The Impact of COVID-19 Pandemic on Dental Practice: A Questionnaire-Based Report

Hanie Ahmadi (hanieah199@gmail.com)
Shiraz University of Medical Sciences https://orcid.org/0000-0002-9694-465X

Alireza Ebrahimi
Shiraz University of Medical Sciences

Farhad Ghorbani
Shiraz University of Medical Sciences

Research article

Keywords: COVID-19, Pandemic, Dentistry, Dental practice

DOI: https://doi.org/10.21203/rs.3.rs-38321/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License
Abstract

Background: The highly contagious nature of the novel coronavirus, besides the fact that dental procedures commonly generate blood and saliva droplets that are the routes of contagion lead to the closure of many dental clinics. In the present study, we aimed to evaluate the impact of coronavirus disease 2019 (COVID-19) pandemic on dental practice by conducting an online questionnaire among dental practitioners and finding their perspective on the subject.

Methods: This report is based on a questionnaire that was conducted among Iranian dentists. The survey included questions that evaluate the dentists’ attitudes toward the COVID-19 pandemic and its effect on their personal life, financial status, and the quality of dental services for patients.

Results: Overall, 240 dentists contributed to this study (214 general dentists and 26 specialists). The majority of the participants (n=219, 91%) did not perform non-emergency procedures during the pandemic. 162 (67%) of the contributors asserted that the COVID-19 test must be performed for the patients before any dental procedure and 234, (97%) of them reported that they encountered a decrease in their financial income since the pandemic.

Conclusion: Most of the Iranian dentists performed just non-emergency treatments and reduced their work hours during the pandemic. They executed standard protocols more cautiously than the past, and affirmed that public organizations should support the dental practitioners during the pandemic.

Background

In December, 2019, an outbreak of a novel beta coronavirus disease 2019 (COVID-19) began in Wuhan, China's Hubei province. By now, the virus has spread all around the world and disrupted all aspects of human life. The symptoms of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are similar to the previously known coronavirus infections. These include fever, dry cough, fatigue; however, the SARS-CoV-2 has a higher spreading nature. The virus could spread via respiratory droplets and contaminated surfaces, through the mucous membrane of mouth, eyes, and nose, and even via the fecal-oral route (1). This highly contagious nature of the virus has made many medical institutions to cancel all elective procedures to reduce the risk of contagion.

The use of handpieces and ultrasonic instruments during dental procedures unavoidably results in the generation of blood and saliva droplets (2). Consequently, these droplets could contaminate the dental instruments and the office environment. Hence, both dental practitioners and patients could be at risk of being infected with microbial pathogens (3). In this regard, researchers mentioned that dental clinics might be a possible transmission source of viruses such as human immunodeficiency virus (HIV) and hepatitis B virus (HBV); these viruses could transmit during dental practice to the patients and also the practitioners (4, 5).
The highly contagious nature of the SARS-CoV2, and the fact that dental procedures commonly generate blood and saliva droplets ensued the American Dental Association to suggest dental practitioners limit their interventions to emergency treatments (Table 1). Furthermore, more precautionary protocols must be performed during the pandemic to reduce the risk of infection. For instance, the dentists and their assistants should regularly sterilize the oral cavity of patients with a mouth rinse, and frequently disinfect the dental instruments (6). Additionally, they should use high volume saliva ejectors and anti-retraction handpieces to reduce the aerosol production, and use the rubber dam isolation and personal protective equipment (PPE) (6). Moreover, medical waste of suspected or confirmed SARS-CoV2 patients should be stored in double-layer yellow medical waste package bags, “gooseneck” ligation, and transported to the temporary storage area (Fig. 1).

| Dental Emergencies                                      | Dental Urgencies                                      |
|---------------------------------------------------------|-------------------------------------------------------|
| Trauma involving facial bones, potentially compromising the patient’s airway | Severe dental pain from pulpal inflammation            |
| Cellulitis or a diffuse soft-tissue bacterial infection with intra-oral or extra-oral swelling that potentially compromises the patient’s airway | Surgical post-operative osteitis, dry socket dressing changes |
| Uncontrolled bleeding | Pericoronitis or third-molar pain |
|                                          | Biopsy of abnormal tissue                             |
|                                          | Abscess, or localized bacterial infection resulting in localized pain and swelling |
|                                          | Dental treatment required before critical medical procedures |
|                                          | Tooth fracture resulting in pain or causing soft tissue trauma |
|                                          | Dental trauma with avulsion/luxation                   |
|                                          | Final crown/bridge cementation if the temporary restoration is lost, broken or causing gingival irritation |

