

# Knowledge and Anxiety Level of Dentists about COVID-19 Pandemic

Olcay Özdemir<sup>1</sup>, Ecehan Hazar<sup>2</sup>, Sibel Koçak<sup>3</sup>, Baran C Sağlam<sup>4</sup>, Mustafa M Koçak<sup>5</sup>

## ABSTRACT

**Aim:** This study aimed to assess the knowledge and anxiety levels of dentists and pregraduate dental students about COVID-19 in Turkey.

**Materials and Methods:** A three-part online questionnaire was used to collect data. Questionnaire 1 consisted of 10 demographic questions. In questionnaire 2, there were 10 multiple-choice questions, including various COVID-19 knowledge. In questionnaire 3, participants were tested by a self-evaluation test as Worry and Anxiety Questionnaire (WAQ).

**Results:** A total of 1002 respondents had completed the questionnaires. The majority of the participants exhibited very good knowledge. Worry and anxiety scores differ by gender, institution, and specialty ( $p < 0,001$ ). There was no significant relationship between knowledge level and stress level ( $p > 0,050$ ).

**Conclusion:** Female dentists, pediatric dentists, and dentists working in public hospitals in Turkey were found to be significantly more stressed. The level of knowledge was generally high and no correlation was established by the level of anxiety.

**Clinical Significance:** In this global pandemic process, it is known that all dentists' problems and needs are common, and the effects of the disease on the dental profession can be globalized. It is crucial in the face of the anxiety and stress demonstrated by dentists during COVID-19 that mental coping mechanisms and strategies generated to remain calm and function efficiently.

**Keywords:** Anxiety, Coronavirus, Covid-19, Dentistry, Questionnaire-based study.

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## INTRODUCTION

On December 31, 2019, 27 patients with clinical symptoms of fever, dry cough, dyspnea, bilateral lung infiltrates on computed tomography (CT) imaging, and fatigue were identified in Wuhan City in China.<sup>1,2</sup> The etiology of the disease was unknown, but the cases were related to a single local seafood market, where trades in live wild animal species and fish.<sup>1</sup> The infectious agent obtained from the throat swab samples was identified as a novel coronavirus, and pneumonia caused by the virus was called COVID-19 by the World Health Organization (WHO).<sup>3</sup> COVID-19 is caused by a beta coronavirus ( $\beta$ -CoV) and comprised of a single-stranded ribonucleic acid (RNA) structure.<sup>4</sup> The virus has shown a typical structure sequence like the other coronaviruses, and it has genomic similarities with severe acute respiratory syndrome coronavirus (SARS-CoV) (about 79%) and Middle East respiratory syndrome coronavirus (MERS-CoV) (about 50%).<sup>5</sup> 8 of the 14 amino acids in the SARS-CoV were conserved in the novel coronavirus.<sup>6</sup> Subsequently, the International Committee on Taxonomy of Viruses (ICTV) named this novel virus "SARS-CoV-2" due to the phylogenetic and taxonomic analysis.<sup>5</sup>

According to recent research, a similar genomic sequence between a  $\beta$ -CoV obtained from the bat and SARS-CoV-2 was 96.2%.<sup>7</sup> Additionally, researchers from South China found that 70% of the pangolins contain  $\beta$ -CoV. They indicated that the genomic similarity of SARS-CoV-2 with one of the obtained  $\beta$ -CoV from pangolin was 99% and stated that the pangolin may be the intermediate host.<sup>8</sup>

Coronaviruses belong to the family of Coronaviridae cause diseases in vertebrates including pigs, camels, bats, and birds. Sometimes virus transmission to humans can cause mild

<sup>1</sup>Faculty of Dentistry, Department of Paediatric Dentistry, Zonguldak Bülent Ecevit University, Kozlu 67600, Zonguldak, Turkey

<sup>2-5</sup>Faculty of Dentistry, Department of Endodontics, Zonguldak Bülent Ecevit University, Kozlu 67600, Zonguldak, Turkey

**Corresponding Author:** Olcay Özdemir, Faculty of Dentistry, Department of Paediatric Dentistry, Zonguldak Bülent Ecevit University, Kozlu, Zonguldak, Turkey, Phone: +90 5305470120, e-mail: ozdemir.olcay@yahoo.com

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upper respiratory tract infections. However, three times in the 21st-century coronavirus outbreaks have emerged to cause fatal disease and global transmission concerns. Seven coronaviruses are known to cause human disease, four of which are mild: viruses 229E, OC43, NL63, and HKU1. Three members of the coronaviruses can have more serious diseases in humans, and those are SARS-CoV (SARS, severe acute respiratory syndrome), which explored in 2002-2004; MERS-CoV (Middle East respiratory), which emerged in 2012; and SARS-CoV-2 (COVID-19), which emerged in late 2019.

