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Psychological effects of the COVID-19 pandemic on dentistry: A systematic review study

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Abstract:

The outbreak of the COVID-19 epidemic started in late 2019 in Wuhan, China, causing many psychological and occupational effects for the medical staff, including dentists and all those who work to promote oral health. The present systematic review study investigates the psychological causes and effects of the COVID-19 epidemic outbreak on dentists. Systematic search was performed on valid databases such as Science Direct, Web of Science (WoS), Embase, Cochrane, and Scopus. The English articles published from December 2019 to November 2020 were selected according to the inclusion and exclusion criteria. The quality of the articles was assessed using an existing checklist. Then, their full texts were reviewed to extract the necessary data. Finally, the data were summarized in a table. This systematic review study showed the emergence of psychological symptoms such as fear, anxiety, and stress are the three most common disorders in dentists and all those who work to promote oral health as the medical staff. This pandemic has had occupational and economic consequences for dentists. In general, the research results indicated that the outbreak of COVID-19 had affected the dental profession in two areas: (1) Psychological consequences: Reviewing the articles showed that the essential psychological effects in the dental profession are the fear of infection by patients, anxiety, and stress, respectively. (2) Occupational effects: The second significant consequence of the COVID-19 outbreak was that due to fear and anxiety of getting infected with the virus in the dental environment, containing particles and aerosols from patients' saliva and blood, dentists had to limit doing their jobs in the emergency room and sometimes even closing their offices. This issue may cause economic problems for their professions. There is also a need to allocate additional costs for the provision of sanitary equipment.

Keywords:

COVID-19, dentistry, psychological disorders

Introduction

COVID-19 is an epidemic that was first observed in December 2019 in Wuhan, China. The disease was initially limited to China but quickly spread to other parts of the world. Therefore, the World Health Organization (WHO) declared this issue as a public health emergency on January 30, 2020.^[1]

From the beginning of the COVID-19 pandemic until November 2020, more than 57 million people have been infected,

and more than 1 million people have lost their lives.^[2] Some people with severe acute respiratory syndrome (SARS)-CoV-2 infection are asymptomatic, while in others, the infection can cause mild-to-moderate COVID-19 and COVID-19 pneumonia. Its early symptoms are the same as many viral respiratory diseases, including fever, cough, and fatigue. A patient's incubation period is up to 14 days. Some of the risk factors for this disease include old age and underlying diseases.^[3] COVID-19 is a new and unknown disease for which there is no specific treatment currently. Hence, the prevention is very important. Many governments

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have imposed restrictions on disease control, such as quarantine and travel bans.^[4]

Providing health facilities is essential for any society, and health centers are rarely closed in pandemic conditions and are forced to provide medical services. The medical staff has the highest risk of developing the disease due to close contact with COVID-19 disease.^[5] Dentists and dental staff, for example, assistants and laboratory specialists, are medical staff. In addition to close contact with patients, secretions and aerosols are exposed to saliva and blood in patients' mouths while cutting and working.^[6] Therefore, dentists have a high risk of getting the disease from their patients and transmitting it to colleagues, family members, and other patients.^[6]

In addition to the effect that this pandemic has on people and medical staff's physical health, it has also caused psychological disorders. According to a study of 103 people with Ebola, almost all people were terrified after the disease, and more than 50% were afraid of death.^[7] There were also these psychological effects on individuals in the SARS-CoV-2 pandemic and influenza.^[8]

Fear and anxiety are two powerful emotions that can occur during a pandemic. Mild anxiety is natural and helps to perform protective and preventive behaviors.^[9]

According to studies, persistent anxiety in people leads to panic attacks and making wrong and annoying decisions and behaviors. Because dentistry is one of the high-risk occupations, dentists experience constant and severe anxiety in the recent pandemic.^[10,11]

According to a descriptive, cross-sectional study, Consolo *et al.* in Italy, physicians with fear and anxiety about transmitting the disease are concerned about their future careers and their professions' economic issues.^[12]

Concern and other psychological factors also reduce the quality of treatment services provided during the pandemic.^[12]

Shacham *et al.* reported that dentists with underlying disease experience more fear and anxiety during this period in Israel. Dentists are also concerned about being infected with the virus through their patients. This issue has increased their mental confusion.^[13] Ahmed *et al.* conducted an extensive study on dentists in 30 countries. They found out that psychological effects of the COVID-19 pandemic on dentists include fear of their family members' infection, anxiety, fear, and economic anxiety.^[14]

