ORIGINAL ARTICLE

Knowledge and Practices of Dentists Regarding Personal Protective Equipment during COVID-19 Pandemic: A Cross-Sectional Study among Pakistani Dentists

Saood Khan Lodhi[1], Saroosh Ehsan[2], Adeela Rafique[3], Shaila Tahir[4], Talha Khan[5]

ABSTRACT

Background and Objective: The Coronavirus disease 2019 first appeared in the area of Wuhan, China. Dental professionals are at greater risk of getting infected by patients and certain dental procedures involving aerosol generation and proximity to the oropharyngeal region. Therefore, Personal Protective Equipment (PPE) is recommended to protect skin and mucosa from infected blood or saliva. American Dental Association (ADA) has published recommendations for dental treatment, yet most of the dentists are still hesitant in treating patients. The objective of this study was to assess the knowledge and practices of dentists in Pakistan regarding PPE during COVID-19 pandemic.

Methods: Data collection was done using a well-structured web-based questionnaire (Google forms). The survey form was disseminated by sending the link via email, WhatsApp and other online forums.

Results: A total of n = 1016 responses were collected. Approximately 91.6% of the participants were young dentists with years of experience 1 – 10 years. Majority of the participants 76.7% did not have easy access to PPE. A total of 60.8% claimed to be aware of the recent World Health Organizations, Centre for Disease Control and other international guidelines to screen COVID-19 patients at their clinic. Almost all the participants, 95.6%, had never undergone N95 fit-testing in their career. More than half of the participants, 64.4% were not aware of the differences between N95, N99, N100 masks. A positive trend was observed in 91.7% of the participants when asked about washing hands or uses an alcohol-based sanitizer before every patient encounter. More than three quarter (81%) of the participants was not performing aerosol producing procedures at their practices.

Conclusion: Majority of dentists were found to have adequate knowledge and practice scores, which is important to combat COVID-19. However there still many gaps in their knowledge and practices which need to be highlighted to ensure safe dental practice for both patients and dentists.

KEYWORDS: COVID-19, Pandemic, Knowledge, Practices, Personal protective equipment.

How to Cite this:

Lodhi SK, Ehsan S, Rafique A, Tahir S, Khan T. Knowledge and practices of dentists regarding personal protective equipment during COVID-19 pandemic: a cross-sectional study among Pakistani dentists. Biomedica. 2020; 36 (COVID19-S2): 275-80.

1. Dr. Saood Khan Lodhi
Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore – Pakistan.
2. Dr. Saroosh Ehsan
Associate Professor, Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore – Pakistan.
3. Dr. Adeela Rafique
Associate Professor, Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore – Pakistan.
4. Dr. Shaila Tahir
Associate Professor, Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore – Pakistan.
5. Dr. Talha Khan
Senior Demonstrator, Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore – Pakistan.

Corresponding Author:
Dr. Saood Khan Lodhi (BDS), Postgraduate Resident,
Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore – Pakistan.
Email: saoodkhan496@gmail.com

INTRODUCTION

The Coronavirus disease 2019 first appeared in the area of Wuhan, China, and has grown expeditiously into a public health crisis.[1] World Health Organization (WHO) used the term COVID-19, to describe the latest strain of Coronavirus on 11th February 2020.[2] It has spread rapidly to other parts of the world. Airborne droplets, contact or touch of an infected person or a contaminated surface are suggested routes of human-to-human transmission.[3] The main source of transmission of COVID-19 have been symptomatic patients, however according to recent observations asymptomatic patients or in their incubation period are also carriers of severe acute respiratory syndrome i.e. SARS-CoV-2.[3,4] This epidemiologic feature of COVID-19 has made control of spread an enormous challenge.

