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Evaluation of the Knowledge and Attitudes of Dental Patients Towards COVID-19 Infection: A Cross-Sectional Study

Diş Hekimliğine Başvuran Hastaların COVID-19 Hakkındaki Bilgi ve Tutumlarının Değerlendirilmesi: Kesitsel Bir Çalışma

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ABSTRACT Objective: To assess the knowledge and attitudes of Turkish dental patients about COVID-19 infection. **Material and Methods:** Four hundred fifteen patients who received an oral and dental health center were interviewed in this study. A questionnaire of 20 questions was applied to the patients to evaluate their knowledge and attitude about COVID-19 and its relationship with dentistry. **Results:** Two hundred-three women and two hundred-twelve men participated in the study. Thirty three percent of the participants were between the ages of 18-30, and 30.4% were between the ages of 31-40. Most of the participants (87.72%) stated that they did not have COVID-19, while 26.9% were in contact with someone who had COVID-19. In the pandemic process, most dental complaint reported by the participants was gum diseases (55.2%). Loss of taste and smell, and weakness, and joint pain were the most marked COVID-19 symptoms by participants (52.5% and 47.7% respectively). Of the participants 44.6% reported the dentistry devices do not carry the risk of COVID-19 infection transmission. The three methods most frequently used by the participants to reduce the risk of transmission are masks, attention to distance rules, and hand washing. The majority of the participants (88.7%) stated that they paid more attention to their oral and dental health during the restriction period. **Conclusion:** Individual behaviors and knowledge are important to decrease the spread of COVID-19. Though participants in this study's general knowledge and attitude about COVID-19 are positive, their knowledge about COVID-19 risks in dental treatment is inadequate.

Keywords: COVID-19; dental care; dentistry; dental health surveys

ÖZET Amaç: Bu çalışmanın amacı diş hekimine başvuran Türk hastaların COVID-19 enfeksiyonu hakkında bilgi ve tutumlarının değerlendirilmesidir. **Gereç ve Yöntemler:** Bu çalışma bir Ağız ve Diş Sağlığı Merkezi'ne başvuran 415 hasta ile yapıldı. Bu hastalara COVID-19 ve diş hekimliği hakkında bilgi ve tutumlarının değerlendirilmesi amacıyla 20 soruluk anket uygulandı. **Bulgular:** Çalışma 203 kadın ve 212 erkek katılımcıyla gerçekleştirildi. Katılımcıların %33'ü 18-30, %30,4'ü ise 31-40 yaşları arasındaydı. Katılımcıların %26,9'u COVID-19 olan biriyle temaslıydı, %87,72'si COVID-19 geçirmediğini belirtti. Katılımcılar en belirgin COVID-19 semptomu olarak tat ve koku kaybı ile halsizlik ve eklem ağrısını işaretledi. (sırasıyla %52,5 ve %47,7). Katılımcıların %44,6'sı diş hekimliği cihazlarının COVID-19 enfeksiyonu açısından bulaş riski taşımadığını düşündüklerini bildirdi. Katılımcıların bulaşma riskini azaltmak için en sık kullandıkları üç yöntem maske kullanımı, mesafe kurallarına dikkat ve el yıkamaydı. Katılımcıların çoğunluğu (%88,7) kısıtlama döneminde ağız ve diş sağlığına daha fazla özen gösterdiğini ifade etti. **Sonuç:** COVID-19'un bulaş riskini azaltmak için bireylerin davranışları ve bilgi seviyesi önemlidir. Bu çalışmadaki katılımcıların COVID-19 hakkındaki genel bilgi ve tutumları olumlu olsa da dental tedavilerin oluşturduğu COVID-19 bulaş riski açısından bilgi düzeyi yetersizdir.

Anahtar Kelimeler: COVID-19; diş bakımı; diş hekimliği; diş sağlığı araştırmaları

Towards the end of 2019, a pneumonia outbreak of unknown etiology occurred in Wuhan, China. The causative pathogen of the disease is called the 2019 novel coronavirus also known as severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) that is a zoonotic virus, which can spread from animals to humans. The 2019-coronavirus infection disease caused by this pathogen has become a major public

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health problem for China and other countries around the world.[1,2]

The incubation period of SARS-CoV-2 in asymptomatic patients is 2 to 12 days, still, in some cases, it has been reported that the incubation period can extend up to 24 days.[3,4] Mostly it occurs in middle-aged adults, but older patients and children also become infected.[4] In the early stages, symptoms of coronavirus have been shown as fever and fatigue, as in a basic cold sore.[5] In addition to the main symptoms; dry cough and shortness of breath, myalgia/fatigue may be observed and 2 new symptoms anosmia and ageusia were reported in the emerged studies.[6]

