International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 07, Issue 08, August 2022,
*https://doi.org/10.23958/ijirms/vol07-i08/1481*

**Original article**

# Knowledge, Attitude, And Practice of Infection Control Measurement During Covid-19 Pandemic Among Dental Assistant in Hafar Al-Batin, Saudi Arabia

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Received 15 July 2022; Accepted 02 August 2022; Published 05 August 2022

## Abstract

***Background:*** Health care workers, including dentists, dental assistants are at high risk at acquiring and transmitting infection within their work environment due to close contact with patients and the instruments they use that spread droplets, aerosols of blood and saliva. The main objective of this study is to assess knowledge and awareness about infection control measurement during covid-19 pandemic among dental assistant. ***Methods:*** A cross-sectional online survey among dental assistant in Hafar Al-Batin, KSA. An online questionnaire was employed to collect data. The Statistical Package for Social Sciences (SPSS) version 26 was used for data management. We assessed COVID-19 knowledge, knowledge about current guidelines for infection control, and adherence to them. ***Results:*** The study included 398 participants. Our study showed an overall high adherence level to COVID-19 infection control measures and recommendations as the average practice score was 32.2 ± 6.7 out of 39. There was a significant association between practice score and gender (p=0.019), knowing about COVID-19 (p=0.006), source of COVID-19 information (p=0.000), and having completed an educational course on COVID-19 (p=0.002). ***Conclusion:*** Higher infection control practice scores were evident among males, those who knew of COVID-19, those whose source of knowledge was MOH, and those completed an educational course on COVID-19. We recommend further educational activities in order to improve infection control practice and adherence to guidelines.

**Keywords:** ***Dental Assistant, Covid-19 Pandemic, Infection Control Measurement.***

## Introduction

At the end of December 2019 in Wuhan, China was reported Covid-19 as widespread viral disease caused by the SARS cov-2 virus [1]. Multiple respiratory disorders have been linked to the coronavirus family, ranging from a mild common cold to life-threatening pneumonia, organ failure, and death. Multiple respiratory disorders have been linked to the coronavirus family, ranging from a mild common cold to life-threatening pneumonia, organ failure, and death [2]. Infectious saliva-associated respiratory tract secretions are the most prevalent route of nosocomial transmission, which can be either direct or indirect. Coughing, sneezing, or droplet inhalation are all examples of direct transmission, whereas contact with oral, nasal, or ocular mucous membranes is an example of indirect transmission [3].

Route of transmission (cough, sneeze, and droplet transmission) and contact transmission (contact with oral, nasal, and ocular mucous membranes) are the most prevalent modes of COVID-19 dissemination [4]. According to recent findings, SARS-CoV-2 may be identified in saliva and transmitted through aerosol-generated procedures and asymptomatic patients [5].

Infection-control is defined as "measures taken by health-care workers to reduce the risk of infectious agents being transmitted to patients and employees (for example, proper hand hygiene, meticulous work practices, and the use of personal protective equipment (PPE) such as masks or respirators, gloves, gowns, and eye protection)." CDC (Centers for Disease Control and Prevention) (Centers for Disease Control and Prevention, 2005). Based on how an infectious agent is transmitted, infection control techniques include contact, droplet, and airborne precautions [6]. Knowledge, attitude, and practice among dentists, dental students, and dental assistants are complementing concerns for infection control, according to the discussion above. Previous research on this topic has found a range of results ranging from good to moderate to below-recommended standards [1,6,7]. COVID-19 awareness levels were assessed across the country. The KSA Ministry of Health (MOH)

developed recommendations for performing different dental treatments in the categories of emergency, urgent, and regular dental care, in collaboration with international agencies such as the WHO and the Centers for Disease Control and Prevention (CDC) [8].

Moreover, few surveys in Saudi Arabia correctly assessed the degree of infection control knowledge, attitude, and practice among dental assistants. The purpose of this study is to investigate the knowledge, attitude, and practice of dental assistants at governmental and private clinics in Hafar Al-Batin, Saudi Arabia, about infection control measures.

The main objective of this study is to determine the level of awareness and knowledge concerning oral cancer and Its Early Detection among general population in Saudi Arabia.

## Materials and Methods

**Study design**

This study adapted a cross-sectional study design based on a structured questionnaire that was developed by authors.

**Participants, recruitment and sampling procedure**

The study's population consisted of dental care assistants working in dentistry clinics in Hafar Al-Batin, KSA.