Owing to the unique nature of dental procedures which involve aerosol generation, handling of sharps and proximity to the oropharyngeal region, dental professionals are at greater risk of getting infected by patients. In addition to this if adequate precautions are not taken, it can result in greater likelihood of cross infection between staff or expose patients to cross contamination.[5,7]

Bearing in mind the current rapid spread of infection, Center for Disease Control and Prevention (CDC), American Dental Association (ADA) and World Health Organization (WHO) has drawn attention to key steps, in addition to the standard universal precautions to be taken by the dentists and auxiliary team to control the spread of COVID-19.[8-10] Like other transmissible infections, these guidelines include taking patients recent travel history, cough history, difficulty in breathing, checking patients body temperature, use of Personal Protective Equipment, hand washing, 1% hydrogen peroxide mouth rinse before the start of any procedure, use of a rubber dam, high volume suction, anti-retraction hand piece for aerosol producing procedures and regular disinfection of contact areas including door handles, chairs and washrooms.[8-10]

Personal Protective Equipment including masks, gloves, gowns and goggles or face-shields are recommended for use to protect skin and mucosa from infected body secretions such as blood or saliva. As it has been established that interpersonal transmission of severe acute respiratory syndrome i.e. SARS-CoV-2 occurs mainly via respiratory droplets and contact transmission, particulate respirators (e.g. N-95 masks authenticated by the National Institute for Occupational Safety and Health or FFP2-standard masks set by the European Union) are recommended for routine dental practice.[11,12]

Despite the fact that ADA has published recommendations for dental treatment, most of the dentists are still hesitant in treating patients in such a situation. In all probability, most dentists may even not be aware of the recent guidelines.[9] This survey was conducted to evaluate the level of awareness and perception of dental surgeons in Pakistan about the cross-infection control measures required to be implemented in the wake of the COVID-19 pandemic.

METHODS

This study was conducted after an Institutional Ethical approval, in Department of Operative Dentistry, FMH College of Medicine & Dentistry, Lahore in the month of April, 2020 among dentists working in hospital settings and private practices or both in different parts of Pakistan. A total number of N=1016 practicing dentists participated in this study. Dentists were randomly selected in this study. The participants included general dentists, postgraduate trainees, consultants and private practitioners. Data collection was done using a well-structured online questionnaire which was designed using Google forms. The survey form was disseminated by sending the link through Email, WhatsApp and other online applications. Online response record was used to check the number of responses.

The survey questionnaire consisted of different sections. Section 1 was about the questions related to demographic profile of the dentists in which closed ended questions were asked like gender, age, designation, years of experience since graduation and province. In the Section 2, questions regarding knowledge and awareness level of dentists of PPE were asked. In the last section, questions addressing the attitude towards cross-infection control were asked. The survey

questionnaires were kept anonymous to maintain the privacy and confidentiality of the information.

STATISTICAL ANALYSIS

Data was collected and entered in Statistical Package for the Social Sciences (SPSS) version 25. Qualitative variables were analyzed by using frequency and percentages and quantitative variables were expressed as mean ± standard deviation.

RESULTS

Among n= 1016 participants, 34.8% were males and 65.2% were females**.** A total of 87.7% were in the age range of 20-29 years. There were 82.3% general dentists and only 4.7 were private practitioners. Out of n = 1016 participants, 91.6% were young dentists with years of experience between 1 – 10 years. The vast majority (82%) of the participants in this survey were from Punjab and the rest of the participants (17%) from other provinces (Table-1).

Table-1: *Demographics Characteristics of Dentists.*

	Frequency	*Percentage (%)*
Gender		
Male	354	34.8
Female	662	65.2
Age		
20 – 29	891	87.7
30 – 39	82	8.1
40 – 49	36	3.5
Above 50	7	0.7
Designation		
General Dentist	837	82.3
Postgraduate trainee	82	8.1
Consultant	49	4.8
Private practice	48	4.7
Years of Experience Since Graduation		
1 – 10	931	91.6
11 – 20	65	6.4
21 – 30	16	1.6
Above 30	4	0.4
Province		
Punjab	841	82.8
Islamabad Capital Territory	44	4.3
Sindh	32	3.1
KPK	78	7.7
Balochistan	7	0.7
Gilgit-Baltistan	4	0.4
Azad Kashmir	6	0.6
Expatriate	4	0.4

Almost half of the participants (47.9%) didn't not receive any training related to the correct use of Personal Protective Equipment. While (67.2%) of the dentists were aware of the recent international guidelines about the Personal Protective Equipment by WHO, CDC and others. Most of the participants (76.7%) did not have easy access to Personal Protective Equipment during this pandemic. A total of 60.8% of the dentists were reported to be aware of the recent WHO, CDC and other international guidelines to screen COVID-19 patients at their clinic. Almost 95.6% dentists had never undergone N95 fit-testing in their career and only 56.1% believe that facial hair affects the seal of an N95 mask. More than half of the participants (64.4%) were not aware of the differences between N95, N99, N100 masks and 85% did not know how to store N95 respirator in-between patients.

