

The Overall Psychological Impact of COVID-19 on Dental Health Care Professionals: A Scoping Review

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Abstract

The aim of this scoping review was to assess the overall psychological impact of COVID-19 pandemic on the dental health care professionals. The study included a systematic search of various databases using relevant keywords. The literature was limited to English language, studies typically pertaining to Dental Health Care Professionals and all types of study designs were considered. The inclusion criteria was particularly based only on dental health care professionals which included dental practitioners, dental students, dental hygienists and dental professors/academicians, their psychological status regarding COVID-19. A total of 237 records were obtained at first out of which 12 were included in the study according to the inclusion criteria abiding by the PRISMA guidelines. The studies showed an increased amount of stress and anxiety apparent in dental health care professionals, students and auxiliaries which was mainly due to the fear of acquiring and transmitting the disease, uncertain professional future and financial stress.

Keywords: dental health care professionals, COVID-19, stress, anxiety, psychological impact.

I. INTRODUCTION

From December 2019 a new viral pathogen named the novel Coronavirus started spreading across the globe and nearly touched every part of it. In March 2020, the WHO declared it as a pandemic and according to the latest data released by WHO up to July 2nd it has affected 55,88,06,268 people with 63,69,444 deaths.

Sars-COV-2 spreads via airborne through droplets or direct contact with an infected person. Moreover, the virus can also spread even in the absence of symptoms.

Due to very high transmissibility of the virus and dental health care professionals working in a very close contact with the oral cavity, they are highly exposed to the pathogen. With the prolonged aerosol generating procedures the risk becomes even higher. The transmission of SARS-COV-2 can happen through the aerosol procedures, through contaminated instruments or direct contact with the mucous membrane or surfaces either from the patient to the dental health professional or vice-versa. In a study done by To et al¹, on 19 COVID-19 patients, where their saliva was collected, it was reported that the virus was present till 29 days which clearly explains the barbarous nature of virus even after patient recovery. This was possible due to the high efficacy of the virus in binding to angiotensin converting enzyme 2 receptors which are present in the secretory saliva¹.

Under such circumstances, it would be very natural for dentists to be fearful of getting infected by their patients. Furthermore, the high investment in personal protective equipment, dental procedures limited to only emergency services, lack of patient inflow, fear of perceived job loss and the social stigma related to the pandemic would have also added to the emotional burden³.

The information about the pandemic has been spreading through a wide variety of means, out of which the Social media platforms have played a huge role during this global health emergency². These platforms were flooded with the non-specific clinical manifestations of the disease and the unexplained high mortality rate that created knowledge voids, confusion and

uncertainties about the pandemic. This rapid spread of information has resulted in confusion and created a wide-spread anxiety among the population^{4,5}.

The impact of previous pandemics on dental health care professionals has been widely reported and it has shown to cause psychological distress, anxiety and a great concern about their financial viability due to fear of contracting the disease because of close patient contact, reduced number of patients, and uncertainty of the disease in the early days⁶.

So, in these difficult times of the pandemic, it is crucial to analyze the mental status of dental health care professionals, understand the reasons leading to its deterioration if any, to address them and provide adequate help to restore their mental health. A preliminary search for existing scoping reviews and research on the topic has been conducted for which the databases searched were PubMed, Cochrane database of Systematic Reviews, Elsevier,

Scopus, Science Direct, Publication houses including- Wiley, Wolters Kluwer – Medknow, Plos One.

The studies previously conducted focuses on a single factor relationship affecting the mental health of the professionals but the intent of this scoping review is to evaluate the overall psychological impact which takes into consideration the multitude of factors and their relationship of the pandemic on the practicing dentists, professors/academicians and dental students.

The research questions for this scoping review dealt with the following:

- Has the pandemic affected the psychological status of the dental health care professionals?
- What are the factors affecting the psychological status of the dental health care professionals?
- What are the measures that can be taken to restore their mental health?

