Original paper

Fear and anxiety of COVID-19 in dental patients during the COVID-19 pandemic: A cross-sectional survey in Turkey

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Abstract

Background. The significant risk of cross-infection in dental practice has caused indecision among dental patients about whether to attend dental appointments. The coronavirus disease 2019 (COVID-19) pandemic has had a significant psychological impact on dental patients.

Objectives. The aim of this study was to evaluate the levels of and the associated factors for fear and anxiety among dental patients during the COVID-19 pandemic in Turkey.

Material and methods. A cross-sectional questionnaire-based survey consisting of 6 parts was conducted. The 6 parts were sociodemographic data, knowledge about COVID-19, information sources, the perception of COVID-19, the fear of COVID-19 scale (FCoV-19S), and the generalized anxiety disorder-7 scale (GAD-7). A total of 301 participants completed the survey.

Results. As many as 81% of the participants perceived COVID-19 as a serious disease, and 73% reported the fear of visiting their dental clinic due to the possibility of being infected with COVID-19. The participants' knowledge about COVID-19 was significantly correlated with gender, the educational status and the use of the Internet. There was a strong negative correlation between the participants' levels of knowledge and the FCoV-19S and GAD-7 scores. A significant positive correlation was observed between the FCoV-19S score and the GAD-7 score. In regression analysis, being female, perceiving COVID-19 as a serious disease, being afraid of going to the dentist, having a low knowledge score, and having a high GAD-7 score were the predictors of a high FCoV-19S score.

Conclusions. This study determined that the COVID-19 pandemic had had significant psychological effects on dental patients in Turkey. The results also underline the importance of providing more educational information to the public about the strict infection control measures taken by dental clinics against COVID-19 transmission in order to eliminate misperception.

Keywords: anxiety, fear, COVID-19 pandemic, coronavirus disease 2019 (COVID-19), dental patient

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Introduction

Coronavirus disease 2019 (COVID-19) was initially identified in Wuhan, China, in December 2019 and it spread around the world. The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020.[1]

The COVID-19 pandemic rapidly changed social relationships, health conditions and the routine of people's daily lives.[2] In response to the pandemic, governments introduced various measures to prevent the transmission of the disease, including social distancing, self-isolation and quarantine orders. Due to the prolonged lockdown and COVID-19-associated fear, a large proportion of the population experienced frustration, stress and irritability.[3,4] Studies have reported that the percentage of people with anxiety, depression, fear, and sleep problems increased during the COVID-19 pandemic.[5–9]

The risk of cross-infection in dental practice has been demonstrated to be remarkably high because of close physical contact between dental patients and professionals, as well as the production of aerosol during dental procedures.[10] Professional dental associations around the world have published recommendations and guidelines dental clinics should follow during the pandemic.[11] Changes in health-seeking behaviors have been reported during the COVID-19 pandemic.[12] In such an uncertain situation, patients may remain undecided about their dental appointments. Previous reports have documented that the fear of COVID-19 contributes to delays in accessing healthcare.[13,14] The delivery of dental services globally has been severely disrupted during the COVID-19 pandemic.[15] Patients' concern and fear are related to the possibility of contracting the infection and transmitting the disease to their families. All of these factors may increase the psychological stress in dental patients.

Many studies have evaluated depressive symptoms in individuals from different segments of society during the COVID-19 pandemic, such as dental practitioners, the hospital staff and students.[16–20] However, few studies have investigated dental patients' perception and mental status regarding dental visits during pandemics.[14,21,22] A study conducted during the severe acute respiratory syndrome (SARS) epidemic in Hong Kong reported that 2/3 of dental patients were worried about getting infected during dental procedures, and thus avoided dental care.[21] Another study conducted during the Middle East respiratory syndrome (MERS) outbreak showed that 26% of dental patients expressed concern regarding attending dental appointments due to the fear of contracting the disease.[22]

Since regular dental care is a critical factor in ensuring and maintaining adequate dental and periodontal health, a better understanding of a patient's psychological state and perception during the COVID-19 pandemic would help us develop strategies for optimal dental practices. Therefore, the aim of this study was to evaluate the knowledge status and perception regarding COVID-19, and to determine the fear and anxiety levels of dental patients in Turkey during the pandemic.

