

ORIGINAL RESEARCH



Stress perception among dental practitioners in Saudi Arabia during the COVID-19 pandemic: a cross-sectional survey

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Abstract

The coronavirus outbreak (COVID-19) significantly impacted dental health practitioners. Dentists are exposed to uncertain fears affecting them mentally and financially, leading to a multi-fold increase in anxiety and stress. To assess the stress levels among the dental practitioners during the COVID-19 pandemic and evaluate perceptions of dental practitioners after a pandemic outbreak. A well-self-administered questionnaire was designed, and Google forms were sent to participants. The questionnaire involves demographic details (section 1), Cohen's stress levels (section 2), and perceptions of dental practice after pandemic (section 3). The comparisons were made based on sex, age group, qualification, and occupation. Descriptive statistics were performed using SPSS (version 17.0, Chicago, IL, USA). Overall, 376 participants in the survey, 66.2% (249) were males, and 33.8% (127) were females. The most common age group of respondents was 31–40 years (44.7%). Occupation wise 44.4% were private practitioners, while postgraduates were 49.5% among the study population. The comparison of stress mean scores among the sexes showed non-significant ($p > 0.05$) while there was evidence of significance among the age group, qualifications, and occupations of the participants ($p < 0.05$). The overall mean stress score level was 19.95, whereas males (20 ± 7.7), private dental practitioners (21.9 ± 7.9), and participants of more than 50 years of age (26.1 ± 7.8) got high-stress scores, respectively. The dentists with graduates in the study showed (17.5 ± 7.5) had the least stress scores. Overall dental practitioners are at moderate stress levels; among them, males, private practitioners, and dentists above 50 years of age exhibited more stress, whereas graduates had the least stress scores.

Keywords

Stress; Dental practitioners; COVID-19; Pandemic

1. Introduction

Dentists are considered one of the high-risk groups among the healthcare professions concerning COVID-19 due to proximity to the patients in dental operatory while treating [1]. Nonetheless, aerosol generated by dental procedures and droplets splashing out while treating the patients may pose a potential risk to COVID-19 disease at dental operatory [2, 3]. Hence, dentists have a higher chance of transmitting these vulnerable diseases from infected patients and potentially spreading them to the other patients attending the dental operatory, families, and friends [4]. Subsequently, continuous propaganda regarding this virus through electronic, social, and print media created anxiety and fear among healthcare professionals and the general population [5]. Most dental institutes and private dental clinics had suspended duties because of the pandemic outbreak of COVID-19 disease [6].

It is natural for the dentist to experience stress and fear about the future with all these circumstances. Stress is a normal physiological response to an abnormal situation. It can affect several aspects of life, including behavior, emotions, thinking ability, and overall physical health. Stress is also one of the significant occupational hazards in the dental profession [6].

The dental profession falls into the high-stress category based on published reports [6, 7]. Dental health practitioners are among the high-risk group among all the health care professionals concerning the spread of novel coronavirus infections. This virus's spreading potential has led to dental practice closure to prevent the further spread of infection [4, 5]. The practitioners are exposed to uncertain fears affecting them mentally and financially, leading to a multi-fold increase in anxiety and stress [8]. A Sudanese study [9] performed with healthcare workers reported that 54.9% of their study population had high-stress levels during this pandemic. Sim-

ilarly, another study from Serbia [10] suggested that front-line healthcare workers are more stressed than second-line healthcare workers. A recent Pakistani study [7] reported that dental, psychological support should be accessible to avoid severe stress and anxiety during this pandemic. There is a lacuna in the literature addressing dentists' stress during and after the pandemic COVID-19 outbreak among the dentists working in Arabia. Nevertheless, it is essential to know the stress levels among dentists during the COVID-19 pandemic. Therefore, the study aimed to assess the stress levels among dental practitioners' perceptions of dental practice after the pandemic.

2. Methods

A cross-sectional questionnaire survey was conducted among the dental practitioners. The questionnaire circulated through email and social media to dental practitioners via Google forms, and the responses were received. This survey was conducted using a well-constructed questionnaire (three sections) designed and registered online (Google survey forms). The questionnaire involves demographic details (section 1), Cohen's stress levels [11] (section 2), and perceptions of dental practice after pandemic (section 3). Dental students, non-clinical staff technicians, dental hygienists, dental therapists, and other healthcare professionals were excluded from the survey. Only dental professionals practicing in Saudi Arabia were included in the study.