Ninety percent of the dentists correctly reported the duration of the mask fit test validity for 1 year only. When they were asked about the correct protocol of wearing N95 masks during the COVID-19 pandemic, 40.4 % participants claimed to wear N95 mask only while 37.6% wore surgical mask with N95 (Table-2).

Table-2: *Knowledge and Awareness Assessment.*

Variable	*Yes n (%)*	*No n (%)*
Have you ever received any training related to the correct use of personal protective equipment?	487 (47.9)	529 (52.1)
Are you aware of the recent WHO, CDC and other international guidelines about the personal protective equipment?	683 (67.2)	333 (32.8)
Are you aware of the recent WHO, CDC and other international guidelines to screen COVID-19 patients at your clinic?	618 (60.8)	398 (39.2)
Do have easy access to personal protective equipment during this pandemic?	237 (23.3)	779 (76.7)
Do you believe that facial hair affects the seal of an N95 mask?	570 (56.1)	446 (43.9)
Have you ever undergone N95 fit-testing?	45 (4.4)	971 (95.6)
Are you aware of the differences between N95, N99, N100 masks?	362 (35.6)	654 (64.4)
Do you know how to store your N95 respirator in-between patients?	152 (15)	864 (85)
	Frequency	*Percentage (%)*
How long is the mask fit test valid for?		
1 year	914	90.0
2 years	81	8.0
3 years	13	1.3
4 years	8	0.8
The correct protocol of wearing N95 masks during the COVID-19 pandemic is		
Surgical mask under the N95 mask	206	20.3
Surgical mask over the N95 mask	176	17.3

N95 mask only	410	40.4
Surgical mask only	36	3.5
Unclear or yet to be determined	188	18.5

A positive trend was seen in 91.7% of participants when they were asked about washing hands or use an alcohol-based sanitizer before every patient encounter. When they were questioned about taking any precautionary measures e.g. preoperative mouth rinse with hydrogen peroxide/povidone iodine in every patient to reduce the possibility of COVID-19 infection transmission, (61.8%) of the participants answered that they are not practicing during this outbreak. More than half (52.3%) of the participants reconfirmed about not performing the aerosol producing procedures. Another 15.8 % participants were wearing surgical mask plus N95 mask, airtight eye goggles, face shield head cap, protective gown while performing aerosol producing procedures (Table-3).

Table-3: *Practice Assessment during COVID-19.*

Variable	*Yes n (%)*	*No n (%)*
Do you wash hands and or use an alcohol-based sanitizer before every patient encounter?	932 (91.7%)	84 (8.3%)
During the ongoing COVID-19 pandemic are you performing aerosol producing procedures?	193 (19%)	823 (81%)
	Frequency	*Percentage*
During this pandemic outbreak, are you taking any precautionary measures e.g. preoperative mouth rinse with hydrogen peroxide / povidine iodine in every patient to reduce the possibility of COVID-19 infection transmission?		
Yes	232	22.8
No	156	15.4
Not Practicing during this outbreak	628	61.8
Which precautions are you taking while performing aerosol producing procedures		
Surgical mask	79	7.8
N95 mask	29	2.9
Airtight eye goggles	7	0.7
Face shield	40	3.9
Head cap	4	0.4
Protective gown	1	0.1
Not performing such procedures	532	52.3
N95 mask, Airtight eye goggles, Face shield, Head cap, Protective gown	71	7
Surgical mask, Airtight eye goggles, Face shield, Head cap, Protective gown	125	12.3
Surgical mask, N95 mask, Airtight eye goggles Face shield Head cap, Protective gown	109	10.7
Others	19	1.9