Material and methods

Study design

This cross-sectional study was approved by the Ethics Committee at the Faculty of Medicine of Akdeniz University, Antalya, Turkey (No. of approval: 70904504/706), and conducted in accordance with the Declaration of Helsinki. The study followed the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines.[23]

Data was collected from the dental patients of the Akdeniz University Faculty of Dentistry between September 23 and October 23, 2020, after dental clinics were reopened to the public in Turkey. The inclusion criteria for participation were as follows: willingness to participate and provide informed consent; age of 18 years or above; and the ability to understand, read and write in the Turkish language. Individuals who did not consent to participate in the survey, patients who were under the age of 18 years and foreign patients who could not communicate in Turkish were excluded from the study.

The questionnaire (paper-based survey) was structured into 6 domains: general sociodemographic data (Appendix 1); knowledge about COVID-19 (Appendix 2); COVID-19 information sources (Appendix 3); the perception of COVID-19 (Appendix 4); the fear of COVID-19 scale (FCoV-19S)[24] (Appendix 5); and the generalized anxiety disorder-7 scale (GAD-7)[25] (Appendix 6) (The questionnaires as Appendices are available from the corresponding author on reasonable request.).

Measurement

Level of knowledge about COVID-19

Based on the information gathered from the published literature,[26] the questions asked to assess the participants' level of knowledge about COVID-19 regarded the transmission routes, prevention and clinical symptoms of COVID-19. Two questions were answered as either 'true' or 'false', and the remaining 2 were multiple-choice questions. Each correct answer scored 1 and the knowledge scores were calculated by summing the number of correct answers. The total knowledge score ranged from 0 to 10. Due to the lack of a standardized tool in the literature, the participants with an overall score >50% were considered knowledgeable. The Cronbach's alpha coefficient of the knowledge questionnaire was $\alpha = 0.78$.

Perception of COVID-19

Perception was assessed through the following 2 questions: "Is COVID-19 a serious disease?"; and "Are you afraid to visit the dental clinic due to the possibility of contagion with COVID-19?". Similar questions have been used in previous studies.[27,28]

Fear of COVID-19 scale

The participants' fear levels were measured with the Turkish validated version of the FCoV-19S.[29] This scale is reliable and valid for determining the fear of COVID-19 in the general population. It is a unidimensional scale with 7 questions. The score for each question is rated on a 5-point Likert-type scale ranging from 'strongly disagree' (1) to 'strongly agree' (5). To obtain the FCoV-19S score, all items were summed; the total score ranged from 7 to 35. The higher the score, the greater the level of fear of COVID-19. The internal consistency of the Turkish version of the scale was found to be 0.84.[29] The Cronbach's alpha value of this scale was found to be $\alpha = 0.80$.

Generalized anxiety disorder-7 scale

The participants' anxiety levels were evaluated using the Turkish version of GAD-7. The GAD-7 is a 7-item and 4-point Likert-type scale (0 – not at all; 1 – several days; 2 – more than half of the days; and 3 – almost every day) developed by Spitzer et al. that is used for the diagnosis, monitoring and assessing the severity of anxiety disorders.[25] The total score was calculated and the anxiety levels were classified into 4 categories (minimal: 0–4; mild: 5–9; moderate: 10–14; and severe: 15–21).[25] The GAD-7 was first adapted into the Turkish language by Konkan et al., and the Cronbach's alpha value was $\alpha = 0.85$.[30] The Cronbach's alpha value for the present scale was found to be $\alpha = 0.84$.

Statistical analysis

Descriptive values, including median (*Me*), mean and standard deviation ($M \pm SD$), and absolute and relative frequencies (n (%)), were calculated to examine the participants' characteristics. The normality of quantitative data was determined using the Kolmogorov–Smirnov test. The χ^2 test was used to determine differences between categorical variables. Differences between continuous variables were examined using the Mann–Whitney U test. Correlations were determined using Spearman's rank correlation coefficient (r). Linear regression analysis was performed to predict the potential influencing factors related to the fear of COVID-19. The regression coefficient (β) and 95% confidence interval (*CI*) were reported. All calculations were considered statistically significant at $p < 0.05$. All statistical analyses were performed using IBM SPSS Statistics for Windows, v. 23.0 (IBM Corp., Armonk, USA).