Possible reasons for stress and perceptions of dental practice after the COVID-19 pandemic among dental practitioners were evaluated. The mean values of stress scores achieved using Cohen stress scores (low stress (0–13), moderate stress (14–26), and high perceived stress (27–40)) were compared based on sex, age, occupation, and qualification among the respondents. Two of the researchers (SSA and MSK) participated in the pilot study and had a consensus on the validity of the questionnaire. The constructed questionnaire was pre-tested with 22 dentists, and intraclass correlation coefficients were run for each item's test-retest and intra-rater reliability. The authors discussed all the items with a value of intraclass correlation coefficients below 0.80, and modified concerns raised by the pilot study with the Intraclass Correlation Coefficient (ICC) value of ≥ 0.8 were considered satisfactory. The minimum required sample size was calculated to be 264 (90% confidence level with 5% margin of error) according to the recent data from the Saudi Commission for health specialties with a 50% response distribution [6]. The data was tabulated and compared based on sex, age group, qualification, and occupation. Participants with complete responses to all the questions were included in the final analysis. Descriptive statistics were performed using SPSS (version 17.0, Chicago, IL, USA). Comparisons were made using the chi-square test and mean value stress scores using one-way-ANOVA (Bonferroni test). Comparisons were made at a 95% confidence interval with a p -value less than <0.05 .

3. Results

Oval all 376 participants submitted the completed questionnaire comprising three sections about personal and professional level stress levels due to COVID-19. The demographic information of the participant was presented in Table 1. Out of a total of 376 participants, 66.2% (249) were male and 33.8% (127) female, with the most common age bracket of respondents being 31–40 years (44.7%). More non-Saudi (53%) have participated more than native Saudi Arabian dentists. Based on qualification, the participants were as follows 49% (186) had a master's degree, 23.4% (88) were graduates, 16.8% (63) were board-certified, 8.5% (32) were PhDs, and 1.9% (7) had a diploma. The majority of the participants, 44.4% (167) in the survey, work at private clinics, 21.3% (80) are faculty who worked as private practitioners as well, 21% (79) are academic faculty, and 13.3% (50) were working with the government (Fig. 1). The mean stress score was 19.95. Mean stress scores for females and males were 19.8 ± 7.2 and 20 ± 7.7 , respectively (Table 1). Although there is no significant difference among the overall stress scores among both sexes ($p > 0.05$), males showed a higher stress score than females from stress. Among the participants, Saudi Arabian nationals (20.43 ± 6.54) showed comparatively more stress scores than the non-Saudi Arabian (19.54 ± 8.42) dental practitioners, and the findings were statistically significant. Participants more than 50 years of age were under high stress (26.1 ± 7.8) than the other age groups, and the findings were statistically significant ($p < 0.05$) among the groups and within the age group (Table 2). Participants with a diploma (23.8 ± 8.7) reported stress mean scores, whereas participants who were graduates had less mean value (17.5 ± 8.5) (Table 2). The correlation between the groups and the groups and the results was statistically significant ($p < 0.05$). Private practitioners showed high stress mean scores (21.9 ± 7.9) than the government employees (18 ± 6.4), academic faculty (16 ± 5.2), and faculty who were having their private practice (20.8 ± 7.7). Private practitioners showed higher stress scores values than that of any others in the comparison group, which was highly significant ($p < 0.05$) (Table 2). A majority (51%) of the practitioners felt that they would receive support from the professional communities to work during the post-COVID-19 pandemic ($p < 0.05$). A forty-three percent of dental practitioners felt that the support from local and national dental branches was adequate to start work after the COVID-19 pandemic ($p < 0.05$), while 38.8% of participants felt inadequate. Almost 84.6% of the participants anticipate that their income will get affected during post-pandemic practice (Fig. 2).

4. Discussion

The current cross-sectional study attempts to evaluate the stress among dental practitioners during this COVID-19 pandemic. A close-ended questionnaire study was performed to collect information about the prevalence of stress among dental practitioners during this COVID-19 outbreak in Saudi Arabia. With careful data collection and interpretation, questionnaire-based studies have effectively collected information about the participants' attitudes, preferences, opinions, and experiences [12].

