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Effect of COVID-19 Pandemic on Anxiety and Treatment Adherence in Orthodontic and Dental Patients

COVID-19 Pandemisinin Ortodonti ve Genel Diş Hekimliği Hastalarındaki Kaygı ve Tedavi Devamlılığına Etkisi

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Abstract

Aim: The COVID-19 pandemic affected not only the working dental staff but also dental and orthodontic patients in many ways like psychological distress and not attending scheduled appointments due to anxiety. Reduced adherence to orthodontic appointments is known to be one of the main causes of failed treatment. This study aimed to evaluate the differences in the psychological wellbeing of general dental patients and orthodontic-patients during the COVID-19-pandemic regarding their treatment progress.

Material and Methods: This cross-sectional study involved 200 patients. The sample was divided into two groups of 100 as general dental and orthodontic patients respectively. Two forms of a previously prepared questionnaire containing the Kessler Psychological Distress Scale (K10) were given to the patients.

Results: Seventy-six percent of the total sample felt anxious about isolation during COVID-19 pandemic. Anxiety and depression levels in general dental patients were statistically significantly higher than orthodontic patients. Besides, 40% of orthodontic patients feared that their treatment duration will elongate and 35% were agreed that teeth movement is affected negatively during the quarantine.

Conclusion: The quarantine showed to have an impact on the appointment adherence and patients' anxiety regarding their treatment. Patients fear getting infected or infecting their relatives by their routine dental appointments. Orthodontic patients were more concerned than general dental patients about the possible negative effect of the pandemic on their treatment. As orthodontic treatment is a long-term treatment with routine appointments, to reduce anxiety levels of these patients', routine tele-orthodontic appointments could be a solution for non-emergent cases.

Keywords: COVID-19, orthodontics, surveys, psychological distress

Öz

Amaç: COVID-19 pandemisi sadece çalışan diş hekimlerini değil, hastaları da psikolojik kaygı nedeniyle randevularına gidememe yönünde etkilemiştir. Ortodontik randevulara devamlılığın aksaması, başarısız tedavilerin ana nedenlerinden biri olarak bilinmektedir. Bu çalışma, genel diş hekimliği hastalarının ve ortodonti hastalarının COVID-19 salgını sırasında tedavi ilerlemelerine ilişkin psikolojik iyi oluşlarındaki farklılıkları değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntem: Bu kesitsel çalışma 200 hastayı içermektedir. Örneklem, sırasıyla genel diş hekimliği ve ortodonti hastaları olmak üzere yüzer kişilik iki gruba ayrılmıştır. Hastalara Kessler Psikolojik Sıkıntı Ölçeği'ni (K10) içeren önceden hazırlanmış olan iki anket formu doldurtulmuştur.

Bulgular: Toplam örneklemin yüzde yetmiş altısı, COVID-19 salgını sırasında izolasyon konusunda endişeli hissetmiştir. Genel diş hekimliği hastalarında anksiyete ve depresyon düzeyleri, ortodontik hastalardan istatistiksel olarak anlamlı derecede yüksek bulunmuştur. Ayrıca ortodonti hastalarının %40'ı tedavi sürelerinin uzayacağından korkarken, %35'i karantina süresince diş hareketlerinin olumsuz etkilendiği konusunda hemfikir oldukları tespit edilmiştir.

Sonuç: Karantinanın, randevu devamlılığı ve hastaların tedavilerine ilişkin kaygıları üzerinde etkisi olduğu gözlenmiştir. Çoğu hasta, rutin diş randevuları sırasında enfekte olmaktan veya akrabalarına virus bulaştırmaktan korkmaktadır. Ortodonti hastaları, pandeminin tedavileri üzerindeki olası olumsuz etkisi konusunda genel diş hekimliği hastalarına göre daha fazla endişelidir. Ortodontik tedavi rutin randevularla uzun süreli bir tedavi olduğundan bu hastaların kaygı düzeylerini azaltmak için rutin tele-ortodontik randevular acil olmayan durumlar için bir çözüm olabilir.