DISCUSSION

This survey has been conducted to gain an insight about the level of awareness and perception of dental surgeons in Pakistan about the cross-infection control measures required to be implemented in the wake of the COVID-19 pandemic. The vast majority (82%) of the participants in the survey was from Punjab and the rest (18%) were from other provinces. The majority of the participants were females which is in accordance with the fact that the number of female dental surgeons is higher than males in Pakistan.[13]

Also, the majority of the participants were below 30 years of age with their work experience of less than 10 years. With the establishment of many new private dental colleges in Pakistan a very large number of young practitioners are present and, in this pandemic, it is extremely crucial that they are prepared with adequate knowledge to protect themselves and their patients from the transmission of this disease.[14]

More than half of the participants (52%) reported that they have never been trained on the adequate use of Personal Protective Equipment. This is quite alarming and raises many question marks on the cross-infection control training being provided in the dental colleges in Pakistan. This issue has been highlighted in other studies from the region as well.[15,16] However COVID-19 pandemic is an unprecedented situation and another reason for this alarming finding could be attributed to the requirement of new guidelines and safety measures.

A total of 67% of the participants claimed to be aware of the recent WHO, CDC and other international guidelines about the Personal Protective Equipment, which is similar to the findings of a recent study from the same region and much less than a multination study.[16,17] However this awareness may not be confused with implementation of these guidelines as well. Almost (61%) of the participants claimed to be aware of WHO, CDC and other international guidelines to screen COVID-19 patients at the dental clinic. It is imperative to increase the level of awareness about these guidelines amongst general dentists.

Majority of the participants (76%) at the time of filling the questionnaire did not have easy access

to PPE. This finding corroborates to the findings of a recent literature review.[18] The availability of PPE will have to be ensured if regular dental treatment has to be resumed. Another indicator of the dire situation of cross infection control awareness and measures taken for the safety of the dentists was that almost all dentists (95.6%) had never undergone N95 fit-testing in their career despite of knowing the need for fit testing but no such facility is available so far. These findings have also been highlighted in other studies from this region.[18]

Only (43.9%) believed that facial hair could affect the seal of an N95 mask which is contrary to the CDC guidelines.[19,20] More than half of the participants i.e. (64.4%) were not aware of the differences between various types of N series masks and confusion was also found in whether to wear a surgical mask over an N95 mask or under it. The confusion of the dentists regarding these important issues needs to be highlighted and best practices need to be shared amongst the general dentists.

However, the majority of the dentists (90%) reported the duration of the mask fit test validity for 1 year which is in accordance with the current guidelines.[21] Most of the participants seemed to be following good hand hygiene practices. Also 81% of the participants were not performing aerosol producing procedures at their dental clinics which is also in accordance with the recent guidelines.[21]

CONCLUSION

In the present study, dentists were found to obtain good knowledge and practice scores, which is important to combat COVID-19. Dentists should appropriately use the social media to spread awareness among people, and in their clinical practice, they should screen, isolate and refer the potential cases having the symptoms of COVID-19. They are also advised to follow the CDC and WHO guidelines in their clinics, and sensitize their staff so that no stone is left unturned in defeating this pandemic.

LIMITATIONS OF STUDY

This study has a few limitations in terms of small sample size from provinces other than Punjab hence it may not correctly represent the country in total. Most responses are from younger dentists, so responses from more experienced dentists were lacking. Also, all the data has been self-reported by the participants. Future studies may be conducted with a larger sample size to strengthen the conclusions drawn from the topic under discussion.

ACKNOWLEDGEMENT

The authors wish to acknowledge the support of Miss. Afshan Khanum from Department of Biostatistics, FMH College of Medicine & Dentistry, Lahore, Pakistan, for helping in data analysis on SPSS.

CONFLICT OF INTEREST

None to declare.

FINANCIAL DISCLOSURE

None to disclose.