COVID-19 is a novel outbreak and there is limited information regarding risk factors for severe diseases. With the SARS-CoV-2 virus spread to different countries and rapidly increasing transmission, WHO declared the COVID-19 outbreak as a pandemic on March 11, 2020. Since December 2019, 16,114,449 laboratory-confirmed cases

of COVID-19 have been reported by the World Health Organization (WHO) with 646,641 related deaths in 216 countries, areas, or territories till this report is written.<sup>9</sup>

Initially, studies show the possibility of virus transmission from animal to human, while studies have also shown that SARS-CoV-2 is transmitted from person to person through direct droplet inhalation or contact with oral, nasal, or eye membranes.<sup>10-13</sup>

Dental professionals are very frequently exposed to saliva or bioaerosols that can lead to an increased risk of infection generated during certain dental treatments. Bioaerosols occur during treatment in an asymptomatic but infected patient and carry the viruses through airborne<sup>14</sup> and these bioaerosols can pass through the pores of the masks or contaminate environmental surfaces.<sup>15,16</sup> Hence, dentists are at great risk of exposing this infection or become a source of transmission to patients, coworkers, or family. The presence of this fatal virus among healthcare workers underscores a need for continuing efforts toward COVID-19 disease (SARS-CoV-2) awareness.

The pandemic due to the COVID-19 disease may cause anxiety and limit their clinical practice. Currently, there is no information about the psychological impact and mental health of Turkish dentists during the peak of the COVID-19 pandemic because of the risks and the standard protective measures. In daily clinical work, standard protection may not be effective enough to prevent the spread of this outbreak, especially when patients are in the incubation period, unaware of being infected, or choose to conceal their infection. This study aimed to assess the knowledge and anxiety levels of dentists and pregraduate dental students about COVID-19 in Turkey.

## MATERIALS AND METHODS

The study was approved by the Zonguldak Bülent Ecevit University Human Research Ethics Committee (Protocol Number: 789/20.05.2020) and the Republic of Turkey, Ministry of Health, Scientific Research Platform (Protocol Number: 2020-06-23T13\_02\_07). A total of 1002 dentists and pregraduate students were accepted to participate in the present study.

A three-part online questionnaire was used to collect data (<https://docs.google.com/forms/>). The participants reached the survey by clicking on the link via social media community groups, e-mail, and other communication media. The survey was available for about 5 days. The identity of the participants remained confidential.

Questionnaire 1 consisted of 10 demographic questions, including dentists' age, gender, marital status, having any children, children nursemaid, contact of geriatric people, education level, profession, self-evaluation of COVID-19 knowledge, and anxiety level (Table 1). In questionnaire 2, there were 10 multiple-choice questions, including various COVID-19 knowledge (Table 2). The questions on the survey were prepared by the authors after reviewing related literature, studies, and international guidelines.<sup>5,17-20</sup>

In questionnaire 3, participants were tested by a self-evaluation test as Worry and Anxiety Questionnaire (WAQ) developed by Dugas and Francis<sup>21</sup> (Table 3). There were 10 questions that measure the anxiety issues, excessive and uncontrollable aspect of anxiety, duration and frequency of the disorder, somatic symptoms, anxiety and anxiety-related helplessness, and intervention in life. For the total score on the WAQ, the scores were added up to the responses for each of the items. To meet anxiety level on the WAQ, one must