The novel pandemic has caused many problems for delivering dental services to the patients resulting in the closure of many dental clinics, especially the private offices. Moreover, the Irish Dental Association asserted that about 75% of dental practitioners are expecting a financial loss of over 70% during the outbreak (7). Furthermore, it has been mentioned that dental practitioners could be infected with the SARS-CoV-2 virus, unnoticeably, and become carriers of the virus (8). In the present study, we aimed to evaluate the impact of coronavirus disease 2019 (COVID-19) pandemic on dental practice by conducting an online questionnaire among dental practitioners and finding their perspective on the subject.
Methods

Study design and population

This report is based on a questionnaire conducted from June 10 to 25, 2020, among Iranian dentists. Our study population consists of dentists who work in Iran regardless of their city and workplace, and 240 dental practitioners, including specialists and general dentists, participated in this investigation. The dentists were asked to participate in the study by an invitation letter that distributed among them via the internet (e-mail or social media). The study protocol was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences. The participants have voluntarily involved in this study and written informed consent was obtained. They were assured that no personal information is required, and their filled data would be kept confidential. An online questionnaire using Google Forms was used to collect the data.

Questionnaire

The preliminary draft of the questionnaire was designed for the present study based on experts’ opinions (5 attending dentists, Dental School, Shiraz University of Medical Sciences) and guidance from relevant literature. Experts above and a skilled statistician evaluated the face and content validity of the questionnaire. The content of the survey was also verified in terms of the topic concepts. Therefore, the biased, confusing, guiding, and double questions were omitted. We pilot tested the questionnaire on a sample of 20 dentists.

The survey includes 51 questions and four sections in Persian. The first section included primary demographic data. The second part consisted of closed questions (yes/no questions) about the dentists’ opinion on the COVID-19 pandemic and its effect on their personal life, financial status, and the quality of dental services for patients. The third section consists of multiple-choice questions about the dentists’ perspectives on the pandemic. The last part of the survey is based on the 5-point Likert-scale scoring to evaluate dentists’ attitudes and views on the outbreak.

Data gathering and statistical analysis

A trained person who was unaware of the names and degrees of the participants has gathered the results. Microsoft Excel sheets have been used to create tables and graphs. Two members of the research group reviewed the extracted data for accuracy. Items in the investigation were described by Descriptive statistical analysis. The calculation was performed using Statistical Package for the Social Sciences (SPSS (version 22.0 software.

Results

Overall, 240 dentists were contributed to this study (214 general dentists and 26 specialists). More than half of the participants (n = 150, 62%) were between 24 to 35 years with a job experience of fewer than ten years. Among all the participants, 114 (47%) were male, 126 (52%) were female, 108 (45%) were
married, and 132 (55%) were single. Moreover, 72% of the married participants had a child or more children (Table 2). 18 (7%) of the participants have observed the symptoms the COVID-19 in themselves, and one dentist had the disease; besides, 9 (3%) of the participants reported that their assistants had the symptoms (Table 3).
Table 2
Demographic data of dentists

