

Evaluation of Dentists' Anxiety Levels During the Coronavirus Pandemic

Koronavirüs Salgını Esnasında Diş Hekimlerinin Anksiyete Düzeylerinin Değerlendirilmesi

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Abstract

Objective: Coronavirus disease-2019 (COVID-19) is a highly contagious infection whose possible transmission routes are airborne droplets, close contact with an infected person or contaminated surface, blood, or saliva. These possible routes of transmission are closely related to the work conditions of dentists. The present study assessed the anxiety levels of dentists and related factors during the COVID-19 pandemic using the Beck Anxiety Inventory (BAI).

Materials and Methods: A questionnaire consisting of 33 questions on the anxiety levels of dentists related to infection COVID-19 was used. The questionnaires were sent to dentists via online platforms. Mann-Whitney U and Kruskal-Wallis tests were used to compare quantitative variables.

Results: In total, 260 dentists were included in the study. The median (minimum-maximum) BAI score of participants was 28 (19-75), which displayed moderate anxiety. There was a statistically significant difference between the genders in terms of BAI scores ($p<0.001$). No statistically significant difference was found between ages ($p=0.79$). Of the participants, 64.6% ($n=168$) stated that the level of income decreased, and 69.2% stated that safe working conditions decreased.

Conclusions: During the COVID-19 pandemic, dentists were one of the most affected groups by the pandemic due to dental settings. Gender and the presence of chronic disease were the main factors that negatively affected the anxiety level of dentists. As the developments regarding the pandemic are updated daily, dentists should follow them and update their information through various platforms.

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19), olası bulaşma yolları havadaki damlacıklar, enfekte bir kişiyle ya da kontamine bir yüzeyle yakın temas, kan veya tükürük olan oldukça bulaşıcı bir enfeksiyondur. Bu olası bulaşma yolları diş hekimlerinin çalışma şartları ile yakından ilişkilidir. Bu çalışmanın amacı, diş hekimlerinin COVID-19 salgını esnasındaki anksiyete düzeylerini ve ilişkili faktörleri Beck Anksiyete Envanteri (BAE) ile değerlendirmektir.

Gereç ve Yöntemler: Çalışmada, diş hekimlerinin COVID-19 enfeksiyonuna ilişkin anksiyete düzeyleri ile ilgili 33 sorudan oluşan anket formu kullanıldı. Anketler online platformlar aracılığıyla diş hekimlerine gönderildi. Kantitatif değişkenleri karşılaştırmak için Mann-Whitney U ve Kruskal-Wallis testleri kullanıldı.

Bulgular: Toplamda 260 diş hekimi çalışmaya dahil edildi. Katılımcıların ortalama (minimum-maksimum) BAE skoru 28 (19-75) olarak bulundu ve bu skor orta

derecede anksiyeteyi ifade etmektedir. BAE skorlarına göre cinsiyetler arasında istatistiksel olarak anlamlı fark vardı ($p<0,001$). Ancak yaşlara göre istatistiksel olarak anlamlı bir fark bulunmadı ($p=0,79$). Katılımcıların %64,6'sı ($n=168$) gelir düzeylerinin düştüğünü, %69,2'si ise güvenli çalışma koşullarının azaldığını belirttiler.

Sonuç: COVID-19 salgını esnasında, çalışma ortamlarının doğası gereği salgından en çok etkilenen gruplardan biri diş hekimleridir. Çalışmamızda, cinsiyet ve kronik hastalık varlığı diş hekimlerinin anksiyete düzeyini olumsuz etkileyen temel faktörler olarak belirlendi. Salgın ile ilgili gelişmeler günden güne değişiklik gösterebildiği için, diş hekimlerinin gelişmeleri yakından takip etmeleri ve çeşitli platformlar üzerinden bilgilerini güncellemeleri gerekmektedir.

Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) or better known as the 2019 coronavirus disease (COVID-19) is a viral infection that first started in December 2019 in Wuhan, China (1). This newly discovered highly contagious infection spread very rapidly to other countries of the world and became a worldwide pandemic in a few weeks (2,3). The first positive case in our country was detected on March 11, 2020, the same day the World Health Organization officially declared the COVID-19 outbreak (4).