Olivieri *et al.* researched the population of endodontists and their assistants. They showed that endodontists

were fearful and anxious, and their assistants had moderate-to-severe anxiety, especially in the 1st week after quarantine. However, in general, the dental community's psychological symptoms are less than in the medical community because physicians are at the forefront of treating patients with COVID-19.^[15-17]

According to cross-sectional descriptive studies on the psychological effects of the COVID-19 pandemic on dentists and dental staff, symptoms such as fear, anxiety, stress, anxiety about future careers, family-related infections, financial and economic worries, quarantine-related depression, and hearing of the statistics of cases and deaths, sleep disorders, and other disorders have been observed.

This study's main objective is to investigate and explore the psychological causes and effects of the COVID-19 pandemic on the mental health of dentists and dental staff. It is expected that the research results can help governments and the Ministry of Health to identify high-risk occupations and their psychological and supportive needs and provide specialized and supportive services to dentists during the COVID-19 pandemic to minimize the risk and its psychological effects.

Materials and Methods

The present study is a systematic review of articles published from late 2019 to November 2020 with a thematic focus on the covid-19 virus pandemic's psychological effects on dentists. A systematic search of PubMed, Science Direct, Web of Science (WoS), Embase, Cochrane, and Scopus databases was performed with the keywords mental disorder, psychological disorder, psychiatric disease, psychiatric diagnosis, psychiatric illness, and COVID-19, coronavirus, SARS-COV-2, novel coronavirus, and dentistry, dental health care.

The inclusion criteria include valid psychological articles published from 2019 to 2020, related to the psychological effects of COVID-19 on dentists, available and written in English.

The exclusion criteria included unpublished articles, those done on inhumane specimens with no useful results, methodological problems, and those with no data on the psychological effects of COVID-19.

Criteria for selecting the articles

First, the titles and abstracts of the 59 studies were examined. Then, those having inclusion criteria were selected. A checklist [Table 1]^[11] containing 15 items was employed to evaluate the quality of the 14 selected articles (12-25). The selected studies were utterly reviewed and scored by two researchers independently.

The quality of studies based on the given score is as follows: Low quality (0–5), medium quality (6–10), and high quality (11–15).

Results

In the initial systematic search, 159 articles were found. After reviewing them, 100 articles that were duplicates were removed, and 59 articles remained on which the primary search was done. Finally, 14 with inclusion criteria articles remained (articles 12–25) [Figure 1]. These 14 articles were all published in 2020. This systematic review study seeks to summarize the research into the psychological effects of the COVID-19 pandemic on dentists, their assists, nurses, and all those who work in oral health. According to these articles, common psychological complications in these people are fear of transmitting the disease from patients, anxiety, financial and economic worries, career prospects worries, worries about transmitting the disease to family members, stress, sleep disorders, depression, posttraumatic stress disorder (PTSD), confusion, anger, and sadness that is fully described in Table 2.

In almost all studies, the main cause of fear and anxiety was close contact with patients, predominantly asymptomatic carriers. One article pointed out that the cause of anxiety and worry in these people is their underlying diseases. In three articles, the reason for dentists' fear and concern is the lack of access and provision of complete protective equipment. Five articles mentioned that the reason for dentists' financial worries is limiting their work to emergency patients and reducing working hours, office rental costs, and the cost of providing protective equipment for motels and shields, N-95 glasses and masks, and proper ventilation. According to a systematic review of these 14 articles, the psychological effects of COVID-19 pandemic on dentists included symptoms related to fear in 11 articles, anxiety in 9 ones, financial anxiety in 9 ones, concern about career prospects and knowledge in 8 ones, in 8 articles, and concerns about disease transmission to family members and friends in 8 [Table 2]. Eleven of the 14 articles employed online questionnaires as a data collection instrument (two articles had distributed their questionnaires globally among dentists). In three articles, it was mentioned that the rate of career prospects anxiety in young dentists is much higher than in old and experienced ones. The reason can be the loss of opportunities to acquire sufficient skills and knowledge during the pandemic.

