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Original Research Article

KNOWLEDGE, ATTITUDE AND PRACTICE OF HAND HYGIENE AMONG DENTISTS AS A PREVENTION METHOD FROM COVID-19 IN AL QASSIM REGION, KINGDOM OF SAUDI ARABIA: A CROSS-SECTIONAL STUDY.

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Abstract:

Aim: To assess the knowledge, attitude and practices of hand washing among dentists in Al Qassim Region, Saudi Arabia. Materials and Method: A descriptive cross-sectional study was carried out by use of a self-administered questionnaire. The questionnaire was based on WHO's "Five Moments of Hand Hygiene Questionnaire" with a few notable changes. Statistical Analysis: Statistical Package for Social Sciences (SPSS) version 16 was used to analyze data. Results were displayed

as counts and percentages.

Results: The level of knowledge of Hand Hygiene (HH) was found high in 52% and moderate in 37% of the participants, when in the attitude levels the majority of the participants i.e. 88% had high level of attitude and was moderate in 7% of respondents. Level of practices of Hand Hygiene was high in 61%, moderate in 37% and almost none (1.4%) of our participants were found with a low level of practices.

Conclusion: The population under study scored high on attitude when compared to practices and knowledge scores were the least. These points to the need for interventions for improving knowledge through regular workshops and continuing education. Since knowledge does not automatically translate into practices, emphasis on HH compliance must be laid. Planned interventions to improve compliance must be multidimensional which considers and includes administrative support, clinic ergonomics and design, timely HH supplies, periodic educational programs, reminders, process surveillance and employee feedback to achieve sustained improvements.

Keywords: COVID-19, Dentist, Hand hygiene, Knowledge, Practices.

Introduction:

Coronavirus 2019 (abbreviation "COVID-19") emerged in December 2019 in Wuhan China. After the first reported case outside China in Thailand, it was a public health problem affecting the entire world leading to the WHO declaring it a pandemic on 11 March 2020. ¹ The disease is highly contagious, and its patients mainly show clinical symptoms which include fever, dry cough, fatigue, muscle pain, and shortness of breath. In China, 18.5% of patients with COVID-19 progress into an acute phase, characterized by acute respiratory distress syndrome, septic shock, difficult-to-treat metabolic acidosis. ^{2,3} Respiratory viruses such as COVID-19 enter the body through the eyes, nose, or throat. Hands are one of the most common modes of transmission of the virus from one person to another. ⁴

Hospital-associated virus transmission has been suspected in up to 29% of health care workers (HCW). COVID-19 can also be transmitted from patient to patient and hence HCW must remain vigilant. ⁵ While the global pandemic is spreading, one of the easiest, effective, and economical ways to prevent the spread of the virus is by practicing good hand hygiene. ⁴ HCWs including dentists are the most common agent that transmit most hospital infections

(healthcare-related infections) from one patient to another Hand Hygiene (HH) is effectively achieved by washing hands with soap and water or an alcohol gel.⁶

In these times of COVID-19 pandemic, wherein we know that infected subjects with and without clinical signs of the disease may transmit the virus, Dentistry is at the greatest risk of infection. As we work in close proximity of the portals of entry for the virus namely mouth and nose and due to the production of aerosol during treatment and in the constant presence of saliva. The assessment of knowledge, practices, and attitude of HCWs may also help to identify factors that influence their HH compliance allowing for planning to overcome any barriers to its implementation.

Aim of the study:

The present study was carried out to assess knowledge, attitude, and practices of Hand Hygiene among dentists as a prevention method for COVID-19 in Al Qassim Region, Kingdom of Saudi Arabia.

Materials and Method:

A descriptive cross-sectional study was carried out among dentists working in governmental and private dental

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colleges and hospitals in Al Qassim region. The study was approved by the ethical committee of the institution with the approval code DRC/005FA/20 and conducted from March to June 2020 using a self-administered WHO's "Five Moments of Hand Hygiene Questionnaire" to collect data with a few notable changes to assess the knowledge of dentists in view of the COVID-19 pandemic. We used another self- administered questionnaire to assess Attitude and Practices, utilizing 5 and 6 questions respectively.

