampling method. To gather the data, the Geriatric Anxiety Scale (GAS), the COVID-19 Anxiety Scale (CAS), the COVID-19 Fear Scale (CFS), and a questionnaire assessing demographic variables were used. Simple linear regression and Pearson's correlation coefficients were used to evaluate the relationships between the variables.

**Results.** The sample consisted of 70.5% males and 29.5% females aged  $\geq 65$  years. The GAS total score ( $15.64 \pm 9.34$ ) and its 3 subscale scores were strongly correlated with the CAS and CFS scores. The GAS total score and its subscale scores had a significant linear regression with both the CAS and CFS scores ( $p < 0.001$ ).

**Conclusions.** An increase in the anxiety and fear levels associated with the pandemic was observed in geriatric individuals. Thus, it should be considered that geriatric individuals may encounter some difficulties during dental treatment and prosthetic rehabilitation after the pandemic. Therefore, it is important to normalize the anxiety levels with the help of professionals, and to implement interventions such as socialization, physical activity and meditation to help balance the anxiety levels.

**Keywords:** coronavirus disease, COVID-19 pandemic, fear, geriatric anxiety

## Introduction

Senility is a physiological process that reduces or limits the level of physical activity, increases the occurrence of diseases that require drug use, weakens cognitive functions, and thus makes people socially, physically and emotionally dependent to varying degree.<sup>1,2</sup> In addition to a gradual decrease in the ability to adapt to environmental factors, the senility limit is defined as being over 65 years old in most developed western countries, over 60 years old by the United Nations, and over 65 years old by the World Health Organization (WHO).<sup>1</sup> With aging, regression occurs in both the immune system and the anatomical and physiological natural defense systems against pathogens. Infectious diseases are more common in geriatric individuals and they can be more severe than in young people.<sup>3–5</sup> Coronavirus disease 2019 (COVID-19) is not fatal in the majority of the elderly. However, a significant number of the patients who died from COVID-19 and needed intensive care were elderly individuals. Considering this situation, a fear of getting the disease and of infecting relatives and peers with the disease, and an increase in the anxiety levels can be observed in elderly individuals.<sup>6,7</sup> In addition, the social isolation and loneliness caused by the pandemic are dangerous to the geriatric population, and may cause psychological effects due to increased dependence on others with advancing age.<sup>8</sup> Social media, and electronic and printed media articles about the COVID-19 pandemic can cause strong emotions, such as anxiety and fear.<sup>9</sup> It has been reported that two of the most important factors negatively affecting quality of life in the elderly population are anxiety and depression, and that these conditions are responsible for an increase in the death rate.<sup>10,11</sup> Fear is an emotional reaction triggered by a known danger or threatening situation that causes behaviors such as the fight-or-flight response.<sup>9</sup> Anxiety, which can occur at different intensities, is defined as a feeling of uneasiness toward an unknown danger.<sup>12</sup> To understand the psychological repercussions of the COVID-19 pandemic, emotions such as anxiety and fear should be taken into account and closely observed.

Partial and total tooth loss is common in the geriatric population. Thus, prosthetic dentistry plays an important role in restoring the function and esthetics of these edentulous patients. The psychological states and moods of patients significantly affect both the treatment processes and patient satisfaction with the treatment results.<sup>13–15</sup> According to Berggren and Meynert, if an individual has a predisposition to anxiety, a vicious circle of fear, anxiety-induced avoidance of dental care, deterioration of dentition, and feelings of guilt, shame and inferiority can occur.<sup>16</sup> In anxiety disorders, the main cause of physical symptoms is thought to be the sympathetic nervous system stimulation.<sup>17</sup> The stimulation of the autonomic nervous system may cause tachycardia, arterial hypertension, dyspnea, perspiration (especially of the palms), a tight throat,