| Variable                  | Number (%) |
|---------------------------|------------|
| **Age (years)**           |            |
| 57–67                     | 6 (2)      |
| 46–56                     | 42 (17)    |
| 36–45                     | 42 (17)    |
| 24–35                     | 150 (62)   |
| **Years of experience**   |            |
| > 30                      | 6 (2)      |
| 20–30                     | 42 (17)    |
| 10–20                     | 42 (17)    |
| < 10                      | 150 (62)   |
| **Gender**                |            |
| Male                      | 114 (47)   |
| Female                    | 126 (52)   |
| **Marital Status**        |            |
| Single                    | 132 (55)   |
| Married                   | 108 (45)   |
| **Number of children if married** |      |
| 3                         | 7 (6)      |
| 2                         | 21 (19)    |
| 1                         | 49 (46)    |
| No children               | 31 (28)    |
| **Field of practice**     |            |
| Pediatric Dentistry       | 3 (1)      |
| Prosthodontics            | 3 (1)      |
| Orthodontics              | 6 (2)      |
| Oral and Maxillofacial Radiology | 3 (1)   |
| Oral and Maxillofacial Surgery | 3 (1)  |
| Endodontics               | 3 (1)      |
| Operative Dentistry       | 3 (1)      |
| General Dentist           | 216 (90)   |
| **Health sector**         |            |
| Private sector            | 36 (15)    |
| Public sector             | 84 (35)    |
| Variable                | Number (%) |
|-------------------------|------------|
| Independent Private clinic | 120 (50)  |
| Have you experienced the following statements since the eruption of the COVID-19 pandemic? | Yes | No | Not applicable |
|---|---|---|---|
| | Number (%) | Number (%) | Number (%) |
| A rise in phone calls from patients | 93 (38) | 84 (35) | 63 (26) |
| Visited high-risk patients | 15 (6) | 225 (93) | |
| Had symptoms of COVID-19 | 18 (7) | 222 (92) | |
| Had a positive test for COVID-19 | 3 (1) | 12 (5) | 225 (93) |
| Your assistants had symptoms of COVID-19 | 9 (3) | 231 (96) | |
| Your assistants had a positive test of COVID-19 | 0 (0) | 117 (48) | 123 (51) |
| Changed in working time and dental practice | 228 (95) | 12 (5) | |
| Performed non-emergency procedures | | | |
| | Because of the patients’ request | 9 (3) | 73 (91) | |
| | Because of financial problems | 12 (5) | | |
| Changed the dental practice standards | | | |
| | Focus on preventive care | 30 (12) | 33 (13.0) | |
| | Not performing unnecessary treatment | 87 (36) | | |
| | Reducing the treatment sessions | 90 (37) | | |
| Reviewed the latest guidelines towards the COVID-19 pandemic | 195 (81.0) | 45 (18.0) | |
| Implemented the latest guidelines about doing dental procedures during the COVID-19 pandemic | 204 (85) | 36 (15) | |
| Had problem with providing personal protective equipment (PPE) | 210 (87) | 30 (12) | |
| Rising in the price of PPE | More than 100% | 105 (43) | 6 (2) |
| Have you experienced the following statements since the eruption of the COVID-19 pandemic? | Yes Number (%) | No Number (%) | Not applicable Number (%) |
|---|---|---|---|
| Between 75–100% | 33 (13) | | |
| Between 50–75% | 36 (15) | | |
| Between 25–50% | 33 (17) | | |
| Up to 25% | 18 (7) | | |
| Received help from a public organization for providing PPE | 27 (11) | 213 (88) | |
| Increased in the consumption of PPE while performing dental procedures | 234 (97) | 6 (2) | |
| A decrease in income | 234 (97) | 6 (2) | |
| Received financial help from a public organization | 6 (2) | 231 (96) | 3 (1) |
| Used another source of income for daily expenditure | 90 (37) | 150 (62) | |
| Encountered with financial problems | 138 (57) | Up to 2 months 39 (16) | |
| | | Up to 6 months 30 (12) | |
| | | Up to a year 15 (6) | |
| | | Never 18 (7) | |
| Dismissed your assistants because of financial problems | 105 (43) | 135 (56) | |
| Your assistants decided not to work during COVID-19 pandemic | 99 (41) | 141 (58) | |
| Paid assistants’ salary regardless of the closure of dental clinics | 126 (52) | 48 (20) | 66 (27) |
| Recommended your assistants for getting help from unemployment insurances | 57 | 183 | |
| | 23.0% | 76.0% | |
Almost one-third (n = 93, 38%) have observed an increase in their phone calls from patients for their dental problems since the COVID-19 outbreak. However, nearly all of the participants (93%) believed that dental consultation via phone calls could not resolve the patients’ problems (Tables 3 and 5).
Table 5
Dentists perception regarding the COVID-19

