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Knowledge and therapeutic approach of Iranian dentists toward COVID-19 pandemic

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ABSTRACT

Introduction: Dental services are a hotspot for viral transmission. Dentists must have complete knowledge about the disease and quick access to information to combat this transmission. To prevent COVID-19 viral spreading through dental practices, dentists must be well-versed in disease and infection control measures. As a result, this study aimed to assess the knowledge of Iranian dentists on the Covid 19 pandemic.

Materials &Methods: The present study was a questionnaire-based cross-sectional survey. A modified questionnaire of a perused one was prepared, the validity of which was confirmed, and the reliability was accepted by Cronbach's alpha test (0.86). This questionnaire was completed by 133 Iranian dentists and included six components: consent to participate in research, demographic information, knowledge, infection control, vaccination, and therapeutic approach. Data were analyzed using Mann-Whitney, Kruskal-Wallis, and Spearman rank correlation coefficients, and $P<0.05$ was considered the level of significance.

Results: Iranian dentists are shown to have proper knowledge, but only 21.7% of participants received infection control courses; moreover, only 47% of them knew the accurate incubation period of the Virus. Dentists working in Academic clinics took more preventive measures than those working in private clinics ($P=0.023$).

Conclusion: It is recommended that health care authorities ensure that dentists receive organized information and guidelines.

Keywords: COVID-19 , Dentists, Infection Control, Knowledge, Surveys and Questionnaires

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Introduction

Coronavirus is a term that refers to a range of respiratory viruses that can cause mild to severe symptoms and lead to respiratory failure. Its name recalls the virus's morphology, including pointed structures on the surface that resemble

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a crown.[1]The origin of SARS-CoV-2 is unknown, although it is believed that the virus was first transmitted from animals to people in the Huanan seafood market in Wuhan, China, in December 2019, where a cluster of pneumonia cases caused by a newly found coronavirus was diagnosed.[2] It was declared a pandemic emergency by World Health Organization (WHO) in March 2020. Common clinical features of this virus infection include fever, cough, headache, diarrhea, fatigue, headache, and myalgia. Anosmia and ageusia are other commonly reported symptoms.[3]

COVID-19 has an incubation time that ranges between 1 and 14 days. Early detection of symptoms is life-saving. Some mucocutaneous manifestations of this viral infection can be beneficial for the early diagnosis. There were also occasions where the only manifestation was oral symptoms, and some reports indicated that approximately 80% of infected cases were asymptomatic.[4, 5] Many regular dental treatments can transfer the virus through aerosols, making dentists one of the most significant risk groups for transmission and infection with the coronavirus. As a result, the demand for personal protective equipment has increased. In case of airborne infections like COVID-19 , personal protective equipment consists of gloves, masks, gowns, face protection, head cover, and rubber boots.[6]

Iran was one of the first countries infected with the virus after the epidemic in Wuhan, China.[7] The first cases in Iran were reported on 19 February 2020 in Qom. [8] Soon after that, many more cases were identified in other provinces, with some provinces being highly affected in the early phase of the epidemic, including Tehran, Gilan, Mazandaran, Qom, and Golestan.[9] Due to the latest report by the public relation and information center of the Ministry of Health of Iran in November 2021, a total of 6 million COVID-19 positive cases were reported in Iran, about 128000 of whom have died. Nevertheless, more than 3000 COVID-19 positive patients were being cared for in hospital intensive care units at the time of the report. [10] To combat the outbreak of COVID-19, dentists must have a high degree of knowledge about the disease, its severity, and infection control measures. Various studies were conducted in different countries to assess their dentist's knowledge. In this regard, this study was conducted to assess Iranian dentists' knowledge, attitudes, and prevention strategies regarding the COVID-19 pandemic.

Materials & Methods

The present study is a questionnaire-based cross-sectional survey approved by code IR.SBMU.DRC.REC.1399.151 in the Research Council of Shahid Beheshti University of Medical Sciences. Due to COVID-19 pandemic circumstances, the actual number of active dentists was unavailable, making a precise assessment of the target population number impossible. As a result, from May 22nd to June 27th, 2020, this study was conducted using Google Forms and circulated through social media groups.

Sample size: The statistical population was the target of dentists in the whole country, the total number of which was announced by the Ministry of Health as nearly 20,000 dentists. Consequently, the statistical population had a limited statistical opinion and many changes. The following formula is used to determine the sample size:

$$n = \frac{N * Z_{\frac{\alpha}{2}}^2 * \sigma^2}{\varepsilon^2(N-1) + Z_{\frac{\alpha}{2}}^2 * \sigma^2}$$

Where N represents the volume of the target population and is equal to 20,000, α is the level of error and equal to 0.05, ε is the accuracy of the researcher, which usually takes a value equal to 10%, and σ is the standard deviation equal to 0.59.[11] As a result, the number of samples required for this study was obtained to be 132.84 people, which was considered by rounding 133 people. It should be noted that the number of active dentists reported by the Ministry of Health (20,000) is based on pre coronavirus conditions. In addition, many dentists did not work because of the corona pandemic; therefore, the exact number of active dentists during the pandemic was not known.

