ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 3, Issue – 5, September - 2020, Page No. : 123 - 129

Assessment of Knowledge and attitude among postgraduate students of Pediatric Dentistry towards PPE (Personal protective equipment) and decontamination protocol during COVID-19 pandemic in India: A Cross-sectional Study.

[1]Nancy Singh, Post graduate student, Department of Pedodontics and Preventive Dentistry, Chhattisgarh Dental College And Research Institute, Rajnandgaon ,India.

[2]Nagarathna PJ, Professor and Head of department, Department of Pedodontics and Preventive Dentistry, Chhattisgarh Dental College And Research Institute, Rajnandgaon ,India.

[3]Nikita Bhure, Post graduate student, Department of Pedodontics and Preventive Dentistry, Chhattisgarh Dental College And Research Institute, Rajnandgaon ,India.

[4]Sonal Rathi, Post graduate student, Department of Pedodontics and Preventive Dentistry, Chhattisgarh Dental College And Research Institute, Rajnandgaon ,India.

[5]Sneha Potrajwar, Post graduate student, Department of Pedodontics and Preventive Dentistry, Chhattisgarh Dental College And Research Institute, Rajnandgaon ,India.

Corresponding Author: Nikita Bhure, Post graduate student, Department of Pedodontics and Preventive Dentistry, Chhattisgarh Dental College And Research Institute, Rajnandgaon ,India.

Citation of this Article: Nancy Singh, Nagarathna PJ, Nikita Bhure, Sonal Rathi, Sneha Potrajwar, "Assessment of Knowledge and attitude among postgraduate students of Pediatric Dentistry towards PPE (Personal protective equipment) and decontamination protocol during COVID-19 pandemic in India: A Cross-sectional Study. ", IJDSIR- September - 2020, Vol. – 3, Issue - 5, P. No. 123 – 129.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: During this outbreak of COVID-19, Healthcare professionals are exposed to a higher risk of getting infected due to their close contact with infected patients. Pediatric Dentists, including the postgraduate students, who treat the children during this pandemic, thereby, should enact a high level of awareness to control and manage its spread.

Aim: This study aims to investigate knowledge and attitude among postgraduate students of Pediatric Dentistry towards PPE (Personal protective equipment) and decontamination protocol during COVID-19 pandemic.

Method: A web-based, cross-sectional study using a self-reported questionnaire was conducted during May 2020. A 22- item survey questionnaire was developed and distributed and was distributed to 525 postgraduate

students who were the members of the Indian Society of Pedodontics and Preventive Dentistry (ISPPD). Statistical analysis was performed using SPSS 22.0 version.

Result: Out of 347 participants, 97% of the Postgraduate students were aware about PPE. 71% of postgraduate students responded that gloves and face shields are the reusable components in PPE after appropriate decontamination. Almost all postgraduate students preferred to use N95mask or FFP2 mask, gown, gloves, goggles as personal protective equipment while performing aerosol-generating procedures.

Conclusion: During this COVID-19 outbreak, awareness and knowledge about PPE and the decontamination protocol was found significant among the postgraduate students.

Keywords: PPE, Pedodontics Postgraduate students, COVID-19.

Introduction

Coronavirus disease 2019 is a new variant of the Coronavirus, which causes severe acute respiratory syndrome SARS, but now in a mutated highly contagious version. About eight years after the MERS-COV epidemic, the current outbreak of coronavirus disease 2019 (COVID-19) emerged in Wuhan, China, at the end of 2019. [1] Since then, it has spread to 200 countries. The outbreak was declared a public health emergency of international concern on January 30, 2020, by the World Health Organisation (WHO) [2]

Healthcare professionals are exposed to a higher risk of getting infected due to their close contact with infected patients.[3] In particular, dentists who perform their duties not only in close contact with patients but also while exposed to aerosol and droplets splashing out of patients' oral cavity. [3,4] Therefore, dentists have a high risk of Therefore, dentists have a high risk of getting infected from patients and potentially spreading it to their peers, families, and other patients.[5]According to the NEW YORK TIMES, the dentistry had the most risk of any other profession in relation to COVID-19.[6]

Pediatric Dentists, including the postgraduate students, who treat the children during this pandemic thereby, should enact a high level of awareness and integrity to deal with the disease and be able to control and manage its spread. The Centers for Disease Control and Prevention (CDC), the American Dental Association (ADA), and the World Health Organization had published recommendations for rational use of personal protective equipment and to control the spread of COVID-19 for dentists and the dental staff.[7-9]

Till date, no antiviral treatment or vaccine has been explicitly recommended for COVID-19. Therefore, applying preventive measures to control COVID-19 infection is the most critical intervention. The postgraduate students managing the child patient should be aware of all the preventive guidelines from reputable and reliable sources. The present questionnaire-based study aimed to assess the knowledge and attitude towards the use of personal protective equipment and decontamination protocol among Pedodontics postgraduate students during the current viral outbreak.