II. METHODOLOGY

The design of this scoping review was based on the JBI framework of evidence synthesis where the following steps were done to conduct the scoping review⁷.

1. Identifying the research question: All the authors together came to the final research questions which have been mentioned above
2. Identifying relevant studies: We performed a systematic search of PubMed, Cochrane database of Systematic Reviews, Elsevier, Scopus, Wolters Kluwer-MedKnow and Plos One, Science Direct, Wiley and other online literature with the key terms using Boolean operators such as “Dentists” OR “Dental Health Care Professionals” AND “Psychology” OR “Mental Health” AND “COVID-19” OR “SARS-COV-2” OR “CoronaVirus”. The literature was limited to English language, those published till 25th January, studies typically pertaining to Dental Health Care Professionals and all types of study designs were considered.
3. Study Selection: The inclusion criteria was particularly based only on dental health

care professionals which included dental practitioners, dental students, dental hygienists and dental professors/academicians, their psychological status regarding COVID-19. All the duplicate researches from various databases was excluded manually, as per the 3-step plan the articles were then first screened for the titles after which the abstracts of the selected titles were screened. The studies were then finally selected and data was extracted from the full text articles. When agreement could not be reached within the different authors then a third reviewer was consulted for discrepancies and differences were resolved through a detailed discussion.

4. Presenting the Data: For analysing the data, the article search was represented in the form of Flow diagram for the scoping review process adapted from the PRISMA statement by Moher and colleagues (2009) (Figure 1). All the studies which were included in this review were analysed descriptively and finally the data was extracted according the demands of this scoping review.

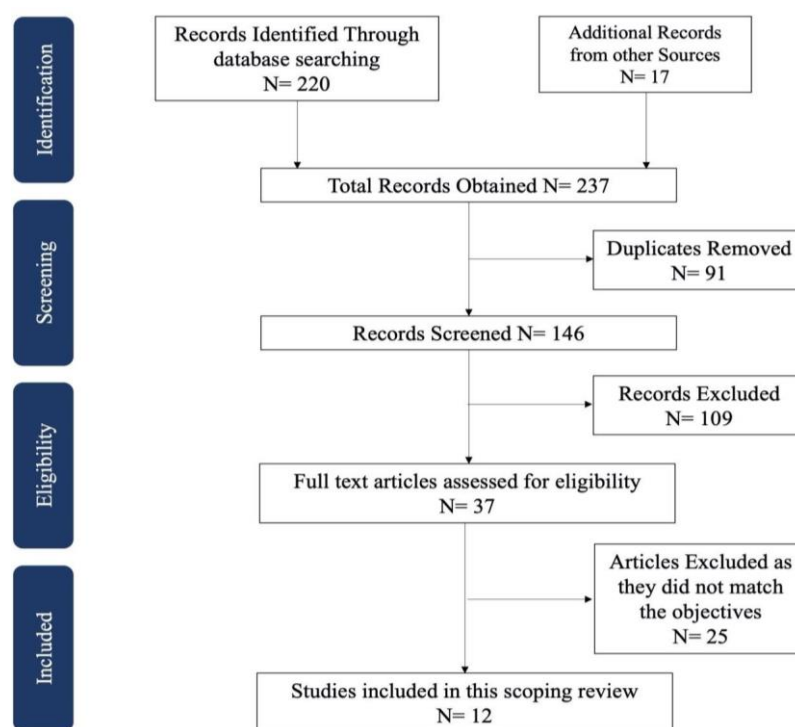


Figure 1. PRISMA Flow Chart

5. Collating the Results: A total of 237 articles were obtained after the first research after which they were screened for any duplicates and thereby 91 were removed. 109 studies did not qualify the inclusion criteria of the present scoping review. 37 studies were then assessed for eligibility and out of which 12 were finalised on the basis on the objectives and the research question of this review. These

12 studies focused on the cause-relationship factor of the psychology related to COVID-19 amongst dental health care professionals (Table1). The studies that were omitted included the editorials with little or no information that could be used, few were dissimilar to the areas of review interest, some were in a foreign language and it was impossible to retrieve the others.

