

# JORDANIAN ROYAL MEDICAL SERVICES DENTISTS KNOWLEDGE, AWARENESS, ATTITUDE, BEHAVIOR AND PRACTICE REGARDING COVID-19: A CROSS SECTIONAL STUDY

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## ABSTRACT

*Exposure of dentists to coronavirus or better known as COVID-19 infection is high due to their work environment and the contiguity of the disease. This study aims to assess the knowledge, attitude, and practice (KAP) of the Royal Medical Services (RMS) dentists toward the COVID-19 pandemic.*

*An online survey was distributed among a sample of RMS dentists using a pretested and valid questionnaire. Information on sociodemographic data and KAP regarding COVID-19 were collected and scored. Based on the total scores obtained in each domain, every participant was categorized into good, fair, and poor. The association between sociodemographic details and different KAP domains was analyzed using the chi-square test.*

*The percentage of the participants with good knowledge and good practice regarding COVID-19 was (77.3%) and (61.7%) respectively. The knowledge and practice indexes in this study were 22.68(75.6%) and 17.82(66%) consecutively. Talking about the combined average knowledge and practice index (KP) score and index in this sample it was 40.5(71.05%). Significant relationship between qualification and good practice ( $p = 0.037$ ) and between the knowledge and the practice ( $p = 0.002$ ).*

*It was concluded that RMS dentists showed good knowledge and practice concerning COVID-19. However, they had some knowledge gaps and uncertainties here and there, that needed to be addressed and cleared out.*

**Keywords:** COVID-19, dental practice, transmission, pandemic, RMS dentists.

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## INTRODUCTION

The coronavirus disease (COVID-19) is a global public health emergency and a major challenge for the global community and the health care systems. The World Health Organization (WHO) announced

COVID-19 as a global pandemic on March 11, 2020.<sup>1</sup> On December 1, 2019, COVID-19 was first reported in Wuhan, Hubei Province, China.<sup>2</sup> COVID-19 is a newly emerging disease and a lot of things about it are still vague and unknown. The incubation period of COVID-19 is between 2 and 14 days.<sup>3</sup> Its typical symptoms are fever, fatigue, cough, and headache and can cause acute respiratory distress syndromes (ARDS), yet the bulk of cases are with no or with mild symptoms like flu.<sup>3,4</sup> Contributing to more than 80% of the total cases.<sup>3,4</sup> The disease fatality rate is about 2.3% but can reach up to 14.8% in patients 80 years and above.<sup>5</sup>

The route of COVID-19 transmission is by human-to-human contact through respiratory droplets directly and indirectly.<sup>6</sup> The direct transmission occurs when a COVID-19 case coughs, sneezes, or exhales producing droplets that reach the mouth, nose, or eyes of another person.<sup>6</sup> The indirect transmission happens when an uninfected person touches contaminated

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objects, then touching their face.<sup>7</sup> This causes grave concern, for most of the dental procedures, involves close contact with the patients, exposure to saliva, blood, and generating droplets and aerosols, and what makes the situation worse the fact that the standard protective measures in everyday clinical work are not good enough to prevent the possible spread of COVID-19.<sup>8-10</sup> COVID-19 patients are ought not to be provided with routine dental treatments, yet dental emergencies are always on the cards. Furthermore, the asymptomatic and the presymptomatic patients are a great threat to dentists and other dental health care workers (DHCW). For the above-mentioned reasons dentists and DHCW are at substantial risk of getting this highly infectious disease, therefore dental clinics hold a notable risk of COVID-19 infection and transmission.<sup>8</sup>

To control this disease practical guidelines recommendations to dentists and DHCW were published by the Centers for Disease Control and Prevention (CDC), the American Dental Association (ADA), and the World Health Organization (WHO).<sup>11-13</sup> Yet, it is not only about following strict guidelines that guarantee a safe working environment. Knowledge and awareness of the dentist is also important. Dentists should have enough knowledge and awareness to be able to manage, deal with disease, protect themselves and others and prevent its spread.