**Sample size**

The sample size was estimated using the Raosoft calculator with a confidence level of 95%, and 5% margin of error; the minimum sample size of our study 384 participants and the total sample size was 398 participants.

**Inclusion criteria**

All dental assistant either male or female who accept to participate in the study and working in Hafar Al-Batin city were included in the study.

**Exclusion criteria**

The dental assistant not working in Hafar Al-Batin city, KSA were excluded.

**Method for data collection and instrument:**

Data collection was done in the form of the participants' responses to the questions. The survey instrument was a self-administered anonymous questionnaire in English. The questionnaire included demographic features such as age, gender, and the residential area of the participants. The participants were asked about their knowledge, attitude, and practice of infection control measurement during COVID-19 pandemic.

**Practice scoring system**

Practice items were scored as follows: Always = 3, Sometimes = 2, Rarely = 1, and Never = 0. Summation of all scores for the 13 practice items yielded a score ranging from 0 (poorest practice) to 39 (best practice).

**Statistical analysis**

All data was entered in Microsoft Excel software and coded for management statistical analysis performed using SPSS version 26. We used simple frequency tables for descriptive analysis and Chi-square test for inferential analysis where a p-value < 0.05 was considered statistically significant.

## Results and Discussion

The study included 398 dental assistants, two thirds (66.8%) of whom are females, and 56.3% are 21-29 years old. Public hospitals (42.7%) and private clinics (39.7%) were the most common types of facilities where participants practiced, and nearly half of all (48.5%) practiced for less than 2 years (**Table 1**).

**Table 1: Sociodemographic factors of participants (n=398).**

| Parameter | | Frequency (%) |
|---|---|---|
| Gender | Female | 266 (66.8%) |
| | Male | 132 (33.2%) |
| Age | 21 -29 years | 224 (56.3%) |
| | 30 -39 years | 121 (30.4%) |
| | 40 -49 years | 46 (11.6%) |
| | 50-60 years | 7 (1.8%) |
| Type of facility you are practicing in? | Academic institutions | 70 (17.6%) |
| | Private clinics | 158 (39.7%) |
| | Public hospital/centers | 170 (42.7%) |
| Years of experience in practice | 2 -5 years | 118 (29.6%) |
| | Less than 2 years | 193 (48.5%) |
| | More than 5 years | 87 (21.9%) |

Table 2 shows the general knowledge of participants towards COVID-19. The majority of participants know of COVID-19 (88.9%), receive information about COVID-19 from MOH (55%), have completed an educational course about COVID-19 (71.1%), recognize COVID-19 severity (83.9%), know the mode of transmission of COVID-19 (85.9%), recognize that COVID-19 is of viral etiology (70.6%), and recognize direct contact as the mode of transmission (51.3%).

**Table 2: COVID-19 knowledge among participants (n=398).**

| Parameter | | Frequency (%) |
|---|---|---|
| Do you know about novel coronavirus (COVID 19)? | No | 44 (11.1%) |
| | Yes | 354 (88.9%) |
| Where do you get information about COVID-19? | Medical Website | 43 (10.8%) |
| | MOH | 219 (55%) |
| | News | 43 (10.8%) |
| | Social Media | 93 (23.4%) |
| Have you completed an educational course on COVID-19? | No | 115 (28.9%) |
| | Yes | 283 (71.1%) |
| What are the symptoms of the disease that you know? | All of the above | 241 (60.6%) |
| | Dry cough | 40 (10.1%) |
| | Fever | 82 (20.6%) |

| | | |
|---|---|---|
| | Nasal congestion | 12 (3%) |
| | Runny Nose | 3 (0.8%) |
| | Sore Throat | 12 (3%) |
| | Tiredness | 8 (2%) |
| Do you know about the severity of COVID 19? | No | 64 (16.1%) |
| | Yes | 334 (83.9%) |
| Do you know the mode of transmission of COVID 19? | No | 56 (14.1%) |
| | Yes | 342 (85.9%) |
| Do you know the people who are at more risk to COVID 19? | No | 52 (13.1%) |
| | Yes | 346 (86.9%) |
| Etiology of COVID-19 | Bacteria | 71 (17.8%) |
| | I don't know | 31 (7.8%) |
| | Parasites | 15 (3.8%) |
| | Viruses | 281 (70.6%) |
| Routes of transmission | Contaminated food or drink | 31 (7.8%) |
| | Direct contact | 204 (51.3%) |
| | Fecal | 11 (2.8%) |
| | I don't know | 44 (11.1%) |
| | Sneezing | 108 (27.1%) |