**Table 1:** Demographic characteristics and WAQ score distribution of the participants

	(n)	(%)
<b>Gender</b>		
Female	703	70,2
Male	299	29,8
<b>Marital status</b>		
Married	305	30,4
Single	697	69,6
<b>Having any children</b>		
No	771	76,9
Yes	231	23,1
<b>Children nursemaid*</b>		
Family member (under the age of 60)	75	34,0
Family member (over the age of 60)	56	25,6
Nursemaid (under the age of 60)	53	24,2
Nursemaid (over the age of 60)	3	1,4
Old enough to not need care	23	10,5
Other	14	6,0
<b>Are there any members over the age of 60 with whom you have close contact within the family?</b>		
No	636	63,5
Yes	366	36,5
<b>Institution</b>		
Faculty of dentistry	583	58,2
Private clinic	254	25,3
Public hospital	178	17,8
<b>Expertise</b>		
Pregraduate student	411	41,0
General dentist	329	32,8
Endodontics	66	6,6
Pediatric dentistry	47	4,7
Periodontology	46	4,6
Prosthodontics	37	3,7
Orthodontics	19	1,9
Restorative dentistry	17	1,7
Dento-maxillofacial radiology	16	1,6
Oral and maxillofacial surgery	14	1,4
<b>Did the impact of the COVID-19 pandemic on Turkey affect you psychologically?</b>		
Yes	865	86,3
No	61	6,1
I'm not sure	76	7,6
<b>How would you assess your level of knowledge about the COVID-19 pandemic?</b>		
Enough	602	60,1
Not enough	91	9,1
<b>WAQ General (items 1,2,3,10)</b>		
Not providing the criteria	840	83,8
Report a score of "4" or higher	162	16,2
<b>WAQ Cognitive criteria (items 1,2,3)</b>		
Not providing the criteria	809	80,7
Report a score of "4" or higher	193	19,3
<b>WAQ Somatic criteria (items 4-9)</b>		
Not providing the criteria	458	45,7
Report a score of "4" or higher on at least 3 of the 6 somatic symptoms	544	54

(*p* < 0,05)

**Table 2:** Correct answer distributions of questions

	(n)	(%)
<b>COVID-19 is caused by</b>		
Correct (SARS-CoV-2)	609	60,8
Incorrect	393	39,2
<b>COVID-19 patients develop</b>		
Correct (severe acute respiratory illness)	991	98,9
Incorrect	11	1,1
<b>COVID-19 can be fatal for</b>		
Correct (people with diabetes, cancer, and other chronic diseases)	983	98,1
Incorrect	19	1,9
<b>Incubation time for the virus is</b>		
Correct (1–14 days)	986	98,5
Incorrect	16	1,5
<b>Vaccination or medication of COVID-19 is available on the market</b>		
Correct (No)	998	98,6
Incorrect	4	0,4
<b>Can use to diagnose COVID-19</b>		
Correct (PCR)	500	49,9
Incorrect	502	50,1
<b>There is a high risk of nosocomial infection in dental interventions for COVID-19</b>		
Correct (Yes)	997	99,5
Incorrect	5	0,5
<b>The standard protection measures in daily clinical work are effective enough to prevent the spread of COVID-19, especially when patients are in the incubation period, are unaware they are infected or choose to conceal their infection</b>		
Correct (No)	979	97,7
Incorrect	25	2,3
<b>If a dental treatment is to be performed, what is the most appropriate mouthwash before treatment?</b>		
Correct (hydrogen peroxide %1, povidone-iodine 0,2%)	387	38,6
Incorrect	615	61,4
<b>Which one of the drugs that is not recommended to be used especially for COVID-19 disease?</b>		
Correct (ibuprofen)	357	35,6
Incorrect	645	64,4

**Table 3:** Worry and anxiety questionnaire

Questions/scoring									
<b>Do your worries seem excessive or exaggerated?</b>									
Not at all excessive			Moderately excessive			Totally excessive			
0	1	2	3	4	5	6	7	8	
<b>Over the past 3 months, how many days have you been bothered by excessive worry?</b>									
Never			1 day out of 2			Every day			
0	1	2	3	4	5	6	7	8	
<b>Do you have difficulty controlling your worries? For example, when you start worrying about something, do you have difficulty stopping?</b>									
No difficulty			Moderate difficulty			Extreme difficulty			
0	1	2	3	4	5	6	7	8	
<b>Restlessness or feeling keyed up or on edge</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	
<b>Being easily fatigued</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	
<b>Difficulty concentrating or mind going blank</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	
<b>Irritability</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	
<b>Muscle tension</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	
<b>Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep)</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	
<b>To what extent does worry or anxiety interfere with your life? For example, your work, social activities, family life, etc.?</b>									
Not at all			Moderately			Very severely			
0	1	2	3	4	5	6	7	8	

report at least one worry theme, report a score of “4” or higher on items 1, 2, 3, and 10, as well as report a score of “4” or higher on at least 3 of the 6 somatic symptoms.

Three other categories of criteria can be met: cognitive criteria (a score of “4” or higher on items 1, 2, and 3), somatic criteria (a score of “4” or higher on at least 3 of the 6 somatic symptoms on items 4, 5, 6, 7, 8, and 9), and no criteria (does not meet any of the above categories).