TABLE 1. Comparison of stress mean scores based on the sex, nationality, age, qualification, occupation of the participants.

Details	Mean	SD	SE	p-value
Sex				
Female	19.85	7.27	0.64	0.12 ^{NS}
Male	20	7.77	0.49	
Nationality				
Non-Saudi	19.54	8.42	0.6	0.00*
Saudi	20.43	6.54	0.49	
Age (years)				
21–30	16.38	6.21	0.75	0.00*
31–40	19.01	7.52	0.58	
41–50	21.98	6.99	0.66	
above 50	26.14	7.81	1.47	
Qualification				
Board certified	20.84	6.27	0.79	0.01*
Diploma	23.86	8.76	3.31	
Graduate	17.52	7.57	0.8	
Masters	20.67	7.87	0.58	
PhD	19.88	7.07	1.25	
Occupation				
Academic Faculty	16.04	5.25	0.59	0.00*
Ministry of health	18.04	6.43	0.91	
Practitioner in private and academic faculty	20.86	7.77	0.87	
Private Practitioner	21.94	7.1	0.62	

SD—standard deviation; SE—standard error; *—significant; NS—not significant.

Studies on psychological implications of stress and anxiety on the previous outbreak of similar infections such as severe acute respiratory syndrome (SARS) revealed various factors causing psychological trauma in healthcare workers. The factors include the fear of getting infected patients and infecting the family members [13, 14]. According to Cohen’s stress scale, dental practitioners’ overall stress score was a moderate level score (19.95) in the present study. It can be understood that dental practitioners have longer and direct physical contact with the patient, which is the reason for abnormal stress mean scores. There is no statistically significant difference between the overall stress mean scores and sexes ($p > 0.05$). The pandemic outbreak of COVID-19 created high stress in dental practitioners among health care professionals. However, male participants showed more overall stress mean scores, which agrees with the Korean study [15]. During this time, pandemic stress among the health workers is expected, especially when practitioners can easily get infected from the patient and the mortality rate is continuously at a peak [13]. Healthcare workers treating the patients are constantly at higher risk of acquiring this transmissible disease [4]. This perception may alter the psychological behavior of health care professionals [16].

The present study shows that dentists over 50 years of age are under more stress (26.1 ± 7.8) than other age groups, and

the results were statistically significant. Older adults are more affected by COVID-19 than the younger age groups, and there are no proper treatment protocols to manage the COVID-19 disease, which further enhances the stress [17]. Most academic institutes were closed rather than suspended because of the COVID-19 disease outbreak. It has been established that the primary transmission route of COVID-19 disease is through droplets and aerosol [18]. There are no clear instructions for private practitioners on their duties, constant developments, and changes in treatment protocols by health authorities. Financial constraints have made them more prone to stress. It is probably why private practitioners showed high-stress scores than others within the comparative group like academic faculty and government employees. A prior epidemic outbreak of SARS-like diseases has created a stressful atmosphere in the general population and health care professionals because of the rapid spread of the disease from infected individuals to a healthy people and vice versa [19]. The fear of getting infected patients’ infection is often justified by the rapid spread of COVID-19 and many individuals infected worldwide. It has led to the closing down of dental practice by the local and the national authorities in many countries, which have significant economic implications, especially for private practitioners. It has been reflected in the present study, where 84.6% of private dental practitioners think that income will be affected during