Table 3 shows the perception of participants towards COVID-19 infection control in dentistry. Most of the participants believe that dentist, staff and patients are at high risk of COVID-19 transmission during dental procedures (89.2%), reported that they know the guidelines for working as a dental assistant during COVID-19 (83.7%), are of the importance of the Saudi MOH protocol (83.2%), aware that the protocol helps identifying challenges presented by COVID-19 for dental care (79.6%), recognize that this protocol helps implementing infection control in management of dental emergencies (81.4%), and know that the guidelines restrict the presence of unnecessary individuals in the clinic during COVID-19 outbreak (76.6%).

**Table 3: Infection control and COVID-19 in dentistry knowledge among participants (n=398).**

| **Parameter** | | **Frequency (%)** |
|---|---|---|
| Do you think that during the dental procedures, the dentist, staff and patients are at high risk of transmitting COVID-19? | **No** | 43 (10.8%) |
| | **Yes** | 355 (89.2%) |
| Do you know that the guidelines during COVID- 19 pandemic are dental assistants working in the dental department? | **No** | 65 (16.3%) |
| | **Yes** | 333 (83.7%) |
| Do you know that the Saudi Ministry of Health guides dentist with this protocol to encourage a consistent approach in the management of emergency/urgent dental conditions? | **No** | 67 (16.8%) |
| | **Yes** | 331 (83.2%) |
| Do you know that this protocol helps to identify the challenges that the COVID-19 epidemic presents for the provision of dental care? | **No** | 81 (20.4%) |
| | **Yes** | 317 (79.6%) |
| Do you know that this protocol helps to provide and implement Infection Prevention and Control guidance during the management of dental emergency cases during COVID 19 outbreak? | **No** | 74 (18.6%) |
| | **Yes** | 324 (81.4%) |
| Do you know that MOH guidelines restricts the presence of unnecessary individuals in the dental clinic? | **No** | 93 (23.4%) |
| | **Yes** | 305 (76.6%) |
| Do you know the dental protocol of COVID 19 suggests that Dentists should follow a strict infection control protocol guide with all emergency dental patients? | **No** | 62 (15.6%) |
| | **Yes** | 336 (84.4%) |

As shown in table 4, wearing disposable gloves for surgery was always practice by 69.1%, using high volume evacuation by 50.3%, using single ampoules for local anesthetic injection by 56.8%, asking patients to do preoperative mouth rinse by 54%, disinfection and sterilization by 62.3%, immersing used instruments in decontaminating solutions by 60.3%, sterilizing hand pieces by 62.3%, sterilizing endodontic files by 63.3%, using wrapping bags for sterilization by 60.8%, and chemical disinfection of impressions before sending to the laboratory by 62.6%.

**Table 4: Infection control practice items and score among participants (n=398).**

| **Item** | **Always (3)** | **Sometimes (2)** | **Rarely (1)** | **None (0)** |
|---|---|---|---|---|
| Wearing disposable gowns for surgery | 275 (69.1%) | 89 (22.4%) | 27 (6.8%) | 7 (1.8%) |
| Using high volume evacuation | 200 (50.3%) | 154 (38.7%) | 33 (8.3%) | 11 (2.8%) |
| Using of single ampoules for local anesthetic injections | 226 (56.8%) | 132 (33.2%) | 29 (7.3%) | 11 (2.8%) |
| Asking your patient to do preoperative mouth rinses | 215 (54%) | 143 (35.9%) | 29 (7.3%) | 11 (2.8%) |
| Disinfection and sterilization | 248 (62.3%) | 119 (29.9%) | 19 (4.8%) | 12 (3%) |
| Immersing used instruments in decontaminant solutions | 240 (60.3%) | 113 (28.4%) | 33 (8.3%) | 12 (3%) |
| Sterilizing of hand pieces | 248 (62.3%) | 119 (29.9%) | 19 (4.8%) | 12 (3%) |
| Sterilizing of endodontic files | 252 (63.3%) | 113 (28.4%) | 26 (6.5%) | 7 (1.8%) |
| Use of wrapping bags for instrument sterilization | 242 (60.8%) | 108 (27.1%) | 38 (9.5%) | 10 (2.5%) |
| Use of surface barriers for dental unit surfaces | 238 (59.8%) | 109 (27.4%) | 47 (11.8%) | 4 (1%) |
| Use of routine wiping for surface disinfection | 240 (60.3%) | 116 (29.1%) | 38 (9.5%) | 4 (1%) |
| Chemical disinfection of impressions before sending to the laboratory | 249 (62.6%) | 99 (24.9%) | 39 (9.8%) | 11 (2.8%) |
| Washing impressions with water before sending to the laboratory | 233 (58.5%) | 119 (29.9%) | 35 (8.8%) | 11 (2.8%) |
| Practice score (/39) (Mean ± SD) | 32.2 ± 6.7 | | | |

