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Knowledge, Attitude, and Performance of Dentists toward Dental Treatments during Corona Pandemic: A Review Article

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Objectives On December 11, 2019, the World Health Organization declared the outbreak of the new coronavirus (COVID-19). The rapid transmission of the COVID-19 virus through aerosols in the air and on contaminated surfaces highlights the increased importance of personal hygiene. By April 7, 2023, approximately 684 million people worldwide had contracted the virus, with over 6 million lives lost. This survey summarizes dentists' knowledge, attitude, and performance during the COVID-19 pandemic.
Methods A keyword search was conducted in April 2023 on Google Scholar and PubMed databases. The search results for MeSH words such as awareness, attitude, performance, dentist, COVID-19, and self-care yielded 24 articles published from 2019 to 2023. Nine articles were excluded from the study for not addressing one of the 3 knowledge, attitude, and performance (KAP) factors.
Results This study analyzed a total of 15 articles. The results were organized in three categories: knowledge, attitude and performance. Generally, dentists in these studies had a good knowledge about COVID-19 but based on most studies continuous education in this field is necessary. Regarding attitude and performance, studies showed that most of dentists prefer to perform only emergency procedures using personal protective equipment.
Conclusion Dentists included in these studies generally demonstrated an acceptable level of knowledge, attitude and performance about COVID-19.
Keywords Awareness; Attitude; Performance; Dentists; Covid-19; Self-care.

Introduction

In humans, the pathogenesis of the coronavirus depends on the virulence factor of the virus and the immune and health status of the host. This disease can be very dangerous for elderly people and individuals with systemic problems such as metabolic syndrome, tuberculosis, HIV infection, cancer, chronic lung, and liver diseases. Clinically, symptoms usually appear when the infection spreads to the lower respiratory tract. These symptoms can range from mild to severe, depending on various factors. In mild cases, patients typically experience symptoms such as fever, dry cough, lymphopenia, diarrhea, myalgia, sputum production, and headaches. In severe cases, symptoms of hypoxia, septic shock, coagulation disorders, and acute respiratory distress syndrome (ARDS) may occur due to damage to the alveolar system. [1]

This virus can be transmitted from animals to humans or humans to humans. Droplets in the air and contact with an infected person or contaminated surfaces are some of the suggested transmission routes. [2, 3] In terms of recovery and treatment from the COVID-19 virus, there are only supportive treatments available that help control the symptoms, and so far, there is no definitive treatment for it. [4] According to the World Health Organization (WHO), the incubation period of the COVID-19 virus is 2 to 10 days. However, according to some studies, this interval can vary between zero and 27 days.

Dentists and dental treatment staff are exposed to a very high risk of infectious diseases, including COVID-19, due to the nature of their work and their direct and close contact with patients. Additionally, common dental treatments require using devices and tools such as ultrasonic scalers, air-water syringes, and turbines, which come into contact with the patient's blood and saliva, creating aerosols and infectious droplets in the dental workplace. [5]

Dentists should follow appropriate standards of personal protection or self-care when treating different types of patients. Correctly using glasses, masks, gloves, gowns, and other protective equipment is crucial to achieve the best protective effect and reduce the risk of infection during the COVID-19 pandemic. This type of self-care is known as graded protection. [6]

Considering the high risk of contracting COVID-19 among dentists and their interactions with other dental treatment staff, patients, and families, failing to take proper and sufficient self-care precautions can lead to transmission of the virus to others. Therefore, dentists play a significant role in the fight against the COVID-19 virus spread during the pandemic. Based on the aforementioned factors, this study aimed to evaluate the awareness, attitude, and performance of dentists regarding the COVID-19 virus during the pandemic.

Materials and Methods

A literature review was conducted following PRISMA (preferred reporting items for systematic reviews and meta-analyses) guidelines. The main issue addressed in this study was the evaluation of dentists' knowledge and attitude regarding the coronavirus and its impact on dentists' performance based on the "problem, intervention, comparison, outcome (PICO)" framework. The questions that guided this

review were as follows: What is the perception of the COVID-19 pandemic among dentists? How did dentists perform during the pandemic? What is the current mindset of dentists regarding the COVID-19 pandemic?

