Case Study

KNOWLEDGE OF SAFETY PRECAUTIONS AND EMERGENCY MANAGEMENT DURING COVID PANDEMIC AMONG DENTISTS IN SAUDIARABIA: CROSS-SECTIONAL STUDY

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ABSTRACT

Recently, with the emergence of world pandemic called COVID-19 virus all over the world, dental practitioners have stood out as high risked front liners. The aim of this study is to analyse the knowledge and management of emergency and safety precautions implemented by dentists during the pandemic of COVID-19 in Saudi Arabia. An online survey was used for this cross-sectional study using google forms and was distributed to dental professionals who works in government hospitals, private clinics, and academic universities in Saudi Arabia. Statistical evaluation was done using the data that was obtained from 355 dentists (academicians, private practitioners, military and government employees) , with the power of the sample being 0.85. Relevant awareness regarding the incubation period and symptoms of COVID-19 virus was observed among the dental professionals. Preparedness and perception among dental professionals seem to be satisfactory and statistically significant. Obligatory improvements should be provided through educational campaigns.

Key words: SARS-CoV-2, COVID-19, Pandemic, Aerosol, Frontliner.

Introduction

The newly emerged respiratory infection caused by coronavirus species COVID-19 (SARS-CoV-2, formely known as 2019-nCoV, has created massive panic and chaos worldwide [1, 2]. World Health Organization (WHO) on 30th January 2020 announced public health emergency regarding a global pneumonia epidemic, and on 11th February 2020, WHO named this disease as novel viral pneumonia coronavirus disease 2019 (COVID-19). The first few cases of COVID-19 were identified in Wuhan, Chinaon (December 2019), through genome sequencing in pneumonia patients with unknown etiology [3]. By 2nd July 2020, approximately 4.91% of the mortality rate was reported worldwide. 194,225 cases were reported in Saudi Arabia with 1,698 deaths, which led the MOH to announce general health guidelines to combat the pandemic, and health care was limited to emergency cases, including dental care [4-6].

SARS-CoV-2 shares the same host receptor, with SARS-CoV. The natural host of SARS-CoV-2 shows 96.2% whole-genome identity to BatCoV RaTG13 [7]. This virus spreads through respiratory droplets, direct contact, and through aerosol-generating procedures [8]. COVID-19symptoms include, fever, dry cough, myalgia loss of smell and taste, irregular chest computed tomography scan. [9].

In the advent of symptoms like loss of smell and taste, patients tend to approach a dentist for consultation and care [10]. This paves a path of concern regarding the health of the dental practitioner who can likely become infected from the patient, through direct contact with the mucous membrane, inhalation of aerosol/droplets, oral fluids, contaminated instruments, and surfaces. Thus, it is advised that during dental procedures, certain precautionary protocols must be observed for the safety of the practitioner, dental personnel, and patients. Good hand hygiene with a cleansing time of the 40s, clinical disinfection protocol, use of personal protective equipment (PPE), N-95 masks, gloves, gowns, face shields, ensuring adequately ventilated space and cautious use of aerosol-generating procedures became mandatory [8, 11-13].

By 28th January 2022, COVID vaccines produced with the collaboration of scientists across the world, gave a headstart to combat the spread of COVID-19. These vaccines have proved to be an innovative and successful tool, by reducing severity and complications caused by the virus [14].

Materials and Methods

Study design

This cross-sectional research was conducted from 13 February to 10 April 2021, using a web based questionnaire involving dental professionals working in government hospitals, private clinics and academic universities, in Saudi Arabia. The questionnaire was prepared in English and reviewed for face validation by two independent local reviewers. The questionnaire was distributed through emails, text messages, and social media outlets. Undergraduate dental students were excluded from the study. The questionnaire was categorized into parts, out of

which, the first part comprised of demographic information about the participants. The second part assessed the participants' awareness and basic knowledge about SARS-CoV-2 and COVID-19, emphasizing on the signs, symptoms, route of transmission, incubation period, and viability outside the human body. The last part of the questionnaire focused on the methods of prevention and attitude towards treating SARS-CoV2-infected patients.

A pilot study was conducted to ensure the certainty of the questionnaire, by sending the survey to 20 participants and the data were inserted in SPSS version 22 to determine the reliability using Chronbach's coefficient alpha (value: 0.712). Experienced researchers in REU reviewed the validity of the questionnaire and changes were made accordingly.