Table 1 : The description and outcomes of the selected studies

Titles	Author	Type of Study	Results
1. “Psychological distress and the perceived impact of the COVID-19 pandemic on UK dentists during a national lockdown ⁶ ”	“Victoria Collin et al ⁶ ” (22 January 2021)	Questionnaire Survey	Psychological distress was found to be lower in UK dentists when it was compared to previous researches
2. “Psychological Distress and Post-Traumatic Symptomatology among Dental Healthcare Workers in Russia: Results of a Pilot Study ⁸ ”	“Maria Sarapultseva et al ⁸ ” (15 January 2021)	Questionnaire Survey	20.3–24.2% DHCWs showed mild to extreme severe symptoms of psychological distress 7.1–29.7% showed clinical symptoms of Post-Traumatic Stress Disorder.
3. “Impact of COVID-19 on Indian Dentists: A Cross Sectional Survey ⁹ ”	“Harneet Singh et al ⁹ ” (28 December 2020)	Questionnaire Survey	Females were at a greater risk of Post-traumatic stress disease (PTSD). They also showed a greater tendency towards depression with pain and discomfort
4. “Psychological Distress during COVID- 19 Lockdown among Dental Students and Practitioners in India: A Cross-Sectional Survey ¹⁰ ”	“Trishnika Chakraborty et al ¹⁰ ” (15 December 2020)	Questionnaire Survey	Dental Students and practitioners were at a higher level of depression

5. “Psychological Impact of the COVID-19 Pandemic on Emergency Dental Care Providers on the Frontlines ¹¹ ”	“Jiang Tao et al ¹¹ ” (01 December 2020)	Questionnaire Survey	The COVID-19 outbreak led to deterioration of health conditions, inculcated a feeling of fear and helplessness.
6. “The Psychological Impact of the COVID-19 Pandemic on Dental Healthcare Professionals ¹² ”	“Aditya Shetty et al ¹² ” (30 November 2020)	Questionnaire Survey	The reported anxiety levels were high and majority was due to transmitting the disease to others.
7. “Behavior change due to COVID-19 among dental academics—The theory of planned behavior: Stresses, worries, training, and pandemic severity ¹³ ”	“Nour Ammar et al ¹³ ” (29 September 2020)	Questionnaire Survey	COVID-19 had a significant psychological impact on the dental academics. There was a direct, dose-dependent association between change in behaviors and worries.
8. “Perceived Job Insecurity and Depressive Symptoms among Italian Dentists: The Moderating Role of Fear of COVID-19 ¹⁴ ”	“Roberta Gasparo et al ¹⁴ ” (24 July 2020)	Questionnaire Survey	Perceived job insecurity and fear due to COVID-19 had a positive association with depressive symptoms. Those who had little or no fear of COVID-19 showed a very weak association with the depressive symptoms.
9. “Subjective Overload and Psychological Distress among Dentists during COVID-19 ¹⁵ ”	“Eitan Mijiritsky et al ¹⁵ ” (14 July 2020)	Questionnaire Survey	Increased levels of subjective overload and psychological distress was found amongst dentists and it also varied between different countries.
10. “Epidemiological Aspects and Psychological Reactions to COVID-19 of Dental Practitioners in the Northern Italy Districts of Modena and Reggio Emilia ¹⁶ ”	“Ugo Consolo et al ¹⁶ ” (15 May 2020)	Questionnaire Survey	85% of the dentists were worried of contracting the disease during clinical activity. 9% reported a severe anxiety. 70.2 % DHWs showed feelings of concern, 46.4% were anxious and 42.4% were fearful of the situation. 89.6% were concerned about their professional future