The common clinical symptoms of COVID-19 are fever, dry cough, dyspnea, myalgia, fatigue, headache, diarrhea after 3-5 days incubation period. Anosmia and ageusia were also reported in most patients for early diagnosis of COVID-19 infection. Radiological findings of the disease are ground-glass opacities in lower lung lobes (5-7). Since the symptoms of most patients (about 80%) are not very obvious, the number of undiagnosed patients increases. These patients can easily transmit the infection to other people (8,9).

Airborne droplets, close contact to an infected person or a contaminated surface, blood or saliva are reported routes of possible transmission. These transmission routes pose a great risk in dental practice, which has a similar transmission route (10). Dental procedures can cause bleeding, aerosol and droplet formation, causing the infection to be transmitted from the patient to the dentist and other people in the same area (10,11). On the other hand, the dental office also potentially may expose patients to cross-infection. Due to the risk of cross-infection, emergency dental care was recommended in dentistry (12). Therefore, the risk of contamination and reduced working hours due to infection may lead to anxiety in dentists.

The aim of this study was to evaluate the anxiety levels of dentists and related factors during COVID-19

infection using the Turkish version of Beck Anxiety Inventory (BAI) (13).

Materials and Methods

Ethical approval of the study was obtained from, Ethics Committee of the Faculty of Medicine of Aydın Adnan Menderes University (protocol number: 2020/88, date: 07.05.2020). In addition, Republic of Turkey, Ministry of Health, Scientific Research Platform also approved the study. In this study, a questionnaire consisting of 33 questions on the anxiety levels of dentists related to infection of COVID-19 was composed and converted into an online format by using the Google forms (Google Inc., Mountain View, CA, USA) and sent through WhatsApp to the dentists. The dentists who participated in the study were accessed from institution database. This questionnaire was conducted between August to September 2020. A statement about the details of the study was added to the beginning of the questionnaire and it was stated that participation was voluntary. The first 12 questions addressed personal and professional information, including their age, gender, marital status, number of children, institution, presence of expertise, smoking status, chronic disease, income level, work position, safe working conditions, and the remaining 21 questions were the items of the BAI (14).

Beck Anxiety Inventory

The BAI evaluates the extent of anxiety containing 21 questions related to common symptoms of anxiety. Each question is scored between 0 and 3 points, so the total score ranges from 0 to 63. A total score of 0-21 indicates very low anxiety, 22-35 represents moderate anxiety, and 36 and higher means potentially concerning levels of anxiety. The reliability and validity of the scale for the Turkish population was tested by Ulusoy et al. (13).

Statistical Analysis

The statistical package of SPSS version 23.0 for Windows (SPSS, Inc, Chicago, IL, USA) was used for analysis of the data. Mann-Whitney U test was used to compare for two independent groups and Kruskal-Wallis test was used to compare for more than two independent groups for quantitative variables. Pairwise comparisons were performed using Dunn's test. A p-value of less than 0.05 was considered to indicate a statistically significant difference.

Results

A total of 260 responses were received with a response rate of 80%. The median [minimum (min)-maximum (max)] BAI score of participants was 28 (19-75) which displays moderate anxiety. The distribution of anxiety levels of the participants according to BAI scores was represented in Table 1. Of the participants, 56.5% were female (n=147), and 43.5% (n=113) were male. There was statistically significant difference between the genders in terms of BAI scores ($p<0.001$). The median (min-max) BAI score of female dentists was 32 (19-75), while that of male dentists was 25 (21-52). The age range of the participants was 25-60. No statistically significant difference was found between ages ($p=0.79$). A statistical analysis revealed that there was significant difference between the participants' BAI scores in terms of chronic diseases ($p=0.01$). The median (min-max) BAI score of participants with chronic disease was 33 (22-75), and those without chronic disease was 28 (19-59). In addition, there was a statistically significant difference in terms of working conditions (work positions, work security and safe working conditions) of the participants. Of the participants, 64.6% (n=168) stated that the level of income decreased, 33.8% (n=88) did not change, and 1.5% (n=4) increased. However, no statistical

difference was found related to income levels ($p=0.79$). The demographic and professional features of the participants are provided in Table 2.