Statistical analysis was performed with SPSS software (SPSS V23; IBM Corp., Armonk, New York, USA). Data were analyzed using Kolmogorov–Smirnov test. Mann–Whitney U and Kruskal–Wallis tests were used to determine the difference between groups for categorical variables. The relationship between variables was examined by Spearman’s correlation analysis. The level of significance was set at a *p*-value of less than 0.05.

## RESULTS

A total of 1002 respondents had completed the questionnaires. The demographic characteristics of participants are presented in Table 1. The majority of respondents were women (70,2%), aged 20 to 40 years (86,3%), single (69,6%), and with no child (76,9%). 36.5% of the participants stated that they had close contact with individuals over 60 years old in the family. 41% were pregraduate students, 32,9% general dentists and the others were specialists. The majority of the participants work in the university hospital (58,3%), private clinic, and public oral and dental health center, respectively. About 60,1% participants reported that they had enough knowledge about COVID-19 pandemic, and 86,3% stated that the pandemic affects them psychologically.



**Table 4:** Comparisons by WAQ score (total score)

	Median (min –max)	Statistical analysis	<i>p</i>
<b>Gender</b>			
Female	39 (0–80)	<i>U</i> = 72252	<0,001
Male	26 (0–80)		
<b>Marital status</b>			
Married	36 (3–80)	<i>U</i> = 98168	0,054
Single	35 (0–80)		
<b>Children</b>			
No	35 (0–80)	<i>U</i> = 96334,5	0,059
Yes	36 (0–79)		
<b>Are there any members over the age of 60 with whom you have close contact within the family?</b>			
No	34,5 (0–80)	<i>U</i> = 123590	0,102
Yes	36 (1–80)		
<b>Institution</b>			
Faculty of dentistry	33 (0–80)b	<i>U</i> = 31,182	<0,001
Private clinic	34 (0–80)b		
Public hospital	43 (0–80)a		
<b>Expertise</b>			
Pregraduate student	31 (0–80)	<i>U</i> = 38,146	<0,001
General dentist	37 (0–80)		
Endodontics	39 (0–79)		
Pediatric dentistry	44 (9–67)		
Periodontology	35 (0–72)		
Prosthodontics	37 (5–68)		
Orthodontics	31 (4–60)		
Restorative dentistry	42 (14–79)		
Dentomaxillofacial radiology	37,5 (5–79)		
Oral and maxillofacial surgery	24 (0–46)		
<b>Correlation analysis of knowledge and WAQ</b>			
Total score	<i>r</i> = –0.031	<i>p</i> = 0.324	

U, Mann–Whitney U test, Kruskal–Wallis test (a–b, there is no difference between groups with the same letter); *r*, Spearman's correlation coefficient (*p* > 0.050)

Table 2 describes the general knowledge of the dentists about COVID-19. Most of the respondents were correctly aware of the pandemic. A total of 909 (90,7%) participants exhibited very good knowledge (the correct answer to 7 or more questions). Poor knowledge was more obvious in questions related to the pathogen coronavirus name (SARS-CoV-2), diagnostic test (PCR), type of recommended mouth rinse before dental procedures (1% hydrogen peroxide, 0,2% povidone), and drug which was not recommended for use (ibuprofen) as shown in Table 2. The mean knowledge score was 7,86, maximum and minimum scores were 10 and 3, respectively.

Tables 1 and 4 describe the anxiety level and psychological impact of the pandemic. The ratio of those who marked 4 and above to the 1-2-3-10 questions (general worry and anxiety level) was 16.2%, and 1-2-3 (cognitive symptoms) was 19.3%. The ratio of those who marked 4 or more in at least 3 of 4-5-6-7-8-9 questions was 54.3%. The results showed that the majority of the participants demonstrated somatic symptoms such as discomfort, tiredness, and sleep disturbance. 16.2% of the participants were affected by

the COVID-19 outbreak at a level that could be diagnosed with an anxiety disorder (Table 1).

A comparison of demographic data and the anxiety level was given in Table 4. Worry and anxiety scores differ by gender (*p* < 0,001). Female dentists were found to be more psychologically affected by the COVID-19 outbreak and the scores varied according to the institution (*p* < 0,001). The difference arose from the fact that the WAQ scores of the employees working in the public hospital were higher than the other groups. There was a significant difference in the specialty (*p* < 0,001). The WAQ scores of pediatric dentists were higher than the other categories. There was no difference between WAQ scores and marital status, presence of children, or familiar contact with individuals over the age of 60 (*p* > 0,050).

There was no significant relationship between knowledge level and stress level (*p* > 0,050) (Table 4).