Anahtar Kelimeler: COVID-19, ortodonti, anket, psikolojik stres

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INTRODUCTION

Extreme Coronavirus 2 (SARS-CoV-2), presently equipped for causing COVID-2019 (COVID-19) worldwide, started in Wuhan, China, toward the finish of 2019. On January 30, 2020, the World Health Organization (WHO) hailed this as a pandemic. Patients with confirmed coronavirus disease 2019 presented symptoms including fever, cough, sneezing, vomiting, general weakness, and severe pneumonia (1). All experts globally still plan and implement infection prevention measures to further spread the infection and help fight pandemics (2).

A significant proportion of countries have adopted SARS-CoV-2 containment and infection containment methodologies, including organizing infection tests, excellent social isolation, restricted segregation, and observation of the most vulnerable populations. The measures taken are generally managed by the official WHO sites, contingent upon the number of cases in every nation (1).

Many previous studies reported high cross-transmission rates of COVID-19 among healthcare workers. According to the literature, the risk of cross-infection between patients and dentists is high (3). Since the incubation period of this disease ranges from 14 days to 24 days, during this latency period, the virus is still highly infectious. According to a previous study, aerosol formation is a confirmed transmission route in dental clinics (4). Many patients visit the orthodontic clinic during the day, which requires very serious application of infection control measures for SARS-CoV-2. The COVID-19 pandemic has several consequences (5), including family reunification, closure of schools, associations, and government offices, and changes in work plans that create an incredible fear of the dark. Questionable or even inaccurate information on disease behavior, geographic distribution, pollutant levels, and actual mortality rates have exacerbated the weakness and fears of the population (5). Today, dentists, as a rule, cannot provide dental care regularly but are limited to service only in emergencies and crises in areas at high risk of COVID-19 transmission (6). Little attention is paid to the propensities and concerns of orthodontic patients, which are associated with the effects of the pandemic and social fragmentation, as scheduled hours are associated with longer treatment periods (7).

This article aims to examine the consequences of epidemiological isolation and quarantine on orthodontic and dental appointments and to measure the anxiety levels experienced by the patients regarding their treatment duration and outcomes.

MATERIALS and METHODS

This research follows the principles of the World Medical Association (WMA) Declaration of Helsinki. Before starting the procedures, ethical committee approval (approval no: 2020/ 10-517) is received from Istanbul Yeni Yuzyil University Ethical Committee for Health Science Researches. Informed consent is obtained from all volunteers who filled in the surveys.

Power analysis (G*power 3) calculation was used and based on expecting a moderate level of correlation for the survey. The power analysis showed that a minimum of 197 responses is required to represent the active patients. The sample for this cross-sectional study comprised 200 attendants with an age rate between 17–47 years (Table 1). The total sample is divided into two groups: a control group of 100 patients visiting Istanbul Yeni Yuzyil University Dental Hospital for general dental treatments and a study group of 100 patients visiting the orthodontic department of the same hospital.

The inclusion criteria for this study included patients aged 17 years old or above, presenting good general and oral health, undergoing active dental or orthodontic treatment during the pandemic, and agreeing to participate in the survey. While the exclusion criteria included, patients younger than 17 years old and patients cut off their treatment before the COVID-19 pandemic. Two forms of previously prepared surveys composed of questions about how the patients feel about the pandemic and how anxious they were about their oral health and dental treatment plan were prepared and given to the patients as; a) Structure A for the overall dental patients, including demographics and COVID-19 related epidemical data concerning their dental treatment, and b) structure B for the orthodontic patients including demographics and COVID-19 related epidemical data and orthodontic situation of the patients. The two structures incorporated the Kessler Psychological Distress Scale (K10), widely accepted as an authenticated clinical index of

psychological signs (8). The patients were instructed on the way to complete the survey.