It is known that coronavirus can be transmitted mainly by direct contact and droplets. coronavirus disease-2019 (COVID-19) is also likely to spread when exposed to high concentrations of aerosols in a relatively closed environment. Aerosols generated during routine dental treatments pose a potential risk to dentists, auxiliary staff, and patients.[7] Having sufficient information about dental equipment and treatments of patients will also reduce the risk of spreading COVID-19 in the community. Dentists are at risk of contracting COVID-19 due to face-to-face communication with patients, exposure to saliva, blood, and other body fluids, and using sharp and high-speed dental instruments. Therefore, biosafety measures taken to prevent cross-infection must be effective. Dental patients may be exposed to COVID-19 if dentists do not comply with biosecurity protection measures such as face barriers, body protection, disinfection of environments, and social distancing.[8] It is important to note that conservation protocol measures should include not only the dentist and assistant staff but also the patients to reduce cross-contamination.[9] In this critical process, understanding the aerosol spreading and its importance in dentistry makes it necessary to apply some special precautions in addition to standard measures.[10]

Oral health which has impacted many systemic diseases can not be separated from general health. There is a two-way relationship between oral health and general health. Recent studies have shown that oral lesions can be observed with COVID-19 patients.[11] Despite the relationship between COVID-19 and oral lesions has not been lightened clearly, it is suggested that insufficiency of the immune system, adverse reactions of drugs, and fear and emotional stress in COVID-19 patients can cause these lesions.[12,13]

Dentists, assistant staff, and dental patients are on the line in this duration and it is worthwhile to assess the patients' knowledge, attitude towards dentistry during COVID-19 infection. In this situation, this study aims to evaluate the knowledge and attitudes towards COVID-19 infection in dental patients who applied to dentists with various complaints.

MATERIAL AND METHODS

This study was carried out by applying a questionnaire consisting of 20 questions to 415 patients who were referred to an oral and dental health center affiliated with the Ministry of Health between January 2021-February 2021. Necessary permissions were obtained from the Non-interventional Ethics Council of the Kütahya Health Science University (date: January 20, 2021, no: 2021/01-24). It was performed in accordance with the principles of the Declaration of Helsinki. The patients were aged 18 and over. They had various dental complaints. Patients who had mental retardation, speech or hearing problems, and could not cooperate were excluded from the study. With the questionnaire, the socio-demographic characteristics of the participants such as age, gender, education, and income status, as well as the individuals' knowledge and attitudes towards COVID-19 infection, measurements of COVID-19, and the relation between COVID-19 and dentistry were questioned. All participants were informed about the study and written permission was taken. An interviewer obtained data from participants in a room face to face. The collected data were evaluated in the SPSS (ver.20; IBM Corporation, Armonk, NY, USA) program. Descriptive statistics were used to evaluate the responses, and chi-square tests were used to determine differences between groups. The significance level was accepted as 0.05.

RESULTS

The age and gender distribution of participants were presented in Table 1. Education and income rates

TABLE 1: Frequency analysis of demographic data.

	Frequency (n)	Percentage (%)
Age groups		
18-30	137	33
31-40	126	30.4
41-50	88	21.2
51-64	52	12.5
65 and above	12	2.9
Sex		
Female	203	48.9
Male	212	51.1
Income rate		
Below 2,000 TL	90	21.7
2,000-5,000 TL	267	64.3
Above 5,000 TL	58	14
Education		
Illiterate	8	1.9
Primary education	130	31.3
High school	140	33.7
Higher education	121	29.2
Master's/doctorate	16	3.9

demonstrate that the majority of the participants was between 2,000-5,000 TL and high school graduates (64.3%, 33.7% respectively) (Table 1). Of the participants, 87.72% stated that they did not have COVID-19, while 27% were in contact with someone who had COVID-19, 66.3% of individuals did not think that COVID-19 would cause symptoms in the oral cavity and teeth (Table 2). The majority of participants aged 18-30 (49.6%) stated that they learned information about the COVID-19 infection from social media, while half of the participants between the ages of 31-40 stated that they learned information from television and newspaper.

In response to the question, "How do you think the COVID-19 infection emerged?" the option "Made in the laboratory" was chosen by 40.5% of the participants. The differences in responses to this question based on the participants' educational levels were statistically significant (p=0.000).

A question about the transmission of the COVID-19 was asked to participants. Almost all participants reported that the COVID-19 infection was transmitted by sneezing, coughing, or contact (98.6% and 96.4% respectively).

While 50.8% of the participants notified that they had dental problems during the pandemic process, 63.1% of those who had dental problems were women. The most common dental complaint was gum disease (55.2%).