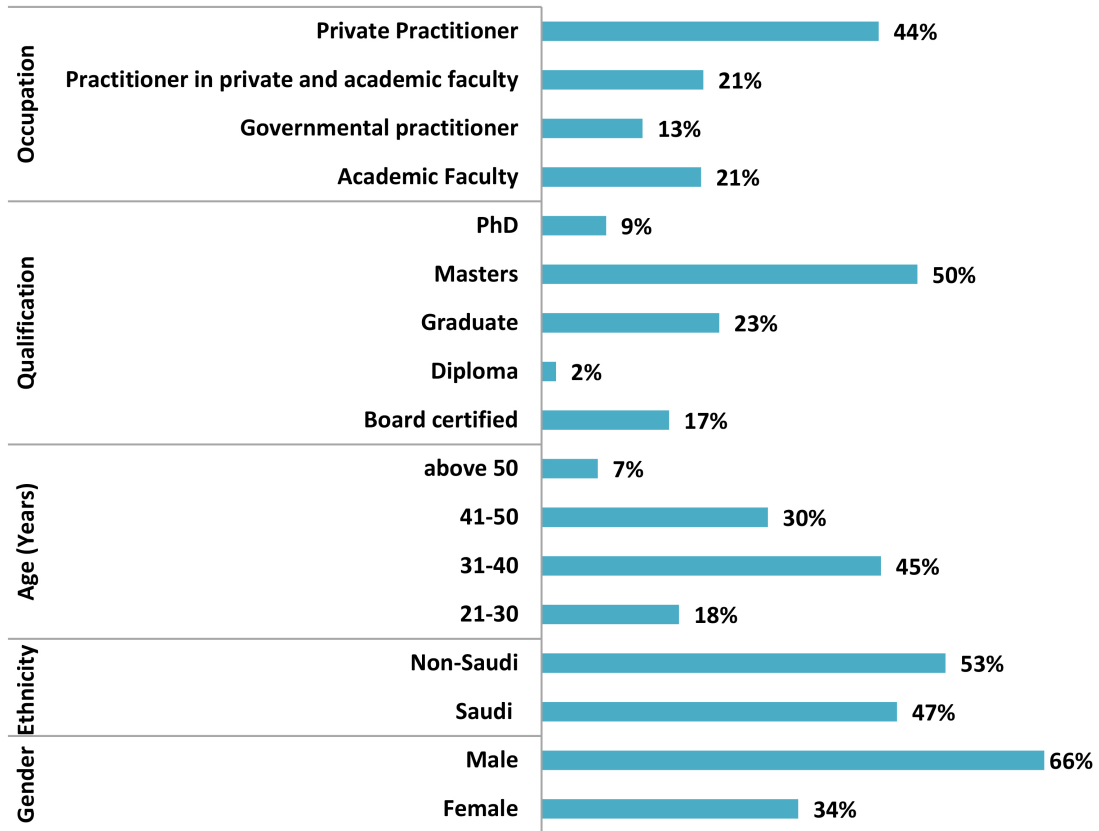


FIGURE 1. Demographic characteristics of the study population.