Discussion

COVID-19 is spreading rapidly in the world, and many people are becoming infected with it. Due to the

Table 1 Quality assesment checklist

NO.	Question
1	Dose the study address any research question(s) or objective(s)?
2	Dose the study provide any theoretical framework for the evaluation method?
3	Dose the theoretical framework of the study include any health promotion theory?
4	Dose the study provide a timeframe for the data collection? Dose the study identify the country where the search was conducted?
5	Dose the study mention that the reviewed psychological symptoms were downloaded for evaluation?
6	Dose the study discuss the selection criteria for psychological symptoms to be included or excluded for review?
7	Dose the study provide a clear description of the evaluation method?
8	Are there at least two independent data extractors with a consensus procedure in place in case of disagreement?
9	Is a list of the psychological symptoms reviews provided?
10	Dose the study discuss the finding of the evaluation?
11	Dose the study look at the reviewed diseases consequences to promote or enable behavioural change?
12	Dose the study discuss any limitation?
13	Dose the study discuss any limitation?
14	Dose the study provide any future recommendation in general?
15	Dose the study state any conflict of interest?

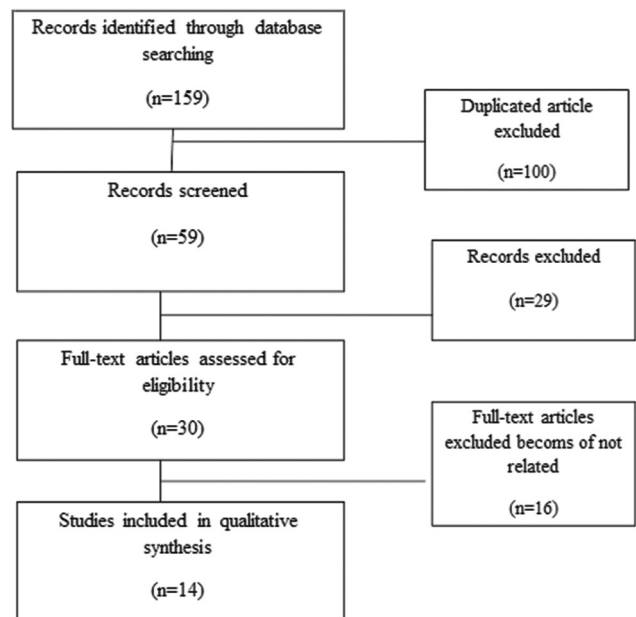


Figure 1: Diagram of the articles section process

unknown nature of this disease and its high prevalence, the possibility of increasing psychological complications on people, especially the medical staff, including dentists, is partial.^[12] Due to the nature of COVID-19, attention to psychological effects on the medical staff is essential. This study examines the psychological-occupational symptoms and their causes on dentists because they are in close contact with patients and secretions of saliva and blood from patients during dental work.

Table 2: Psychological symptoms of covid-19 in dentistry

Number	Name of author	Year	Country	Type of study	Study population	Psychological symptoms				
						Anxiety	Fear	Family concern	Occupation concern	Other
1	Consolo	2020	Italy	Cross-section	n=365	✓	✓	-	✓	Sadness-anger
2	Shacham	2020	Israel	Cross-section	n=338	-	✓	-	✓	Overload distress
3	Jouhar	2020	Globally 5 country	Cross-section	n=650	✓	✓	✓	-	Nervous-afraid of getting quarantined feel sad when hear people die from COVID-19
4	Mijiritsky	2020	Globally 30 country	Cross-section	n=1302	✓	✓	✓	✓	Overload-distress
5	Mahendran	2020	Hongkong	Cross-section	n=120	✓	-	✓	-	-
6	Olivieri	2020	Spain	Cohort	(n=4 endodontist) (n=11 staff)	✓	✓	✓	✓	Noncontrollable concern
7	Ozdede		Turkey	Cross-section	n=249	✓	-	✓	-	Concern about graduation stress
8	Khanel	2020	Nepal	Cross-section	n=106	-	✓	✓	-	Stress
9	Nair	2020	India	Cross-section	n=586	✓	✓	-	✓	Stress-insomnia depression
10	Kar	2020	India	Letter to editor	-	-	✓	✓	✓	PTSD
11	Gas parro	2020	Italy	Cross-section	n=735	-	✓	-	✓	Depression feel sad when hearing people die from COVID-19
12	Kinariwad	2020	India	Cross-section	n=403	✓	-	-	✓	-
13	Tysiack-Misa	2020	Poland	Cross-section	n=875	✓	✓	✓	-	Confusion
14	Vergara-Buenaventura	2020	Peru	Review	-	-	✓	-	-	Stress-low mood insomnia-PTSD
Number						Cause of psychological disorder				Type of health career
						Limitation to emergency reduction working time cost of PPE		Other		
1	✓			✓						Dentist
2	✓			-			Background illness			Dentist dental hygiene
3	✓			✓						Dentist
4	✓			-						Dentist
5	✓			-						Dentist dental staff (nurse laboratory)
6	✓			-			Not enough personal protective equipment			Endodontist dental staff
7	✓			-						Dentistry student
8	✓			✓						Dentist
9	✓			-			Cant earn enough skill and knowledge about their major			Endodontist endodontic resident
10	✓			✓						Dental health career
11	✓			-						Dentist
12	✓			-			Not enough personal protective equipment			Dentist
13	✓			-			Not enough PPE			Dentist
14	✓			✓						Dentist

