



Awareness and Practice of Infection Control Protocol Amid Covid-19 Pandemic in Private Dental Clinics in Saudi Arabia

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Authors' contributions

This work was carried out in collaboration among all authors. Author SA designed the study, wrote the protocol and wrote the first draft of the manuscript. Author KSHA designed the study, managed the analyses of the study. Authors FAB, NAA, MFA and FA managed literature searches. Author IAA managed data analysis. Author SIA managed manuscript writing. Author NTA managed results interpretation and wrote results. Author NAS managed discussion writing and literature searches. Author NT managed data collection and analysis. Author RSA managed statistical analysis. All authors read and approved the final manuscript.

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ABSTRACT

Aim: The purpose of our research was to assess the knowledge and awareness regarding infection control practice against coronavirus infection in various dental clinics in Saudi Arabia.

Methodology: A descriptive survey was conducted amongst 200 dentists. The study was conceptualised in Riyadh Elm University, Riyadh, Kingdom of Saudi Arabia and included dentists from various dental clinics across Kingdom of Saudi Arabia in the month of November, 2020. A questionnaire consisting of 12 questions was distributed, based upon knowledge of COVID-19, transmission as well as prevention strategies that can be implemented in dental clinics for stopping the chain of outbreak of this pandemic. The data was analyzed with the help of descriptive statistics using SPSS 25 software.

Results: 71% of study participants felt the need for using N-95 masks routinely during patient treatment. An astounding number of participants (92%), believed that there have been significant changes in infection control after COVID-19 pandemic. 65% of participants believed that High volume evacuators (HVE) suction devices, as well as High efficiency particulate air (HEPA) filters, need to be used to control aerosol spread so as to prevent COVID-19 infection.

Conclusion: Dentists in Saudi Arabia showed satisfactory knowledge and positive attitude towards COVID-19. Improving dentists' level of knowledge could be achieved through increasing their accessibility to materials provided by dental health care authorities, which specifies the best and safest approaches for dealing with patients during and after the outbreak.

Keywords: COVID-19; SARS-CoV-2; pandemic; cross infection.

1. INTRODUCTION

COVID-19 has been considered as a global pandemic since March, 2020 [1]. Healthcare facilities have had a major difficulty to meet demands for treating patients during this pandemic especially [2]. Due to highly contagious nature of this disease, it has become mandatory for healthcare workers to wear PPE (Personal protective equipment) kits, masks, gloves etc to avoid getting this infection while working in a hospital [3-5]. Due to the severity of this viral infection there has been a dire need for ICU beds, PPE kits, ventilator machines etc. This has created panic amongst hospital staff and authorities [6].

COVID-19 infection is caused by SARS-CoV-2 which is a part of a diverse group of Coronaviruses. The coronavirus disease 2019 (COVID-19) is the third known coronavirus after SARS-coronavirus (SARS-CoV) and Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) that was first described in late December 2019, until the epidemic began in Wuhan, China, and induces extreme respiratory disease and human pneumonia-like infection [7]. Earlier studies have authenticated that these coronaviruses originated from mainly bats and jumped species from an intermediate host like camels or civets to its final host which is in humans. It is also suspected that current epidemic of COVID-19 infection has its origin from bats and later jumped to pangolins. Inhalation of respiratory droplets as well as

person to person has been one of the primary routes of transmission in coronavirus infection [8]. A range of symptoms appear in these patients like fever, cold, cough, breathlessness, dyspnoea, loss of smell sensation etc [9].

For dentists in particular, they come under vulnerable population as they come in close contact with patients. SARS-CoV-2 infection can rapidly spread through aerosols generated during dental treatment and they remain suspended in air for up to 3 hours in dental clinics. Usage of ultrasonic scalers, dental handpieces, produce huge amount of aerosol which risks dental practitioners as well as patient's health to contracting COVID-19 infection [10].

2. AIM OF THE STUDY

The objective of this research was to assess the knowledge and awareness regarding infection control practice against coronavirus infection in various dental clinics in Saudi Arabia. It also assessed the amount of knowledge about COVID infection and its prevention strategies. The study is aimed at spreading awareness among professionals about infection protocol especially dentists as there is generation of aerosol in dental clinics.