Ethical approval and consent

Informed consent and ethical approval (Institutional Review Board) IRB# ("FUGRP/2021/225/398/390) was obtained from the Scientific Research Unit of Riyadh Elm University. Participants were informed about the purpose of the study, voluntary nature of participation, their right to refuse or withdraw at any point from the study, and the potential benefits of the involvement in the study. Consent form was attached along with the online questionnaire, and participants were redirected to the questionnaire after the completion of the consent, to ensure approved participation of the participants.

Analysis methods

Analysis of the collected data was done using SPSS version 22, which included descriptive as well as inferential statistics. Comparisons between groups were done with the significance value kept under 0.05 using the Chi-square test. The results of all categorical variables are presented in terms of frequencies and percentages. A Chi-square test was performed to compare work sectors, work settings, and professionals. All tests were performed at a significance level of α=0.05.

Results and Discussion

355 dentists from all over Saudi Arabia filled the survey, with the power of the sample being 0.85, which shows that there is an 85% chance of achieving a statistically significant association in the acquired data **(Table 1)**.

Table 1. Power of sample

Mean	1.43
Std Deviation	0.49
Sample size	355
Alpha	0.05
Sample mean	1.50
Standard Error of Mean	0.03
Critical Value	1.47
Beta	0.15
Power	0.85

Table 2 demonstrates demographic information of the study participants. Obtained data showed, (59.7%) were women, and 144(40.3%) were men. The majority of the participants were postgraduate practitioners (24.5%) working in the academic working sector (39.2%). Majority were from the central region (58.9%). In terms of the specialties, 18.6% were general practitioners, 12.7% orthodontist, operative dentistry 41%, 9.3% prosthodontics, 8.5% endodontists and periodontists. 49% of the participants treated COVID patients in their clinics, which showed similarity to the study done by Nasser [15], where it was stated that if an emergency dental treatment was to be provided to a Covid-19 suspected patient, separate appointments should be arranged in a ventilated waiting area, at least one hour apart from regular patients.

Table 2. Demographical distribution of study participants

Demographics	Frequencies (%)
Gender	Males: 40.3% Females: 59.7%
Years of practice	<5 years: 44.8% 5-10 years: 29.6% >10 years: 25.6%
Region of practice	Central: 58.9% Northern: 14.1% Western: 12.1% Eastern: 8.2% Southern: 6.8%
Working sector	Academic: 39.2% Private: 27.3% Public military: 6.2% Government: 27.3%
Qualification	DDS/BDS: 18.3% Postgraduate diploma: 16.9% MSc: 24.5% PhD: 7.6% Board certificate: 18.9% General dental practitioner: 13.8%
Specialties	General practice: 18.6% Prosthodontics: 9.3% Operative dentistry: 11.5% Endodontics: 8.5% Pediatric dentistry: 5.4% Oral surgery: 5.1% Periodontics: 8.5% Oral Medicine: 10.7% Orthodontics:12.7% AEGD: 5.1% Family dentistry: 3.1% Other: 1.7%

Treating COVID-19 patients in special dental clinics:	Yes: 49% No: 51%

Awareness of COVID 19

Table 3 shows participants' awareness regarding the common symptoms, incubation period, and transmission of COVID-19 viruses; and about personal protective measures to be adopted by dentists during use of aerosol-generating procedures. 96.9% to 89%, of the participants were aware of COVID symptoms like fever and shortness of breath. According to **Table 5**, 88.2% agreed that the disease is transmitted through direct contact with respiratory tract secretions, and 49% of the participants believed that the disease cannot be transmitted from asymptomatic patients. 15.8% of the participants were not aware that surfaces contaminated by COVID patients should be cleaned with a bleaching solution. According to the data, only 87% of the participants were aware of personal protection against COVID. Majority of the respondents were aware of the protocols issued by CDC, ADA for the prevention of disease transmission. But scant knowledge has led the participants to rely on clinical indicators to diagnose COVID19. These findings were in accordance with previous studies by Ahmed MA, carried out among dental practitioners [16]. Updated informations regarding COVID viruses are being followed every second; as we are still in the learning phase and yet to know about the nature of these viruses and their variants.