Materials and Methods: A web-based, cross-sectional study using a self-reported questionnaire was conducted during May 2020. A 22- item survey questionnaire was developed using recommendation by WHO and Indian dental association protocol-COVID19. The questions were structured using Google forms, which are a survey administration app. The developed draft survey instrument was made accessible through a link and was distributed among ten randomly selected postgraduate students to assess the readability, clarity, and acceptability for the questioner. The pretest questionnaire was distributed to 525 postgraduate students who were members of the

Indian Society of Pedodontics and Preventive Dentistry (ISPPD).

Statistical analysis

The obtained data were coded, validated, and analyzed using SPSS 22.0 version. Descriptive analysis was applied to calculate frequencies and proportions.

Results

Out of 525 postgraduate students, a total of 347 had responded. Out of these, 35% were males, and 65% were female respondents. Of the total respondents, 61% of respondents were from first year, and the remaining 39% were second and third-year postgraduate students. The sociodemographic characteristics of the participants are shown in Table 1.

Table 1: The sociodemographic characteristics of the 347 postgraduate students enrolled in the study

Variable	Postgraduate students, n (%)
Age in years	
21-25yrs	167 (48.13%)
26-30	178 (51.30%)
31-35	2 (0.58%)
Gender	
Male	121 (34.87%)
Female	226 (65.13%)
Year of pursuing MDS	
First year	197 (61.38%)
Second year	65 (18.73%)
Third year	69 (19.88%)

Assessment of awareness towards the use of Personal Protective Equipment

Out of 347 participants, 97% of the Postgraduate students were aware of PPE. When they were asked about the use of PPE the majority of students responded that PPE is used to protect both skin and mucosa from infected blood and secretion. 66% of students were sure that they could treat their patients by wearing PPE. However, 34% postgraduate students were not self-confident about it. When they were asked about the list of whole components the PPE includes except 25(7.20%) of the participants, all were well aware. (Table 2)

Table 2: postgraduate student's awareness towards Personal Protective Equipment (PPE)

VARIABLES	POSTGRADUATE STUDENTS n (%)
Are you aware of PPE?	
Yes	337 (97.12)
No	10 (2.88)
PPE is used for	
To protect skin from (potentially) infected blood or secretion.	50 (14.41)
To protect mucosa from (potentially) infected blood or secretion.	12 (3.46)
Both	285 (82.13)
Can you treat a child by wearing PPE kit ?	
Yes	228 (65.71)
No	18 (5.19)
May be	101 (29.11)
What are the components of PPE?	
mask, goggles, face shield.	0
mask, gloves, goggles, face shield	25(7.20)
mask, gloves, goggles, face shield, coverall/ gowns, head cover and shoe cover.	322(92.80)

Knowledge and attitude towards the rationale use of Personal Protective Equipment

The majority of postgraduate students did not agree to reuse all the PPE components. According to 71% postgraduate students, gloves and face shields are the reusable components in PPE after appropriate decontamination. The participants reported different responses regarding the sequence for donning and doffing of personal protective equipment, as shown in (Table 3). A total of 48% of postgraduate students recommended 3ply surgical masks and gloves as the type of PPE for reception staff during this pandemic. Almost all postgraduate students preferred to use N95mask or FFP2

mask, gown, gloves, goggles as personal protective equipment while performing aerosol-generating procedures on COVID-19 patients. (Table 3)