The questionnaire consisted of 27 questions arranged in four sections. The first section was concerned with the general data of the participants (6 questions). The second section was concerned with the participants knowledge about HH (10 questions). The third section was related to participants attitude about HH (5 questions). All the questions in this section were about the proper rules, information, and sufficient training about HH. The final section included six questions about the reported practices of the participants in preventing the spread of infection and how to deal with the pandemic COVID-19.

The questionnaire was checked by two subject experts for its validity and was found satisfactory. A pilot study was conducted on 20 faculty members for the questionnaire reliability on two different days, one week in between. A Kappa test demonstrated a reliability coefficient of 0.88 indicating almost perfect reliability.

A list of dentists was obtained from the health affairs in Al Qassim region (N=355).

The study included all dentists practicing in Al Qassim region whose email IDs were available except interns. The questionnaire was also shared on the dentists' groups on WhatsApp to increase the response rate. We used a Convenience sampling technique and all submitted responses were included in the study.

An implicit consent was included at the beginning of the questionnaire. All participants were informed about the study purpose and reassured regarding the confidentiality of their individual responses.

The population size of all dentists in Al Qassim region is 355.

The sample size (n) was calculated according to the formula: n = [z2 * p * (1 - p) / e2] /

[1 + (z2 * p * (1 - p) / (e2 * N))]. Where: z = 1.96 for a confidence level (α) of 95%, p =

proportion (expressed as a decimal), N = population size, e = margin of error.

z = 1.96, p = 0.5, N = 355, e = 0.05

n = [1.962 * 0.5 * (1 - 0.5) / 0.052] / [1 + (1.962 * 0.5 * (1 - 0.5) / (0.052 * 355))]

n = 384.16 / 2.0821 = 184.502

n ≈ 185

The sample size (with finite population correction) was equal to 185. A total of 137 completed questionnaires were received, giving a response rate of 74.05%.

Statistical Package for Social Sciences (SPSS) version 16 was used to analyze the study data (Chi-square test was used to analyze the questions while ANOVA test was used to analyze the domains). Results were displayed as counts and percentages.

Results

The demographic details of participants are presented in Table (1). About 64% of our participants were male and 36% were females. A majority of them were faculty at various universities (72.99%) with 13 (9.49%) being employed at hospitals and another 24 (17.52%) who were in Private dental practices.

Table 1: Demographic details of the study participants

SEX	FREQUENCY	PERCENT		
Female	50	36%		
Male	87	64%		
Total	137	100%		
JOB LOCATION				
Faculty member in Universities	100	72.99%		
Governmental hospitals	13	9.49%		
Private clinics	24	17.52%		
Total	137	100%		
SPECIALTY				
Basic sciences	13	9.49%		
Diagnosis	5	3.65%		
Radiology	7	5.11%		
Periodontology	5	3.65%		
Surgery	5	3.65%		
Operative	7	5.11%		
Endodontics	11	8.03%		
Prosthodontics	42	30.66%		
Pedodontics	10	7.30%		
Orthodontics	0	0.00%		
Public health	18	13.14%		
General practitioner	14	10.22%		
TOTAL WORKING EXPERIENCE				
< 1year	10	7.30%		
1-5 years	22	16.06%		
6-10years	105	76.64%		
Total	137	100%		

Table (2) presents the Knowledge attitude and practices of the participants regarding HH and the comparison between the groups. The first question regards the importance of hand hygiene to break the chain of infection for COVID-19. This question was answered in the affirmative by 100%, 95.83% and 97% of dentists in governmental, private and University respectively with no significant differences

between the groups (P = 0.771) This confirms the high level of knowledge of the participants.