A comprehensive search was conducted in April 2023 in Google Scholar database and PubMed. Keyword searches using MeSH terms for "awareness," "attitude," "performance," "dentist," "COVID-19," and "self-care" were performed. Two authors independently screened the resulting articles by title, abstracts, and full text. After completing the study selection process, the references listed in the selected studies were also reviewed.

The inclusion criteria for eligible studies were as follows: [1] Studies relevant to the impact of COVID-19 in dental field, [2] studies that assessed the knowledge, attitudes, or performance of dentists using questionnaires. Relevant studies meeting these criteria were included.

Studies that did not address all 3 KAP criteria (knowledge, attitude, and performance) and used patients as study subjects were excluded from this study.

In cases where there was a disagreement regarding the inclusion of a study between the 2 reviewers, a third reviewer was consulted for further evaluation.

Results

Upon accessing the full texts of the articles, duplicate records were removed, and titles and abstracts were independently screened. As a result, this study included 15 articles (Figure 1).

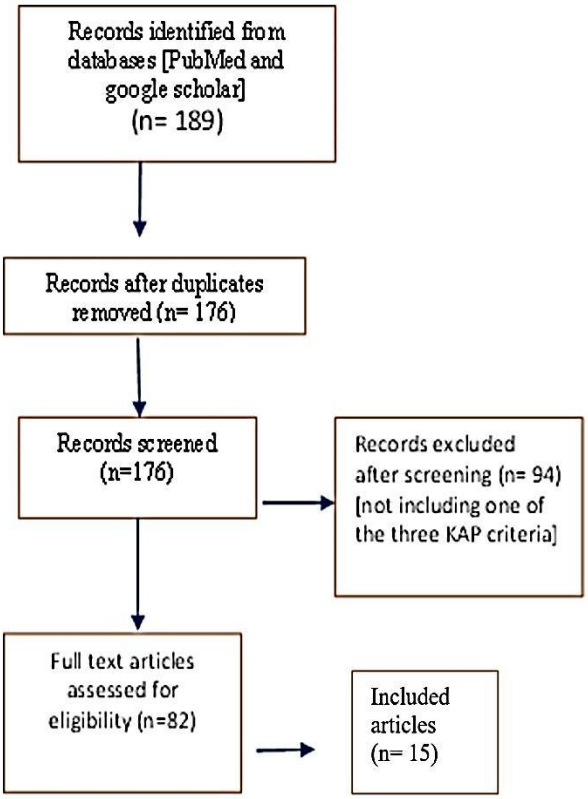

Figure 1: Method of searching and selecting the articles

Table 1 displays 15 selected articles on KAP during the Corona pandemic. The number of participants in these studies varied from 132 to 1251, with a total of 5368 participants across these 15 studies. All studies were cross-sectional and used questionnaire to assess KAP.The participants in these studies included dentists from India, Bangladesh, Jordan, Saudi Arabia, Egypt, Turkey, and Europe.

Discussion

The aim of this study was to evaluate the awareness, attitude, and performance of dentists regarding the COVID-19 virus during the pandemic.

Knowledge:

In these studies, participating dentists generally exhibited an acceptable level of knowledge about COVID-19. In Arora et al.'s study, the distribution of overall knowledge among the 646 respondents showed that 62 (9.6%) had a poor level of knowledge, 522 (80.8%) had a fair level of knowledge, and 62 (9.6%) had a good level of knowledge. The distribution of the level of knowledge (fair or good) was significantly higher among female respondents compared to male respondents, and it was also higher among respondents with a post-graduation degree compared to those with only a graduation degree. [7]

Similar levels of knowledge were observed in Kabir et al.'s study, which involved Bangladeshis dentists. The participants demonstrated good knowledge, attitude, and performance against the COVID-19 virus. Additionally, the level of awareness among specialist dentists was about 3 times that of general dentists, and dentists with higher income had a higher level of awareness than those with lower income. [8]

In a study involving 368 Jordanian dentists aged 22-73 years, Khader et al. reported that Jordanian dentists were aware of COVID-19 symptoms, the mode of transmission, and infection controls and measures in dental clinics. According to this study, 36.1% of Jordanian dentists correctly reported the incubation period of the COVID-19 disease as 1 to 14 days. Most Jordanian dentists were knowledgeable about the symptoms of COVID-19, how to identify people suspected of having the disease, the known methods of transmission, and preventive measures against transmission of the virus. [5]