light-headedness, a dry mouth, nausea, and a decreased pain threshold.<sup>18,19</sup> In addition, other studies have reported that COVID-19 causes symptoms such as anosmia, loss of taste, headache, and rhinosinusitis.<sup>20–22</sup> These symptoms may disrupt the patient's compliance during treatment, make the patient feel more pain, impede the dentist's work, and increase nausea, all of which may complicate the impression process and result in an unpleasant dental experience.<sup>23</sup> Thus, it is important to evaluate the anxiety levels in the approach to patients. Several studies have evaluated the psychological effects of the COVID-19 pandemic on doctors, nurses and caregivers, and have reported increased fear, anxiety and stress during the pandemic.<sup>24–27</sup> It has also been observed that fear and anxiety differ between individuals, and that these differences are affected by sociodemographic variables.<sup>28</sup> Although there are studies evaluating anxiety and fear in geriatric individuals before and during the COVID-19 pandemic, there are no studies evaluating these effects during the controlled normalization phase, which followed the withdrawal of the stay-at-home and masking orders. Thus, the present study aimed to determine the relationship between the geriatric anxiety levels and the COVID-19-induced anxiety and fear levels in geriatric individuals.

## Methods

A cross-sectional online survey was conducted with the participation of geriatric individuals. An age of 65 years was accepted as the senility limit, and individuals aged 65 and above were included in the study. The survey was conducted between March 1 and March 31, 2021. During this period, controlled normalization was started in Turkey and most pandemic restrictions continued. Prior to starting the study, an approval (2022/38) was obtained from the Ethics Committee at the Faculty of Dentistry of Ataturk University, Erzurum, Turkey. The study was carried out in accordance with the 2008 Declaration of Helsinki, and all participants signed an informed consent form prior to participation. A total of 129 geriatric patients aged 65 and above, who previously had visited the Ataturk University Faculty of Dentistry and had been reached through social media platforms, agreed to fill out the online questionnaire. The questions were prepared in Turkish and included both multiple-choice and close-ended questions. The online survey was designed through <https://docs.google.com/forms> and sent to the participants via social media and e-mail. The questionnaire consisted of 4 main parts. In the 1<sup>st</sup> part, 4 out of 8 questions evaluated sociodemographic characteristics (age, gender, the educational level, and chronic illnesses). The 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> parts of the questionnaire included the Geriatric Anxiety Scale (GAS) consisting of 30 questions,<sup>29</sup> the COVID-19 Anxiety Scale (CAS) consisting of 5 questions<sup>30</sup> and the COVID-19 Fear Scale (CFS) consisting of 7 questions, respectively.<sup>31</sup>

The GAS is a 30-item self-report scale used to measure anxiety symptoms, especially among older adults.<sup>29</sup> Individuals are asked to indicate how often they have experienced each symptom over the past week, including the day of questioning. The questions are answered using a 4-point Likert scale ranging from 0 (not at all) to 3 (all of the time). The GAS total score is based on the first 25 items. There are 3 subscales: somatic (9 items); cognitive (8 items); and affective (8 items). The last 5 items are used by clinicians to determine the area of anxiety. These items cannot be included in the total score of this scale or its subscale scores.<sup>32</sup> Scores range from 0 to 75, and higher scores indicate greater anxiety.

The CAS was developed by Lee<sup>33</sup> and adapted to Turkish by Evren et al.<sup>30</sup> It consists of 5 questions asking participants about how often they have experienced the situations presented in the statements on the scale over the last 2 weeks. Participants are asked to use a 5-point time-anchored scale ranging from 0 (not at all) to 4 (nearly every day over the last 2 weeks). While the maximum score that can be obtained on the scale is 20, the minimum score is 0. The optimized cutoff score was accepted as 9, and it was determined that participants with high scores had high COVID-19 anxiety levels.<sup>30</sup>

The CFS was developed by Ahorsu et al.<sup>34</sup> and adapted to Turkish by Haktanir et al.<sup>31</sup> Participants are asked to answer 7 questions using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The maximum score that can be obtained on the scale is 35, and the minimum score is 7.<sup>31</sup> The optimized cutoff score was accepted as 17.5, and it was determined that participants with high scores had high COVID-19 fear levels.<sup>35</sup>

## Statistical analysis

The obtained data was analyzed using the IBM SPSS Statistics for Windows program, v. 22 (IBM Corp., Armonk, USA). The categorical variables are presented as number and percentage ( $n$  (%)), and the numerical variables are presented as mean and standard deviation ( $M \pm SD$ ). The adherence of the numerical variables to a normal distribution was investigated using the Kolmogorov–Smirnov test. For the statistical evaluations,  $p < 0.05$  was considered statistically significant. The distribution of the data was parametric, and simple linear regression and Pearson's correlation coefficients were used to evaluate the correlations between the variables.