Table 3. Awareness of participating dentists of COVID-19

Awareness related questions	Responses (%)
1. The incubation period of Coronavirus is 1–21 days:	- Correct: 73.8% - Wrong: 21.1% - Don't know: 5.1%
2.The main symptoms of Corona are fever>38 °C, cough, sore throat, runny nose, and shortness: of breath:	- Correct: 91.8% - Wrong: 7.9% - Don't know: 2.3%
3. Covid-19 is transmitted through direct contact with respiratory tract secretions:	- Correct: 88.2% - Wrong: 9.6% - Don't know: 2.3%
4. COVID-19 can stay on surfaces for a few days:	- Correct: 70.7% - Wrong: 22% - Don't know: 7.3%
5. Covid-19 can be transmitted through eating undercooked meat/chicken:	- Correct: 47.6% - Wrong: 40.3% - Don't know: 12.1%
6. The disease cannot be transmitted from an asymptomatic patient:	- Correct: 49.9% - Wrong: 43.9% - Don't know: 6.2%
7. All surfaces contaminated by the patients with Covid-19 infection should be cleaned with diluted (5%) bleaching solution:	- Correct: 66.2% - Wrong: 15.8% - Don't know: 18%
8. Dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosol:	- Correct: 87.6% - Wrong: 9% - Don't know: 3.4%
9. Most common symptoms related to COVID-19:	- Fever: 96.9% - Cough; 88.2% - Difficulty in breathing: 89% - Fatigue: 84.5% - Headache: 86.5% - Skin rash: 14.9%

Preparedness and source of awareness about the disease

Table 4 depicts perception and preparedness for the disease among participants. 85.1% believed COVID will resolve with time and doesn't require any special treatment, while 14.9% doesn't. 87% of the participants prefer to avoid working with COVID patients, and 42% refused to treat the patient and asked them to leave the clinic. This is similar to the findings in a study done by

Bakken *et al*., which noted that the majority of dental professionals were not comfortable providing even elective or emergency treatment to their Covid-19 suspected patients. Another similar study showed that only 41.8% of the dentists were willing to provide emergency services to their patients [17]. About 4% of the participants conveyed that it might cause panic if a patient is asked to sit at a distance. About 15% of the participants believed that their role in educating others are moderate to mildly significant (15.5%-7%); this attitude was similar to a study that stated the primary oral care physician is responsible to clear misconceptions about this disease and inculcate positive attitude,by educating and encouraging infection control measures among the patients [18]. **Table 6** shows that 11.5% of the participants were unaware of whom to contact in case of unprotected exposure to the COVID 19 virus. It was also observed that 12.7% of participants did not encourage their patients to be vaccinated before appointments, as 7% of the dentists were not convinced that vaccination decreases the severity and chance of getting COVID.

43% of the dentists did not allow their staff members to work on patients who showed flu-like symptoms and 22.8% of dentists referred such patients to hospitals without giving treatment. This was in accordance with another study that due to short chair-side distance between the practitioner and patient during aerosol-generating procedures, dental staff can be prone to contract COVID-19 and it is undeniable [19].

Information about COVID-19 vaccines were mostly from health care professionals (45.1%) and 14.9% gathered information, from family and friends, and 11.3% through television and newspapers. Another study which was similar to our study, highlighted that mostly young dentists who were open to web learning resources, received higher level of knowledge in their field of practice and thus played a major role in educating others about COVID-19, precautionary measures to be taken and the benefits of taking vaccines [20]. **Figure 1** illustrates the frequency of the source of information used.

Table 4. Perception and preparedness for the disease among study participants

1. Do COVID-19 symptoms often resolve with time and do not require any special treatment? -Yes: 85.1% -No: 14.9%
2. Is it important to educate people about COVID-19 to prevent the spread of the disease? -Yes: 96.1% -No: 3.9%
3. Do you prefer to avoid working with a patient who is suspected of COVID-19? -Yes: 87% -No: 13%
4. What would you do in case a patient is sneezing or coughing in your clinic? -Refuse to treat the patient and ask him/her to leave the clinic: 41.7% -Treat the patient and ask him/her to go to the hospital: 35.5% -Refer the patient to the hospital without treating him/her: 22.8%
5. What do you think about asking patients to sit far from each other, wearing masks in the waiting area, and washing hands before getting on the dental chair? -Necessary and help to reduce disease transmission: 96.9% -Not necessary and could cause panic: 3.1%
6. Would you allow any of your dental staff to work with patients if they have flu-like symptoms? -Yes: 56.6% -No: 43.4%
7. What do you think about the dentist's role in educating others about COVID-19? -Very significant: 75.8% -Moderately significant: 15.5% -Mildly significant: 7.3% -Not significant at all: 1.4%
8. Do you know who to contact in case of unprotected exposure to a known or suspected COVID-19 patient? -Yes: 88.5% -No: 11.5%

9. Do you know what to do if you have signs or symptoms suspected of COVID-19 infection?
-Yes: 94.6%
-No: 5.4%

10. Will you encourage your patients to be vaccinated against COVID-19 before visiting your practice?
-Yes: 77.1%
-No: 12.7%
-Unsure: 10.2%