Discussion

Among healthcare professionals, dentists are more vulnerable to infectious diseases, as they work in routine clinical procedures close to the patients' oral and nasal cavities that contain body fluids such as saliva, mucus and blood (15). Dentists treating COVID-19 positive patients who are asymptomatic or in the incubation period are at serious risk of exposure to the virus and cross-infection (16,17). This possibility may cause fear and anxiety in physicians. Additionally, economic concerns may trigger anxiety in this group due to recommended emergency dental care procedures or postponed practices until an uncertain period (18,19). In this study, approximately two-thirds of the participants stated that their income level (64.6%) and safe working conditions (69.2%) decreased. Depending on the risk of virus contamination and economic concerns, participants presented moderate anxiety using the BAI. This scale is a standard protocol which was used in the present study to measure anxiety levels of various dental practitioners. In their study using the BAI, Zhao et al. (19) stated that frontline dental staff is more likely to suffer from anxiety disorders than the general public. According to the study findings of Suryakumari et al. (18), the mean anxiety scores of the dental practitioners were high, but a high percentage of the population presented with a low level of anxiety. In a different study applied to dentists through a questionnaire in various countries, Ahmed et al. (20) suggested that dentists have high anxiety levels. Similarly, Mahdee et al. (21) also reported a high level of anxiety in Iraqi dentists. In a recently published study, Oliveri et al. (22) reported high level of general anxiety during the first weeks of pandemic in endodontists and dental staff. In a different study (23), the authors declared that the participants have low level of comfort related to the COVID-19 pandemic similar to the study of Yilmaz and Ozbilen (24) which was performed to orthodontists. According to the study of Tysi c-Mi sta and Dziedzic (25) dentists who suspended their clinical work expressed high anxiety in comparison to dentists who continued their practice.

Table 1. The distribution of anxiety levels of the participants

Anxiety levels	BAI score	n	%
Very low anxiety	0-21	25	9.6
Moderate anxiety	22-35	170	65.4
Concerning levels of anxiety	≥ 36	65	25.0
	Total	260	100.0

BAI: Beck Anxiety Inventory

Table 2. The demographic and professional features of the participants

Sociodemographic characteristics	n (%)	median (min-max)	p-value
Gender			
Female	147 (56.5)	32 (19-75)	p<0.001
Male	113 (43.5)	25 (21-52)	
Age			
25-35	112 (43.1)	28 (21-75)	0.79
36-45	99 (38.1)	28 (21-59)	
46-60	49 (18.8)	31 (19-53)	
Institution			
State agency	170 (65.4)	29 (21-59)	0.21
Private practice	90 (34.6)	28 (19-75)	
Presence of expertise			
Yes	128 (49.6)	28 (21-75)	0.93
No	130 (50.4)	28 (19-59)	
Marital status			
Married	180 (69.2)	28.5 (19-75)	0.15
Not married	80 (30.8)	27 (21-52)	
Chronic disease			
Yes	38 (14.6)	33 (22-75)	0.01
No	222 (85.4)	28 (19-59)	
Number of children			
0	114 (43.8)	28 (21-75)	0.07
1	79 (30.4)	31 (21-53)	
2	57 (21.9)	27 (19-52)	
>2	10 (3.8)	30.5 (24-59)	
Smoking status			
Before pandemic, No; Now, No	177 (68.3)	28 (19-75)	0.94
Before pandemic, No; Now, Yes	7 (2.7)	29 (24-36)	
Before pandemic, Yes; Now, Yes	62 (23.9)	27.5 (21-59)	
Before pandemic, Yes; Now, No	13 (5.0)	30 (22-41)	
Income level			
Decreased	168 (64.6)	28 (19-75)	0.79
Not changed	88 (33.8)	28 (21-57)	
Increased	4 (1.5)	36 (23-49)	
Work security			
Can lose	30 (11.6)	34 (23-53)	0.007
Not changed	228 (88)	28 (19-59)	
Lost*	1 (0.4)		
Work position			
Cannot work on my position ^a	66 (25.4)	28 (21-75)	0.008
Working on my position ^a	170 (65.4)	28 (19-59)	
Working out of my position ^b	24 (9.2)	34.5 (21-57)	
Safe working conditions			
Decreased ^a	180 (69.2)	30 (19-75)	0.001
Not changed ^b	35 (13.5)	25 (21-41)	
Increased ^b	45 (17.3)	27 (21-45)	

^{a,b}Significant differences are represented by different superscript letters, *not analyzed, min-max: Minimum-maximum