When questioned regarding the main route of crosstransmission of germs between patients in a health-care facility, majority of the participants from the University (47%) and governmental hospitals group (76.92%) rightly recognized the hazards of not following hand hygiene, but 50% among the private clinics group were more concerned regarding contaminated surfaces with no significant differences between the groups. (P = 0.129)

Table 2: Knowledge, attitude and practices of Participants regarding hand washing

Sample derived from Dentists from	Universities Private Clinics			Governmental hospitals		Total		
Knowledge	n=100	%	n=24	%	n=13	%	n=137	P value
Are you aware that hand hygiene can Break the chain of infection for COVID-19?	97	97.00%	23	95.83%	13	100.00%	133	0.771
Did you receive formal training in hand hygiene in the last three years?	30	30.00%	10	41.67%	6	46.15%	46	.189
Where did you receive additional training or information in view of COVID-19?								000
a. Self-directed learning	64	64.00%	17	70.83%	4	30.77%	85	
b. Professional bodies	17	17.00%	7	29.17%	0	0.00%	24	
c. Employer orientation	12	12.00%	0	0.00%	2	15.38%	14	
d. Governmental bulletins	7	7.00%	0	0.00%	7	53.85%	14	
Do you routinely use an alcohol-based hand-rub for hand hygiene?	69	69.00%	17	70.83%	8	61.54%	94	.842
Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?								.129
a. Health-care workers' hands when not clean	47	47.00%	9	37.50%	10	76.92%	66	
b. Air circulating in the hospital	14	14.00%	2	8.33%	0	0.00%	16	
c. Patients' exposure to contaminated surfaces	35	35.00%	12	50.00%	2	15.38%	49	
d. Sharing non-invasive objects between patients	4	4.00%	1	4.17%	0	0.00%	5	
The Sources of infection of COVID-19 could be hospital environment (Surfaces)?	91	91.00%	23	95.83%	8	61.54%	122	.003 HS
What is the least time necessary to sterilize your hands with alcohol to eliminate most germs in your hands?								.020 HS
a. 1-5 minutes	6	6.00%	1	4.17%	0	0.00%	7	
b. 20 sec	69	69.00%	11	45.83%	13	100.00%	93	
c. < 15 sec	9	9.00%	2	8.33%	0	0.00%	11	
d. Until it dry	16	16.00%	10	41.67%	0	0.00%	26	
Do you find the use of hand rubs more convenient than hand washing?	47	47.00%	5	20.83%	4	30.77%	56	.038 HS
Are you aware that in certain instances, hand hygiene with soap and water is recommended over the use of a hand rub?	92	92.00%	20	83.33%	13	100.00%	125	.118

Dr Nader M. Elsayed Marei e	t al,	al, International Journal of Medical Science and Diagnosis Research (ch (IJMSDR)		
Do you wash or disinfect your hands after touching the patient?	100	100.00%	24	100.00%	13	100.00%	137	
Sample derived from Dentists from	Universiti	es	Private clinics		Governmental hospitals		Total	
Attitude	n=100	%	n=24	%	n=13	%	n=137	P value
Do you commit to the proper rules of hand hygiene all the time?	91	91.00%	22	91.67%	11	84.62%	124	.754
Do you have sufficient information about hand hygiene?	96	96.00%	23	95.83%	11	84.62%	130	.218
Do you think wearing a medical glove reduces the importance of sticking to the rules of hand hygiene?	15	15.00%	0	0.00%	0	0.00%	15	.121
Are the new staff trained and instructed to comply with the rules of hand hygiene?	53	53.00%	12	50.00%	11	84.62%	76	.090
Is adherence to the rules of hand hygiene easy and normal for you?	97	97.00%	23	95.83%	13	100.00%	133	.771
Sample derived from Dentists from	Universiti	es	Private clinics	,	Governmental hospitals		Total	
Practices	n=100	%	n=24	%	n=13	%	n=137	P value
Do you perform hand hygiene before and immediately after contact with a patient?	88	88.00%	22	91.67%	13	100.00%	123	.476
Do you feel hand hygiene posters around washing areas will help improve compliance?	100	100.00%	24	100.00%	13	100.00%	137	
In which instances, washing with soap and water is preferable to use of a hand rub?								.535
a. When hands are visibly soiled	29	29.00%	6	25.00%	2	15.38%	37	
b. In all instances of patient care	82	82.00%	18	75.00%	11	84.62%	111	
What according to you is the greatest barrier to apply hand hygiene in your practices?								.083
a. Time constraints due to busy schedule	32	32.00%	10	41.67%	9	69.23%	51	
b. Lack of reminders	37	37.00%	12	50.00%	1	7.69%	50	
c. Lack of adequate/ timely supplies	25	25.00%	2	8.33%	3	23.08%	30	
d. Cost factor	6	6.00%	0	0.00%	0	0.00%	6	
Has the COVID-19 pandemic made you more aware and conscious regarding hand hygiene?	96	96.00%	24	100.00%	13	100.00%	133	.682
Do you feel regular training regarding hand hygiene should be	84	84.00%	21	87.50%	13	100.00%	118	.345

H.S – Highly Significant

included as part of your training to improve and reinforce the message of hand hygiene at your work place?