11. “COVID-19 Factors and Psychological Factors Associated with Elevated Psychological Distress among Dentists and Dental Hygienists in Israel ¹⁷ ”	“Maayan Shacham et al ¹⁷ ” (22 April 2020)	Questionnaire Survey	Increased Psychological distress was associated with background illness, fear of contracting. COVID-19 from patient, and a higher subjective overload. Low psychological distress was associated with a high self-efficacy and being in a committed relationship.
12. “Fear and Practice Modifications among Dentists to Combat Novel Coronavirus Disease (COVID-19) Outbreak ¹⁸ ”	“Muhammad Adeel Ahmed et al ¹⁸ ” (19 April 2020)	Questionnaire Survey	87% participants were afraid of contracting the disease from either a patient or a co-worker. More than 72% of participants expressed a feeling of nervousness when talking to patients in close vicinity, 92% were afraid transmitting the infection to their families, and 77% were afraid of getting quarantined in case they got infected. 73% were anxious about the cost of treatment if they got infected, while 86% were afraid seeing the mortalities due to COVID-19.

III. DISCUSSION

Effects of the pandemic on the psychological status of dental health care professionals and the factors contributing to the same

With the SARS-Cov-2/Coronavirus taking the world in its grips and the WHO declaring it a pandemic by the end of March 2020 a lot was uncertain for professionals around the world. As it brought the world to a stand-still, it had a crippling effect on the economy and put our health care systems in top gear which led to them being overwhelmed. Scientists and researchers all over the world started studying the effects of the virus and its various routes of transmission. They found that the virus has an extreme affinity to ACE receptors and because of the receptors' presence in the salivary gland,

saliva was found to be a major source of aerosolization of the virus particle¹². As dental health care professionals and the auxiliaries work in close proximity to patient's oral cavity, the transmission of the virus from the patient to the dentists was a factor that could not be ignored. This led to a great deal of anxiety and fear ascribed to higher risk of infection during treatment in the dental office, and in turn transmission of that virus to loved ones¹⁹.

In response to contain the rapid dissemination of the virus, governments all around the world imposed lockdowns with various restrictions. This led to a complete halt of various activities, restricted movement, a “stay at home” protocol, and allowed only essential services to continue. A wide variety of changes occurred such as temporary unemployment, working from home, home-schooling of children, lack of physical

contact with other family members, friends, and colleagues¹³. It also gravely affected the dental profession as the dental practices were strictly limited to urgent/emergency procedures only. This had led to an impaired economy with a possible reduced patient turnover and decreased capability for the patients to pay for dental expenses. This had an undesirable impact on a dentist's financial capacity due to the high risk of financial loss²⁰. The income reduction, and with that the seeming job insecurity has been found to lead to an increased amount of stress and other mental problems¹⁴. The articles included in this study also show that Young dental practitioners who were trying to set themselves up professionally by setting up their dental practices showed higher levels of stress as compared to dental practitioners already established in the area^{14,21}. A possible reason for this could be the financial liabilities the young dental practitioners have on them and a greater concern for their career development. It is also important to understand that dentistry is a highly skilled job and a minimum training of 5 years is required to be one. With the rise in cases of COVID-19, dental schools were shut down and the students had to adapt to e-learning techniques, coupled with the postponement of several research projects may have created new tensions and added to previously existing mental health conditions related to work-life conflict. Another factor adding to the stress and anxiety to the dental students is the uncertainty looming over their professional future due to lack of clinical training, lack of research experience, possible delay in securing jobs due to increased course length, and a general lack of confidence in dealing with patients on a day to day basis as they did not have any¹⁰. Post-graduate students on the other hand were at the front of the line in dealing with emergency cases. However, the risk of getting infected due to a lack of personal protective equipment added to the stress. When things started to normalize with the institutions opening there was a reluctance on the part of the patients for treatment resulting in a decreased patient inflow which, consequently

led to a decreased clinical exposure. Academically, the fear of not being able to finish the clinical work, thesis projects, dissertations, etc. had a detrimental consequence on the mental health of the dental students¹⁰.