| How do you agree/disagree with the following statements? | Completely agree Number (%) | Agree Number (%) | Somewhat Agree Number (%) | Disagree Number (%) | Completely disagree Number (%) |
|----------------------------------------------------------|-----------------------------|------------------|---------------------------|---------------------|-------------------------------|
| Phone call is effective to resolve patients’ dental problems | 3 (1)                      | 15 (6)           | 69 (28)                   | 81 (33)             | 72 (30)                       |
| Examine the patient for COVID-19 symptoms such as fever, cough, muscle pain, or history of contact or traveling to high-risk areas | 105 (43)                  | 51 (21)          | 42 (17)                   | 30 (12)             | 12 (5)                        |
| Take COVID-19 test for patients | 105 (43)                  | 57 (23)          | 36 (15)                   | 51 (6)              | 27 (11)                       |
| Reopening of dental clinics result in spreading of the virus | 81 (33)                   | 60 (25)          | 51 (21)                   | 15 (6)              | 33 (13)                       |
| Possibility of continuing the dental profession by persisting coronavirus-19 | 12 (5)                    | 33 (13)          | 72 (30)                   | 63 (26)             | 60 (25)                       |
| Had problems with paying basic fees | 105 (43)                  | 51 (21)          | 48 (20)                   | 15 (6)              | 21 (8)                        |
| A decrease in financial income by continuing the pandemic in the future | 90 (37)                   | 96 (40)          | 30 (12)                   | 15 (6)              | 9 (3)                         |
| Had symptoms of anxiety and depression during the COVID-19 pandemic | 54 (22)                  | 51 (21)          | 45 (18)                   | 45 (18)             | 45 (18)                       |
| Need to talk to a psychiatrist or therapist | 21 (8)                    | 75 (31)          | 39 (16)                   | 39 (16)             | 66 (27)                       |
| Follow the latest news of the COVID-19 pandemic | 102 (42)                  | 78 (32)          | 36 (15)                   | 18 (7)              | 6 (2)                         |
| Latest news of COVID-19 pandemic are useful | 36 (15)                   | 57 (23)          | 84 (35)                   | 42 (17)             | 21 (8)                        |
| Following the latest news is cause of my depression and anxiety | 45 (18)                   | 63 (26)          | 51 (21)                   | 63 (26)             | 18 (7)                        |
| Latest guidelines of dental settings during COVID-19 are useful | 33 (13)                   | 81 (33)          | 99 (41)                   | 24 (10)             | 3 (1)                         |
| The guidelines toward dental practice during COVID-19 will change in the future | 45 (18)                   | 117 (48)         | 57 (23)                   | 21 (8)              | 0 (0)                         |
| PPE is effective to prevent virus transmission | 57 (23)                   | 84 (35)          | 60 (25)                   | 30 (12)             | 9 (3)                         |
Almost two-thirds of the participants (n = 195, 81%) have asserted that they would review the latest guidelines regarding COVID-19 pandemic regularly; among them, 114 (47%) have found these guidelines helpful. Moreover, 204 (85%) of them reported that they implement these guidelines into practice. Additionally, more than half of the participants (n = 162, 67%) believed that dental practice standards would reform because of the pandemic (Tables 3 and 5).

The majority of the participants (n = 219, 91%) did not perform non-emergency procedures during the pandemic, and 228 (95%) of them had changed their work hours. The contributors have had different concepts regarding the changes that are needed to be made in dental practice standards; as 90 (37%) reported that they would reduce treatment sessions at the lowest possible, and 30 (12%) said that they would focus on preventive care, in the future. Additionally, 111 (46%) of the participants said that they had canceled all dental procedures temporarily since the outbreak. Furthermore, almost half of the contributors (n = 117, 48%) believed that dental clinics should be closed until the end of the pandemic. In this regard, 108 (45%) of the participants thought that the proper use of PPE could reduce the risk of contagion (Tables 3 and 4). However, 141 (58%) of the participants believed that the reopening of the dental clinics might result in an increase of the COVID-19 incidence, and the offices should be closed.
Table 4
Dentists’ attitude during the pandemic