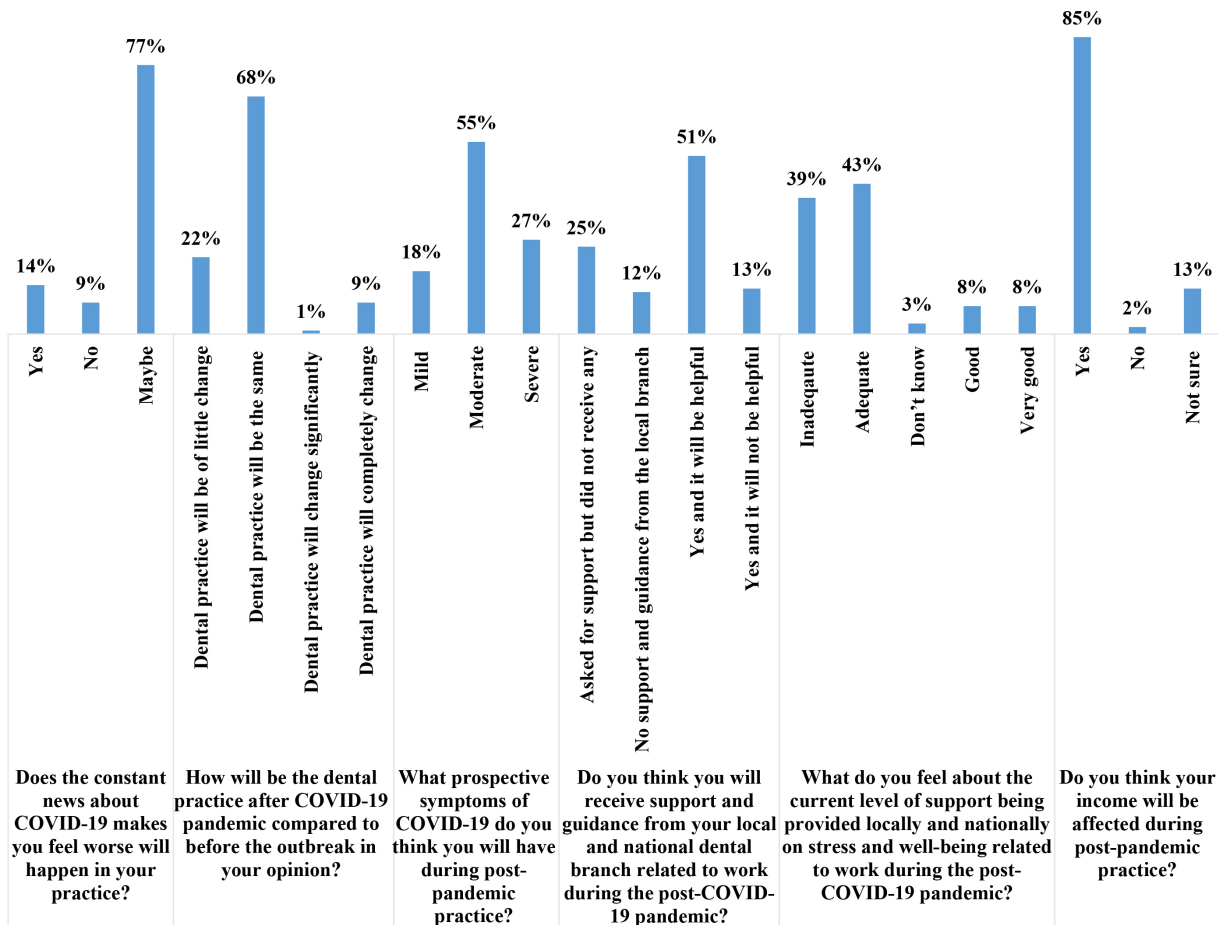


FIGURE 2. Perceptions of dental practitioners on practice after COVID-19 pandemic outbreak.

TABLE 2. Bonferroni comparison of stress mean scores among the participants based on age, qualification, and occupation.

Group	Comparison groups	Mean Difference	SE	p value	95% confidence interval	
					Lower Bound	Upper Bound
Age (years)						
21–30	31–40	–2.63	1.03	0.07 ^{NS}	–5.36	0.1
	41–50	–5.60*	1.1	0.00*	–8.52	–2.68
	above 50	–9.76*	1.61	0.00*	–14.03	–5.49
31–40	41–50	–2.97*	0.87	0.01*	–5.29	–0.65
	above 50	–7.13*	1.46	0.00*	–11.01	–3.25
41–50	above 50	–4.16*	1.56	0.04*	–8.18	–0.14
Qualification						
Board certified	Diploma	–3.02	2.99	1	–11.46	5.43
	Graduate	3.32	1.24	0.08	–0.18	6.82
	Masters	0.17	1.09	1	–2.92	3.26
	PhD	0.97	1.63	1	–3.64	5.57
Diploma	Graduate	6.33	2.95	0.32	–1.99	14.66
	Masters	3.19	2.89	1	–4.97	11.35
	PhD	3.98	3.13	1	–4.86	12.83
Graduate	Masters	–3.14	0.97	0.01*	–5.89	–0.40
	PhD	–2.35	1.55	1	–6.73	2.02
IMasters	PhD	0.79	1.44	1	–3.27	4.85
Occupation						
Academic faculty	Ministry of health	–2.00	1.31	0.76 ^{NS}	–5.48	1.47
	Practitioner in private and faculty	–4.83*	1.15	0.00*	–7.88	–1.77
	Private Practitioner	–5.90*	0.99	0.00*	–8.53	–3.28
Ministry of health	Practitioner in private and faculty	–2.82	1.31	0.89 ^{NS}	–6.29	0.64
	Private Practitioner	–3.90*	1.17	0.01*	–7.00	–0.80
Practitioner in private and faculty	Private Practitioner	–1.08	0.99	1.0 ^{NS}	–3.69	1.54

SE—standard error; *—significant; NS—not significant.

the post-COVID-19 pandemic outbreak.