Present study was carried out to evaluate the knowledge, awareness, attitude, and practice of dentists working at Royal Medical Services (RMS) concerning COVID-19. The RMS is one of the major public health sectors, that offers its dental services to most of the Jordanian population, thus it contributes to a high chance of disease-transmitting if its health care workers are not knowledgeable, and they didn't follow a proper infection control protocol.

## METHODOLOGY

### *Study design*

This was a descriptive cross-sectional study that was conducted using an online survey questionnaire targeting RMS dentists. The data collection started on the 19th of March 2021 and ended on 25th of March 2021. The questionnaires were anonymous, to ensure privacy. Participation was voluntary. It was held that the participants who answered the questionnaire and sent it back fully answered had approved in taking part in this study. Ethical approval of the study was obtained from the technical training directorate at RMS.

It was formulated in English using Google forms and was distributed among RMS dentists via a link created for the purpose. A pilot study was executed using a sample group of 20 RMS dentists. The reports

from the pilot study were not used in our final investigation.

### *Sample size*

Online Raosoft sample size calculator for population surveys was used to calculate the sample size. Based on the estimated number of RMS dentists (550). The minimal calculated sample size needed for the study to have a confidence level of 95% and a 5% margin of error is 227.

### *Study tool*

Based on the information given by WHO and CDC on COVID-19 and after literature search,<sup>14-16</sup> a self-administered structured questionnaire was designed. Later, the questionnaire was finalized in view of pilot study results, and after establishing reliability. Reliability was confirmed by given-out the questionnaire to 20 dentists and subjecting it to Test-retest (with one week gap). The final questionnaire version consisted of four sections with a total of 36 questions.

The 1st section contained sociodemographic, general information about the participants. Including gender, age, years of practice, qualification, qualification, complete training on COVID-19.

The 2nd section contained questions addressing the knowledge and awareness of the RMS dentists. It consisted of 13 questions discussing their knowledge about: the viral incubation period, symptoms, route of transmission, the time it stays on the surfaces, the most effective disinfectant material, diagnostic method, effectiveness of flu vaccine on COVID-19 virus, the preventive measures to follow, the importance of isolation measures and personal protective equipment (PPE), the transmission of the disease from an asymptomatic patient and if they knew how to act or whom to contact if they themselves were suspected or were in an unprotected encounter with a suspected or confirmed case of COVID-19.

The third section was made of 12 questions to assess the dentists' attitude towards the following topics: perception of COVID-19, its effect on participant daily routine, the importance of educating patients, treating COVID-19 patients, management of staff or patients with flu-like symptoms, recommendations to eliminate COVID-19, and satisfaction with the RMS measures during the pandemic.

The fourth section, the practice section, included 5 questions weighing up the application of preventive measures and protocols and covering the following topics: personal protection equipment, standard precautions, infection control measures, and appropriate dental treatment during the pandemic.

**Data scoring**

Preceding the analysis, all correct responses in the knowledge and practice sections were scored 1 and the incorrect or not sure responses received 0. The total knowledge score was measured by summation of all answers of that section and ran from 0 to 30, the greater the score the better knowledge. Correspondingly, the knowledge and awareness scores were categorized as ‘uninformed’ (0), ‘poor knowledge’ (1–10), ‘fair knowledge’ (11–20), and ‘good knowledge’ (21–30). For the practice section, the same way was used to calculate the total scores of participants. They were between (0-27), higher scores indicate better practice. The categories were ‘no infection control practice’ (0), ‘poor practice’ (1-9), ‘adequate practice’ (10-18) ‘good practice’ (19-27).