| Question                                                                 | Dentist Number (%) |
|------------------------------------------------------------------------|---------------------|
| How have you changed your treatment plans during the COVID-19 pandemic? |                     |
| Nothing has changed                                                   | 3 (1)               |
| Canceled all treatments until the end of the pandemic                 | 63 (26)             |
| Canceled all treatment until the end of the alert phase of the pandemic | 111 (46)            |
| Performed emergency treatment                                         | 63 (26)             |
| What kind of non-emergency treatments should you do during the pandemic? |                     |
| Do not perform any non-emergency treatment                             | 198 (82)            |
| Aesthetic dental procedures                                           | 6 (2)               |
| Restorative treatment of asymptomatic caries lesion                   | 3 (1)               |
| Extraction of asymptomatic teeth                                      | 6 (2)               |
| Initial examination                                                   | 27 (11)             |
| When the dental clinics should revive their normal work hour?         |                     |
| Until the end of the COVID-19 pandemic                                 | 117 (48)            |
| Till the end of the alert phase                                       | 31 (38)             |
| The clinic should be open now                                         | 30 (12)             |
| What is your strategy of choice regarding the reopening of dental clinics? |                     |
| I do not intend to work until the end of COVID-19 pandemic             | 72 (30)             |
| Visiting patients who don't have COVID-19 symptoms                    | 21 (8)              |
| Taking COVID-19 test for patients                                     | 39 (16)             |
| Using PPE                                                             | 108 (45)            |
| Should you have more free time these days, how do you fill the time?  |                     |
| Do not have free time                                                 | 15 (6)              |
| Do research                                                           | 15 (6)              |
| Communicate with others                                               | 27 (11)             |
| Study                                                                 | 144 (60)            |
| Do exercise                                                           | 39 (16)             |
| Which of the following equipment has been a scarce item during the pandemic? |                     |
| I have not had a problem finding PPE                                  | 9 (3)               |
| Disinfectant solutions                                                | 24 (10)             |
### Question

| Question      | Dentist Number (%) |
|---------------|--------------------|
| Facemask      | 135 (56)           |
| Medical gown  | 9 (3)              |
| Eyewear or shield | 9 (3)       |
| Gloves        | 54 (22)            |

More than half of the participants \( n = 156, 65\% \) believed that the triage of patients should be done regarding the COVID-19 symptoms such as fever, cough, muscle pain, and their history of contact and travel to high-risk areas. Moreover, 162 (67\%) of the contributors asserted that the COVID-19 test must be done for the patients before any dental procedure (Table 5).

About half of the participants \( n = 105, 43\% \) reported that they encountered a significant rise in the price of PPE. Besides, 135 (56\%) noticed that finding facemask could be a significant problem during the pandemic. Most of the dentists \( n = 213, 88\% \) claimed that they did not receive any help from any public organization for providing this equipment; in contrast to the fact that their \( n = 234, 97\% \) consumption of PPE had been significantly raised, during the pandemic (Table 3).

Most of the participants \( n = 234, 97\% \) reported that they encountered a decrease in their financial income since the pandemic. More than half of the contributors \( n = 150, 62\% \) needed another source of income for daily expenditure. Besides, more than half of the participants \( n = 156, 65\% \) had trouble covering necessary payments of their offices and lives; however, only 6 (2\%) of them received financial help from public organizations. In this regard, 138 (57\%) mentioned that, by persisting the COVID-19 pandemic, they might encounter financial problems soon. Moreover, 105 (43\%) of the participants dismissed their assistants because of the economic difficulties, and 57 (23\%) recommended their assistants to receive help from unemployment insurances (Tables 3 and 5).

Since the participants had more time during quarantine, we asked them regarding their free time and feelings. More than half of the participants \( n = 144, 60\% \) preferred to study in their free time. Furthermore, 105 (43\%) observed the symptoms of depression and anxiety in themselves, and 96 (40\%) have found that they should consult with a psychiatrist. Among all the participants, 108 (45\%) believed that following the latest news about COVID-19 could result in depression and anxiety (Tables 4 and 5).

### Discussion

Dental professionals are at higher risk of being infected by SARS-CoV-2, exposing to blood, saliva, and aerosol/droplet generation during dental procedures (9, 10). Previous investigations considered that dentists are the highest risk group of health-care workers for contracting COVID-19 (11). Several recommendations have been proposed since the beginning of the outbreak, including infection control.
protocols and triage of patients to reduce the risk of nosocomial infection in dental settings. Although, the patients who are carrying the novel virus can be asymptomatic, and the routine triage might not detect them. The nosocomial transmission of SARS-CoV-2 has been a concern for dental practitioners, as it could put both patients and dentists at the risk of contagion.

The results of our study showed that about 7% of the contributors had experienced the symptoms of COVID-19, and nearly 1% of them had a positive COVID-19 test. Besides, the workers in dental clinics are also at considerable risk of contagion, as our investigation showed that 3% of the contributors’ assistants had the symptoms mentioned above. This indicates that dental practice should be done even with more infection control cautionary, and the non-emergency treatments should be delayed until the end of the pandemic.