The economic fallout is an additional important factor contributing to the higher stress levels among private practitioners than occupations. It had been evident in the study that mental stress has been directly related to the socio-economic impact created by the lockdown of activities due to the COVID-19 pandemic outbreak [20]. The coronavirus can last on surfaces ranging from a few hours to days [21]. The prolonged incubation period without developing the symptoms makes it difficult to limit its transmission. Almost all participants relied on multiple sources of information like news, scientific journals, social media, and website information on COVID-19. It might be why practitioners constantly feel that worse will happen in their practice, which further adds to their stress [22].

The Cohen stress scores were used to evaluate the dental

practitioners working in Saudi Arabia. However, the recent studies used the impact of event scale-revised (IES-R) and depression, anxiety, and stress scale (DASS-21) used to assess the stress levels [23–25]. The findings in the present study were comparable with those studies. It was evident that there was evidence of high stress among the dental practitioners irrespective of scaling of measurement due to the COVID-19 pandemic outbreak. A recent British study [26] reported that the study demonstrates that the dental practitioners’ psychological distress levels are reduced using stressors. The authors also recommended introducing financial viability, personal protective equipment (PPE), dental leadership, and changes to the dental profession [27, 28]. A couple of researchers have also suggested remote management of dental problems during the COVID-19 pandemic [29, 30]. Digital technology adaptation and use in dentistry [31] have also been popularised

during this pandemic. These new changes might be helpful for the dental community in post COVID period. This study also evaluated the contribution to understanding the stress levels among dentists and overcoming psychological stress. The role of stress busters and stress relieving factors among dental practitioners has also been recommended for further research. A recent study [32] evaluated the stress busters used to relieve occupational stress among Saudi dental practitioners. A population-based study [33] from Saudi Arabia reported that there would be a tremendous impact on health care services. Furthermore, a few researchers have studied stress and its impact on sleep [34], musculoskeletal disorders [35], and temporomandibular joints [36]. It shows the importance of counseling and wellbeing support from local health authorities. An Italian study [37] also reported the importance of local health authorities' role in dealing with the wellbeing of dentists.

There were some limitations in the present study that need to be considered. The questionnaire was used with closed-ended questions and the first of its kind. Since the study was a cross-sectional survey, this methodology has inherent limitations. Primarily, exact reasons for stress cannot be determined. Secondly, comparisons were made among the groups, and subgroup analysis was not made. These factors are considered limitations for the present cross-sectional survey, and the results may not be generalized. The results may be used as a reference from Saudi Arabia.

The current pandemic outbreak of COVID-19 has affected all aspects of daily life. Unlike other professionals, oral health care professionals are exposed to a higher risk of getting infected by this treacherous coronavirus. The study's cause-effect relationship could not be concluded because of the rapidly spreading nature of infection and the cross-sectional nature of the study plan. As the effect of the COVID-19 pandemic is worsening day by day, dental practitioners must modify their practice according to the recommended guidelines from local and national dental authorities to perform emergency treatment. This unexpected oblivious situation has led to issues that eventually created stress. This stress might be psychological and financial stress among dental professionals. Moreover, there was variance in the stress mean scores among the dental practitioners due to worry of getting affected COVID-19 and worried about dental practice in post-pandemic situations. There is a need to explore the stress coping mechanisms and stress busters during this COVID-19 pandemic among oral health care professionals.

5. Conclusion

The dental practitioners during this COVID-19 pandemic had been suffering from significant stress. Overall, dental practitioners are at moderate stress levels; males, private practitioners, and dentists above 50 years of age exhibited high-stress scores. An 85% of the dentists expected to significantly impact their income post-COVID-19 period. A majority of the practitioners opined a need for professional communities to work during the post-COVID-19 pandemic. Dental practitioners felt that the support from local and national dental branches was adequate to start work after the COVID-19 pandemic. Based

on the findings from the present study it is imperative to take measures to diminish the psychological stress among dental practitioners in circumstances like the COVID-19 pandemic.