**Statistical analysis**

Data management and analysis were done using IBM SPSS for Windows, v. 26.0 (IBM Corp., Armonk, USA). Descriptive statistics were performed. Frequencies and percentages were used to display the distribution of the sociodemographic, general information of participants, the responses of the participants to each knowledge, attitude, and practice questions. They were also used to display the assortment of poor, fair, and good knowledge as well as no infection control, poor, adequate, and good practices among the sample. The total knowledge and practice scores were presented by Mean and standard deviation. Furthermore, they were presented as a percentage identifying the total knowledge index as well as the total practice index of participants. For the total knowledge and practice index (KP) of this study, the previously measured indexes were summed and presented as a percentage. Chi-square test set a P value of less than 0.05 was used to identify the correlation between variables.

**RESULTS**

**Sociodemographic Data for Participants**

This study included 256 (98 females and 158 males) RMS dentists with a response rate of 73% (256 out of 350 responded) and an age range between 20-59 years. Table 1 summarizes participants’ sociodemographic data and general information

**Participants’ Knowledge of COVID-19**

The overall knowledge and awareness scores were high with an average score of 22.7 (SD 3.4) and index of (75.6%). 77.3% (198 participants) scored above 20 out of 30 in this section, 28.7% (56 participants) scored between (11-20) and 0.8% (2) had a score of 10 or less. Two hundred & twelve (82.2%) stated correctly that an asymptomatic patient could transmit COVID-19, this, and other matters that assess the participants

knowledge related to COVID-19 are shown in more details in table 2.

**Attitude and perception of participants toward COVID-19**

Table 3 shows the attitude and perceptions of participants towards COVID-19. Two hundred & thirty (89.9%) were worried of getting infected. Regarding attitude towards treating suspected patients, 202 (78.9%) preferred not to treat them. Participants’ responses related to this section are mentioned in table 3.

**Participants’ practice during the COVID-19 pandemic.**

Table 4 summarizes the responses of participants to this section.

**Static significant relation**

None of the socio-demographic and general information of the participant had any significant relation with knowledge or practice except for qualification. Qualification and the dental practice during the COVID-19 pandemic (p=0.037) were significantly related. We also found a significant relationship between the overall knowledge and the overall dental practice (p = 0.002).

TABLE 1: SOCIODEMOGRAPHIC AND GENERAL INFORMATION

Sociodemographic and general information	Frequency	Percentage
Gender		
Females	98	38.3%
Males	158	61.7%
AGE		
20-29	96	37.5%
30-39	114	44.5%
40-49	44	17.2%
50-59	2	0.8%
Years of Practice		
0-9	136	53.1%
10-19	98	38.3%
20-29	22	8.6%
Qualifications		
Specialists	138	53.9%
General practitioners	118	46.1%
Attending Training Program		
Yes	88	34.4%
No	168	65.6%

TABLE 2: PARTICIPANTS KNOWLEDGE AND AWARENESS OF COVID-19

Questions	Correct answer	Participants correct answers		Participants wrong answers	
		frequency	percentage	frequency	percentage
<b>Knowledge And Awareness</b>					
Incubation Period	2-14 days	100	39.1%	156	60.9%
Symptoms					
Fever	Yes	248	96.9%	8	3.1%
Cough	Yes	232	90.6%	24	9.4%
Runny nose	Yes	88	34.4%	84	65.6%
Sore throat	Yes	192	75%	64	25%
Shortness of breath	Yes	194	75.8%	31	24.2%
Joint/muscle pain	Yes	242	94.5%	14	4.5%
Red eyes	Yes	66	25.8%	190	74.2%
Skin rashes	Yes	56	21.9%	200	78.1%
Diarrhea	Yes	206	80.5%	25	19.5%
Vomiting	Yes	108	42.2%	74	57.8%
Might present with no symptoms.	Yes	198	77.3%	58	22.7%
Loss of smell and taste	Yes	244	95.3%	12	4.7%
<b>TRANSMISSION</b>					
Coughing and sneezing	Yes	256	100%	0	0%
Hand Shaking and Hugging	Yes	238	93%	18	7%
Touching contaminated surfaces	Yes	218	85.2%	38	14.8%
Can it persist for few hours to days on contaminated surfaces?	Yes	186	72.7%	70	27.3%
Infected Surfaces are Cleaned By.	5% Bleach	68	26.6%	188	73.4%
Diagnostic Method	PCR	252	98.4%	4	1.6%
Influenza Vaccine can Provide Immunity.	No	222	86.7%	34	13.3%
Preventive Measures are.					
Put face Mask on Known or Suspected Patient	Yes	240	93.8%	16	6.2%
Place Patient in Adequate Ventilated Rooms	Yes	180	70.3%	76	29.7%
Avoid Moving the Patient Frequently out of their area unless it is necessary.	Yes	176	68.8%	80	31.2%
Frequently Cleaning Your Hands	Yes	234	91.4%	22	8.6%
Social Distancing	Yes	244	95.3%	12	4.7%
Personal protection measures are important.	Yes	252	98.4%	4	1.6%