3. METHODOLOGY

The study was conceptualized in Riyadh Elm University, Riyadh, Kingdom of Saudi Arabia and included dentists from various dental clinics

across kingdom of Saudi Arabia in the month of November, 2020. A descriptive survey was conducted amongst 200 dentists, of which 25 were female and rest were male dental surgeons; practicing in various dental clinics across Saudi Arabia. Random sampling technique was utilized to get an unbiased sample for the present study. A questionnaire consisting of 12 questions was distributed, based upon knowledge of COVID-19, transmission as well as prevention strategies that can be implemented in dental clinics for stopping the chain of outbreak of this pandemic. (Table 1) Google form containing the questions were emailed to the participants and the reply was recorded in Microsoft Excel sheet. Confidentiality as well as voluntary participation was kept on high priority.

The data were analysed using IBM Statistical Package for the Social Sciences (SPSS) version 25. Frequency percentage analysis was carried out to record data.

4. RESULTS

In our study, around 67% of participants were aware about the latest developments about COVID-19 pandemic. 71% of study participants felt the need for using N-95 masks routinely during patient treatment. An astounding number of participants (92%), believed that there have been significant changes in infection control after COVID-19 pandemic. 88% of participants believed that it is imperative to instruct the people more for this disease, transmission as well as

prevention. However, only 54% of participants observed stringent precautions of social distancing in the waiting area of clinic. Unfortunately, only 43% of participants were practicing proper disinfection of items between successive patients. 65% of participants believed that HVE suction devices need to be used to control aerosol spread (Table 2).

5. DISCUSSION

Safety guidelines has been a topic of discussion for COVID pandemic and dental professional have particularly concerned due to their closed atmosphere working environment. It is imperative to understand that the knowledge about this virus is ever evolving and therefore utmost precaution against contacting and spread of this virus needs to be the priority of any clinical set up.

Understanding the chain of transmission is vital to the spread of this disease and it requires a pathogen, host to have a consistent channel for blow out of this viral infection. If this has to be controlled, then this chain has to be broken. Usually the infection control procedures that are followed commonly in a dental clinic are sufficient but in COVID disease it will serve only as an initial barrier against infection. Therefore, it is imperative to understand the nature of contagiousness of this infection to draw new measures to prevent this infection spread. This can be done in four phases- before treatment, during patient evaluation, during the treatment as well as after the treatment has been done [11].

Table 1. Questionnaire of the present study

Q. No.	QUESTIONS
1	Are You Updated with the latest news about the spread of the COVID-19 Pandemic?
2	Are You Updated with the latest health online resources for COVID-19?
3	Before the COVID 19 Pandemic, Did You Routinely Follow Universal Precautions of Infection Control for Every Patient?
4	Before the COVID 19 Pandemic, were you familiar with the "Transmission-Based Precautions" for dental procedures?
5	Do you think N-95 mask should be routinely worn in dental practice as a new precaution?
6	Did your infection control routine change after the COVID 19 Pandemic?
7	Is social distancing practiced in the waiting area?
8	Disinfecting items between patients is followed?
9	Sterilize (or autoclave) items before being used with patient is followed?
10	Is it important to educate people about COVID-19 do to prevent the spread of the disease?
11	Do you know who to contact in case of unprotected exposure to a known or suspected COVID-19 patient?
12	Do you use of HVE suction devices and HEPA filters to control spread of aerosols?

Table 2. Data recorded in the study

Question No.	Variable in the study	Measured data
1	Updated about latest developments related to COVID-19	Yes (67%)/ No (33%)
2	Knowledge about online health sources in relation to COVID-19	Yes (89%)/ No (11%)
3	Universal precautions for infection control	Yes (62%)/ No (38%)
4	Transmission based precautions	Yes (45%)/ No (55%)
5	N-95 masks recommendation for routine usage in clinics	Yes (71%)/ No (21%)
6	Change of infection control routine after pandemic	Yes (92%)/ No (8%)
7	Social distancing in waiting area	Yes (54%)/ No (46%)
8	Disinfecting items between patient treatments	Yes (43%)/ No (57%)
9	Sterilization of items before starting of any treatment	Yes (93%)/ No (7%)
10	Important to educate people about COVID-19	Yes (88%)/ No (12%)
11	Knowledge about helpline in relation to COVID-19	Yes (61%)/ No (39%)
12	Usage of HVE suction and HEPA filters for controlling aerosol spread	Yes (65%)/ No (35%)

In hospital settings, performing aerosol-generating procedures (AGPs, eg intubation, suction, bronchoscopy, cardiopulmonary resuscitation) or using a nebulizer on a SARS patient facilitated patient-to-HCP transmission [12,13,14]. Inappropriate selection of PPE may also put HCPs at risk of infection [15]. Exposure to AGPs was identified as a risk factor for acquiring COVID-19 [16]. However the exact mode of transmission remains uncertain. For example, blood, saliva and stool, of COVID-19 patients have been tested positive for SARS-CoV-2 [17-19].