REFERENCES

1. Gralinski LE, Menachery VD. Return of the Coronavirus:2019-nCoV. Viruses. 2020;12(2):135-9.
2. Zu ZY, Jiang MD, Xu PP, Chen W, Ni QQ, Lu GM, et al. Coronavirus disease 2019 (COVID-19): a perspective from China. Radiology. 2020: 200490. [Epub ahead of print].
3. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel Coronavirus indicating person-to-person transmission: A study of a family cluster. Lancet. 2020; 395 (10223): 514-23.
4. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. N Engl J Med. 2020; 382 (10): 970-1.
5. Zemouri C, de Soet H, Crielaard W, Laheij A. A scoping review on bio-aerosols in healthcare and the dental environment. PloS One. 2017; 12 (5): e0178007.
6. Ather A, Patel B; Ruparel NB, Diogenes A, Hargreaves KM. Coronavirus disease 19 (COVID-19): Implications for clinical dental care. J Endod. 2020; 46 (5): 584-95.

7. Ahmed MA, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar MS, et al, Fear and practice modifications among dentists to combat novel Coronavirus disease (COVID-19) outbreak. Int J Environ Res Public Health. 2020; 17 (8): 2821-7.
8. Centers for Disease Control and Prevention (CDC). CDC developing guidance regarding responding to COVID-19 in dental settings. Division of oral Health, National Center for Chronic Disease Prevention and Health Promotion ((NCCDPHP); 2020 [updated May 12 2020]; Available online at: https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html. [Last accessed on May 13, 2020].
9. The American Dental Association (ADA). Coronavirus frequently asked questions. 2020. [updated April 16, 2020]; Available online at: https://success.ada.org/en/practice-management/patients/Coronavirus-frequently-asked-questions. [Last accessed on April 18, 2020].
10. The World Health Organization (WHO). Infection prevention and control during healthcare when COVID-19 is suspected: Interim guidance. 2020 [updated 19 March 2020]; Available online at: https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-Coronavirus-(ncov)-infection-is-suspected-20200125[Last accessed on March 21, 2020].
11. The Chinese Preventive Medicine Association (CPMA). An update on the epidemiological characteristics of novel Coronavirus pneumonia (COVID-19). Chin J Epidemiol. 2020; 41 (2): 139–44.
12. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. J Dent Res. 2020; 99 (5): 481-7.
13. Pakistan Medical & Dental Council > Statistics–PMDC. Available online at: http://www.pmdc.org.pk/statistics/tabid/103/default. aspx. [Last accessed on April 10, 2020].
14. Jawaid SA. Plight of dentistry in Pakistan. Pak J Med Sci. 2020; 36 (3): 299-302.
15. Chughtai AA, MacIntyre CR, Zheng Y, Wang Q, Toor ZI, Dung TC, et al. Examining the policies and guidelines around the use of masks and respirators by healthcare workers in China, Pakistan and Vietnam. J Infect Prev. 2015; 16 (2): 68-74.
16. Sufia S. Cross infection control protocol awareness amongst fresh dental graduates in Lahore. J Pak Dent Assoc. 2019; 28 (3): 122-8.
17. Kamate SK, Sharma S, Thakar S, Srivastava D, Sengupta K, Hadi AJ, et al. Assessing Knowledge, Attitudes and Practices (KAP) of dental practitioners regarding the COVID-19 pandemic: A multinational study. Dent Med Probl. 2020; 57 (1): 11-7.
18. Chughtai AA, Khan W. Use of personal protective equipment to protect against respiratory infections in Pakistan: A systematic review. J Infect Public Health. 2020; 13 (3): 385-390.
19. Centers for Disease Control and Prevention. To beard or not to beard? That's a good question! CDC website. Available online at: https://blogs.cdc.gov/niosh-science-blog/2017/11/02/noshave/. [Last accessed on April 10, 2020].
20. Russell P. COVID-19: NHS staff face a close shave to ensure face masks work. Medscape News UK. 02-28-20. Available online at: https://www.medscape.com/viewarticle/925882. [Last accessed on March 15, 2020].
21. National Health Services – NHS Available online at: https://www.england.nhs.uk/Coronavirus/publication/preparedness-letters-for-dental-care). [Last accessed on March 30, 2020].

Author's Contribution

SKL: Acquisition, analysis and interpretation of data, drafting the manuscript.

SE: Conception and design of study, drafting the manuscript, final approval of version to be published.

AR: Concept and design of study, drafting the manuscript and revision of final version for intellectual content.

ST: Data acquisition and interpretation.

TK: Data acquisition.