AUTHOR CONTRIBUTIONS

SAS and SKM—designed the research study; AAT, SA and SKM—performed the research; SA, MZM, SAS and VKV—analyzed the data; SAS, SKM and VKV—wrote the manuscript, all authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Institutional Review Board, Deanship Scientific Research, Majmaah University under the No. MUREC-July.12/COM-2020/34-3. Informed consent was obtained from all participants in the study.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- [1] Ahmed MA, Johar R, Ahmed N, Adnan S, Aftab M, Zafar MS, *et al.* Fear and practice management among dentists to combat novel coronavirus disease (COVID-19) outbreak. *International Journal of Environmental Research and Public Health.* 2020; 17: 2821.
- [2] Bhumireddy J, Mallineni SK, Nuvvula S. Challenges and possible solutions in dental practice during and post COVID-19. *Environmental Science and Pollution Research.* 2021; 28: 1275-1277.
- [3] Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. *Journal of Dental Research.* 2020; 99: 481-487.
- [4] Mallineni SK, Innes NP, Raggio DP, Araujo MP, Robertson MD, Jayaraman J. Coronavirus disease (COVID-19): characteristics in children and considerations for dentists providing their care. *International Journal of Paediatric Dentistry.* 2020; 30: 245-250.
- [5] Sun W. The virus of fear and anxiety: China, COVID-19, and the Australian media. *Global Media and China.* 2021; 6: 24-39.
- [6] Al-Khalifa KS, Al-Sheikh R, Al-Swuailem 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.
- [7] Kamal AT, Sukhia RH, Ghandhi D, Sukhia HR. Stress and anxiety among dental practitioners during the COVID-19 pandemic: a cross-sectional survey. *Dental and Medical Problems.* 2021; 58: 139-146.
- [8] Myers HL, Myers LB. 'It's difficult being a dentist': stress and health in general dentist practitioner. *British dental journal.* 2004; 197: 89-93.
- [9] Mahgoub IM, Abdelrahman A, Abdallah TA, Mohamed Ahmed KAH, Omer MEA, Abdelrahman E, *et al.* Psychological effects of the