Table (3) details the mean score of knowledge attitude and practices of Hand hygiene among the participants. The mean score for Knowledge was the highest for Dentists at governmental hospitals at 7.23, followed by those in universities and private clinics at 7.06 and 6.64 respectively. However, in the attitude and practices, governmental hospitals scored 3.53 and 5.07 respectively. The corresponding scores for private clinics was 3.39 and 4.60 and that for dentists at universities 3.52

and 4.5. Comparisons between the groups were not significant with P = 0.358, 0.263 and 0.225 for knowledge, attitudes and practices respectively.

Table 3: Mean (±SD) Score of HH knowledge, attitude and practices of the study participants

		Mean	SD	95% CI for Mean		F	р
				L	U	1	
	Governmental hospital (n1=13)	7.231	1.013	6.619	7.843		
Knowledge	Private Dental Clinics (n2= 24)	6.64	1.381	6.07	7.21	1.036	0.358
Kilowieuge	Universities (n3= 100)	7.061	1.497	6.762	7.359	1.036	0.556
	Total (n=137)	7	1.44	6.757	7.243		
	Governmental hospital (n1=13)	3.538	1.125	2.926	4.149		
Attitude	Private Dental Clinics (n2= 24)	3.391	0.829	3.059	3.722	1.348	0.263
Attitude	Universities (n3= 100)	3.52	0.881	3.347	3.692	1.348 0.203	
	Total (n=137)	3.503	0.8921	3.353	3.652		
	Governmental hospital (n1=13)	5.076	0.493	4.808	5.343		
Practices	Private Dental Clinics (n2= 24)	4.608	0.769	4.3	4.915	1.51 0.22	0.225
riactices	Universities (n3= 100)	4.591	1.084	4.378	4.803	1.51 0.225	
	Total (n=137)	4.642	0.9832	4.477	4.806		

F: for ANOVA test

Table (4) outlines the level of HH among all participants as either high, moderate or low. The level of knowledge of HH was found high in 52% and moderate in 37% of the participants, when in the attitude levels the majority of the participants i.e. 88% had high level of attitude and it was moderate in 7% of respondents. Level of practices of hand hygiene was high in 61%, moderate in 37% and almost none (1.4%) of our participants were found with a low level of practices.

Table 4: Levels of Knowledge, attitude and practices of HH of the study participants

Levels of knowledge of HH	No.	%
High (>75%)	72	52.6
Moderate (50%-75%)	51	37.2
Low (<50%)	14	10.2
Levels of attitude of HH	No.	%
High (>75%)	121	88
Moderate (50%-75%)	9	7
Low (<50%)	7	5
Levels of practices of HH	No.	%
High (>75%)	84	61.31
Moderate (50%-75%)	51	37.23
Low (<50%)	2	1.46

Discussion

Like all other HCWs, Dentists have a moral responsibility to follow the protocols of HH which are evidence based. However, it is also the responsibility of employers to provide updated information regarding HH and eliminate any barriers to its implementation. The present study was performed to evaluate knowledge, attitude and practices of dentists regarding. HH

When questioned about formal training in hand hygiene in the last 3 years, it is alarming to note only 30%, 41.67% and 46.1% recalled receiving any such training in universities, private and governmental sector respectively with no significant differences between the groups (P = 0.189) When we enquired regarding any additional training or

information in view of the COVID-19 pandemic, a majority of the respondents attributed the same to self directed learning with 17 (70%) of dentists in private clinics, 64 (64%) in universities and 4 (30.77%) in governmental hospitals. Governmental hospitals benefitted by employer bulletins to about 53% and another 15% were provided by orientation programs by the employers. These findings point to a robust system of knowledge transfer in governmental institutions in updating the knowledge of their employees. It is also pertinent to note here that self directed learning also makes use of literature which are prepared and widely disseminated in public domains using the Internet and social media by the governmental bodies such as Ministry of Health.