PTSD=Posttraumatic stress disorder

According to the results of the systematic review study, the most common psychological disorders among dental staff during the COVID-19 pandemic are fear of transmitting the disease to their patients, anxiety, financial worries, high expenses, career prospects worries, lack of skills and knowledge during the pandemic, worries about transmitting the disease to their family, stress, insomnia, depression, and PTSD.

In general, a systematic review of the review showed that the consequences of COVID-19 disease in physicians could be classified as follows:

1. Psychological consequences (fear, anxiety, worry about transmitting the disease to your family, stress, depression, insomnia, and mental disorder)
2. Occupational consequences (financial worries, worries about not providing sufficient health equipment for the workplace, career prospects worries, and fear of losing one's job).

Explaining the results of a systematic study of psychological consequences, we can refer to Consolo *et al.* in Italy, where many dentists are afraid of COVID-19. Still, few think their patients carry the coronavirus. Numerous strategies have been proposed to control these concerns, including triaging remote patients, especially patients whose therapy requires several sessions, controlling patients' body temperature upon entering offices, requiring patients to wear masks upon entering offices, asking them about their travel records in the last 2 weeks, disinfecting surfaces, using air conditioners, having high suction, and using complete protective equipment while working on patients.^[12]

According to a descriptive cross-sectional study conducted in Israel to assess the psychological effects of the covid-19 pandemic on dentists and their staff, people with a history of underlying diseases such as diabetes and cardiovascular disease were more stressed and anxious because they were more susceptible. They are hospitalized in the hospital and intensive care unit to get the disease. This study mentioned that, as the AIDS pandemic, dentists in the COVID-19 pandemic are afraid of being infected by their patients, which has caused their mental confusion.^[13]

In a study by Ahmed *et al.*, conducted through online questionnaires in 30 countries, 90% of the participants were anxious, 92% worried about their families getting infected, and 86% felt scared and uncomfortable when they heard about the COVID-19 deaths. It is also reported that most dentists were 90% aware of the WHO and CDC protection and prevention guidelines.

Fear and anxiety are two common and natural disorders during the pandemic. The reasons for this are the

possibility of infection during dental processes, the disease transmission to family members and friends, the rapid spread of the virus in the world, quarantine in case of disease, and vaccination unavailability and effective treatment for the disease.^[14]

A cross-sectional descriptive study on dentists in five countries showed that people in different countries and cultures have various COVID-19 infections and mortality rates. Hence, people's understanding of the COVID-19 and its causes, level of stress, mental disorder, and generally, its psychological effects are different. For example, in Italy, where deaths from the COVID-19 were higher in March 2020 than in other countries studied, the rate of psychological complications such as fear of infection and anxiety was higher.^[15]

Another study on endodontists and their assistants reported that endodontists had fear and anxiety. Their assistants had moderate-to-severe anxiety, especially in the first few weeks of the pandemic. Anxiety has decreased a little over time. Furthermore, the anxiety level among dentists and their assistants during the COVID-19 pandemic were generally lower than that of physicians and hospital staff. Physicians are the first line of treatment for patients with COVID-19.^[16-17]