In both forms, the first section comprises seven questions (Q) to evaluate descriptive information and depressive symptoms the attendance. The second section was composed of nine questions with multiple choice answers about the understanding of the seriousness of the disease, including questions about the investigators' risk of infection of COVID-19, including awareness and seriousness of COVID-19, and the major concerns about the effects of the outbreak for themselves, and those around them. A numerical rating scale (NRS) was used to measure the degree of anxiety related to the pandemic and the influence of quarantine on their dental therapy, with 0 being no anxiety and 10 being severe anxiety, and how long since their last visit to the dental clinic. In Form B, two additional questions were added for orthodontic patients to indicate reported what kind of orthodontic appliance they use (fixed/removable/fixed lingual appliance) and anxiety levels regarding the negative effect of the pandemic and quarantine during their orthodontic therapy. The K10 scale was composed of ten questions to appraise mental discomfort. Each question was consumed on a five-point scale from 1 (none of the time) to 5 (all the time), and the overall score was between 10 and 50.

Statistical analysis

Statistical analysis was performed with SPSS (statistical package for the social sciences) v.25 (IBM, New York, NY). Statistical significance level was established at $p<.05$. Independent samples t-tests were used to determine the effect of patients' treatment and gender on anxiety with the pandemic, its impact on a treatment plan, and the effect on patients' treatment on K10 score. In order to ascertain the effect of patients' treatment and gender on the remaining questions in section 1, the Chi-square test was used as they were nominal variables.

RESULTS

COVID-19-related epidemiological information:

In the total sample, 71.5% stayed home as much as possible, 22% went out as usual, and only 6.5% did not leave home for anything. Regarding respecting the quarantine, orthodontic patients scored significantly higher than general dental patients, p=.033. Ten percent of general dental patients did not venture from home for anything compared to only 3% of orthodontic patients. Also, 79% of orthodontic patients stayed home; however, much could reasonably be expected compared to 64% of general dental patients. However, 26% of general dental and 18% of orthodontic patients went out as usual, with no statistically significant difference between the groups (Table 2).

Seventy-six percent of the specimen felt anxious about the isolation and the pandemic. In detail, 83% of general dental patients felt anxious, while only 69% of orthodontic patients felt anxious. However, results for both groups did not indicate any statistically significant differences, p=.076 (Table 2). The anxiety level with the coronavirus pandemic in general dental patients was significantly higher than orthodontic patients by 0.7, p=.010. Similarly, anxiety levels caused by the fear that the pandemic and lockdown will have a negative effect on dental treatment in general dental patients were significantly higher than orthodontic patients, p=.017 (Table 2). A significant difference was observed in the will to go if the dental specialist reached out to plan an appointment during the quarantine between the two groups of dental and orthodontic patients $p<.001$. Only 16% of general dental patients claimed that they were able to go to the appointment compared to 66% of orthodontic patients, while 78% of general dental patients claimed to be able to go to the appointment only in case of urgency compared to 31% from orthodontic patients (Table 2).

The most important protective equipment for general dental patients was a face shield in combination with a surgical mask (93%), while for orthodontic patients, this was found to be the disposable surgical mask (84%) (Table 2). The main concerns about the COVID-19 outbreak for the total sample were the risk of infection for their relatives (67%) then the danger of the disease (27%), with no significant difference between both groups, p=.959 (Table 2). There was a significant difference in the last clinic visit between groups ($p<0.001$). Sixty-eight percent of general dental patients had their last visit to the clinic 3-6 months ago; however, 52% of orthodontic patients had their last visit to the clinic 1-2 months ago (Table 2). The important concern of attending an appointment for both general dental patients and orthodontic patients was the risk of infecting themselves or their families (69% and 81%, respectively) (Table 2).

As a result of the present study, it was observed that about

Table 1. Patients' age and gender within study groups.