^{*:} significant at p<0.05

Alcohol based hand rubs are routinely used by 64 (64%), 17 (70.83%) and 8

(61.54%) among dentists from Universities, private clinics and governmental hospitals. This is encouraging as CDC guidelines also recommend the use of Alcohol hand sanitizers. Since hand sanitizers provide rapid convenient hand hygiene, a case for their availability and accessibility in dental clinics must be made to reduce cross contamination.⁸

When discussing main routes of cross-transmission of potentially harmful germs between patients in a health-care facility, majority of dentists correctly agreed that contaminated hands were responsible at 76.9%, 47% for Dentists at hospitals and Universities. However, in the private sector more dentists were concerned about contaminated surfaces 12 (50%) than about transmission through contaminated hands at 9 (37%).

When asked if Hospital environment could be a source of COVID-19, about 95 % (n=23) of dentists in private and 91% (n=91) in Universities answered in the affirmative. However, this number was 61% (n=80) for dentists in governmental sector. This comparison between the groups was highly significant. (P=0.003) We believe this is because dentists at governmental hospitals are more aware of the stringent adherence to infection control protocols applied in their hospitals and this is responsible for their enhanced confidence regarding the safety of the hospital environment.

Twenty seconds is the least amount of time necessary to sterilize hands using alcohol to eliminate most germs in your hands and it was rightly mentioned by dentists from governmental, university and private clinics at 100%, 69% and 45% respectively. When compared between the groups, this was highly significant with a P = 0.020.

When asked if hand rub was more convenient to hand washing, 47 (47%), 5 (20.83%) and 4 (30.77%) of dentists in governmental, private and academic institutions respectively agreed. Dentists in governmental hospitals showed greater preference for hand rubs followed by those in academic institutions which was highly significant (P = 0.038)

Saito H demonstrated improved HH practices even in resource limited settings when alcohol-based hand rub was provided along with HH education. Lotfinejad et al. (2020) demonstrated the efficacy of alcohol-based hand rubs on inactivated enveloped viruses, including coronaviruses, recommending solutions with a minimum of 60% ethanol for hand hygiene. 10

It is heartening to note that 92 (92%) of dentists at universities and 20 (80.33%) of dentists at private clinics and 13 (100%) at governmental hospitals also made the

distinction between the need to wash hands with soap and water as against the use of a hand sanitizer in certain clinical situations. All dentists (100%) across the three study groups regularly disinfected or washed hands before and after touching the patient.

Majority of the dentists surveyed had sufficient information regarding HH and were committed to it. It is encouraging to note that governmental hospitals emphasized the importance of handwashing to their new recruits (84.62%).

Our study found that all dentists in government hospitals perform hand hygiene before and immediately after contact with a patient. While it was 88% for dentists at Universities and 91.6% for those in private practices and 100% for governmental hospitals (P = 0.476). These rates of compliance are high compared to certain other studies. Thivichon- Prince, 2014¹¹ compared compliance of HH Among Educators and Students and noted educators had a higher compliance rate 63.7% compared to the students at 35.8%.

In another study by El Adawi, it was seen that less respondents wash their hands before gloving (27%) when compared to after de-gloving (73.9%). Also, the numbers for hand hygiene after torn gloves at 69.6%, contaminated hands (83.5%), prior to lunch (89.6%) and after use of the wash room was (86.1%). This may be a matter of inadequate personal hygiene. ¹²

Hsin-Chung Cheng et al¹³ also recorded low compliance of HH at 34.7% for general procedures compared to 92.8% during oral surgery services. The study recommended education and continuous monitoring to improve handwashing compliance with emphasis on correct handwashing technique.