According to the survey results, the 3 methods most frequently used by the participants to reduce the risk of transmission are masks, attention to distance rules, and hand washing (93.5%, 91.8%, 53% respectively). In the question "Which symptoms suggest that you have a COVID-19 infection?" 52.5% of the individuals marked the option of loss of taste and smell, and 47.7% of them marked the option of weakness and joint pain.

Of the participants, 44.6% believed that the devices used in dentistry do not carry the risk of transmission in terms of COVID-19 infection. The

TABLE 2: Frequency of the answers given to some questions.

	Yes (n %)	No (n %)
Have you had a COVID-19 infection?	51 (12.3)	364 (87.7)
Have you ever been in contact with a patient with COVID-19 infection?	112 (27)	303 (73)
Did you have any problems with your teeth during the pandemic process?	211 (50.8)	204 (49.2)
Do you pay attention to the quarantine rules?	407 (98.1)	8 (1.9)
Do you think the use of a mask is enough to protect against COVID-19 infection?	191 (46)	224 (54)
Do you think the COVID-19 virus can cause any symptoms or diseases in the mouth and teeth?	140 (33.7)	275 (66.3)
Do you see oral and dental health centers as risky places in terms of COVID-19 infection transmission routes?	298 (71.8)	117 (28.2)
Do you think that the devices used in dentistry pose a transmission risk for COVID-19 infection?	230 (55.4)	185 (44.6)

COVID-19: Coronavirus disease-2019.

answers given to this question according to the education level of the participants were statistically significant (p=0.008) (Table 3). The percentage of the participants who reported that they paid more attention to their oral and dental health during the restriction period was 88.7%, while this rate was higher for women than men (91.6%, 85.8% respectively).

DISCUSSION

The best way to prevent and slow down transmission is to become conscious and informed about the COVID-19 virus, the disease it causes, and how it spreads. Therefore, every individual of the community has great responsibilities and individual behaviors may dramatically decrease morbidity and mortality rates of COVID-19.[14] Research on the knowledge and attitudes of dentists and dental students has been conducted in the literature, but there have been few studies on dental patients' knowledge and attitudes concerning COVID-19.[15-18] The purpose of this study was to assess dental patients' general knowledge and attitudes concerning COVID-19 in this context.

At the time while the study was being written, there were approximately 111 million patients diagnosed with COVID-19 in the world. In this study, fifty-one participants (12.3%) had COVID-19 infection and 112 participants (27%) were in contact with someone who had COVID-19. Karayürek et al. reported that 1.8% of dental professionals had COVID-19. In the study by Aras et al. conducted with dental students, 11.8% of individuals were in contact with someone who has been diagnosed with COVID-19.[17,18]

To protect from COVID-19 and prevent its spread, it is important to have reliable and true information about the disease. Aras et al. reported that most of the dental students (76.4%) obtain information about COVID-19 from the reports of the Ministry of Health and World Health Organization (WHO).[18] The dentists had reached information about the disease mostly from personal websites/social media accounts (96.27%) and from the Ministry of Health and WHO (91.37%) in the study of Duruk et al. In this study, social media (51.1%) and Ministry of Health (41%) reports are the 2 most used methods by the participants.[15] Though personal websites/social media accounts were used frequently and easily by individuals, for the most reliable and accurate information, people should only access the websites of official and scientific organizations.

There have been confusing pieces of information about the origin of COVID-19. Although a rumor that COVID-19 was brought out in the laboratory on social media and the internet, it was reported that an emergency of SARS-CoV-2 in the laboratory is improbable. It is suggested that SARS-CoV-2 acquired mutations during adaptation to passage in cell culture.[19] In this study, 40.9% of the participants believed that COVID-19 emerged in the laboratory. It seems that confusing information about the origin of COVID-19 affects the community. During the pandemic process, because of the contagiousness of SARS-CoV-2 and inadequate information about

TABLE 3: The answers to the questions about the risk of transmission according to participants' education.

	Do you see oral and dental health centers as risky places in terms of transmission routes of COVID-19 infection?		Do you think that the devices used in dentistry pose a risk of transmission for COVID-19 infection?	
	Yes (n %)	No (n %)	Yes (n %	No (n %)
Illiterate	5 (1.2)	3 (0.7)	5 (1.2)	3 (0.7)
Primary education	75 (18.1)	55 (13.3)	55 (13.3)	75 (18.1)
High school	103 (24.8)	37 (8.9)	84 (20.2)	56 (13.5)
Higher education	103 (24.8)	18 (4.3)	77 (18.6)	44 (10.6)
Master's/doctorate	13 (3.1)	3 (2.6)	9 (2.2)	7 (3.9)
p value	0.000*		0.008*	

*p<0.05, chi-square test; COVID-19: Coronavirus disease-2019.