Various findings were reported as potential factors associated with the anxiety levels of dentists. In this study, it was determined that age, specialty, income level, and smoking status did not affect anxiety level, but gender, work position, work security, safe working

conditions and presence of chronic disease negatively affected. In contrast, Zhao et al. (19) stated that while age and protective measures were inversely related to anxiety level, workload, potential infectious substance exposure and aerosol formation were not associated

with anxiety. Age, gender, qualification, type of practice, and years in practice were not effective on the high levels of fear and anxiety according to findings of Suryakumari et al. (18). No significant relationship was reported by Ahmed et al. (20) between the anxiety levels of dentists and their gender and education levels. Age and gender affected the anxiety levels of dentists according to study of Mahdee et al. (21). As mentioned, various anxiety levels and related factors were reported for dentists in the literature. These differences may arise from study population, sample size, country conditions, economical status, and the questionnaires (self-structured or validated) used in these studies.

If the necessary protective measurements are not undertaken, dental staff can be exposed to infection because of the nature of dental settings (15). In fact, dental staff is very familiar with personal protection and infection control measures and risk assessment. However, further protective measures should be required to protect against this pandemic. N95 or FFP2/FFP3 masks were uncommon for infection control in dentistry until COVID-19 pandemic (23). Medical uniform, disposable protective clothing and cap, N95 or FFP2/FFP3 masks, protective goggles and face shield, and gloves are the most commonly used personal protective equipment to protect against COVID-19 infection (3,11,12,22). Surface disinfection, ventilation of the operating room, and washing hands frequently are also recommended precautions. Before dental procedures, mouth washing with chlorhexidine or hydrogen peroxide and rubber dam using are necessary for aerosol-producing procedures (8,10,15). Despite taking personal protective measures, dentists may be concerned about the risk of infection. Taking necessary preventive measures and having sufficient knowledge on this subject will reduce the anxiety level of dentists. By controlling infection, dentists can play an important role in preventing the transmission of COVID-19. Additionally, thanks to the application of COVID-19 vaccine to healthcare professionals, the anxiety levels of physicians may also decrease (3,5). There are some limitations of the study. The effect of the vaccine on the anxiety level of dentists was not evaluated. There was no study in the literature that measured the anxiety levels of dentists after vaccination against COVID-19 infection. In addition,

anxiety levels of dentists were not measured before the pandemic.

Conclusion

In the present study, gender and the presence of chronic disease adversely affected the anxiety level of dentists. The changes in work positions and the decrease in safe working conditions of dentists during the pandemic have also negatively affected the level of anxiety of this group. The experiences obtained during the unprepared COVID-19 pandemic clearly revealed the necessity of preparing appropriate protocols for each healthcare institution to set an example for similar global pandemics that may occur in the future. Being prepared for such extraordinary conditions will help reduce the anxiety levels of dentists.

Ethics

Ethics Committee Approval: Ethical approval of the study was obtained from, Ethics Committee of the Faculty of Medicine of Aydın Adnan Menderes University (protocol number: 2020/88, date: 07.05.2020).

Informed Consent: Informed consent was not applicable for this type of study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: G.Ö., Concept: G.Ö., G.Ş., Design: G.Ö., G.Ş., Data Collection or Processing: G.Ö., G.Ş., U.E.A., Analysis or Interpretation: U.E.A., Literature Search: G.Ö., Writing: G.Ö.

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References

1. Chen L, Zhao J, Peng J, Li X, Deng X, Geng Z, et al. Detection of SARS-CoV-2 in saliva and characterization of oral symptoms in COVID-19 patients. *Cell Prolif* 2020; 53: e12923.
2. Spagnuolo G, De Vito D, Rengo S, Tatullo M. COVID-19 Outbreak: An Overview on Dentistry. *Int J Environ Res Public Health* 2020; 17: 2094.
3. Guo H, Zhou Y, Liu X, Tan J. The impact of the COVID-19 epidemic on the utilization of emergency dental services. *J Dent Sci* 2020; 15: 564-7.
4. Hacimusalar Y, Kahve AC, Yasar AB, Aydın MS. Anxiety and hopelessness levels in COVID-19 pandemic: A comparative study of healthcare professionals and other community sample in Turkey. *J Psychiatr Res* 2020; 129: 181-8.