Gender	n	General Dental Patients		Orthodontic Patients	
		Mean± SD	Min-Max	Mean± SD	Min-Max
Male	107	31.±7.9	17 - 47	23±5.9	55 - 36
Female	93	32 ± 8.1	18 - 46	21.8 ± 5.5	16 - 39
Total	200	31.6 ± 8	17 - 47	22.6 ± 5.7	55 - 39

40% of the orthodontic patients firmly concurred that the COVID-19 outbreak-related quarantine would elongate their treatment duration, and 35% agreed that the teeth movement is affected negatively related to less frequent appointments. For orthodontic patients, the main concerns about mechanics placed in the mouth and not followed by frequent appointments were as follows; a) loop bends getting loose and inactive, b) broken brackets, and c) loose temporary anchorage devices. The most complaints and reasons for an urgent appointment among orthodontic patients were poking wires, debonded brackets, and elastics coming out. However, for general dental patients, the main cause was pain which would not be stopped with medication.

A significant difference was observed in respecting the quarantine between males and females (p=0.006). Only 2.8% of males do not leave home for anything compared to only 10.8% of females, and 29% of males go out as usual compared to 14% of females. However, 68.2% of males and 75.3% of females were staying at home as much as possible—with no statistically significant difference between the groups. Males (82.2%) felt more anxious than females (68.8%), and females (12.9%) felt more fear than males (3.7%). Orthodontic patients were more willing to attend a scheduled appointment during the quarantine than the general patient group (Table 2).

Kessler Psychological Distress Scale (K10):

The K10 items demonstrated a Cronbach's alpha of 0.88, indicating high internal consistency. There was no significant difference in the K10 score between general dental patients and orthodontic patients, p=.634 (Table 3). Less than half of the general dental patients had anxiety feelings more often than usual (39%), 57% about the same as usual, and 4% less than usual. It was significantly more than orthodontic patients; 21% had these feelings more than usual, 64% about the same as usual, and 15% less often than usual, p=.001 (Table 3). The reported count of days shows general dental patients claimed not to be able to work or carry out their normal activities because of negative and depressive feelings—significantly higher than orthodontic patients, p<.001 (Table 3). The reported number of days general dental patients could do consists of only half or even less of their daily activities. It is because negative and depressive feelings were significantly higher than orthodontic patients', p<.001 (Table 3). The number of times general dental patients contacted a health professional about these feelings was significantly higher than orthodontic patients, p=.030 (Table 3). Seventy-five general dental patients reported that they did not believe the main cause of negative feelings was physical health problems. At the same time, 16% of the patients agreed that this was the main cause only a little of the time, and 9% some of the time. For orthodontic patients, it was never the main cause in 71%. Besides, little of the time was relevant for 20%, some of the time in 8%, and most of the time in 1%. However, no significant difference was observed between the two groups, p=.234 (Table 3).

DISCUSSION

The COVID-19 pandemic had a global impact on daily life events due to unexpected diseases and deaths (9). According to a survey released by the WHO on April 24, 2020, Turkey is in the sixth place in the European region for the COVID-19 outbreak. The outbreak of

this disease and related life changes—like quarantine and lockdown measures—have been reported to have a psychological impact on the public through panic, increased anxiety, and depression (10,11). Previous research has been published detailing the potential impact of COVID-19 on Dentistry (12). Other articles have described the routes of transmission, implications, and controls required in dental practice to prevent cross-infection (13). As patients, students, and teachers all share the same limited space in the Dental Clinics and Dental Hospitals of Universities, it is believed that these places are likely to create a favorable place for the spread of the virus faster (14). To prevent the dissemination of the virus, it is crucial to raise awareness and control cross-contamination among the patients, dentists, and assistants by providing information about precautions and recommendations in the dental clinic (15,16). As the main route for coronavirus transmission has been identified as through droplets and aerosols (17), the results of the present study revealed that many dental patients fear getting infected during their routine dental appointments. The latest COVID-19 epidemic recommendations recommend that all non-essential dental care should be delayed, and only patients showing symptoms of discomfort, severe swelling, bleeding, and severe acute injuries should be recommended to seek treatment (3-18). According to a study conducted at a dental emergency department in Beijing, China (15), the impact of the COVID-19 pandemic on the reporting of dental treatments was observed.