Could it be prevented by isolation measures?	Yes	146	57%	105	43%
Asymptomatic patient transmitting it.	Yes	212	82.8%	22	17.2%
Do you know who to contact when unprecedently encountered a suspected or a confirmed Covid-19 patients?	Yes	202	78.9%	54	21.1%
Do you know what to do when you suspect being infected by COVID-19?	Yes	238	93%	18	7%

TABLE 3: ATTITUDE OF PARTICIPANTS REGARDING COVID-19

Attitude	frequency	percentage
Perceiving COVID-19		
Very dangerous	174	68%
Moderately dangerous	74	28.9%
Not dangerous	8	3.1%
COVID-19 as Serious Health issue		
Yes	246	96.1%
No	10	3.9%
worrying about getting infected		
Yes	230	89.9%
No	126	9.1%
Daily Routine changed		
Yes	240	93.8%
No	16	6.2%
importance of people education		
yes	256	100%
No		0%
Symptoms are resolved on their own.		
TRUE	202	78.9%
False	54	21.1%
Treating COVID-19 Patients		
Yes	54	21.1%
No	202	78.9%
Managing patients that sneeze or cough in your clinic.		
Refused to treat them.	26	10.2%
treat them then refer them to the hospital.	12	4.7%
refer them to the hospital before treating them.	48	18.8%
Consider them as COVID-19 patients and treat them accordingly.	170	66.4%
Would let dental staff that have who got flu-like symptoms to work.		
no	228	89.1%
yes	28	10.9%
Satisfaction about the measures		

yes	192	75%
No	64	25%
Changing the mask and gloves to decrease the spread of disease.		
Important	244	95.3%
Not important	12	4.7%
Way to eliminate COVID-19.		
Vaccination	154	60.2%
protective measures	94	36.7%
herd immunity	8	3.1%

TABLE 4: PARTICIPANTS' DENTAL PRACTICE DURING THE COVID-19 PANDEMIC.

Questions About Practice	correct answers	Participants correct answers		Participants wrong answers	
		Frequency	percentage	Frequency	percentage
Personal Protection Equip- ment you wear.					
Mask	yes	256	100%		
Gloves	yes	254	99.2%	2	0.8%
Gown	yes	214	83.6%	42	16.4%
Headcover	yes	94	37.7%	162	62.3%
Shoe cover	yes	58	22.7%	198	77.3%
Face Shield	yes	198	77.3%	58	22.7%
Dental goggles	yes	86	33.6%	170	66.4%
Personal Protection Donning	Gown, mask, face shield, gloves	182	71.1%	74	28.9%
Personal Protection Removal	Gloves, face shield, mask, gown	126	49.2%	130	50.8%
The Protocol					
Hands washing before and after treating patients.	correct	220	85.9%	36	14.1%
I clean and disinfect surfaces.	correct	208	81.3%	48	18.7%
I wear personal protection equipment.	correct	230	89.8%	26	10.2%
Change gloves after each patient	correct	232	90.6%	24	9.4%
Avoid busy clinics.	correct	186	72.7%	70	27.3%
Disinfect the dental chair after each patient.	correct	194	75.8%	62	24.2%
Emergency Treatments During the Pandemic					
Routine Dental work	no	220	85.9%	36	14.1%
Pulp extirpation only	yes	202	78.9%	54	21.1%
Pulp extirpation and complet- ing RCT in one session.	no	224	87.5%	32	12.5%