Dental academicians have also been seen to face high levels of stress due to heavy work load and mismatch between their ability to act and what is required from them. They are also liable to anxiety and fear attributed to the greater risk of infection during treatment provision in the dental office during this pandemic¹³.

As financial situations around the world tumbled, many people started losing their jobs and some found their salaries taking a hit. A study was done by Ugo Console¹⁶ where one-third of the examinees voiced their concerns regarding the expenses they had to bear to install new devices and implement new protocols to prevent the spread of SARS-COV-2 added much to their financial strain. Above all this, the thought of getting infected and bearing the cost of treatment was one of the major factors that led to financial stress amongst the dental professionals in these times of hardship.

The measures that can be taken to restore their mental health

As the burden of the Coronavirus pandemic on the psychological health of dental health care professionals was so prominent, it was imperative that solutions to tackle the issues needed to be devised. Multiple authors^{6,10,12,16} have suggested resorting to age-old counseling therapy by setting up mental health support programs via digital platforms. This may prove to be beneficial in the screening of dental health care professionals for occupational anxiety and stress. The key aspect of this is early identification and prevention of progression of stress into severe psychological repercussions which could potentially lead to depression.

Furthermore, it is also advised to incorporate mental health workshops/seminars into the dental school curriculum to improve the calibre

and self-efficacy of students thereby also broadening their mental health awareness^{10,12}. To make up for the lack of clinical exposure and training for dental students, the use of augmented reality simulators (“DentSim, MOOG Simodont Dental Trainer”, etc.) could prove to be beneficial. A tie-up with local private or government hospitals to enrol the present interns for junior residency programs to surmount the loss of the training period of residency due to shutting of colleges could also be done¹².

Since COVID-19 has taken a great toll on the financial status of dental practitioners, the local governments could provide funding in the form of personal protective equipment or monetary support. This will help alleviate the financial losses and also reduce the fear of being infected and transmitting the virus. On the flip side, the mental reservations on behalf of patients due to the fear of being infected leads to them avoiding timely dental care. The government could allocate funds in creating awareness programs for patients in order to motivate and assure them about the competence of dental health care professionals in providing quality dental treatment with utmost precautions and care^{14,12}. This could lead to a build-up of trust, thereby reducing the patient’s fear of getting infected and perceiving the dental setting as a safe one. As a consequence, this might in turn decrease the perception of job insecurity in dentists and also its effect on mental health.

IV. CONCLUSION

Since the beginning of the COVID-19 pandemic, the world has come to a halt and the economies around the world have tumbled. With the lockdowns being imposed by the governments all around the world, work-from-home protocol being followed, professions such as Dentistry, and thus the dental healthcare workers, students, and auxiliaries suffered a great deal of anxiety and stress in regards to the unforeseeable and uncertain future.

The fear of getting infected and passing the infection onto the near and dear ones was one of the obvious reasons of stress and anxiety. As all dental clinics were operating on minimal

work force and were allowed only emergency treatments, there was increased financial stress due to decreased patient turnover. Dental students on the other hand were losing the precious time for garnering the skill and knowledge to be a successful dental practitioner. As colleges were shut, classes were online and clinical training was minimal, great deal of stress regarding the professional future and difficulty in employment prospects was high. Dental academicians were struggling with the increased workload of trying to teach the students with best of their abilities with the E-learning technologies.

To tackle the psychological implications of stress and anxiety and to prevent it from advancing to depression, counselling seems to be an evergreen solution. Incorporation of mental health workshops and seminars in the dental curriculum is also a great avenue to raise mental health awareness. Governments all around the world could also aid in funded campaigns to raise awareness amongst public to not be fearful of getting the treatment. This in turn would help increase mutual trust and relieve financial stress.

FUNDING:

Not Applicable

DECLARATIONS OF INTEREST:

None

CONFLICT OF INTEREST:

All other authors declare that they have no conflicts of interest.