Finally, 133 dentists participated in the study. Participants provided consent regarding publishing their data in the first section of the questionnaire, their personal information was protected, and they had the option to discontinue responding to the survey at any time. The questionnaire was a modified version of the one used by Mustafa et al.[12]. Two different experts evaluated the original questionnaire, selected appropriate questions, and modified them. The validity of this questionnaire was reviewed through the content validity method by six professors in this field and

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approved after making the desired corrections. Moreover, Cronbach's alpha was used to evaluate the reliability of the questionnaire, and it was 0.86, which is an acceptable value, confirming the strong reliability of this questionnaire.

The questionnaire contained 32 questions in 5 sections, including demographic information, knowledge, dental treatments, vaccine, and risk assessment. SPSS version 26 was used to analyze the data. The relationship between sex and other categorical variables was assessed using the Mann-Whitney test. Also, the Kruskal-Wallis test was employed to evaluate the relationship between age, practice location, degree of education, and other categorical variables. Other than demographic data, the Spearman rank correlation coefficient was used to explore any correlation between different questionnaire parts. The statistical significance level was set as a P value of less than 0.05.

In order to evaluate the questionnaire, every correct answer was considered as 1 point. However, some questions had more than one correct answer, which could result in more than 1 point; false answers did not end with a negative point. Finally, the sums of points were calculated in each section, the average of which was used to evaluate and compare study groups. The overall points in each section were as follows: Knowledge: 14, Dental treatments and infection control: 12, Vaccine: 5, Risk assessment and therapeutic approach: 10.

Results

Demographic Data: A total of 133 responses were collected from Iranian dental practitioners. The majority of responders were female, with an average age of 20-29. Most of the participants were general dentists who worked in private practices. Table 1 presents the demographic characteristics of the participants in detail.

Table 1. Demographic data of participants

Demographic Variables	percent
Gender	
Male	26.6
Female	73.4
Age	
20-29	71.1
30-39	21.9
40-49	3.1
50-59	3.9
≥٦٠	0
Region of practice in the country	
Central region	42.1
Northern region	27
Western region	18.3
Eastern region	4
Southern region	8.7
Working sector	
University and dental schools	35.7
Private practice	46.5
University clinics	17.1
Others	0.8
Education Status	
Dentistry student	20.9
General dentist	60.5
Specialist/Resident	18.6
Participation in COVID-19 infection control courses	
Yes	21.7
No	78.3

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Knowledge: The participants demonstrated proper knowledge of COVID-19 symptoms with an average point of 8.47. Also, 91.7% of dentists agreed that fever and cough are the most common disease symptoms. Moreover, 96.9% were aware that the virus was spread by aerosol, and 68.4% answered the contact transmission chance correctly. However, only 47.3% of participants knew the answer to the incubation period, and only 21.7% participated in infection control courses. Although dental residents and specialized dentists had a little more knowledge about COVID-19 and got 8.8 points compared to general dentists, who got 8.3 points on average, the difference was not statistically significant (P=0.802). The outcome of the knowledge section is presented in Table 2.

Table 2. Participant responses to the knowledge section

Question	
Which one is the incubation period of the coronavirus?	
2-7 days	22.5
2-14 days	47.3
7-14 days	22.5
7-21 days	7.8
Which of the following is a COVID-19 symptom? (There might be multiple right answers.)	
Fever	96.2
Cough	91.7
Runny nose	41.3
Sore throat	66.9
Shortness of breath	52.6
Joint / muscle pain	38.3
Eye redness	15
Skin rash	20.3
Diarrhea	33.8
Vomit	26.3
It may be asymptomatic	39.8
Which of the following is a COVID-19 transfer method? (There might be multiple right answers.)	
Respiratory (through sneezing and coughing)	96.9
Handshaking	68.4
Touch surfaces (door handles, tables, etc.)	47.3
Which of the following is considered a risk for COVID-19 ? (There might be multiple right answers.)	
Diarrhea symptoms	50.3
Respiratory infection symptoms	84.9
History of travel to high prevalence areas or new species of COVID-19	85.7
History of Contact with the infected person	93.2

Dental Treatments and Infection Control: The majority of responders used appropriate personal protective equipment with an average point of 5.9. In addition, 96% believed that personal protective equipment is effective against viral transmission. Face protection was beneficial to 97.7% of dentists, and 85.3% used a combination of two masks; however, most dentists did not use COVID-19 rapid test, pulse oximeter, and thermometer before treatment. Table 3 presents the dental treatments and infection control measures section.