Table 3: postgraduate students' knowledge and attitude towards PPE

Variables	postgraduate students n (%)
Will you prefer to reuse the whole components of PPE?	
Yes	61 (17.58%)
No	225 (64.84%)
Maybe	61 (17.58%)
What are the reusable components in PPE after appropriate decontamination?	
Mask, goggle and face shield.	85 (24.5%)
Goggle and face shield.	248 (71.47%)
Mask and face shield.	-
Gloves, mask, goggles	14 (4.03%)
Which sequence will you prefer for donning PPE:	
Gown – mask or respirator- goggles or face shield- gloves	192 (55.33%)
Gown- face shield or goggles- mask or respirator- gloves.	93 (26.80%)
Gloves- goggles or face shield- mask or respirator- gown	47 (13.54%)
Face shield or goggles- mask or respirator- gloves- gown	15 (4.32%)
Which sequence will you prefer for doffing PPE:	
Gloves- goggles or face shield- mask or respirator- gown.	167 (48.13%)
Gown – mask or respirator- goggles or face shield- gloves	37 (10.06%)
Gown –gloves - goggles or face shield- mask or respirator	70 (20.17%)
Gloves- gown- mask or respirator- face shield or goggle	73 (21.04%)
Which type of PPE will you prefer for reception staff?	
2plysurgical mask + gloves	59 (17%)
Goggle+ N95 mask+ gloves	97 (27.95%)
3plysurgicalmasks + gloves	168 (48.41%)
NoPPE required	23 (6.63%)
Which type of PPE is preferred for aerosol generated procedures performed on COVID-19 patients?	
Mask (N95 or FFP2), gloves, goggle	55 (15.85%)
N95orFFP2 mask, gown, gloves, goggle.	292 (84.15%)
Maskandglovesonly	-
No PPE	-

Knowledge and attitude about infection prevention and decontamination protocol during COVID-19

When asked about recommended hand-wash timing with soap and water, only 14% of postgraduate students reported correctly. Approximately one-third of students participated recommended 20-30 seconds for hand hygiene with alcohol-based formulation (hand sanitizer).

The majority of respondents agreed that 0.2% chlorhexidine is not an effective mouthwash to be used before starting dental treatment during this pandemic. Almost all the participants reported that high-speed suction evacuator is mandatory while performing aerosol-generating procedures. Out of the total, 56% of postgraduate students preferred to autoclaved their handpiece after every patient. 59% of participants recommended 1% sodium hypochlorite as the most effective agent in disinfecting operative surfaces between patients. The majority of postgraduate students recommended 0.1% sodium hypochlorite as the best agent to disinfect the dental waterline. More than half of the participants reported that fumigation should be done at the end of the day. (Table 4)

Table 4: knowledge and attitude about infection prevention and decontamination protocol during COVID-19

VARIABLES N (%)	PARTICIPANTS
Recommended hand-wash timing with soap and water?	
10-20 seconds	46(13.26%)
20-30 seconds	164(47.26%)
30-40 seconds	90(25.94%)
40-60 seconds	47(13.54%)
Recommended timing for hand hygiene with alcohol based formulation (sanitizer) ?	
<20 seconds	120 (34.58%)
20-30 seconds	125 (36.02%)
30-40 seconds	87 (25.07%)
When you should autoclave the handpiece ?	
After 5 patients	86 (24.78%)
After every patients	195 (56.20%)
At the end of the day	58 (16.71%)
Not required	8 (2.31%)
Most effective agent in disinfecting operative surfaces between patients?	
1% sodium hypochlorite	204 (58.79%)
Using detergent	41(11.82%)
5% sodium hypochlorite	-
70% alcohol	102 (29.39%)
Best agent to disinfect dental waterlines:	
0.1% sodium hypochlorite	224 (64.55%)
0.01% sodium hypochlorite	82 (23.63%)
0.001% sodium hypochlorite	31 (8.93%)
Using detergent	10 (2.88%)

Fumigation should be done:	
After every patient	22 (6.34%)
After 5 hours	45 (12.97%)
At the end of the day.	220 (63.40%)
Twice a day	60 (17.29%)

Discussion

Most of the postgraduate students were aware of PPE and its use. Based on current evidence, the COVID-19 virus is transmitted between the dentist, the dental assistant, and the child patient through the close contact and droplets generated by coughing and sneezing. Airborne transmission may also occur during aerosol-generating procedures and support treatments; thus, WHO recommended using suitable PPE for limiting the spread of COVID-19.[10,11] Approximately 66% of students responded that PPE is an essential and most important self-protection protocol for preventing COVID-19 spread while 34% of students were not in favor of using PPE while treating children as the child will be uncooperative and ultimately results in negative behavior. Most of the postgraduates knew the PPE components which include gloves, medical/surgical face masks, goggles, face shield, and gowns, as well as items for specific procedures-filtering facepiece respirators (i.e., N95 or FFP2 or FFP3 standard or equivalent) - hereafter referred to as "respirators."[12]In the current exceptional crisis scenario of the COVID-19 pandemic, the reprocessing of disposable PPE is an evolving area where research and development are ongoing and urgently needed. 71% of postgraduate students reported goggle and face shield as reusable components of PPE, which is cleaned with soap/detergent and water followed by disinfection using either sodium hypochlorite 0.1% (followed by rinsing with clean water) or 70% alcohol wipes.[10] Reprocessing of cotton gowns can be done by washing it with warm water (60-90°C) and laundry detergent, followed by soaking in 0.05% chlorine (30 minutes.).There are no validated promising disinfection or sterilization methods for other PPE components to date. [10]