There is also anxiety and worry among dental students because they have to leave university and return home. They are also concerned about not having enough skills and knowledge in their field. The anxiety and worry level was more reported in female students but did not differ much in different educational levels. The cause of high levels of anxiety among dental students is aerosols' production during the dental process and close contact with patients. Therefore, many of them prefer virtual to face-to-face education during the COVID-19 pandemic.^[18]

In a study of Indian endodontists, the effects of factors such as age, sex, work experience, and treatment on psychological disorders caused by the virus were investigated. The results show that disorders such as fear and anxiety are more common in women. Younger dentists also have a higher risk of moderate-to-severe fear and anxiety than older dentists. Inexperienced endodontists also had more economic concerns than experienced ones due to their weaker financial situation and newcomers. Finally, two factors, age, and work experience, are considered two effective factors in endodontists' stress.^[19-20] Furthermore, dentists fear COVID-19 transmission due to the development of depressive symptoms and depression, especially in young people who feel job insecurity.^[19-20]

For explaining the occupational consequences of covid-19 on dentists, the study of Consolo *et al.* can be referred

to. They concluded that the COVID-19 pandemic had imposed short-term and long-term effects on dentists' economics so that about a third of those surveyed are financially anxious to provide more protective equipment for prevention. Another reason for dentists' financial worries is the fear of losing their jobs during the pandemic.^[12] COVID-19-related anxiety has led to the closure of dental offices despite economic hardship. Only emergency dental treatments are done for patients with pain, swelling, bleeding, and trauma, while all optional and unnecessary treatments are delayed.^[21-23]

The results of studies on endodontics residents indicate that young and inexperienced people have a lot of financial anxiety due to the fear of losing their job during the pandemic. They also have many jobs and financial worries because these people are in the early stages of starting their careers and gaining skills and experience.^[20]

One of the reasons for dentists' financial concerns is the reduction in the number of patients during the pandemic and the need to spend a lot of money to provide complete protective equipment such as N-95 mask and shield for offices and surface disinfectants.^[24-26]

Study limitations

The full text of some studies was not available. Some articles had not reached the publishing stage. Selected descriptive cross-sectional articles were performed in specific COVID-19 pandemic conditions. The possibility of sampling was not complete, and the questionnaires were provided online. Hence, the chance of a face-to-face survey was low.

Suggestions

Suggestions to compensate for psychological effects

Dentists and all dental office staff should observe the WHO's full health protocol. They should follow principles such as social distance in the workplaces, proper ventilation of the offices, disinfection of surfaces with alcohol-based materials, mask-wearing for all office visitors, and postponement of unnecessary tasks. Furthermore, dentists, assistants, and nurses are recommended to use personal protective equipment such as surgical, N-95, or FFP3 masks.

Patient triage is an important recommendation made by WHO and ADA; that is, patients should be examined for symptoms such as fever, fatigue, body aches, cough, etc., before entering the offices. Furthermore, their travel records should be registered. Some affairs such as patients' follow-up should be done virtually or by phone.

It is suggested that the Ministry of Health of each country hold workshops to introduce and teach the necessary protocols during the pandemic period for dental staff.

Psychology workshops have also been suggested to increase dental confidence and positive thinking. Dentists are advised to avoid hearing unrealistic and marginal news in cyberspace and try to live their routine, eat healthy food, and have a proper exercise program.

Suggestions to compensate for occupational effects

Governments should provide financial support to dentists during this period (e.g., providing them with loans to compensate for the economic damage of the COVID-19 pandemic). Furthermore, some protective equipment needed for dentistry for free or at a government rate should be provided for them. Job support and job security are also mentioned because dentists are at the highest risk of losing their jobs during a pandemic.

Conclusions

Generally speaking, the results of this systematic review showed that the COVID-19 outbreak had affected dentistry in two areas.

Psychological consequences

As the articles showed, the most critical psychological effects in the dental profession have been reported as fear of patients' infection, anxiety, and stress, respectively.

Occupational outcomes

The second significant consequence of COVID-19, according to studies, was due to fear and anxiety of contracting the virus in the dental environment, which contains particles and aerosols from patients' saliva and blood. Dentists were forced to limit their work to emergencies and sometimes even close offices. This issue has caused economic problems in dentistry. There is a need to allocate additional costs to provide sanitary equipment and disinfectants for their work environment, making dental staff more involved in economic issues. They were also worried about losing their jobs during a pandemic.

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Conflicts of interest

There are no conflicts of interest.

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