## Results

A total of 129 patients – 91 (70.5%) males and 38 (29.5%) females – were included in the study. The sociodemographic characteristics of all participants and additional information about COVID-19 are presented in Table 1. The mean scores for the GAS were as follows: GAS total score –  $15.64 \pm 9.34$ ;

somatic subscale score –  $6.17 \pm 3.56$ ; cognitive subscale score –  $3.85 \pm 3.41$ ; and affective subscale score –  $5.62 \pm 3.47$ . The mean scores for the CAS and the CFS were as follows: CAS score –  $7.67 \pm 2.75$ ; and CFS score –  $15.6 \pm 5.55$ . The GAS total score and the 3 subscale scores were significantly correlated with the CAS and CFS scores, as shown in Table 2. As shown in Table 3, the GAS total score and the 3 subscale scores had a significant linear regression with the CAS score ( $p < 0.001$ ). Similarly, the GAS total score and the 3 subscale scores had a significant linear regression with the CFS score ( $p < 0.001$ ), as shown in Table 4.

**Table 1.** Sociodemographic characteristics of the participants and participant information about coronavirus disease 2019 (COVID-19)

Sociodemographic characteristics and COVID-19 data		$n$ (%)
Age [years]	65–69	60 (46.5)
	70–74	49 (38.0)
	75 and above	20 (15.5)
Gender	M	91 (70.5)
	F	38 (29.5)
Educational level	primary school	27 (20.9)
	secondary school	3 (2.3)
	higher school	13 (10.1)
	graduate	56 (43.4)
	postgraduate	30 (23.3)
Chronic illnesses	hypertension	63 (48.8)
	diabetes mellitus	16 (12.4)
	asthma	7 (5.4)
	chronic obstructive pulmonary disease	3 (2.3)
	chronic kidney disease	6 (4.7)
	coronary artery disease	19 (14.7)
	other	7 (5.4)
	none	8 (6.2)
State of being infected with COVID-19	I did not have the disease	103 (79.8)
	I had the disease once	24 (18.6)
	I had the disease twice	2 (1.6)
Vaccination status	0	2 (1.6)
	1 dose	0 (0.0)
	2 doses	14 (10.9)
	3 doses	32 (24.8)
	4 doses	81 (62.8)
Reason for getting vaccinated	a fear of COVID-19 complications	38 (29.5)
	a fear of COVID-19 complications due to advanced age	28 (21.7)
	a fear of COVID-19 complications due to a chronic illness	17 (13.2)
	protecting public health	44 (34.1)
	a fear of vaccine side effects	2 (1.6)
Reason for not getting vaccinated	the thought that the vaccine will not be useful	2 (1.6)
	a fear of being negatively affected by the vaccine because of a chronic illness	1 (0.8)

$N = 129$ ; M – male; F – female.

**Table 2.** Correlation matrix for the COVID-19 Anxiety Scale (CAS), the COVID-19 Fear Scale (CFS) and the Geriatric Anxiety Scale (GAS) (total and subscales)

Scale	GAS total	GAS somatic subscale	GAS cognitive subscale	GAS affective subscale	CAS	CFS
CAS	0.429*	0.406*	0.370*	0.374*	–	0.442*
CFS	0.493*	0.454*	0.430*	0.439*	0.442*	–

\*  $p < 0.001$  (two-tailed).**Table 3.** Regression analysis of the effect of the COVID-19 Anxiety Scale (CAS) score on the Geriatric Anxiety Scale (GAS) total score and its subscale scores

Predictor	Outcome	<i>R</i>	<i>R</i> <sup>2</sup>	<i>t</i>	$\beta$	<i>p</i> -value
CAS score	GAS total score	0.429	0.184	5.353	0.429	<0.001*
	GAS somatic	0.406	0.165	5.008	0.406	<0.001*
	GAS cognitive	0.370	0.137	4.490	0.370	<0.001*
	GAS affective	0.374	0.140	4.543	0.384	<0.001*

\* statistically significant.