Similar results were obtained in a study by Turska-Szybka et al. regarding the KAP of Polish Dental Healthcare Professionals during the COVID-19 pandemic. Almost 75% of the respondents (72.5%) followed information about the COVID-19 pandemic continuously. The vast majority of respondents (95.5%) correctly identified the virus's incubation time as 1–14 days and recognized the most important symptoms of infection: Cough (91.6%), fever (96.4%), and shortness of breath (86.6%). Only half

of the dentists (53.5%) correctly stated that the highest viral load was probably present at an early stage of infection. Approximately 69.2% of dentists considered the PCR test as the primary test for identifying the COVID-19 virus. [9]

In a study by Basim Almulhim et al. involving 388 Saudi undergraduate dental students, most participants (68%) believed they had sufficient knowledge. In contrast, 29% were unsure, and only 2% felt they didn't have the required knowledge. The average knowledge scores of dental students in Saudi Arabia were calculated to be 5.84 out of 7. Female students had significantly higher knowledge than male students. [10]

In Indu et al.'s study, faculty members from different universities in India demonstrated good knowledge (83.3%) regarding the COVID-19 virus in dental treatments during the pandemic. Additionally, 83.3% of DHPs (Dental Healthcare Professionals) had good awareness of COVID-19 infection and preventive measures, and 84.1% of them were knowledgeable about possible modes of transmission. [11]

According to Khanal et al.'s study, 92% of dentists regularly acquired new information about COVID-19. Furthermore, 84% of the participants had correct information about the mode of transmission of the disease (respiratory droplets), 93% were aware of the conditions requiring medical intervention, and 82% were aware of the correct way to maintain hand hygiene. In this study, there was no significant relationship between dentists' knowledge and work experience. [12]

Contrary to the previous studies, Bakaeen and colleagues reported that dentists still lacked knowledge about COVID-19. Only 46.6% of dentists were familiar with N-95 masks, and 92% believed that it was necessary to use this mask for treating patients suspected of having COVID-19, but only 20% of dentists used these masks. [13]

According to the study by Bera et al., 64.7% of dentists knew about the incubation period of the virus, 98.9% recognized fever as the main symptom of COVID-19, and 80.6% stated that COVID-19 may be present with no clinical symptoms. The results of this study indicated that dentists working in a university environment had significantly higher knowledge than those in public and private practice. [14]

In Krithika et al.'s study, 9 questions were asked to assess awareness. Interns, dentists, and specialty students scored 7.25, 7.50, and 7.29, respectively. The difference between these groups was not significant. [15]

Attitude:

Dentists in these studies generally exhibited a positive attitude toward the COVID-19 virus. In Arora's study, about half of Indian dentists considered COVID-19 very dangerous. Only 41% of dentists were willing to provide emergency medical services to patients during the COVID-19 pandemic. When asked about personal protective equipment, almost 50% of dentists selected Surgical N-95 masks. In comparison, 20.6% opted for a combination of Surgical N-95 (Medical respirator) and Standard N-95 (Unvalved), and 14.2% believed that only Standard N-95 masks should be used. [16]

In Khader's study, a total of 74.7% of Jordanian dentists believed that, in order to reduce disease transmission, it is necessary to ask patients to sit far from each other, use masks while in the waiting room, and wash their hands before being in the dental unit. [5]

In Kabir 's study, most dentists agreed with the Jordanian research regarding the appropriate way to prevent COVID-19. They considered health education, quarantine, and social distancing the most suitable preventive measures. The study also showed that 30.1% and 32.6% of participants had mild to extremely severe levels of anxiety and depression, respectively, with females being more likely to experience depression and anxiety compared to males. Additionally, individuals aged above 40 years had higher odds of depression and anxiety than those aged between 18-40 years. [8]

In Venkata Teja's study, most Indian dentists believed that dentists played an important role in preventing the transmission of the virus and should make every effort to prevent its spread. [17]

In Almulhim 's study, dental students in Saudi Arabia generally held a positive attitude towards COVID-19. However, only 16% of students were willing to treat patients during the pandemic, and 28% preferred telemedicine. [10]

In koç 's study, most Turkish pediatric dentists (82%) performed emergency dental procedures, while 18.5% performed emergency and non-emergency dental procedures during the COVID pandemic. [18]