11. Will you offer resources to patients, such as a fact sheet to explain the benefits of the vaccine, where they can get the vaccine, etc.
-Yes: 68.5%
-No: 17.2%
-Unsure: 14.4%

12. Vaccination decreases my chances of getting COVID-19 or its complications
Strongly agree: 59.7%
Agree: 31.3%
Disagree: 6.8%
Strongly disagree: 2.3%

13. Which of the following define your concerns about getting the vaccine?
I have concerns about vaccine side-effects, long term safety, and efficacy: 65.9%
I don't believe it will be a solution for coronavirus disease: 5.1%
I believe that it will have a negative effect on my health: 7.3%
I have religious reasons: 8.2%
Other: 13.5%

14. Are you planning to get the COVID-19 vaccine?
Yes: 77.5%
No: 13.8%
Not sure yet: 8.7%

15. Have you received the COVID-19 vaccine?
Received first dose: 36.9%
Received both doses: 23.4%
Neither: 39.7%

16. Television being the source of information regarding vaccines:
Very little: 36.9%
Little: 16.9%
Some: 22.3%
Much: 12.7%
Very much: 11.3%

17. Newspaper/Magazines being the source of information regarding vaccine:
Very little: 30.4%
Little: 27.9%
Some: 28.7%
Much: 7.3%
Very much: 5.6%

18. Family/Friends being the source of information regarding vaccine:
Very little: 39.7%
Little: 17.2%
Some: 15.2%
Much: 13%
Very much: 14.9%

19. Healthcare professionals being the source of information regarding vaccines:
Very little: 3.7%
Little: 5.6%
Some: 15.2%
Much: 30.4%
Very much: 45.1%

20. Family/Friends being the source of information regarding vaccine:
Very little: 7.9%
Little: 9.6%
Some: 27.6%
Much: 23.9%
Very much: 31%

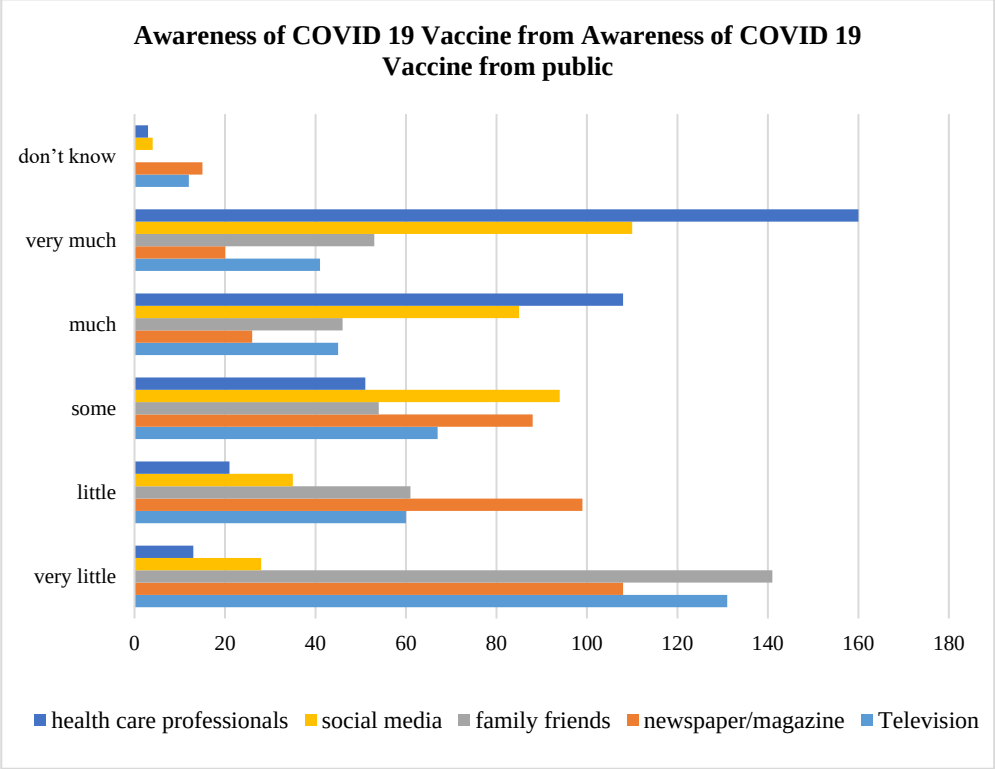

Figure 1. Information about COVID-19 vaccine

Table 5 demonstrates that specialty had the most statistically significant association and qualification had the least number of statistically significant associations (Chi-square test).