**Table 4.** Regression analysis of the effect of the COVID-19 Fear Scale (CFS) score on the Geriatric Anxiety Scale (GAS) total score and its subscale scores

Predictor	Outcome	<i>R</i>	<i>R</i> <sup>2</sup>	<i>t</i>	$\beta$	<i>p</i> -value
CFS score	GAS total score	0.493	0.243	6.393	0.493	<0.001*
	GAS somatic	0.454	0.206	5.745	0.454	<0.001*
	GAS cognitive	0.185	0.179	5.371	0.185	<0.001*
	GAS affective	0.439	0.192	5.502	0.439	<0.001*

\* statistically significant.

From the sociodemographic data, gender ( $\beta = -0.44$ ;  $t = -5.35$ ;  $p < 0.001$ ) and the educational level ( $\beta = -0.25$ ;  $t = -3.02$ ;  $p = 0.003$ ) had a significant linear regression with the GAS total score ( $F(2,121) = 32.455$ ;  $p < 0.001$ ;  $R^2 = 0.35$ ) ( $p < 0.001$ ). Gender ( $\beta = -0.29$ ;  $t = -3.40$ ;  $p = 0.001$ ) and the educational level ( $\beta = -0.33$ ;  $t = -3.88$ ;  $p < 0.001$ ) had a significant linear regression with the CFS score ( $F(2,121) = 23.904$ ;  $p < 0.001$ ;  $R^2 = 0.28$ ) ( $p < 0.001$ ). Gender ( $\beta = -0.21$ ;  $t = -2.10$ ;  $p = 0.018$ ), the educational level ( $\beta = -0.36$ ;  $t = -4.14$ ;  $p < 0.001$ ) and the presence of a chronic illness ( $\beta = 0.17$ ;  $t = 2.15$ ;  $p = 0.033$ ) had a significant linear regression with the CAS score ( $F(3,120) = 16.171$ ;  $p < 0.001$ ;  $R^2 = 0.29$ ) ( $p < 0.001$ ). Other sociodemographic data did not show a significant linear regression with the scales ( $p > 0.05$ ).

## Discussion

The main source of anxiety in old age is concern about physical health. Anxiety symptoms among the geriatric population have been associated with a variety of psychological outcomes, including depression, social isolation and loneliness. In this study, the relationships between the COVID-19 anxiety and fear levels and the geriatric anxiety levels in geriatric individuals were examined, and it was revealed that there were significant positive relationships between these variables. At the same time, the results of this study showed that there were significant positive relationships between the geriatric anxiety subscales (psychosomatic and emotional) and the COVID-19 anxiety and fear levels.

In this study, greater anxiety and fear levels were observed in females and less educated individuals. Other studies without age restrictions have reported similar results. For example, Wieckiewicz et al. found a greater psychological impact of the pandemic and increased anxiety levels in females aged less than 28.5 years who were less educated.<sup>21</sup> In other studies, the psychological effects of the pandemic have also been observed to be greater in less educated female individuals.<sup>36,37</sup> Based on the results cited above, it appears that the pandemic has affected to a greater extent less educated females, regardless of age.

During the COVID-19 pandemic, several studies examined the COVID-19-induced anxiety and fear levels in dentists, postgraduate students in dentistry, and in individuals with different sociodemographic characteristics.<sup>38–40</sup> Geriatric individuals, who are thought to be more affected by the emotional damage caused by the pandemic, were included in this study, as the treatment processes and the satisfaction of patients with prostheses could be affected by increased anxiety levels. There have been several COVID-19-related studies on geriatric individuals. For example, Balasundaram et al. associated the fear of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection with the psychological distress and anxiety caused by curfew, which negatively affected the healthcare and non-COVID-19 medical services of the elderly.<sup>41</sup> Mowla et al. found high rates of depression and anxiety symptoms in their comparative study on elderly people who had not had the disease during the pandemic and those who had survived COVID-19.<sup>42</sup> Köverová et al. examined the levels of stress, general

anxiety and COVID-19-related anxiety during the 1<sup>st</sup> and 2<sup>nd</sup> waves of the pandemic, and highlighted the roles of the psychological predictors of stress, anxiety and COVID-19 anxiety during both waves.<sup>43</sup> Bergman et al. evaluated the moderating role of COVID-19-related ageism in the relationship between COVID-19 health worries and anxiety symptoms among geriatric people, and showed that both health worries and ageism were positively associated with anxiety symptoms.<sup>44</sup> Unlike these studies conducted during the COVID-19 pandemic, our study examined the levels of anxiety and fear related to COVID-19 as well as the geriatric anxiety levels during the normalization phase of the pandemic. As such, this study was designed in a different way; however, it should be noted that previous studies suggested the use of the GAS after the pandemic.