According to Gawad's study, most Egyptian dentists believed the COVID-19 virus caused the infection. However, only 43.5% of the dentists believed that transmission of the COVID-19 virus could be prevented by following WHO guidelines, and 77.8% of the participants postponed dental treatment for suspected patients. [19]

Turska-Szybka et al. assessed the attitude of dentists regarding the COVID-19 virus. According to this study, 56% of participants were concerned about the pandemic, with 23.6% experiencing clear anxiety. Additionally, 42.1% considered the possibility of infection with the COVID-19 virus in the workplace to be very high. [9]

According to the survey conducted in Khanal et al.'s study, 60% of dentists believed that policymakers should prepare guidelines for the reopening of offices during the pandemic, and 45% believed that policies should be established regarding the health of dentists and treatment staff. Furthermore, 34.9% of dentists reported that their mental health was worse than before the COVID-19

pandemic. [12]

According to the study by Bera et al., 51.1% of dentists considered COVID relatively dangerous, and 44% considered it completely dangerous. Additionally, 99.5% considered washing hands with soap and using alcohol solutions as the best way to prevent disease transmission, while 17% believed that protective equipment was unnecessary and might cause panic among patients. [14]

Krithika et al. studied the attitude of interns, dentists, and residents. They scored 1.62, 2.04, and 1.92 out of 4, respectively, with statistically significant differences observed. [15]

Performance:

Participating dentists in these studies generally performed well against the COVID-19 virus. In Arora's study, Indian dentists who had completed the infection control course, showed a higher level of preparedness to manage symptomatic patients. In Khader's study, most dentists frequently washed their hands with soap and water and used alcohol-based disinfectants. Almost all dentists changed their routine for masks and gloves to reduce the possibility of infection transmission to patients and themselves. [16]

Kabir et al. concluded that Bangladeshi dentists performed well against the COVID-19 virus. Additionally, dentists with less than 5 years of work experience, performed 10.3 times better than dentists with more experience. [8]

According to Venkata Teja's study, most Indian dentists during the coronavirus pandemic performed treatment for symptomatic patients and avoided aerosol-producing procedures such as crown preparation. [17]

In Almulhim 's study in Saudi Arabia, surprisingly, only 16% of dentists were treating patients during the pandemic, and 28% did not want to treat patients. Meanwhile, 28% preferred teledentistry, while the majority of 44% were willing to handle only emergency cases. The 16% patient treating dentists, had significantly higher mean attitude scores than those who did not treat patients ($p < 0.001$) but had lower knowledge mean scores ($p = 0.225$). [10]

In Srivastava 's study, dentists in Saudi Arabia performed well during the coronavirus pandemic. In this study, although the dentists had an average level of awareness, they showed a positive attitude and an acceptable level of performance because they followed the guidelines issued by various international and national health agencies. [20]

Based on Indu's study, Indian faculty members performed well against the COVID-19 virus in dental treatments during the coronavirus pandemic. In this study, there was a difference of opinion about some methods of infection control and the existence of a standard protocol in dental treatment. [11]

In Gawad's study, the majority of Egyptian dentists (63.8%) did not consider the use of surgical masks sufficient, and 55.8% of them preferred the use of N-95 masks. [19]

According to the Turska-Szybka study, 84% of the participants stated that during the pandemic, they admitted patients by implementing triage and using infection control equipment. In comparison, 72.5% of dentists followed information related to the pandemic and infection control protocols continuously, with the most common source being the Polish Dental Association (73.4%). These dentists accepted patients with toothaches that could not be relieved by painkillers, periodontal abscesses, and dental injuries but refused to perform sandblasting, scaling, and making dental crowns. [9]

In Khanal et al.'s study, 63% of dentists accepted only emergency patients, 23% refused to accept patients in general, and 11% treated all patients. Among active dentists, 55% believed in recording patients' travel records, and only 49% of dentists recorded patients' body temperature. [12]

According to Bakaeen's study, 76% of dentists were postponing elective treatments and only providing emergency treatments. 73.6% of dentists strongly believed that the pandemic had a significant impact on their economic conditions. Dentists working in private practice had significantly less information about N-95 masks and used them less often. Also, dental specialists used these masks significantly more than general dentists ($p < 0.01$). [13]