Results

Participants' sociodemographic data

A total of 301 participants completed the questionnaire (117 males and 184 females). The demographic data of the participants are summarized in Table 1.

COVID-19 knowledge

The mean COVID-19 knowledge score was 7.66 ±2.04 (*Me*: 8; range: 0–10). Eighty-seven percent of the study participants had sufficient COVID-19 knowledge. Significant differences were observed in the disease knowledge scores according to gender, where males had higher scores than females ($p < 0.05$), and the educational status, where participants that held a master's degree had higher scores than those who did not ($p = 0.001$). Furthermore, highly educated respondents (i.e., university education, a master's degree or Ph.D.) had higher knowledge scores than participants with only primary or high school education ($p < 0.001$). Among the studied demographic characteristics, gender ($r = 0.123$; $p < 0.05$) and the educational status ($r = 0.207$; $p < 0.001$) were significantly correlated with the mean knowledge scores. Furthermore, there was a positive correlation between the COVID-19 knowledge score and use of the Internet ($r = 0.133$; $p < 0.05$).

COVID-19 perception

Regarding the attitude of the participants toward COVID-19, 81% perceived COVID-19 as a serious disease. Moreover, 73% of the participants (among them, males: $n = 76$, 35%; females: $n = 143$, 65%) were afraid of going to the dental clinic due to the possibility of contracting COVID-19.

COVID-19 information sources

The source of information about COVID-19 was primarily television ($n = 231$, 77%), the Internet ($n = 206$, 68%; the official website of the Turkish Ministry of Health – 89%) and social media ($n = 168$, 56%). Among the social media resources, 38% of the participants used Twitter, 30% used Instagram, 25% used Facebook, and 7% used WhatsApp.

Fear of COVID-19

The mean FCoV-19S score of the participants was 18.10 ±5.64 (*Me*: 18; range: 7–35). The highest mean FCoV-19S scores referred to items "I am most afraid of COVID-19" and "It makes me uncomfortable to think about COVID-19", with values of 3.56 ±1.24 and 3.38 ±1.32, respectively. The lowest mean FCoV-19S score was observed for item "I cannot sleep, because I am worrying

Table 1. Participants' characteristics, and the comparison of the fear of COVID-19 scale (FCoV-19S) scores, the generalized anxiety disorder-7 scale (GAD-7) scores and the knowledge levels