Vaccine: Most of the participants had received the COVID-19 vaccination and were well versed in the subject, gaining an average of 3.5 points. 82% of individuals had received their vaccination at the study time. Moreover, dentists with higher knowledge of vaccination were more cautious in their infection control measures and treatment approaches (P<0.05). Although dental residents and specialist dentists had higher knowledge about the COVID-19 vaccine (3.7 points), the difference was not statistically significant compared to general dentists, who gained 3.3 points on average (P=0.128). (Supplementary Table 1)

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Table 3. Dentists' responses regarding infection control measures

Question	
The use of personal protective equipment such as shields and goggles, FFP2 masks (KN95) and gloves is effective in protecting medical staff in the face of a patient suspected of COVID-19 .	
Yes	96.9
No	0
No idea	3.1
How many masks do you use during your clinical activity?	
A three-layer surgical mask	4.7
Two three-layer surgical masks	27.9
An N95 mask and a three-layer surgical mask	57.4
3M mask	7.8
Others	2.3
How much is the risk of transmitting the infection reduced by using a cloth mask on a three-layer mask or fitting the mask by tying it?	
60 percent	16.8
70 percent	28
80 percent	16.8
95 percent	38.4
Which of the following protective equipment can you use during dental treatment?	
Goggles	16.2
Simple face shield	50
Casket hat face shield	31.5
I do not use these devices	2.3
Do you get Rapid Tests from your patients before starting treatment?	
Yes	1.6
No	98.4
Do you use a pulse oximeter for your patients before starting treatment?	
Yes	21.1
No	78.9
Do you measure your patients' body temperature before starting treatment?	
Yes	38.3
No	61.7
Do you use ultrasonic devices for SRP during the Pandemic period?	
Yes	54.4
No	45.6

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Supplementary Table 1. Participant responses to vaccination questions

Question	
Have you received the vaccination?	
Yes	82
No	28
How long does it take immunity to be developed after vaccination is given?	
Immediately after the first dose injection	2.3
Immediately after the second dose injection	0.8
Sometime after the first dose injection	27.1
Sometime after the second dose injection	69.8
If the vaccination is fully effective, which of the following might be possible? (There might be multiple right answers.)	
Severe form of the disease or being hospitalized due to COVID-19	9.7
Mild type infection	88.7
Vaccinated person may be a carrier of a virus	56.3
what percentage of the population should be vaccinated in order to break the transmission chain?	
100%	7.8
80%	59.7
60%	31
30%	1.6
Is vaccination effective against the new species?	
Yes	76.6
No	23.4

Risk assessment and Therapeutic Approach: Based on the comments of participants, COVID-19 is a critical health concern that requires special consideration while treating dental patients. There is a significant relationship between dentists' place of practice and their therapeutic approach to COVID-19. Dentists working in universities clinics took significantly more preventive measures in their therapeutic approaches with an average of 4.4 compared to those who worked in their private practice with an average of 3.8 (P value<0.05). Furthermore, females were shown to be more conservative in their therapeutic approach, gaining an average of 4.11 compared to men, who gained 3.79; however, the difference was not statistically significant (P value=0.150). Supplementary Table 2 presents the risk assessment section. It is worth noting that there was no evidence of a significant relationship between other category variables.

Supplementary Table 2. Responses of participants to the risk assessment and therapeutic approach section

Question	
How do you assess the risk of COVID-19?	
High risk	67.4
Medium risk	32.6
Mild risk	0
Do you consider COVID-19 an important health issue?	
Yes	98.4
No	1.6
The symptoms of COVID-19 go away over time and there is no need for special treatment.	
Yes	21.7
No	78.3
What do you do if a patient comes to you with symptoms of coughing or sneezing?	
Failure to perform treatment and asking the patient to leave the center	35.7
Performing treatment and requesting the patient to go to the hospital	3.9

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Referral of the patient to the hospital without treatment	60.5
What is your opinion about maintaining distance between patients and the need for them to use the mask while waiting for a visit and hand washing before entering the center?	
It is essential and helps reduce the spread of the disease	100
It is not necessary but it may cause fear	0
If one of your clinic staff members has flu-like symptoms, will you allow them to work with the patient?	
Yes	1.6
No	98.4
What do you think is the role of dentists in educating others about COVID-19?	
Very high	35.7
Medium	54.3
Mild	9.3
None	0.8
If you are in contact with an infected person, do you know where to go or who to contact?	
Yes	77.3
No	22.7
If you have any suspicious symptoms of COVID-19, do you know where to go or who to contact?	
Yes	82.5
No	17.5