HIGHLIGHTS

- We did a Scoping Review analysing the overall psychological impact of COVID-19 on Dental Healthcare Professionals
- 12 studies were included in this review after a thorough deliberation
- Increased amount of stress and anxiety were found amongst dental practitioners due to high financial loss.

- Students and academicians faced stress due to uncertain future job prospects and increased workload respectively.
- It is important to incorporate mental health awareness programmes for early identification and resolution of psychological problems.

REFERENCES

1. To, K. K., Tsang, O. T., Yip, C. C., Chan, K. H., Wu, T. C., Chan, J. M., Leung, W. S., Chik, T. S., Choi, C. Y., Kandamby, D. H., Lung, D. C., Tam, A. R., Poon, R. W., Fung, A. Y., Hung, I. F., Cheng, V. C., Chan, J. F., & Yuen, K. Y. (2020). Consistent Detection of 2019 Novel Coronavirus in Saliva. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America*, 71(15), 841–843. <https://doi.org/10.1093/cid/ciaa149>
2. Al-Amad, S. H., & Hussein, A. (2021). Anxiety among dental professionals and its association with their dependency on social media for health information: insights from the COVID-19 pandemic. *BMC psychology*, 9(1), 9. <https://doi.org/10.1186/s40359-020-00509-y>
3. Shacham, M., Hamama-Raz, Y., Kolerman, R., Mijiritsky, O., Ben-Ezra, M., & Mijiritsky, E. (2020). COVID-19 Factors and Psychological Factors Associated with Elevated Psychological Distress among Dentists and Dental Hygienists in Israel. *International journal of environmental research and public health*, 17(8), 2900. <https://doi.org/10.3390/ijerph17082900>
4. Shuja, K. H., Aqeel, M., Jaffar, A., & Ahmed, A. (2020). COVID-19 Pandemic and Impending Global Mental Health Implications. *Psychiatria Danubina*, 32(1), 32–35. <https://doi.org/10.24869/psyd.2020.32>
5. Torales, J., O'Higgins, M., Castaldelli-Maia, J. M., & Ventriglio, A. (2020). The outbreak of COVID- 19 coronavirus and its impact on global mental health. *The International journal of social psychiatry*, 66(4), 317–320. <https://doi.org/10.1177/0020764020915212>
6. Collin, V., O Selmo, E., & Whitehead, P. (2021). Psychological distress and the perceived impact of the COVID-19 pandemic on UK dentists during a national lockdown. *British dental journal*, 1–8. Advance online publication. <https://doi.org/10.1038/s41415-020-2592-57>. <https://doi.org/10.1371/journal.pone.0244352.t001>
7. Sarapultseva, M.; Zolotareva, A.; Kritsky, I.; Nasretdinova, N.; Sarapultsev, A. Psychological Distress and Post-Traumatic Symptomatology among Dental Healthcare Workers in Russia: Results of a Pilot Study. *Int. J. Environ. Res. Public Health* 2021, 18, 708. <https://doi.org/doi:10.3390/ijerph18020708>
8. Singh H, Kumar A, Gupta A, Redhu A, Singh A. Impact of COVID-19 on Indian dentists: A cross sectional survey. *J Indian Acad Oral Med Radiol* 2020;32:360-5.
9. Chakraborty, T., Subbiah, G. K., & Damade, Y. (2020). Psychological Distress during COVID-19 Lockdown among Dental Students and Practitioners in India: A Cross-Sectional Survey. *European journal of dentistry*, 14(S 01), S70–S78. <https://doi.org/10.1055/s-0040-1719211>
10. Tao, J., Lin, Y., Jiang, L., Zhou, Z., Zhao, J., Qu, D., Li, W., & Zhu, Y. (2020). Psychological Impact of the COVID-19 Pandemic on Emergency Dental Care Providers on the Front Lines in China. *International dental journal*, S0020-6539(20)36532-1. Advance online publication. <https://doi.org/10.1016/j.identj.2020.12.001>
11. Bhat, R., Shetty, A., Shetty, P., Hegde, M., Nayak, U., & D'souza, N. (2020). The psychological impact of the COVID-