Variable		*n* (%) total *N* = 301	FCoV-19S score *M* ±*SD*	*p*-value	GAD-7 score *M* ±*SD*	*p*-value	Knowledge level	*p*-value
Age [years]	18–39	201 (66.8)	18.07 ±5.71	0.677	3.43 ±4.09	0.373	1.92 ±0.49	0.985
	40–59	92 (30.6)	17.97 ±5.37		2.73 ±3.71		1.91 ±0.55	
	≥60	8 (2.7)	20.38 ±7.46		3.21 ±2.38		1.93 ±0.49	
Gender	male	117 (38.9)	16.47 ±5.10	0.000**	2.51 ±3.50	0.007*	7.97 ±2.11	0.009*
	female	184 (61.1)	19.14 ±6.05		3.65 ±4.15		7.46 ±1.97	
Comorbidity	no	259 (86.0)	18.00 ±5.56	0.450	3.17 ±3.96	0.699	7.67 ±2.08	0.832
	yes	42 (14.0)	18.71 ±6.12		3.43 ±3.89		7.59 ±1.78	
Tobacco use (current)	yes	77 (25.6)	19.03 ±6.21	0.096	4.06 ±4.89	0.027*	7.39 ±2.37	0.171
	no	224 (74.4)	17.79 ±5.41		2.92 ±3.53		7.75 ±1.90	
Marital status	married	152 (50.5)	18.09 ±5.61	0.973	2.54 ±3.29	0.028*	7.48 ±2.20	0.114
	single	149 (49.5)	18.11 ±5.68		3.89 ±4.43		7.85 ±1.85	
Having children	yes	151 (50.2)	18.01 ±5.79	0.782	2.88 ±3.76	0.148	7.49 ±2.15	0.140
	no	150 (49.8)	18.19 ±5.49		3.54 ±4.11		7.83 ±1.91	
Employment status	unemployed	181 (60.1)	18.59 ±5.57	0.068	3.08 ±3.79	0.477	7.64 ±2.01	0.806
	working/studying	120 (39.9)	17.38 ±5.67		3.41 ±4.18		7.70 ±2.09	
Educational status	primary school	37 (12.3)	18.43 ±5.30	0.476	2.32 ±3.66	0.152	6.83 ±2.43	0.009*
	high school	83 (27.6)	18.88 ±5.82		3.24 ±4.11		7.32 ±2.22	
	college	28 (9.3)	16.82 ±5.50		2.07 ±2.91		7.85 ±1.75	
	university	136 (45.2)	17.87 ±5.61		3.51 ±4.03		7.99 ±1.76	
	master's degree/Ph.D.	17 (5.6)	17.59 ±5.91		4.47 ±4.15		8.17 ±2.09	
Place of residence	urban	287 (95.3)	18.15 ±5.63	0.484	3.12 ±3.83	0.071	7.66 ±2.02	0.862
	rural	14 (4.7)	17.07 ±5.74		5.07 ±5.66		7.57 ±2.44	
Anxiety (GAD-7)	minimal	218 (72.4)	17.52 ±5.38	0.000**	–	–	7.75 ±1.98	0.080
	mild	58 (19.3)	18.31±6.00		–		7.70 ±2.21	
	moderate-to-severe	25 (8.3)	22.72 ±4.93		–		6.80 ±1.97	

COVID-19 – coronavirus disease 2019; *M* – mean; *SD* – standard deviation; * statistically significant ($p < 0.05$); ** statistically significant ($p < 0.001$).

about getting COVID-19", with a value of 1.71 ±0.99 (Table 2). The fear scores of females were significantly higher than those of males ($p = 0.028$). However, age, the marital status, having children, the employment status, the educational status, the region of residence, and having a systemic disease did not significantly affect the total FCoV-19S score ($p > 0.05$). There was a strong negative correlation between the FCoV-19S score and the COVID-19 knowledge level ($r = -0.808$; $p < 0.001$) (Table 3). There was no significant correlation between the FCoV-19S score and the sources of information ($p > 0.05$).

Participants who considered the disease to be serious had significantly higher FCoV-19S scores (18.80 ±5.65) than those who considered the disease not to be serious (15.40 ±4.06) ($p = 0.032$). Similarly, participants who were afraid to visit the dental clinic due to the possibility of getting infected with COVID-19 had significantly higher FCoV-19S scores (19.66 ±5.48) than those who were not afraid to visit the dental clinic (13.91 ±4.87) ($p = 0.040$). This fear was significantly higher in females than in males ($p = 0.017$).

Multiple linear regression analysis showed that being female ($\beta = 0.880$, 95% *CI*: 0.016 to 0.275; $p = 0.028$), having a low total knowledge score ($\beta = -0.510$, 95% *CI*: −0.935 to −0.680; $p = 0.000$), perceiving COVID-19 as a serious disease ($\beta = 0.114$, 95% *CI*: 0.058 to 0.328; $p = 0.005$), being afraid of attending a dental visit ($\beta = 0.359$, 95% *CI*: 0.504 to 0.792; $p = 0.000$), and having a high total GAD-7 score ($\beta = 0.165$, 95% *CI*: 0.123 to 0.349; $p = 0.000$) were the predictors of having a greater fear of COVID-19 (Table 3).