5. Sabino-Silva R, Jardim ACG, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. *Clin Oral Investig* 2020; 24: 1619-21.
6. Ather A, Patel B, Ruparel NB, Diogenes A, Hargreaves KM. Coronavirus Disease 19 (COVID-19): Implications for Clinical Dental Care. *J Endod* 2020; 46: 584-95.
7. Passarelli PC, Rella E, Manicone PF, Garcia-Godoy F, D'Addona A. The impact of the COVID-19 infection in dentistry. *Exp Biol Med* (Maywood) 2020; 245: 940-4.
8. Coulthard P. Dentistry and coronavirus (COVID-19) - moral decision-making. *Br Dent J* 2020; 228: 503-5.
9. Bescos R, Casas-Agustench P, Belfield L, Brookes Z, Gabaldón T. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *J Dent Res* 2020; 99: 1113.
10. Ge ZY, Yang LM, Xia JJ, Fu XH, Zhang YZ. Possible aerosol transmission of COVID-19 and special precautions in dentistry. *J Zhejiang Univ Sci B* 2020; 21: 361-8.
11. Banakar M, Bagheri Lankarani K, Jafarpour D, Moayedi S, Banakar MH, Mohammad Sadeghi A. COVID-19 transmission risk and protective protocols in dentistry: a systematic review. *BMC Oral Health* 2020; 20: 275.
12. Amato A, Caggiano M, Amato M, Moccia G, Capunzo M, De Caro F. Infection Control in Dental Practice During the COVID-19 Pandemic. *Int J Environ Res Public Health* 2020; 17: 4769.
13. Ulusoy M, Sahin NH, Erkmen H. Turkish Version of the Beck Anxiety Inventory: Psychometric Properties. *J Cogn Psychother* 1998; 12: 163-72.
14. Beck AT, Epstein, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol* 1988; 56: 893-7.
15. Ren Y, Feng C, Rasubala L, Malmstrom H, Eliav E. Risk for dental healthcare professionals during the COVID-19 global pandemic: An evidence-based assessment. *J Dent* 2020; 101: 103434.
16. Al-Khalifa KS, AlSheikh R, Al-Swuailam AS, Alkhalifa MS, Al-Johani MH, Al-Moumen SA, et al. Pandemic preparedness of dentists against coronavirus disease: A Saudi Arabian experience. *PLoS One* 2020; 15: e0237630.
17. De Stefani A, Bruno G, Mutinelli S, Gracco A. COVID-19 Outbreak Perception in Italian Dentists. *Int J Environ Res Public Health* 2020; 17: 3867.
18. Suryakumari VBP, Pallavi Reddy Y, Yadav SS, Doshi D, Surekha Reddy V. Assessing Fear and Anxiety of Corona Virus Among Dental Practitioners. *Disaster Med Public Health Prep* 2022; 16: 555-60.
19. Zhao S, Cao J, Sun R, Zhang L, Liu B. Analysis of anxiety-related factors amongst frontline dental staff during the COVID-19 pandemic in Yichang, China. *BMC Oral Health* 2020; 20: 342.
20. Ahmed MA, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar MS, et al. Fear and Practice Modifications among Dentists to Combat Novel Coronavirus Disease (COVID-19) Outbreak. *Int J Environ Res Public Health* 2020; 17: 2821.
21. Mahdee AF, Gul SS, Abdulkareem AA, Qasim SSB. Anxiety, Practice Modification, and Economic Impact Among Iraqi Dentists During the COVID-19 Outbreak. *Front Med (Lausanne)* 2020; 7: 595028.
22. Olivieri JG, de España C, Encinas M, Ruiz XF, Miró Q, Ortega-Martinez J, et al. General Anxiety in Dental Staff and Hemodynamic Changes over Endodontists' Workday during the Coronavirus Disease 2019 Pandemic: A Prospective Longitudinal Study. *J Endod* 2021; 47: 196-203.
23. Bakaeen LG, Masri R, AlTarawneh S, Garcia LT, AlHadidi A, Khamis AH et al. Dentists' knowledge, attitudes, and professional behavior toward the COVID-19 pandemic: A multisite survey of dentists' perspectives. *J Am Dent Assoc* 2021; 152: 16-24.
24. Yilmaz HN, Ozbilen EO. The Assessment of Knowledge, Behaviors, and Anxiety Levels of the Orthodontists about COVID-19 Pandemic. *Turk J Orthod* 2020; 33: 224-31.
25. Tysiąc-Miśta M, Dziedzic A. The Attitudes and Professional Approaches of Dental Practitioners during the COVID-19 Outbreak in Poland: A Cross-Sectional Survey. *Int J Environ Res Public Health* 2020; 17: 4703.