In the study by Bera et al., 98.9% of dentists followed the social distancing of patients in the waiting room, 98.4% made it mandatory to use a mask, and 95.7% asked patients to wash their hands before starting treatment. Furthermore, 99.3% recorded patients' travel records, and 86% discussed the risks of COVID-19 with patients before starting treatment. Additionally, 87.9% of dentists had noticed the impact of COVID-19 on their professional life. [14]

According to Krithika et al.'s study, there was no significant difference between dentists, interns, and specialized students regarding the use of rubber gloves, masks, hand washing duration, and the protocol implemented for patients suspected of having COVID-19. However, interns used thermal scanners more ($p = 0.03$) and used significantly less sodium hypochlorite solutions to disinfect surfaces ($p = 0.02$). [15]

Table 1- Summary of reviewed articles

No	Authors	Year of study	Number of participants	Participants	Country	Method	Type of study	Findings
1	Arora et al. [16]	2021	246	General dentists	India		Cross sectional	-60.7% and 49.7% of the dentists had taken infection control training and special training for COVID-19
2	Khader et al., [5]	2020	368	General dentists	Jordan	Online questionnaire	Cross sectional	-Only 41.8% of the dentists were willing to provide emergency services to patients.
3	Kabir et al. [8]	2021	184	General dentists	Bangladesh	Online questionnaire	Cross sectional	-awareness of Jordanian dentists toward COVID-19 symptoms, mode of transmission, and infection controls and measures in dental clinics.
4	Singh et al. [21]	2020	274	General dentists	India	Online questionnaire	Cross sectional	-Substantial portion of population especially, females and younger people are at high risk of psychological problems during the COVID-19 outbreak.
5	Teja et al. [17]	2020	300	General dentists	India	Online questionnaire	Cross sectional	-Median practice scores were significantly higher among female respondents. Median knowledge and practice scores were significantly better in study participants with age <40 years
6	Almulhim et al [10]	2021	388	General dentists	Saudi Arabia	Online questionnaire	Cross sectional	-The level of awareness and performance of Indian dentists about the Covid-19 virus was appropriate.
7	Srivastava et al., [20]	2020	318	General and specialist dentists	Saudi Arabia	Online questionnaire	Cross sectional	-Dental health practitioners displayed an average level of knowledge that needs to be enhanced through continuing education programs.
8	koç et al., [18]	2021	200	General dentists	Turkey	Online questionnaire	Cross sectional	-82% of dentists only performed emergency dental treatments, whereas 18.5% performed both emergency and routine dental practices during the COVID-19 pandemic.
9	Indu et al., [11]	2020	132	Specialist dentists	India	Online questionnaire	Cross sectional	-Out of all participants 83.3%, 97.7%, 85.6 % had good knowledge, attitude and practice respectively about dental care during the COVID 19 pandemic.
10	Gawad et al., [19]	2021	374	General dentists	Egypt	Online questionnaire	Cross sectional	-80.63% did not think surgical mask was sufficient to prevent cross-infection, and 84.55% favored the wear of N-95 mask.
11	Turska-Szybka et al., [9]	2021	730	General and specialist dentists	Poland	Online questionnaire	Cross sectional	-84.0% of dentists admitted patients performing a triage and using personal protective equipment.
12	Khanal et al., [12]	2020	106	General and specialist dentists	Nepal	Online questionnaire	Cross sectional	-A statistically significant difference concerning impact and practice during the COVID-19 was observed between general practitioner and specialist working at different work places.
13	Bakaeen et al., [13]	2021	1251	General and specialist dentists	America - Europe - Western Mediterranean (49 countries)	Online questionnaire	Cross sectional	-A new level of protective armamentarium in the dental operatory and updated operational guidance and policies are required.
14	Bera et al., [14]	2021	187	General dentists	India	Online questionnaire	Cross sectional	-Emergency procedures were considered necessary by 90.8% dentists.
15	Kritka et al., [15]	2021	310	Interns, dentists and	India	Online questionnaire	Cross sectional	A constant update regarding COVID-19 should be made available to dental health care professionals.

Conclusion

This study summarizes 15 articles on KAP about COVID-19. All 15 articles showed that the respondents were aware of COVID-19. The attitude and performance of dentists towards the COVID-19 virus were reported to be positive and appropriate in all 15 reviewed studies. Knowledge, attitude, and performance is a tool that we hope will be used to control and prevent the spread of the COVID-19 virus.

Conflict of Interest

Non Declared■

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