The average K10 score of all respondents of the present study was 19.3, significantly higher than the normative population in other research (19,20). It was quite clear that the pandemic negatively affected dental patients' mental health. Supporting the findings of the present study, authors of previous articles have revealed the relationship between dentofacial discomfort and poor oral-health-related quality of life and indications of mental illness (21), parallel to our findings. In the present survey study, males appeared to be more anxious than females; this finding is inconsistent with a survey of psychological distress performed in China during the COVID-19 pandemic, which indicated the opposite (22). Another study performed in the Department of Orthodontics at UNINGA University Center in Brazil revealed that male patients described themselves as calmer than females and the level of anxiety was higher for female patients regarding the pandemic (23). According to the results of another recent study, fear levels and signs of depression in younger people were considerably higher during the pandemic than in older people (24). Besides, the level of anxiety related to the negative impact of the quarantine on the orthodontic treatment outcome was observed to be less than the anxiety about the pandemic itself as only 34% (24). In the present study, 52% of the orthodontic patients claimed that their last visit to the orthodontic clinic was from one-two month before. This result parallels the findings of Peloso et al. (25), who reported that more than 50% of Brazilian patients attended the dental clinic, predominantly for orthodontic procedures, since the pandemic began. According to the results of the present study, the orthodontic patients were more willing to come to a scheduled appointment. This could be related to the fear of thinking that the delayed appointments during the lockdown would affect their treatment outcome. The results of the present study showing that most patients feared contracting the virus during orthodontic appointments are consistent with findings in previous studies (23-25). Dentists and dental assistants have recently been accepted as being at high risk of infection potential among all healthcare professionals as they are in close contact with patients and exposed to droplet spread of saliva and aerosol (26). Most of the articles have concentrated on the impact of the COVID-19 pandemic on the mental health status of the general population and healthcare workers (22,27-29). Some other articles focused on the mental health risks of the COVID-19 pandemic among more vulnerable groups, including patients with pre-existing psychiatric illnesses (30,31). Although most of the participants in the present study were aged between 15 to 30 years of age with no previous health problems, according to the K10, higher depression, and anxiety scores were recorded. There are many sources regarding information on the coronavirus pandemic, including social media platforms, although their creditability is questionable. Misinformation caused by the infodemic created by social media regarding the coronavirus pandemic has been known to affect mental health negatively (32). In many articles, it has been advocated that individuals have started avoidance regarding crowded social gatherings as well as maintaining strict hygiene measures (33). Results of the present study revealed that most

Table 2. COVID-19 related epidemiological information

		Patients			
		Total	General Dental	Orthodontic	P
		n = 200	n = 100	n = 100	
Respecting the quarantine	Do not leave home for nothing	6.5%	10%$_a$	3%$_b$	.033*
	Staying home as much as possible	71.5%	64%$_a$	79%$_b$	
	Going out as usual	22%	26%$_a$	18%$_a$	
General anxiety level	Calm	13%	8%	18%	.076
	Anxious	76%	83%	69%	
	Fear	8%	8%	8%	
	Panic	1.5%	0%	3%	
	Indifferent	1.5%	1%	2%	
Anxiety with the coronavirus pandemic (Mean ± Sd.)		7 ± 1.8	7.4 ± 2	6.7 ± 1.7	**.010***
Appointments during the quarantine	Yes	41%	16%	66%	**.000***
	Only in case of urgency/emergency	54.5%	78%	31%	
	No	4.5%	6%	3%	
Anxiety regarding the impact of the pandemic and quarantine on dental treatment (Mean ± Sd.)		6.3 ± 1.8	6 ± 1.8	6.6 ± 1.7	**.017***
Considered as important, in this actual situation, in a dental office	Disposable lab coat	84%	90%	78%	**.021***
	Disposable surgical mask	88%	92%	84%	.082
	Disposable medical head cap	77%	84%	70%	**.019***
	Use of face shield in addition to the surgical mask	86.5%	93%	80%	**.007***
	Avoid crossing other patients at reception	36%	37%	35%	.768
	PPE for patients	18%	17%	19%	.713
	Alcohol gel at reception	78%	86%	71%	**.010***
Main concern about COVID-19 outbreak	The danger of the disease	27%	26%	28%	.959
	Risk of infection for you or your relatives	67%	68%	66%	
	Isolation from the family and/or society	1.5%	1%	2%	
	Impact on your work or study	2%	2%	2%	
	Public psychological problems caused by the outbreak	2.5%	3%	2%	
Last visit to the clinic	< 1 month	16.5%	13%	20%	**.000***
	1-2 months	29.5%	7%	52%	
	3-6 months	44.5%	68%	21%	
	> 6 months	9.5%	12%	7%	
The most important concern of not attending an appointment	The risk of infecting myself or my family	75%	69%	81%	**.000***
	Dental offices represent a high risk of infection	5.5%	4%	7%	
	My dental treatment is not urgent	12%	24%	0%	
	No concern	7.5%	3%	12%	