For geriatric individuals living alone, the presence of family members and the visits of relatives are an important source of social interaction and joy. The social distancing measures implemented due to the COVID-19 pandemic forced people to stay in their homes and to limit contact with the outside world. This caused social isolation among geriatric individuals and great concern for their own and their relatives' safety.<sup>45</sup> Studies have shown that the health risks related to social isolation can be equal to those related to smoking and obesity.<sup>46</sup> During isolation, the needs for socialization, religious/spiritual services, medical assistance, home delivery, and therapy are often met through the Internet. However, as older adults are not typically skilled at or comfortable using technology and online platforms, they probably did not benefit from any of the services offered. Partly due to these conditions, the geriatric population is at higher risk of suffering from anxiety.<sup>8</sup> In our study, despite the pandemic and associated restrictions winding down, geriatric individuals were observed to have high anxiety and fear levels related to COVID-19. The lack of a decrease in both the general anxiety levels and the COVID-19 anxiety and fear levels can be explained by the fact that traces of these traumatic effects are still seen after the pandemic. Barg et al.<sup>47</sup> and de Beurs et al.<sup>48</sup> found significant positive associations between loneliness and anxiety in older adults, and Khademi et al., in a study conducted in Iran, reported a high level of correlation between loneliness and the anxiety levels.<sup>49</sup> In the current study, a significant correlation was found between the COVID-19 anxiety and fear levels and the geriatric anxiety levels. These associations may be related to the loneliness caused by social isolation during the COVID-19 pandemic.

The lowest mean GAS total score ( $10.1 \pm 6.8$ ) was reported in a study conducted in the USA and Canada.<sup>50</sup> The scores found in other countries and studies are as follows: in the USA –  $13.65 \pm 9.70$ <sup>29</sup>; in Italy –  $13.08 \pm 7.95$ <sup>51</sup>; and in Germany –  $10.51 \pm 8.95$ .<sup>32</sup> The mean GAS total scores obtained in studies conducted in Turkey<sup>52</sup> and Iran<sup>49</sup> are consistent with the current results ( $18.01 \pm 12.78$  and  $17.12 \pm 12.34$ , respectively). These results suggest that the anxiety levels in geriatric individuals living in Eastern societies are higher than in Western societies. Although

the abovementioned Turkish GAS study<sup>52</sup> was conducted before the pandemic, the GAS total score was found to be higher than in our study. The reasons for this difference in scores may be due to regional differences with regard to the places where the studies were conducted.

## Limitations

As in all studies, there are some limitations to the current research. First, the results are based on the analysis of cross-sectional self-reported data, which does not allow causal inference, and bias due to the common-method variance might occur. There is also an imbalance between the number of male and female participants, with females being under-represented in this sample. In addition, there are many factors that affect the anxiety and fear levels. The fact that the unmeasurable factors regarding the effects of the pandemic were not addressed is another limitation of the study. As this study is correlational, it cannot be proven whether one variable causes a change in the other. Thus, further research on more individuals is needed to better understand the relationships between the different types of anxiety.

## Conclusions

In our study, an increase in the anxiety and fear levels caused by the COVID-19 pandemic was observed in geriatric individuals in the high-risk group. Hence, it should be considered that geriatric individuals may encounter some difficulties during dental treatment and prosthetic rehabilitation after the pandemic. Therefore, it is important to normalize the anxiety levels in these patients. Due to the pandemic, most of these individuals will probably need interventions or the help of a professional psychiatrist to alleviate anxiety and fear. In addition, activities that can help reduce the anxiety levels in geriatric individuals, such as socialization, physical activity and meditation, may prove to be of importance.

## Ethics approval and consent to participate

The study was approved by the Ethics Committee at the Faculty of Dentistry of Ataturk University, Erzurum, Turkey (approval No. 2022/38). Informed consent forms were signed by all the participants.

## Data availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Consent for publication

Not applicable.



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