Table 5. Awareness among participants and demographic variables

Awareness related questions	Gender (*P*)	Years of Practice (*P*)	Region of Practice (*P*)	Working Sector (*P*)	Qualification (*P*)	Specialty (*P*)
1. The incubation period of Coronavirus is 1–21 days:	.057	.004*	.233	.012*	.501	.008*
2.The main symptoms of Corona are fever>38 °C, cough, sore throat, runny nose, and shortness: of breath:	.256	.311	.039*	.007*	.330	.863
3. Covid-19 is transmitted through direct contact with respiratory tract secretions:	.068	.916	.794	.729	.558	.582
4. COVID-19 can stay on surfaces for a few days:	.226	.851	.914	.765	.300	.009*
5. Covid-19 can be transmitted through eating undercooked meat/chicken:	.000*	.000*	.003*	.018*	.009*	.000*

6. The disease cannot be transmitted from an asymptomatic patient:	.000*	.000*	.001*	.004*	.020*	.000*
7. All surfaces contaminated by the patients with Covid-19 infection should be cleaned with diluted (5%) bleaching solution:	.001*	.001*	.432	.268	.038*	.045*
8. Dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosol:	.547	.701	.030*	.119	.271	.003*

*Statistically significant association

Table 6 shows the most number of statistically significant associations with specialty and the working sector had the least number of significant associations (Chi-square test).

Table 6. Perception and preparedness of COVID 19 among participants and demographic variables

Perception and preparedness related questions	**Gender (*P-value*)**	**Years of Practice (*P-value*)**	**Region of Practice (*P-value*)**	**Working Sector (*P-value*)**	**Qualification (*P-value*)**	**Specialty (*P value*)**
1. Do COVID-19 symptoms often resolve with time and do not require any special treatment?	.020*	.000*	.001*	.078	.246	.000*
2. Is it important to educate people about COVID-19 to prevent the spread of the disease?	.043*	.101	.397	.081	.165	.063
3. Do you prefer to avoid working with a patient who is suspected of COVID-19?	.150	.023*	.314	.069	.680	.795
4. What would you do in case a patient is sneezing or coughing in your clinic?	.003*	.000*	.005*	.008*	.000*	.003*
5. What do you think about asking patients to set far from each other, wearing masks in the waiting area, and washing hands before getting on the dental chair?	.129	.983	.200	.093	.704	.002*
6. Would you allow any of your dental staff to work with patients if they have flu-like symptoms?	.000	.000*	.003*	.001*	.000*	.000
7. What do you think about the dentist's role in educating others about COVID-19?	.442	.625	.649	.066	.464	.600
8. Do you know who to contact in case of unprotected exposure to a known or suspected COVID-19 patient?	.861	.097	.386	.353	.021*	.016*
9. Do you know what to do if you have signs or symptoms suspected of COVID-19 infection?	.427	.066	.776	.058	.671	.143
10. Will you encourage your patients to be vaccinated against COVID-19 before visiting your practice?	.713	.917	.126	.152	.113	.003*
11. Will you offer resources to patients, such as a fact sheet to explain the benefits of the vaccine, where they can get the vaccine, etc.	.020*	.691	.131	.598	.376	.053
12. Vaccination decreases my chances of getting COVID-19 or its complications	.583	.473	.978	.131	.023*	.003*
13. Which of the following define your concerns about getting the vaccine?	.340	.116	.331	.264	.013*	.003*
14. Are you planning to get the COVID-19 vaccine?	.032*	.137	.148	.743	.140	.131
15. Have you received the COVID-19 vaccine?	.000*	.000*	.002*	.162	.001*	.000*

16. Television being the source of information regarding vaccine:	.000*	.001*	.026*	.028*	.003*	.000*
17. Newspaper/Magazines being the source of information regarding vaccine:	.022*	.000*	.896	.035*	.008*	.000*
18. Family/Friends being the source of information regarding vaccine:	.000*	.107	.001*	.279	.002*	.000*
19. Healthcare professionals being the source of information regarding vaccine:	.857	.666	.310	.632	.362	.299
20. Family/Friends being the source of information regarding vaccine:	.000*	.021*	.052	.005*	.000*	.000

*Statistically significant association

Limitations of this study include a small sample size, and information bias related to online survey distribution. Non-response and accessibility to all subjects remains as another limiting factor for this study.

Conclusion

COVID-19 viruses continues to evolve rapidly forming new variants. Further informational updates regarding this disease can be beneficial to manage the upcoming situation. The knowledge of dental professionals seems to be satisfactory. Obligatory improvements at the level of knowledge and perception should be provided through educational campaigns for future awareness and research.

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