- 19 pandemic on dental healthcare professionals. *Journal Of International Oral Health*, 12(8), 98. doi: 10.4103/jioh.jioh_283_20
13. Ammar, N., Aly, N. M., Folayan, M. O., Khader, Y., Virtanen, J. I., Al-Batayneh, O. B., Mohebbi, S. Z., Attia, S., Howaldt, H. P., Boettger, S., Maharani, D. A., Rahardjo, A., Khan, I., Madi, M., Rashwan, M., Pavlic, V., Cicmil, S., Choi, Y. H., Joury, E., Castillo, J. L., ... El Tantawi, M. (2020). Behavior change due to COVID-19 among dental academics-The theory of planned behavior: Stresses, worries, training, and pandemic severity. *PloS one*, 15(9), e0239961. <https://doi.org/10.1371/journal.pone.0239961>
 14. Gasparro, R., Scandurra, C., Maldonato, N. M., Dolce, P., Bochicchio, V., Valletta, A., Sammartino, G., Sammartino, P., Mariniello, M., di Lauro, A. E., & Marenzi, G. (2020). Perceived Job Insecurity and Depressive Symptoms among Italian Dentists: The Moderating Role of Fear of COVID-19. *International journal of environmental research and public health*, 17(15), 5338. <https://doi.org/10.3390/ijerph17155338>
 15. Mijiritsky, E., Hamama-Raz, Y., Liu, F., Datarkar, A. N., Mangani, L., Caplan, J., Shacham, A., Kolerman, R., Mijiritsky, O., Ben-Ezra, M., & Shacham, M. (2020). Subjective Overload and Psychological Distress among Dentists during COVID-19. *International journal of environmental research and public health*, 17(14), 5074. <https://doi.org/10.3390/ijerph17145074>
 16. Consolo, U., Bellini, P., Bencivenni, D., Iani, C., & Checchi, V. (2020). Epidemiological Aspects and Psychological Reactions to COVID-19 of Dental Practitioners in the Northern Italy Districts of Modena and Reggio Emilia. *International journal of environmental research and public health*, 17(10), 3459. <https://doi.org/10.3390/ijerph17103459>
 17. Shacham, M., Hamama-Raz, Y., Kolerman, R., Mijiritsky, O., Ben-Ezra, M., & Mijiritsky, E. (2020). COVID-19 Factors and Psychological Factors Associated with Elevated Psychological Distress among Dentists and Dental Hygienists in Israel. *International journal of environmental research and public health*, 17(8), 2900. <https://doi.org/10.3390/ijerph17082900>
 18. Ahmed, M. A., Jouhar, R., Ahmed, N., Adnan, S., Aftab, M., Zafar, M. S., & Khurshid, Z. (2020). Fear and Practice Modifications among Dentists to Combat Novel Coronavirus Disease (COVID-19) Outbreak. *International journal of environmental research and public health*, 17(8), 2821. <https://doi.org/10.3390/ijerph17082821>
 19. Pandey S, Kulkarni R, Bhavsar K, Patel R, Parakh A, et al. Impact of the Lockdown on Mental Health of Dentists of India- A Survey Study. *Biomed Sci J*. 2020;1:12
 20. McKibbin, Warwick J. and Fernando, Roshen, The Global Macroeconomic Impacts of COVID-19: Seven Scenarios (March 2, 2020). CAMA Working Paper No. 19/2020, Available at SSRN: <https://ssrn.com/abstract=3547729> or <http://dx.doi.org/10.2139/ssrn.3547729>
 21. Konidena A. Psychological impact of COVID-19 pandemic on dental professionals. *J Indian Acad Oral Med Radiol* 2020;32:203-4.