Complicated trauma	yes	186	72.7%	70	27.3%
Periodontal abscess	yes	118	46.1%	138	53.9%
Extraction of asymptomatic tooth	no	240	93.8%	16	6.2%
Treatment of Pericoronitis	yes	78	30.4%	178	69.6%
Intervene inpatient with uncontrolled bleeding.	yes	138	53.9%	118	46.1%
Removal of stitches	yes	60	23.4%	196	76.6%
Intervene inpatient that will receive chemotherapy, Radiotherapy, or organ transplant.	yes	104	40.6%	152	59.4%
Cementation of crown or bridges	yes	58	22.7%	198	76.3%
Pain due to dislocated wires or brackets	yes	148	57.8%	108	42.2%

## DISCUSSION

This study encountered that Dentists working in the Royal Medical Services had a fairly good knowledge and practice regarding COVID-19, with a KP index of [40.5(71.05%)]. This agrees with previous studies in review articles.<sup>17,18</sup> Yet a few gaps were found that existed here and there. The viral incubation period was correctly expressed by only 39.1% of the participants. This agrees with Khader et al. findings (36.1%),<sup>14</sup> and other regional study done on Saudi dentists.<sup>15</sup> This could be attributed to the fact that the sources of some of the circling information about COVID-19 came from the internet. For only 34.4% of the participants rolled in training programs on COVID-19. This enforces the previous believe that their information came from a different source, such as the internet and social media. These sources are accessible and effective in increasing public awareness.<sup>19</sup> But the vast diverse information present on the internet might not be accurate or true,<sup>20</sup> mushrooming and misguiding the public. In this context, trustable information from a trusty and official medical source should be the main source of information.<sup>21</sup>

Knowing that pre-symptoms or incubation period phase is a threat to the dentist, DHCW as well as their patients, as a COVID-19 case could undergo dental treatment without being identified because it presents no detectable symptoms at this stage.<sup>9</sup> However, participants in this study were knowledgeable enough about the fact that asymptomatic patients could transmit the disease and that a COVID-19 case could be presented with no symptoms. This knowingness was also identified in other studies,<sup>22</sup> and the findings there were higher than the findings of pervious national and regional studies.<sup>14,15</sup> Participants in this study were also aware of the main symptoms of COVID-19 and had excellent knowledge about the route of transmission and the preventive measures which was in line with other

studies.<sup>14-15,16,22-26</sup> Being knowledgeable about these points was in their favor as it helped them to spot the possible danger and take the needed actions which are crucial in managing,<sup>20</sup> and controlling the transmittal of the infection.<sup>9</sup>

Management of COVID-19 is mainly supportive care with no evidence-based specific treatment for it.<sup>27</sup> This was reflected in this study by the fact that (78.9%) of respondents believed that the disease is self-resolving and require no special treatment, based on this stated fact by a sizable percentage of participants it was surprising to see that (68%) of them considered COVID-19 as a dangerous disease and (96.1%) of them regarded it as a serious predicament to the public health which coincide with a recent regional study.<sup>26</sup> However, it was inconsistency with another national study done almost a year ago before this study was conducted, where it was reported that only (17.7%) of Jordanian dentists recognized COVID-19 as very dangerous and almost one-third (36.7%) deemed that COVID-19 is a serious predicament to public health.<sup>14</sup> Many factors may be contributing to this perception and its increased number among Jordanian dentists. The increased number of cases and reported death of COVID-19, it being an interesting topic wildly circulating on social and official media. The fact that extreme measures and lockdowns were taken by the governments to decrease its spread and the fact that for most of them (94%) their daily routine was affected by the pandemic. All of these might have fueled their belief that COVID-19 is a grave issue. Not to forget the fact that this study and the study carried out by Khader et al. were conducted at different times, as mentioned earlier Khader et al. study was executed a year ago at the beginning of the first outbreak when there were only a few reported cases in Jordan of COVID-19.