Association between practice score and sociodemographic factors is shown in table 5. There was a significant association between practice score and gender (p=0.019), knowing about COVID-19 (p=0.006), source of COVID-19 information (p=0.000), and having completed an educational course on COVID-19 (p=0.002).

Higher practice scores were evident among males, those who knew of COVId-19, those whose source of knowledge was MOH, and those completed an educational course on COVID-19.

**Table 5: Infection control practice score in association with socio-demographic characters of participants (n=398).**

| Parameter | | Practice score | | | | P-value |
|---|---|---|---|---|---|---|
| | | 39 - 31 | 30 - 21 | 20 - 11 | 10 - 0 | |
| Gender | Female | 153 (57.5%) | 94 (35.3%) | 15 (5.6%) | 4 (1.5%) | **0.019** |
| | Male | 82 (62.1%) | 50 (37.9%) | 0 (0%) | 0 (0%) | |
| Age | 21 -29 years | 142 (63.4%) | 67 (29.9%) | 11 (4.9%) | 4 (1.8%) | 0.123 |
| | 30 -39 years | 63 (52.1%) | 54 (44.6%) | 4 (3.3%) | 0 (0%) | |
| | 40 -49 years | 27 (58.7%) | 19 (41.3%) | 0 (0%) | 0 (0%) | |
| | 50-60 years | 3 (42.9%) | 4 (57.1%) | 0 (0%) | 0 (0%) | |
| Type of facility you are practicing | Academic institutions | 36 (51.4%) | 30 (42.9%) | 4 (5.7%) | 0 (0%) | 0.114 |
| | Private clinics | 91 (57.6%) | 56 (35.4%) | 7 (4.4%) | 4 (2.5%) | |
| | Public hospital/centers | 108 (63.5%) | 58 (34.1%) | 4 (2.4%) | 0 (0%) | |
| Years of experience in practice | 2 -5 years | 67 (56.8%) | 43 (36.4%) | 4 (3.4%) | 4 (3.4%) | 0.128 |
| | Less than 2 years | 117 (60.6%) | 69 (35.8%) | 7 (3.6%) | 0 (0%) | |
| | More than 5 years | 51 (58.6%) | 32 (36.8%) | 4 (4.6%) | 0 (0%) | |
| Do you know about novel coronavirus (COVID 19)? | No | 18 (40.9%) | 26 (59.1%) | 0 (0%) | 0 (0%) | **0.006** |
| | Yes | 217 (61.3%) | 118 (33.3%) | 15 (4.2%) | 4 (1.1%) | |
| Where do you get information about COVID-19? | Medical Website | 16 (37.2%) | 27 (62.8%) | 0 (0%) | 0 (0%) | **0.000** |
| | MOH | 157 (71.7%) | 51 (23.3%) | 7 (3.2%) | 4 (1.8%) | |
| | News | 28 (65.1%) | 15 (34.9%) | 0 (0%) | 0 (0%) | |
| | Social Media | 34 (36.6%) | 51 (54.8%) | 8 (8.6%) | 0 (0%) | |
| Have you completed an educational course on COVID-19? | No | 60 (52.2%) | 55 (47.8%) | 0 (0%) | 0 (0%) | **0.002** |
| | Yes | 175 (61.8%) | 89 (31.4%) | 15 (5.3%) | 4 (1.4%) | |

## Discussion

Dental healthcare professionals are considered a high-risk category in relation to the pandemic. Because they are vulnerable to infection via a variety of contact and airborne pathways, dental healthcare professionals are thought to be on the front lines of the current pandemic. Given the rapid spread of SARS-CoV-2 across the globe, it is crucial to implement standard, workable preventive measures in dental settings because dentists and other oral health professionals, like dental assistants and dental hygienists, are extremely vulnerable to infection due to close contact with patients who have the novel coronavirus [9,10].