**significance: p<0.05.*

of the patients claimed to show symptoms of psychological distress and depression at different levels—as demonstrated by the Kessler distress scale. Similarly to the findings of Cao et al. (34), no differences were found between male and female attendance in means of total psychological distress scores in the present study. According to Xiang et al., managing psychological health care timely is important to prevent any negative effects on patients' mental health. (35) It was also reported previously during the 2003 SARS outbreak, where similar conditions have been reported (36). The COVID-19 pandemic was not the first pandemic, and there will be others. Therefore it is important to know the possible effect and plan appropriate ways to help patients during the pandemic.

Limitations of the study:

- Our data was generated by participants' subjective reports of their experiences and emotions.
- The self-reporting of depressive or anxiety symptoms is not equivalent to a structured diagnostic interview and cannot be used to classify a mental disorder like a depressive disorder or, in the aggre-

Table 3. Kessler K10 Scores.

		Patient Groups			
		Total n = 200	General n = 100	Orthodontic n = 100	P
K10 Score (Mean ± Sd.) [1]		19.3 ± 5.9	19.1 ± 5.6	19.5 ± 6.3	.634
Having these feeling[2]	More often than usual	30% (60)	39%	21%	.001
	About the same as usual	60.5% (121)	57%	64%	
	Less often than usual	9.5% (19)	4%	15%	
Days totally unable to work (Mean ± Sd., Median)[2]		3.7 ± 4.5	3.9 ± 3.7	3.4 ± 5.1	.000
Days able to do only half or less of the work (Mean ± Sd., Median) [2]		3.6 ± 4.7	3.9 ± 3.4	3.2 ± 5.7	.000
Times to see a doctor or health professional (Mean ± Sd., Median) [2]		0.8 ± 1.6	0.9 ± 1.8	0.6 ± 1.4	.030
How often the physical health problems have been the main cause of these feelings? [2]	Most of the time	0.5% (1)	0%	1%	0.234
	Some of the time	8.5% (17)	9%	8%	
	Little of the time	16% (32)	12%	20%	
	None of the time	75% (150)	79%	71%	

[1] *Chi-square test*
[2] *Independent samples t test*

gate, estimate the disorder's prevalence based on diagnostic criteria.

- Our data was also collected cross-sectional and did not reveal whether the increases in psychological distress were sustained over time.

CONSLUSION

Based on the findings of this research, we may conclude that:

- This study showed that the overall mental health of patients undergoing general dental treatment and orthodontic treatment was severely worsened by the COVID-19 epidemic.
- The COVID-19 pandemic significantly influences patients' attendance at the dental clinic.
- The quarantine recommended due to the coronavirus pandemic was shown to impact orthodontic appointments and patients' anxiety.
- Factors such as younger age, concern about isolation and psychological barriers, and distrust were among the associations with a high level of psychological distress.
- Proper communication with patients via tele-orthodontics and explanations on maintaining proper self-care when regular follow-ups are not possible is indispensable. This would ultimately give the patient a sense of reassurance that they are being well looked after.