Most participants feared treating or encountering a COVID-19 case. This is reflected by the sample attitudes towards dentally treating patients that sneeze

or cough in their clinics as only (4.7%) of the sample offered treatment before medical consultation, on the other hand in a previous study conducted on Jordanian dentists, it was reported that (49.5%) would do the same.<sup>14</sup> This fear was also implied by the fact that only (10.9%) of participants would allow their dental staff to work if they got flu-like symptoms compared to (32.3%) that would be the same as reported by Khader et al. in the previous study,<sup>14</sup> not to forget the fact that most of them (78.9%) showed a negative response towards treating a suspected or confirmed COVID-19 case, which agrees with previous studies.<sup>14,15,26,28,29</sup> These fears may be explained by the factuality that dentists are aware that they are at elevated risk of acquiring infectious diseases due to their work environment.<sup>30</sup>

Regarding the treatments performed and in consistent with the declarations and recommendations of organizations such as WHO,<sup>11</sup> and ADA,<sup>31</sup> the majority of participating dentists in the present study only delivered emergency dental treatments during this pandemic. This is revealed by the results of the current study, as (93.8%) and (85.9%) of the dentists reported that they would not extract an asymptomatic tooth, nor would they continue performing routine dental treatments respectively. Most of them would execute an emergency intervention in the presence of acute pulpitis but will not complete the endodontic treatment only after the outbreak is over, and (72.7%) will intervene in complicated trauma. This agreed with a study done on Turkish dentists.<sup>16</sup> Yet regarding the other dental treatments that are considered as an emergency dental procedure by ADA, most of the participants were unknowledgeable or uncertain as most of the participants stated that they wouldn't perform these treatments or were indecisive in the very least. This differed from the results stated in a previous study in which Turkish dentists were more oriented regarding this subject.<sup>16</sup> This exclusion of some treatment procedures or unclearness again could be explained by the fact that some of the unclear or incomplete information that are circulating among the participants is coming from the internet, not to forget that their fear towards COVID-19 plays major role in emphasizing this practice and reducing the treatment procedures they would perform to the minimal. This practice of only delivering emergency dental intervention to patients during the pandemic was high in Turkey<sup>16,25</sup> and low among Indian dentists.<sup>22,32</sup> This incongruity might be explained by the absent or presence of national guidelines for dentists concerning the appropriate performed dental treatments during this pandemic.

On the other hand, most of dentists working at the Royal Medical Services practiced good preventive measure protocols covering the use of PPE, handwashing, disinfecting the clinic surfaces and the dental chair along avoiding busy clinics. This routine was comparable to other studies.<sup>[14,15,17,22-25,33]</sup> This reported good practice was also in a significant relationship with the speciality. This was in concurrence with other studies in the literature.<sup>16,23</sup> There was also a statistically significant

association between knowledge and practice, the better the knowledge the better the practice, which agreed with a study done by Indu et al.<sup>34</sup> This can only prove the importance of knowledge and its positive effect on having good practice.

### Limitation

This is a cross-sectional study; thus, no cause-effect relationships can be identified only associations can be reported and because it is a survey of self-reporting nature there could be a difference between the actual and reported responses, which may result in social desirability bias, not to forget that respondents in this study are dentists working at the RMS. Thus, the practices they follow during the period of the COVID-19 pandemic could be according to the RMS policy and protocol rather than individual decisions.

### CONCLUSIONS

Dentists working in Royal Medical Services that participated in this survey were knowledgeable with good practice and cautious attitude towards COVID-19. However, they had some uncertainties or misleading information here and there. Efforts should be made to increase their knowledge.

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| 4 Tamara Trad Alzoubi:   | Drafting of the article           |
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