Occupational Safety and Health Administration has mentioned that using remote dental consultations should be considered for the non-emergent cases during the pandemic (12). Additionally, before the current pandemic, remote consultation was found to have sufficient quality for oral treatments (13). The telehealth-based delivery of dental services seems to be an attractive and flexible concept, especially during these unprecedented times (14).

Consistently, the majority of the participants of the present study also reported a tremendous increase in the demand for remote dental consultations. However, they did not consider remote consultation as an effective way of delivering dental services. We believe these controversial results could be because of the characteristics of dental procedures and the lack of appropriate infrastructure. Future studies must be conducted to hypothesize and design advanced technologies that can virtually deliver dental services.

In response to the current pandemic, several organizations such as the Centers for Disease Control and Prevention (CDC), (ADA), British Dental Association, and National Health Service have designed and developed response groups, and guidance for dental settings. In the early days of the pandemic, the guidelines recommended that dental care procedures should be done for urgent and emergency diagnosis while providing appropriate PPE and patient care supplies. However, as the pandemic continued, it has been proposed that dental settings can deliver non-emergency treatments. A survey led by the ADA Health Policy Institute demonstrated that over 90% of dental clinics are now open for elective care services (15). CDC has designed a standard for health-care systems and health-care workers for the delivery of non-emergent services to minimize the risk of the contagion (16).

Most of the contributors mentioned that they follow and implement the latest guidelines for dental settings. More than half of them believed that the standards in that regard must be reformed. The guidelines may differ in different regions of the world according to their facilities and supplies. Though, we believe that a comprehensive worldwide instruction must be provided for dental settings to minimize the risk of infection effectively. A significant number of participants mentioned that they do not perform any non-emergency procedures, and they have lowered their work hours to minimize the spread of the virus. In our study, several suggestions have been made regarding dental practice guidelines such as reducing the treatment sessions, emphasis on preventive care, triaging patients for the related symptoms,
conducting COVID-19 tests for the referred patients, and proper use of PPE. Some participants considered that the reopening of the dental clinics for non-emergency cases might increase COVID-19 incidence, and the offices should be closed until the end of the pandemic.

The global health care systems have already been overwhelmed with infectious and potentially infectious patients. Effective use of PPE, including gowns, gloves, face shields, goggles, and face masks, is an essential regulation for preventing the spread of the virus to and from health-care providers and patients. While the rapid enhance of demand for PPE resulted in the shortage of these supplies all around the world (17).

The majority of the participants have asserted that the consumption of PPE had been significantly raised, and more than half of them had trouble finding facemask since the COVID-19 outbreak. Furthermore, they reported that the price of personal protective equipment (PPE) had been significantly raised, which could be a sign of shortage. No public organization did not help the participants to provide this equipment due to the lack of support from insurance companies.

A significant number of the participants had financial problems caused by their lowered work hours and restricted dental procedures. More than half of them have been expending their saves for daily expenditure. Still, a small number of them have received financial help from public organizations. These results indicate that the related organizations must increase their efforts to fund the dentists and their assistants during these unprecedented times. Should not providing the support funds for the dental care workers, by persisting the COVID-19 pandemic, the number of workers that encounter financial problems will increase.

It has been noted that the health-care workers are encountering far more emotional stress comparing to the general population, during the COVID-19 pandemic (18, 19). Increased workload, fear of being infected with the disease, working with repeatedly changing protocols, using PPE, and caring deteriorating patients are found to be the main concerns among the medical staff during the pandemics. Moreover, difficult decisions should be made by the workers during the pandemics as the resources are limited. Our study also showed that about half of the participants had symptoms of depression and anxiety. They also mentioned that they need to consult with a psychiatrist or a therapist.