COVID-19 and anxiety

The mean total GAD-7 score of the participants was 4.61 ±4.45. Of all the participants, 218 (72%) had minimal depressive symptoms, 58 (19%) had mild symptoms and 25 (8%) had moderate-to-severe symptoms. Subjects with moderate-to-severe depressive symptoms were mostly female ($n = 19$, 10%), single ($n = 16$, 11%) and they were smokers ($n = 12$, 16%). There were no significant

Table 2. Scores of the participants' responses to the fear of COVID-19 scale (FCoV-19S) items

Item	Sum	*M* ±*SD*
1. I am most afraid of COVID-19	1,071	3.56 ±1.24
2. It makes me uncomfortable to think about COVID-19	1,016	3.38 ±1.32
3. My hands become clammy when I think about COVID-19	580	1.93 ±1.13
4. I am afraid of losing my life because of COVID-19	851	2.83 ±1.38
5. When I watch the news and stories about COVID-19 on social media, I become nervous or anxious	861	2.86 ±1.24
6. I cannot sleep, because I am worrying about getting COVID-19	515	1.71 ±0.99
7. My heart races or palpitates when I think about getting COVID-19	555	1.84 ±1.07

differences across the different age and educational status categories (Table 1). There was a strong negative correlation between the GAD-7 score and the COVID-19 knowledge level ($r = -0.136$; $p < 0.05$). In contrast, a significant positive correlation was observed between the FCoV-19S score and the GAD-7 score ($r = 0.236$; $p < 0.001$) (Table 3).

Discussion

This study is the first to evaluate the impact of the COVID-19 pandemic on the psychological status of dental patients in Turkey. The most important finding of this study is that the participants who were very worried about contracting COVID-19 were also identified as fearful and anxious. Given the novelty of the disease, it is natural that people are more prone to fear when faced with unknown situations.

In this study, the mean FCoV19S score was in line with the scores reported in the studies conducted in other populations.[31,32] According to our results, female gender was significantly related to increased fear.[33] The authors of a large-scale nationwide survey examining psychological distress among Chinese people during the COVID-19 pandemic observed the same gender effect, with females reporting significantly higher psychological distress than males.[34]

Perceiving the disease as serious and being afraid of attending a dental visit due to the possibility of contracting COVID-19 were found to be significant factors for the fear of COVID-19 in this study. This is an important finding that demonstrates the negative impact of the COVID-19 pandemic on the frequency of dental clinic visits. Similarly, a retrospective clinical study conducted in China reported that the COVID-19 pandemic significantly affected individuals' dental care-seeking behaviors.[35] Moffat et al. conducted a study in the United States on the identification of dental patients' perception of risk and attitude toward COVID-19; the participants reported that contracting COVID-19 from other patients in a dental clinic represented the greatest risk related to dental care.[27] Moreover, Kranz et al. reported that half of their participants delayed their dental visits and treatment due to the fear of contracting the virus during dental procedures.[14]

In this study, female participants had a significantly higher level of fear regarding dental visits due to the possibility of contracting COVID-19 as compared to males ($p < 0.05$). These results are consistent with a previous study, which found that females were more concerned about the risk of the aerosolized spread of infection during dental treatment and showed increased levels of stress during dental treatment.[22]

The majority of the participants (87%) in the present study showed a sufficient level of knowledge about COVID-19, which is essential to limiting the spread of the disease.[36] Moreover, the knowledge levels were significantly higher in patients with a higher educational status and in males ($p < 0.05$). Similarly, Zhong et al. found that young females with a low educational status tended to have less knowledge regarding COVID-19.[37] In contrast, Nooh et al. reported no significant association between individuals' COVID-19 knowledge levels and gender or educational status.[38] Despite contradictory results in the literature, the findings of this study suggest that highly educated individuals are effective in retrieving reliable information, which may influence their COVID-19 knowledge levels.