Declarations

- Data availability: The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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REFERENCES

1. World Health Organization – WHO (2020) Critical preparedness, readiness, and response actions for COVID-19. Geneva: World Health Organization. https://ipprogress.world/articles/global-ip-index-reveals-pandemics-impact-ip-landscape
2. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? Lancet. 2020; 395(10228):931–934. https://doi.org/10.1016/S0140-6736(20)30567-5.
3. Meng L, Hua F, Bian, Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. J Dent Res. 2020; 99(5):481–487. https://doi.org/10.1177/0022034520914246.
4. Gupta SP, Rauniyar S. Knowledge, attitude, and practice towards management of orthodontic emergency during COVID-19 pandemic among orthodontic professionals. Orthod J Nepal. 2020; 10(2):6-13. https://doi.org/10.3126/ojn.v10i2.31145.
5. Rubin GJ, Potts HW, Michie S. The impact of communications about swine flu (influenza A H1N1v) on public responses to the outbreak: results from 36 national telephone surveys in the U.K. Health Technol Assess. 2020; 14(34):183–266. https://doi.org/10.3310/hta14340-03.
6. Hamid H, Khurshid Z, Adanir N, Zafar MS, Zohaib S. COVID-19 Pandemic and Role of Human Saliva as a Testing Biofluid in Point-of-Care Technology. Eur J Dent. 2020; 14(S01):S123–S129. http://doi.org/10.1055/s-0040-1713020.
7. Lu CW, Liu XF, Jia ZF. 2019-nCoV transmission through the ocular surface must not be ignored. Lancet. 2020; 395(10224):e39. http://doi.org/10.1016/S0140-6736(20)30313-5.
8. Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, Walters EE, Zaslavsky AM. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med. 2002; 32(6):959–976. http://doi.org/10.1017/s0033291702006074.
9. Morens DM, Fauci AS. Emerging infectious diseases: threats to human health and global stability. PLoS Pathog. 2013; 9(7):e1003467. http://doi.org/10.1371/journal.ppat.1003467.
10. Bao Y, Sun Y, Meng S, Shi J, Lu L (2020) 2019-nCoV epidemic: address mental health care to empower society. Lancet. 395(10224):e37–e38. http://doi.org/10.1016/S0140-6736(20)30309-3.
11. Rubin GJ, Wessely S. The psychological effects of quarantining a city. BMJ (Clinical research ed.) 2020; 368:m313. m313. https://doi.org/10.1136/bmj.m313.
12. Sabino-Silva R, Jardim ACG, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. Clin Oral Investig. 2020; 24(4):1619-1621. http://doi.org/10.1007/s00784-020-03248-x.
13. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci. 2020; 12(1):9. http://doi.org/10.1038/s41368-020-0075-9.
14. Gandolfi MG, Zamparini F, Spinelli A, Sambri V, Prati C. Risks of Aerosol Contamination in Dental Procedures during the Second Wave of COVID-19-Experience and Proposals of Innovative IPC in Dental Practice. Int J Environ Res Public Health. 2020; 17(23):8954. http://doi.org/10.3390/ijerph17238954.
15. Gao J, Zheng P, Jia Y, et al. Mental health problems and social media exposure during COVID-19 outbreak. PLoS One. 2020; 15(4):e0231924. http://doi.org/10.1371/journal.pone.0231924.
16. Kamate SK, Sharma S, Thakar S, et al. Assessing Knowledge, Attitudes and Practices of dental practitioners regarding the COVID-19 pandemic: A multinational study. Dent Med Probl. 2020; 57(1):11-17. http://doi.org/10.17219/dmp/119743.
17. 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(5):361–368. http://doi.org/10.1631/jzus.B2010010.
18. Madarati A, Abid S, Tamimi F, et al. Dental-Dam for Infection Control and Patient Safety during Clinical Endodontic Treatment: Preferences of Dental Patients. Int J Environ Res Public Health. 2018; 15(9):2012. http://doi.org/10.3390/ijerph15092012.
19. Andrews G, Slade T. Interpreting scores on the Kessler Psychological Distress Scale (K10). Aust N Z J Public Health. 2001; 25(6):494-497. http://doi.org/10.1111/j.1467-842x.2001.tb00310.x.
20. Slade T, Grove R, Burgess P. Kessler Psychological Distress Scale: normative data from the 2007 Australian National Survey of Mental Health and Wellbeing. Aust N Z J Psychiatry. 2011; 45(4):308-316. http://doi.org/10.3109/00048674.2010.543653.
21. Bäck K, Hakeberg M, Wide U, Hange D, Dahlström L. Orofacial pain and its relationship with oral health-related quality of life and psychological distress in middle-aged women. Acta Odontol Scand. 2020; 78(1):74-80. http://doi.org/10.1080/00016357.2019.1661512.
22. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations [published correction appears in Gen Psychiatr. 2020;27;33(2):e100213corr1]. Gen Psychiatr. 33(2):e100213. http://doi.org/10.1136/gpsych-2020-100213.
23. Cotrin P, Peloso RM, Pini NIP, et al. Urgencies and emergencies in orthodontics during the coronavirus disease 2019 pandemic: Brazilian orthodontists' experience. Am J Orthod Dentofacial Orthop. 2020; 158(5):661-667. http://doi.org/10.1016/j.ajodo.2020.06.028.
24. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey [published correction appears in Psychiatry Res 2021 May;299:113803]. Psychiatry Res. 2020; 288:112954. http://doi.org/10.1016/j.psychres.2020.112954.