## DISCUSSION

Mental implications such as fear and anxiety are possible in pandemics, especially when the number of infected persons and mortality rates increases at an alarming level.<sup>22</sup> A meta-analysis study reported that meta-analyses were published and reported that early evidence that a high proportion of healthcare professionals experience significant levels of anxiety, depression, and insomnia during the current viral outbreak.<sup>23</sup> Besides, the COVID-19 pandemic has negatively affected the daily routine of dentists.<sup>24</sup> Since it has been reported that the primary route for transmission of COVID-19 is through droplets and aerosols,<sup>25</sup> dental procedures have been suspended because of the risk of nosocomial infection and transmission during dental treatments. This enhances the likelihood of dentists and dental healthcare workers getting infected and further spreading the virus. Recent studies reported that a large number of dentists fear getting infected with COVID-19 from their patients or coworkers who provide high psychological tension.<sup>22,26</sup>

The most appropriate way to determine emotions, thoughts, and experiences on the subject like anxiety levels, knowledge of the general or special population is questionnaire-based studies. The suitability of the questionnaire-based studies are proven for gathering data of participants; however, careful collection of data and interpretation is required.<sup>27</sup> This study used an online questionnaire to evaluate Turkish dentists' knowledge and anxiety levels about the COVID-19 infection. The authors aimed to understand the mental impact and knowledge of Turkish dentists during the current viral outbreak after the beginning of the lockdown period.

To the best of our knowledge, the anxiety level of Turkish dentists was evaluated for the first time in the COVID-19 outbreak. The participation rates by gender and age were similar to a systematic review and meta-analysis of Pappa et al.<sup>23</sup> In most studies, the majority of the participants were women and the majority of the age range was 20 to 40. The fact that female participants show more interest in the study may be related to the level of experienced anxiety. The common point of anxiety assessment studies in the COVID-19 outbreak is that females were more affected by the pandemic.<sup>28</sup> Similarly, our results supported this finding female group demonstrated a higher anxiety level with a significant difference when compared to the male group.

When the literature was reviewed, no information is available about the anxiety levels of the dentists during the pandemic



in terms of their areas of expertise. In our study, we found that pediatric dentists' anxiety levels were higher than others have. A study of the epidemiology of COVID-19 among children in China reported that regarding the severity (including both confirmed and suspected cases), 4.4 and 51.0% of cases were diagnosed as asymptomatic and mild symptoms, respectively.<sup>29</sup> These results indicate that it was difficult to distinguish whether a patient who applied to the clinic has COVID positive and providing clinical care for the affected children may be potentially spread the infection. However, postponing appointments can also cause serious infections. These complex conditions may cause pediatric dentists to have higher levels of stress. Besides, due to the protective equipment they wear, the psychological rejection of the patients to be treated and the inability to carry out a controlled treatment during the procedure may also put pressure on them.

According to the results of this study, public hospital employee dentists have a higher level of anxiety. Although dental treatments performed during the outbreak were limited to emergency procedures, dentists working in public hospitals were assigned to be included in testing teams to identify and isolate possible COVID-19 cases in Turkey. This caused public employee dentists to be in contact with many COVID-19 positive patients. That is why they are more likely to experience anxiety than other group dentists.

In Turkey, it was constituted a committee of experts that includes medical specialists in the field before the emergence of the pandemic and gave great importance to the establishment of public information.<sup>30</sup> Therefore, the majority of the participants have sufficient knowledge about novel coronavirus disease. Questions with general information about the disease were answered with a great correct proportion. That is why no significant correlation was found between the level of anxiety and knowledge.

The current study provides preliminary data about the impact of COVID-19 on mental health for Turkish dentists. Findings can help to quantify support needs. It is crucial in the face of the anxiety and stress demonstrated by dentists during COVID-19 that mental coping mechanisms and strategies that generated to remain calm and function efficiently.

## CONCLUSION

As a result of this questionnaire-based study, female dentists, pediatric dentists, and dentists working in public hospitals in Turkey were found to be significantly more stressed. The level of knowledge was generally high and no correlation was established by the level of anxiety.

## CLINICAL SIGNIFICANCE

In this global pandemic process, it is known that all dental healthcare providers' problems and needs are common, and the effects of the disease on the dental profession can be globalized. The current study provides preliminary data about the impact of COVID-19 on mental health for Turkish dentists. Findings can help to quantify support needs. In the face of the anxiety and stress displayed by dentists during COVID-19, mental coping mechanisms to stay calm and work efficiently are crucial.

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