COVID-19, patients could not be treated for their dental problems. While in the studies about COVID-19, toothache was the most common complaint by the patient during the pandemic process, in this study gum diseases (55.2%) were the most common complaint by the patients.[20-22]

The transmission routes of SARS-CoV-2 can be direct or indirect (contact). Direct ways of transmission are coughing, sneezing, and droplet breathing. Indirect ways of transmission are contact with oral, nasal, and eye mucous membranes.[23] In this study, the participants' knowledge about transmission of COVID-19 was adequate, almost all of the individuals reported that the COVID-19 infection was transmitted by sneezing, coughing, or contact (98.6%, 99.8%, 96.4%, respectively).

It is possible to protect from COVID-19 infection by applying simple measurements such as physical distancing, wearing a mask, avoiding crowds and cleaning hands. When protective measurements of COVID-19 were asked to the participants in the studies about COVID-19, most of the participants reported wearing masks, hand washing, avoiding crowded areas, and physical distancing. Similar to literature wearing, a mask and physical distancing were the 2 most commonly used protective methods by the participants in this study (93.5%, 91.8% respectively).[15,17,18]

Most affected patients from COVID-19 have mild to no symptoms, and fever or chills, cough, shortness of breath, or difficulty breathing are the major symptoms of COVID-19 that have been publicly reported. Nowadays it has been stated that symptoms such as ageusia, anosmia, and headache are important to suspect the possibility of the patient being infected by the SARS-CoV-2 virus.[24] Loss of taste and smell, fatigue, and joint pain were the two most marked COVID-19 symptoms by the participants in this study (52.5%, 47.7% respectively).

According to an article was published by the New York Times, dentists are the occupational group with the highest risk of exposure to the COVID-19.[25] Dental devices such as high-speed rotary handpieces and ultrasonic instruments produce aerosols and droplets so contamination with blood and saliva and the spread risk of the viruses are unavoidable in dentistry.[15,22] In the studies of Sun et al. and Keleş ve Sancaklı, most of the participants thought that there was a risk of COVID-19 transmission in dental treatment.[21,26] The studies of Smail and Ateş, and Ahmed et al. stated that many dental patients in their study were not aware that dental procedures are risky in terms of COVID-19 transmission.[22,26] In this study, the majority (71.2%) of the participants stated that dental clinics are risky places in terms of COVID-19 transmission. However, 44.6% of participants thought that dental devices do not risk the spread of the COVID-19. It seems that though participants in this study know transmission routes of COVID-19, they are unaware of dental devices producing aerosol and droplets and in terms of being a risk factor for COVID-19.

Oral health which has impacted many systemic diseases can not be separated from general health. Oral lesions in COVID-19 patients were reported in many studies.[11,13,27,28] Despite the relationship between COVID-19 and oral lesions has not been lightened, it is suggested that insufficiency of the immune system, adverse reactions of drugs, and fear and emotional stress in COVID-19 patients can cause these lesions.[13,27] Also, a recent study has shown that poor oral health was correlated to increased values of C-reactive protein and delayed recovery period of COVID-19.[29] Even though an association with COVID-19 and oral lesions is suspected, in this study 66.3% of participants did not think the SARS-CoV-2 virus may be associated with oral symptoms in the patients.

It was reported that 20.6% of the participants brushed their teeth more frequently and 75.1% of them took care to eat healthy foods in the study of Keleş and Sancaklı.[21] In this study, 88.7% of the participants stated that they paid more attention to their oral and dental health during the pandemic period, while this rate was higher for women than men (91.6%, 85.8% respectively). Individuals stress levels of individuals can increase during the COVID-19 pandemic periods, in parallel with anxiety and depression.[21] In the pandemic period, increased health anxiety levels, treating only emergency cases in dental clinics may have prompted the patients to change oral health habits.

CONCLUSION

Recent studies highlight that individual behaviors may dramatically decrease morbidity and mortality rates of COVID-19. Although it is concluded that the general knowledge of the participants is sufficient in this study, they should have more information about dentistry and its treatments. This study was performed to raise awareness with a limited number of Turkish dental patients early in the pandemic process, however, further studies with a much larger and different national sample size and longer follow-up period are needed to achieve more precise results.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Melike Yurttaş;* ***Design:*** *Melike Yurttaş, Öznur Küçük;* ***Control/Supervision:*** *Melike Yurttaş, Öznur Küçük;* ***Data Collection and/or Processing:*** *Öznur Küçük;* ***Analysis and/or Interpretation:*** *Melike Yurttaş;* ***Literature Review:*** *Melike Yurttaş, Öznur Küçük;* ***Writing the Article:*** *Melike Yurttaş, Öznur Küçük;* ***Critical Review:*** *Melike Yurttaş, Öznur Küçük;* ***References and Fundings:*** *Melike Yurttaş, Öznur Küçük;* ***Materials:*** *Öznur Küçük.*

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