**Conclusion**

Proper use of PPE can minimize the risk of contagion during the COVID-19 pandemic; however, finding PPE during the current pandemic have found to be difficult. According to the result of the present study, Iranian dentists preferred to lower their work hours and limit dental procedures to emergency treatments until the end of the pandemic. The dentists also encounter financial problems because of the closure of dental clinics. Besides, most of the dentists have faced depression and anxiety during the pandemic. Public organizations must intervene to financially and psychologically support the dentists during these unprecedented times.
Abbreviations

(ADA) American Dental Association
(CDC) Centers for Disease Control and Prevention
(COVID-19) Coronavirus disease 2019
(HBV) Hepatitis B virus
(HIV) Human immunodeficiency virus
(PPE) Personal protective equipment
(SARS-CoV-2) Severe acute respiratory syndrome coronavirus 2

Declarations

Ethical consideration

The study protocol was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences. The participants have voluntarily involved in this study and written informed consent was obtained. They were assured that no personal information is required, and their filled data would be kept confidential.

Consent for publication

All authors have approved the paper and agree to its submission and publishing in this journal.

Competing interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Funding

The authors received no financial support for the research and authorship.

Authors’ Contributions

HA: Conceptualization, Methodology, Software, Validation, Formal analysis; AE: Data Curation, Visualization, Writing- Reviewing and Editing, Supervision; FG: Investigation, Supervision, Project administration
Acknowledgment

The authors want to thank SIMR Co. and Medipress™ for the scientific editing of the paper.

References

1. Guo Y-R, Cao Q-D, Hong Z-S, Tan Y-Y, Chen S-D, Jin H-J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak–an update on the status. 2020;7(1):1–10.
2. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM. Guidelines for infection control in dental health-care settings-2003. 2003.
3. Bolyard EA, Tablan OC, Williams WW, Pearson ML, Shapiro CN, Deitchman SD, et al. Guideline for infection control in healthcare personnel, 1998. Infection Control Hospital Epidemiology. 1998;19(6):407–63.
4. Updated U. Public Health Service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis. MMWR Recomm Rep. 2001;50(1):1–52.
5. Ippolito G, Puro V, Heptonstall J, Jagger J, De Carli G, Petrosillo N. Occupational human immunodeficiency virus infection in health care workers: worldwide cases through September 1997. Clin Infect Dis. 1999;28(2):365–83.
6. CDC. Guidance for Dental Settings. Centers for Disease Control and Prevention; June 17, 2020 [Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html.
7. Farooq I, Ali S. COVID-19 outbreak and its monetary implications for dental practices, hospitals and healthcare workers. Postgraduate Medical Journal. 2020:postgradmedj-2020-137781.
8. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. Canadian Journal of Anesthesia/Journal canadien d’anesthésie. 2020:1–9.
9. 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):481–7.
10. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. 2020;12(1):1–6.
11. Jamal M, Shah M, Almarzooqi SH, Aber H, Khawaja S, El Abed R, et al. Overview of transnational recommendations for COVID-19 transmission control in dental care settings. Oral Diseases. 2020;n/a(n/a).
12. OSHA. COVID-19 Guidance for Dental Practitioners: Occupational Safety and Health Administration; May 2020 [cited 2020 June 2020]. Available from: https://www.osha.gov/Publications/OSHA4019.pdf.
13. Ignatius E, Perälä S, Mäkelä K. Use of videoconferencing for consultation in dental prosthetics and oral rehabilitation. Journal of Telemedicine Telecare. 2010;16(8):467–70.

14. Volgenant CM, Persoon IF, de Ruijter RA, de Soet JJOD. Infection control in dental health care during and after the SARS-CoV-2 outbreak. 2020.

15. ADA. HPI polling shows robust, sustained rebound in dental care: American Dental Association Health Policy Institute June 05, 2020 [June 2020]. Available from: https://www.ada.org/en/publications/ada-news/2020-archive/june/hpi-polling-shows-robust-sustained-rebound-in-dental-care?&utm_source=cpsorg&utm_medium=covid-main-lp&utm_content=cv-hpi-view-poll-results&utm_campaign=covid-19.

16. CDC. Framework for Healthcare Systems Providing Non-COVID-19 Clinical Care During the COVID-19 Pandemic: Centers for Disease Control and Prevention May 12, 2020 [Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/framework-non-COVID-care.html.

17. Cook TM. Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic – a narrative review. 2020;75(7):920–7.

18. Greenberg N, Docherty M, Gnanapragasam S, Wessely SJb. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. 2020;368.

19. Tan BY, Chew NW, Lee GK, Jing M, Goh Y, Yeo LL, et al. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. 2020.

Figures
Figure 1

Infection control in dental clinics during the COVID-19 pandemic.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Questionnaireform.docx