Another important finding of this study is a significant negative correlation between the participants' knowledge level and FCoV-19S score ($r = -0.808$; $p < 0.05$)

Table 3. Results of multiple linear regression analysis of the predictors of the fear of COVID-19 (with reference to FCoV-19S)

Predictors	*r*	*β*	95% *CI* for *β*	*p*-value
Gender[a]	0.145	0.880	(0.016 to 0.275)	0.028*
Knowledge level[b]	–0.808	–0.510	(–0.935 to –0.680)	0.000**
Is COVID-19 a serious disease?[c]	0.193	0.114	(0.058 to 0.328)	0.005*
Are you afraid to visit the dental clinic due to the possibility of contagion with COVID-19?[d]	0.648	0.359	(0.504 to 0.792)	0.000**
GAD-7[e]	0.236	0.165	(0.123 to 0.349)	0.000**

r – Spearman's rank correlation coefficient; *β* – regression coefficient; *CI* – confidence interval; [a] males as the reference group; [b] total score for the knowledge level; [c] response to item "Is COVID-19 a serious disease?" with 'no' as the reference group; [d] response to item "Are you afraid to visit the dental clinic due to the possibility of contagion with COVID-19?" with 'no' as the reference group; [e] total score on GAD-7; * statistically significant ($p < 0.05$); ** statistically significant ($p < 0.001$).

and anxiety level ($r = -0.136$; $p < 0.05$). These results are consistent with previous research, which determined that receiving adequate knowledge about the transmission routes of COVID-19 was correlated with lower levels of anxiety.[39]

The present study demonstrated that the COVID-19 pandemic had impacted the anxiety levels in dental patients, with 8% of them reporting moderate-to-severe anxiety, which is similar to the 7% reported among the general population in China.[40] Furthermore, Cotrin et al. reported that the COVID-19 pandemic and quarantine protocols influenced orthodontic patients' anxiety levels.[41] In the present study, there was a significant positive association between the FCoV-19S score and the GAD-7 score. Recent studies found that the fear of COVID-19 was significantly correlated with anxiety and depression.[42,43] These results suggest that dental patients may need psychological support during the COVID-19 pandemic to maintain their mental health. In addition, the current situation may affect the oral health of people in the near future, as previous studies have clearly shown a strong relationship between oral health and mood conditions, such as stress, anxiety and depression.[44]

In the present study, the major source of information associated with COVID-19 was television, followed by the Internet and social media. A cross-sectional study conducted with 9,796 respondents from the Netherlands, Germany and Italy found that most participants acquired information about COVID-19 from traditional sources (e.g., television and newspapers).[45] Moreover, there was a significant positive correlation between the participants' knowledge levels and the use of the Internet ($r = 0.133$; $p < 0.05$) observed in the present study. Our findings are consistent with previous studies.[45,46]

When evaluating the reliability and quality of the information found on the Internet, Hernández-García and Giménez-Júlvez reported that official health organizations provided more accurate information about protective measures against COVID-19.[45] In the present study, the Turkish Ministry of Health official website was the most common source of information about COVID-19 reported by the participants (89%). This website has been working efficiently since the beginning of the pandemic and its portal regularly updates information about COVID-19, according to the WHO guidelines.

Limitations

This study has several limitations. Firstly, the study was cross-sectional in nature and could not establish causality for the outcome. Additionally, the results may only reflect the mental health status during the pandemic. Secondly, although the measurements used in the study had satisfactory psychometric properties, the results were self-reported, which could have led to recall bias. However, a paper-based questionnaire was used in this study, which could have eliminated the selection bias observed in online surveys. Finally, the results were based on a single institution; nevertheless, our faculty was the only referral center for dental care in our region during the pandemic. Larger prospective nationwide studies are needed. The findings of this study are useful for public health professionals in recognizing target populations for specific COVID-19 pandemic-related mental health management and intervention strategies.

Conclusions

The results of this study suggest that the COVID-19 pandemic has had a significant psychological impact on dental patients. Psychological support may be needed to help dental patients manage their fear and anxiety. It is also understandable that, due to the increasing fear of COVID-19, patients may develop dental care avoidance behaviors. Therefore, effective physician–patient communication should be established to prevent misconception, and strict infection control measures should be taken by dental clinics to reduce the risk of COVID-19.

Ethics approval and consent to participate

The study was approved by the Ethics Committee at the Faculty of Medicine of Akdeniz University, Antalya, Turkey (No. of approval: 70904504/706). Written informed consent was obtained from all 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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