Discussion

Due to the proximity of dentists to the working field, they are highly susceptible to the COVID-19 virus. The present study revealed that Iranian dentists have proper general knowledge about COVID-19; however, only 21.7% of participants received infection control courses. Moreover, only 47% of them knew the accurate incubation period of the virus, which is in accordance with some studies conducted in other countries.[12, 13] While showing proper general knowledge may reflect the high motivation of dentists to learn about the issue, a lack of information in a specific area may indicate that the correct information was not easily accessible. On the other hand, Sarfaraz et al. conducted a multi-country study in four countries, revealing insufficient knowledge in fundamental aspects of COVID-19 among dentists while having a positive attitude toward disinfection practices during this pandemic. To summarize the results of the studies mentioned above, it is strongly recommended that health care authorities provide organized materials that dentists can easily access, especially since we had been dealing with the pandemic for more than a year at the time of the study.[14]

Over 95% of participants used proper infection control equipment, which is critical in preventing COVID infection. According to the research findings, there is a significant difference in the therapeutic approaches among dentists working in different areas. Dentists working in universities clinics had more preventive measures in their therapeutic approaches, attributed to dental school administrators' attitudes toward meticulous patient screening to avoid delivering dental treatments to COVID-19 patients. In order to minimize the risk of disease transmission through dental practices, it seems this restrictive attitude should be extended to all dentists across the country, which can be accomplished by motivating them to follow CDC and WHO guidelines. Several pieces of previous studies have shown that better knowledge was associated with higher prevention measures.[15-17] This association was not significant in the present study, and dentists who practice in university clinics have shown much more preventive therapeutic approaches. Naturally, some discrepancies in the results of different studies might be related to the time they were conducted; some studies were performed early in the pandemic with limited information or guidelines.[12]

In the present study, postgraduate residents and dentists had slightly higher knowledge scores than graduates and undergraduates. This finding is in line with other worldwide surveys [16, 18-21] and pieces of research regarding previous pandemics such as ZIKV and Ebola.[22, 23] Involvement of graduates in research and exploration of the latest pieces of

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evidence could be the reason for this. On the other hand, Khanal et al. found no significant association between education levels and COVID-19 related knowledge scores, and Harapan et al. reported higher scores during the Zika virus pandemic for graduates compared to higher education.[24, 25] The disparity in the findings of these two studies could be attributed to differences in education curriculum and rules between countries.

Ahmed et al. reported anxiety and fear among dental practitioners around the globe; participants were afraid of getting infected with COVID-19 from either a patient or a co-worker or of spreading the virus from dental practice to their families. There was no statistical relationship between the responses and gender in their study. [26] In contrast, in the present study, women were found to be slightly more conservative when providing dental treatments to patients with COVID-19 like symptoms. Anxiety and obsessive-compulsive symptoms are psychological dangers for healthcare personnel during the pandemic.[27] These findings could be consistent with those of other studies that have suggested higher levels of job-related anxiety in women.[28, 29]

Leadership scholars have widely recommended learning from experiences. [30, 31] Countries that used their prior experience dealing with emerging infections, such as China and South Korea, have more efficiently responded to the COVID-19 pandemic. Therefore, the results of this study can be helpful during the rest of the COVID-19 era and can be used as a learning tool from experience in future pandemics.

The limitation of the present study was that participants were contacted via social media, which was unavoidable since COVID-19 prohibited all scientific gatherings. Nonetheless, the cross-sectional design of this study precludes making causal inferences.

Conclusion

This cross-sectional study revealed that Iranian dentists have the proper knowledge and therapeutic approaches regarding COVID-19; however, there is a lack of knowledge on the disease incubation period. Only a small number of participants got infection control courses during the pandemic. As a result, to limit infection transmission through dental practices, healthcare authorities are suggested to ensure that organized information and guidelines are provided to dentists. Furthermore, the findings of this study could provide strategies for healthcare authorities to take faster measurements and be better prepared for future epidemics and pandemics.

Conflicts of Interest

There is no conflict of interest

Authors' Contribution

N. M. contributed to the conception, design, data acquisition, interpretation, statistical analysis as well as drafted and critically revised the manuscript.

R. E. Z. contributed to the conception, design, data acquisition, interpretation, statistical analysis, as well as drafted and critically revised the manuscript.

M. S. contributed to the conception, design, data acquisition, interpretation, statistical analysis as well as drafted and critically revised the manuscript.

All of the authors have read and approved the submitted version of the manuscript.

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