But the precise role these body fluids play in disease transmission in healthcare settings and the ways in which they may be transferred remain uncertain.

An adequate measure would be to have mouth rinse with 1% hydrogen peroxide or 0.2% povidone iodine for 1 minute to decrease the aerosol virus load. Chlorhexidine alone has not been an effective mouthwash from COVID-19 as this will not lead to oxidation of virus as reported in various studies. Rubber dam as well as high volume suction devices can help to control aerosol production [20]. 99% of contaminated air can be cleared with the help of HEPA (high efficiency particulate arrest) filters [21]. Rubber dam can effectively block blood as well as saliva contamination which will reduce the chance of contracting infections as well [22].

Samaranayake et al. [23] in his study reported that with the help of rubber dam, there can be a

staggering 70% aerosol reduction [23]. Another method which can remove carious dentine without usage of handpiece is Carisolv; a chemo-mechanical method suggested by Peng et al. [20]. He also suggested that anti-reflux valves can be used to prevent aspiration of fluids which are contaminated when used with a dental handpiece; which also reduce cross-infection as well [24].

Due to high demand of PPEs there has been shortage of PPEs as expected. Because of this shortage of PPE, there are many guidelines emphasizing the use of surgical masks for health care professionals especially in aerosol generating procedures. N95 or equivalent respirators is in particular recommended. Covid virus can be easily transmitted through aerosols, and can maintain its viability in aerosols for many hours. Therefore, face masks may not provide sufficient protection to HCPs due to their long and repeated exposure in confined spaces [25]. In addition, the transmission dynamics of COVID-19 seems more like that of influenza than SARS-CoV [26]. A randomized control study among HCPs exposed to influenza patients found that surgical masks may provide some protection to the wearers, probably by minimizing the frequency of times a person touches their nose and mouth; however, surgical masks may not provide fully effective protection from respiratory pathogens because of leakage due to the loose fit of surgical masks [27]. Global shortage of N95 or equivalent respirators might have prompted the WHO and the CDC to loosen their recommendations regarding face protection,

but frontline health professionals should not be put at risk of infection. The face mask recommendation should be changed to N95 or equivalent respirators for all health professionals in all guidelines.

The COVID-19 pandemic has had a significant impact on orthodontic treatments [28]. More attention should be giving to teleorthodontics; also orthodontists should prepare their patients to deal with some of the problems related to their appliances when possible [28]. Recently, it provided early evidence of three major impacts of the pandemic on dentistry: increasing inequalities due to coverage differences between public and private networks; the adoption of new clinical routines, which are associated with an economic burden for dentists; and associations of regional COVID-19 incidence/mortality with fear of contracting the disease at work [29]. Keeping in mind the existing territorial variation, both at the organization level of dental public health services, and at the care level (especially in child preventive programs and care for pregnant women), this health crisis has highlighted the importance of teamwork [30]. It is necessary to unify the standards for all dental health care units in the national territory in challenging times [30]. Endodontic treatment accounted for almost 50% of patient load during the lockdown, for Covid-19 pandemic, compared to approximately 20% during regular days [31]. Dental professionals seem to be consistent regarding their knowledge of the incubation period of SARS-CoV-2 [32]. However, knowledge of viral survivability and recommended hand-soap washing time were significantly variable among the professionals [32]. A high degree of apprehension toward suspected COVID-19 patients existed among all dental professionals [32]. Pandemic-awareness campaigns are essential among healthcare providers [32].

In our study we observed that, most of the dental surgeons were equipped with basic knowledge about COVID-19 pandemic, its transmission as well as prevention strategies. They were also aware about HVE suction devices as well as HEPA filters which help to control aerosol splatter, which is the prominent mode for spread of COVID- 19 infection. An interesting feature observed that infection control changed and became more stringent with the usage of N-95 masks and PPE gowns. They also believed that people need to be educated more about prevention against this pandemic till an effective vaccine is made available.

6. CONCLUSION

Dentists all over Saudi Arabia, who participated in this research showed satisfactory knowledge and a positive attitude towards COVID-19. Recommendations for improvement in the knowledge is essential as we are still understanding this novel virus and updates need to be in hand so that dental professionals can safely handle clinical settings during outbreaks.

7. LIMITATIONS OF THE STUDY

- A larger sample would be needed to assess an important topic of this nature.
- There are other personnel in clinic including nurses who need to be assessed as well when it comes to awareness of protocol.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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