Due to these factors, dentists were recommended to modify their practise management in order to stop the virus's spread and reduce the chance that they and their patients would get infected [11-15].

The main objective of this study is to assess knowledge and awareness about infection control measurement during COVID-19 pandemic among dental assistants. The study included 398 participants. Our study showed an overall high adherence level to COVID-19 infection control measures and recommendations as the average practice score was 32.2 ± 6.7 out of 39.

Dentists must strictly follow set guidelines in order to ensure the safety of practitioners, employees, and patients in light of the present epidemic. The risk of disease transmission and enhanced precautionary measures may be greatly reduced by adhering to the infection control recommendations offered by the American Dental Association (ADA), the Centers for Disease Control and Prevention (CDC), or the Saudi MOH [16-18]. But COVID-19 is still widely used in the dentistry industry, especially in Saudi Arabia.

Evidence points to the need of proper understanding among healthcare professionals in epidemic control. In this context, it is widely established that health education and ongoing training programmes are crucial [13]. These programmes aim to modify the cultural and behavioural norms of the public and healthcare professionals. For politicians and healthcare professionals, the pandemic's disinformation flow, however, made matters worse [14]. What is read online has a significant impact on decision-making, particularly in connection to specific health conditions that are presently in the news (for example, the COVID-19 epidemic influences risk perception and risk awareness) [15].

Our results show that the majority of participants (89.2%) believe that dentists, staff, and patients are at high risk of COVID-19 transmission during dental procedures. They also reported knowing the regulations for working as a dental assistant during COVID-19 (83.7%), understanding the significance of the Saudi MOH protocol (83.2%), being aware that the protocol helps identify challenges brought on by COVID-19 for dental care (79.6%), and realising that this protocol aids in implementing COVID-19 control measures (76.6%). The practise score significantly correlated with gender (p=0.019), knowledge of COVID-19 (p=0.006), the source of COVID-19 material (p=0.000), and completion of a COVID-19 educational course (p=0.002).

Males, those who were familiar with COVID-19, those whose knowledge came from MOH, and those who had finished a COVID-19 educational course all had higher practise results. According to previous publications, once the WHO labelled COVID-19 a pandemic, between 64 and 90 percent of dentists examined showed improvement in their PPE practises. This improvement may be attributed to dentists' increased understanding of the need of infection management during the pandemic [19,20]. Additionally, researchers in Jordan noticed that Jordanian dentists were more knowledgeable of COVID-19 transmission and infection control procedures (97.6 percent compliance) [21]. Furthermore, according to Nasser et al., 91.3 percent of Lebanese dentists were knowledgeable of COVID-19. 22 The fear of contracting COVID-19 during dental operations, which varied from 78 percent to 94.7 percent, is another reason for the increase in compliance [22]. The increased compliance shown may have also been influenced by the pandemic's focus on infection control training and quality control procedures [23].

Despite the tardy introduction of SARS-CoV-2 vaccinations, the COVID-19 pandemic is still very much alive. It is crucial to start an updating process that aims to spread knowledge

about the illness among dental teams and to ensure best practises and management approaches in order to face this and upcoming challenging viruses without fear of infection in order to improve and ensure a higher percentage of adherence to global health regulations.

## Conclusions

Our study showed an overall high adherence level to COVID-19 infection control measures and recommendations. Males, those who were familiar with COVID-19, those whose knowledge came from MOH, and those who had finished a COVID-19 educational course all had higher practise results. We recommend further educational activities in order to improve infection control practice and adherence to guidelines.

## Ethical approval

The research proposal was approved by the Ethics committee of Ministry of Health in Hafar Al-Batin, Saudi Arabia with Ethical approval number (No. 79).

## Abbreviations

KSA: Kingdom of Saudi Arabia
COVID-19: Coronavirus disease 2019
MOH: Ministry of Health
ADA: American Dental Association

## Data Availability

On request

## Acknowledgments

Not applicable

## Funding

The authors received no financial support for the research, authorship and/or publication of this article.

## Conflict of interest statement

The authors declare that there is no conflict of interest.

## Author contributions

Conceptualization: MJA, AFA, and KTA. Methodology: MJA, AFA, DBA, SMA, NBA, KTA. Formal Analysis: KTA Investigation: KTA, MJA, AFA, DBA. Writing - Original Draft Preparation: KTA. All contributors reviewed the manuscript.

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