25. Peloso RM, Pini NIP, Sundfeld Neto D, et al. How does the quarantine resulting from COVID-19 impact dental appointments and patient anxiety levels? Braz Oral Res. 2020;34:e084. http://doi.org/10.1590/1807-3107bor-2020.vol34.0084.

26. Fallahi HR, Keyhan SO, Zandian D, Kim SG, Cheshmi B. Being a front-line dentist during the Covid-19 pandemic: a literature review. Maxillofac Plast Reconstr Surg. 2020; 42(1):12. http://doi.org/10.1186/s40902-020-00256-5.

27. Lima CKT, Carvalho PMM, Lima IAAS, et al. The emotional impact of Coronavirus 2019-nCoV (new Coronavirus disease). Psychiatry Res. 2020; 287:112915. http://doi.org/10.1016/j.psychres.2020.112915.

28. Lu W, Wang H, Lin Y, Li L. Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. Psychiatry Res. 2020; 288:112936. http://doi.org/10.1016/j.psychres.2020.112936.

29. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. Asian J Psychiatr. 2020; 52:102066. https://doi.org/10.1016/j.ajp.2020.102066.

30. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020; 395(10227): 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8.

31. D'Agostino A, Demartini B, Cavallotti S, Gambini O. Mental health services in Italy during the COVID-19 outbreak. Lancet Psychiatry. 2020; 7(5):385-387. https://doi.org/10.1016/S2215-0366(20)30133-4.

32. Tasnim S, Hossain MM, Mazumder H. Impact of Rumors and Misinformation on COVID-19 in Social Media. J Prev Med Public Health. 2020; 53(3):171-174. https://doi.org/10.3961/jpmph.20.094.

33. Asmundson GJG, Taylor S. Coronaphobia: Fear and the 2019-nCoV outbreak. J Anxiety Disord. 2020;70:102196. http://doi.org/10.1016/j.janxdis.2020.102196.

34. Cao W, Fang Z, Hou G, et al. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res. 2020;287:112934. http://doi.org/10.1016/j.psychres.2020.112934.

35. Xiang YT, Yang Y, Li W, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry. 2020;7(3):228-229. http://doi.org/10.1016/S2215-0366(20)30046-8.

36. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. CMAJ. 2003;168(10):1245-1251. PMCID: PMC154178.