- COVID-19 pandemic: perceived stress, anxiety, work-family imbalance, and coping strategies among healthcare professionals in Khartoum state hospitals, Sudan, 2021. *Brain and Behavior*. 2021; 11: e2318.
- [10] Antonijevic J, Binic I, Zikic O, Manojlovic S, Tosic-Golubovic S, Popovic N. Mental health of medical personnel during the COVID-19 pandemic. *Brain and Behavior*. 2020; 10: e01881.
- [11] Perceived stress scale. 2020. Available at: <https://das.nh.gov/wellness/docs/percievedstressscale.pdf> (Accessed: 24 June 2020)
- [12] Lydeard S. The questionnaire as a research tool. *Family Practice*. 1991; 8: 84–91.
- [13] Tam CW, Pang EP, Lam LC, Chiu HF. Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers. *Psychological Medicine*. 2004; 34: 1197–1204.
- [14] McAlonan GM, Lee AM, Cheung V, Cheung C, Tsang KW, Sham PC, *et al*. Immediate and sustained psychological impact of an emerging infectious disease outbreak on health care workers. *The Canadian Journal of Psychiatry*. 2007; 52: 241–247.
- [15] Kim SY, Shin DW, Oh KS, Kim EJ, Park YR, Shin YC, *et al*. Gender differences of occupational stress associated with suicidal ideation among South Korean employees: the kangbuk Samsung health study. *Psychiatry Investigation*. 2018; 15: 156–163.
- [16] Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, *et al*. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open*. 2020; 3: e203976.
- [17] Vahia IV, Jeste DV, Reynolds CF 3rd. Older adults and the mental health effects of COVID-19. *JAMA*. 2020; 324: 2253–2254.
- [18] Ge ZY, Yang LM, Xia JJ, Fu XH, Zhang YZ. Possible aerosol transmission of COVID-19 and special precautions in dentistry. *Journal of Zhejiang University SCIENCE B-Biomedicine & Biotechnology*. 2020; 21: 361–368.
- [19] Person B, Sy F, Holton K, Govert B, Liang A, National Center for Infectious Diseases/SARS Community Outreach Team. Fear and stigma: the epidemic within the SARS outbreak. *Emerging Infectious Diseases*. 2004; 10: 358–363.
- [20] Aldhuwayhi S, Mallineni SK, Sakhamuri S, Thakare AA, Mallineni S, Sajja R, *et al*. COVID-19 knowledge and perceptions among dental specialists: a cross-sectional online questionnaire survey. *Risk Management Healthcare Policy*. 2021; 14: 2851–2861.
- [21] van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, *et al*. Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1. *New England Journal of Medicine*. 2020; 382: 1564–1567.
- [22] Fazel M, Hoagwood K, Stephan S, Ford T. Mental health interventions in schools I: mental health interventions in schools in high-income countries. *The Lancet Psychiatry*. 2014; 1: 377–387.
- [23] 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. *International Journal of Environmental Research and Public Health*. 2020; 17: 2821.
- [24] Alkhamees AA, Alrashed SA, Alzunaydi AA, Almohimeed AS, Aljohani MS. The psychological impact of COVID-19 pandemic on the general population of Saudi Arabia. *Comprehensive Psychiatry*. 2020; 102: 152192.
- [25] Park CL, Russell BS, Fendrich M, Finkelstein-Fox L, Hutchison M, Becker J. Americans' COVID-19 stress, coping, and adherence to CDC guidelines. *Journal of General Internal Medicine*. 2020; 35: 2296–2303.
- [26] Collin V, O Selmo E, Whitehead P. Psychological distress and the perceived impact of the COVID-19 pandemic on UK dentists during a national lockdown. *British Dental Journal*. 2021: 1–8.
- [27] Mallineni SK, Nuvvula S, Bhumireddy JC, Ismail AF, Verma P, Sajja R, *et al*. Knowledge and perceptions regarding coronavirus (COVID-19) among pediatric dentists during lockdown period. *International Journal of Environmental Research and Public Health*. 2022; 19: 209.
- [28] Ali SH, Foreman J, Tozan Y, Capasso A, Jones AM, DiClemente RJ. Trends and predictors of COVID-19 information sources and their relationship with knowledge and beliefs related to the pandemic: Nationwide cross-sectional study. *JMIR Public Health and Surveillance*. 2020; 6: e21071.
- [29] Aldhuwayhi S, Shaikh SA, Thakare AA, Mustafa MZ, Mallineni SK. Remote management of prosthodontic emergencies in the geriatric population during the pandemic outbreak of COVID-19. *Frontiers in Medicine*. 2021; 8: 648675.
- [30] Nuvvula S, Mallineni SK. Remote management of dental problems in children during and post the COVID-19 pandemic outbreak: a teledentistry approach. *Dental and Medical Problems*. 2021; 58: 237–241.
- [31] Jampani ND, Nutalapati R, Dontula BS, Boyapati R. Applications of teledentistry: a literature review and update. *Journal of International Society of Preventive and Community Dentistry*. 2011; 1: 37–44.
- [32] Aldhuwayhi S, Shaikh SA, Mallineni SK, Kumari VV, Thakare AA, Ahmed Khan AR, *et al*. Occupational stress and stress busters used among Saudi dental practitioners during the COVID-19 pandemic outbreak. *Disaster Medicine and Public Health Preparedness*. 2021; 6: e21071.
- [33] Allassaf A, Almulhim B, Alghamdi SA, Mallineni SK. Perceptions and preventive practices regarding COVID-19 pandemic outbreak and oral health care perceptions during the lockdown: a cross-sectional survey from Saudi Arabia. *Healthcare*. 2021; 9: 959.
- [34] Gupta B, Sharma V, Kumar N, Mahajan A. Anxiety and sleep disturbances among health care workers during the COVID-19 pandemic in India: cross-sectional online survey. *JMIR Public Health and Surveillance*. 2020; 6: e24206.
- [35] Arca M, Dönmezgil S, Durmaz ED. The effect of the COVID-19 Pandemic on anxiety, depression, and musculoskeletal system complaints in healthcare workers. *Work*. 2021; 69: 47–54.
- [36] Emodi-Perlman A, Eli I, Smardz J, Uziel N, Wieckiewicz G, Gilon E, *et al*. Temporomandibular disorders and bruxism outbreak as a possible factor of orofacial pain worsening during the COVID-19 pandemic-concomitant research in two countries. *Journal of Clinical Medicine*. 2020; 9: 3250.
- [37] Cagetti MG, Cairoli JL, Senna A, Campus G. COVID-19 outbreak in north Italy: an overview on dentistry. A questionnaire survey. *International Journal of Environmental Research and Public Health*. 2020; 17: 3835.

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