Hand hygiene is a decisive measure for reducing COVID 19 transmission. It is crucial to perform thorough HH before and after contact with patients, non disinfected surfaces and equipment. In particular, a protocol consisting of 5 HH opportunities (2 before and 3 after treatment) was recommended to reinforce HH compliance. 14

In our study, all participants agreed HH posters around washing areas will help improve compliance

When questioned regarding the greatest barrier to apply HH in your practices, 69% of dentists in governmental hospitals mentioned time constraints due to busy schedule. The dentists in private sector believed there was the need for reminders (50%). Similar results were observed in another study¹² where 40% cited lack of time and another 36% said they were forgetful. There is a definite case for reminders near washing areas to improve compliance. A study by Eliana Dantas¹⁵ conducted on dental students reported inadequate infrastructure such as

sinks and lack of consumables undermining the observance of HH practices. Lack of supplies or costs are not barriers in our study.

Interesting reviews on HH in Sub Saharan Africa, barriers to HH compliance were classified as individual or institutional barriers. Some of the institutional barriers mentioned included lack of access to infection control policy and infrastructural deficits. Such a demarcation allows for accountability in the process so interventions can be more focused. Lack of motivation on the part of hospital administrators is also a barrier to compliance. 17

Monitoring of HH can also be considered to improve compliance. Our study used self reporting as a method of data collection. Direct observation, measurement of usage of hand hygiene products and electronic HH monitoring which are capable of tracking HH Compliance of individual workers may also be utilized. ¹⁸ We need to focus on not just compliance but also the technique for HH to ensure it is optimal.

An observational study to confirm HH compliance reported an overall compliance of 22%. Compliance was better after patient contact at 42.8%. Hand rubbing was performed in 47% of the possible 202 HH actions. This study reported lack of visual reminders for hand hygiene, no HH compliance monitoring and more importantly lack of performance feedback to HCWs which may help motivate them.¹⁹

All dentists confirmed the COVID-19 pandemic has made them more conscious regarding HH with 96% of dentists in Universities and 100% across the other two groups. It is also note worthy that a high percentage of dentists surveyed feel regular training will help reinforce the message of hand hygiene. These findings are consistent with El Adawi et al who reported more than half (57.4%) desired more information regarding hand hygiene. ¹²

The mean score for Knowledge was the highest for Dentists at governmental hospitals at 7.23, followed by those in universities and private clinics at 7.06 and 6.64 respectively (P = 0.358). In the attitude category private clinics scored higher (3.391) compared to dentists at governmental hospitals (3.53) and Universities 3.52 (P = 0.263). The highest mean score for practices was recorded for dentists at governmental institutions (5.07) followed by dentists at private clinics (4.608) and universities (4.591). However, the differences between groups was not statistically significant (P = 0.225)

When we consider the level of knowledge for the entire study population, a majority had high levels of knowledge at 52.6% (n=72) 37.2% (n=51) displayed moderate levels of knowledge and 10.2% (n= 14) displayed low levels of knowledge. When we describe attitude 88% (n=121)

showed high levels of attitude with 7% showing moderate and 5% showing low level of attitude. For practices of Hand Hygiene 61% (n=84) was High with 37.23% (n=72) and 1.46% (n=2) showing moderate and low levels respectively.

Limitations

The study used self-reporting for data collection which had inherent disadvantages such as recall bias and response bias. We tried to overcome response bias by assuring confidentiality of individual responses and data security.

Recommendations

There is a need for regular programs to reinforce the message of hand hygiene and thereby improve compliance.

Reminders around the wash areas highlighting the five moments of hand hygiene and proper techniques for the same will ensure optimal HH.

Conclusion

The population under study scored high on attitude when compared to practices and knowledge scores were the least. These points to the need for interventions for improving knowledge through regular workshops and continuing education. Since knowledge does not automatically translate into practices, emphasis on HH compliance must be laid. Further longitudinal studies with electronic or observational reporting will help better understand and eliminate barriers to HH. In these times of the COVID-19 pandemic, the importance of HH cannot be overstated. Planned interventions to improve compliance must be multidimensional which considers and includes administrative support, clinic ergonomics and design, timely HH supplies, periodic educational programs, reminders, process surveillance and employee feedback to achieve sustained improvements.

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