The knowledge about the sequence of donning and doffing of PPE between postgraduate students was found insignificant. 55% of students reported the correct sequence for donning, whereas only 20% were aware of the doffing sequence.[13-14] The World Health Organisation and Center for Disease Control and Prevention (CDC) recommended the use of complete PPE while performing aerosol-generating procedure on COVID-19 patients.[13-15] The rationale use of PPE among postgraduate students were found significant.

This study revealed that most of the students were unaware of the recommended hand-wash timing. Applying preventive measures to control COVID-19 infection is the most critical intervention, which includes proper hand hygiene. According to Indian Dental Association Protocol-COVID-19, the duration for hand hygiene technique with soap and water is 40- 60 seconds and with alcohol-based formulation 20-30 seconds.[14] The Indian dental association advised to use 1.5% hydrogen peroxide or 0.2% povidone-iodine mouthwash for 1 minute.[14] According to our participants, the least effective mouthwash is 0.2% chlorhexidine against COVID-19. Mark Steven Howe also suggested that povidone-iodine and hydrogen peroxide exhibit substantially more virucidal activity than chlorhexidine against respiratory viruses by a factor of 8000 times.[16] Whereas Jin Gu Yoon et al. , detected that the viral load in the saliva decreased transiently for 2 hours after using the chlorhexidine mouthwash.[17] Further research is needed for comparing the effectiveness of preprocedural mouthwash against COVID-19. Almost all the postgraduate students were well aware that they should use high speed evacuation suction while performing aerosol-generating

procedures in dental settings to minimize droplet spatter and aerosols.

The dental handpiece can be contaminated internally with patient's material. The center for disease control and prevention suggested that one should autoclave the handpiece after every patient to prevent cross-contamination between patients.[13,14] Almost half of the students preferred to autoclave their handpiece after every patient. In contrast, others preferred to use the same handpiece for more than one patient. According to center for disease control and prevention and WHO recommended cleaning the operative area with 0.1% (1000 ppm) sodium hypochlorite in the context of COVID-19 is a conservative concentration that will inactivate the vast majority of other pathogens that may be present in the dental-care setting. However, for blood and body fluids, large spills (i.e., more than about 10mL), a concentration of 0.5% (5000 ppm) is recommended.[14,15,18] The majority of postgraduate students showed significant knowledge in context with sodium hypochlorite and 70% alcohol as the effective disinfectants for environmental surfaces and dental waterlines during this pandemic. Dental Clinics should have adequate ventilation, as it can reduce the risk of infection through dilution and removal of infectious particles through air exchange. According to WHO and IDA protocol 2020, the fumigation of the dental clinics should be done at the end of the day. [13-14]

The pandemic potential of COVID-19 remains a threat to public health, health care workers, and postgraduate students who are under practice. Till date, no antiviral treatment or vaccine has been explicitly recommended for COVID-19. Therefore, proper protocol for Infection Prevention and Control (IPC) during the management of Coronavirus disease 2019 could remarkably change the course of the outbreak.

Conclusion

The awareness and knowledge about PPE and the decontamination protocol were found significant among the postgraduate students who maybe because of the continuously upgrading guidelines provided by standard medical organizations. The students must ensure they remain current in their understanding of standard National guidelines to optimize safety for dental care providers and child patients.

Acknowledgment

We would like to show our gratitude to the postgraduate students who participated in this study and for sharing their pearl of wisdom with us.

References

1. Lai C, Shih T, Ko W, Tang H, Hsueh P. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. Int J Antimicrob Agents 2020 Mar;55(3):105924 [FREE Full text] [doi: 10.1016/j.ijantimicag.2020.105924] [Medline: 32081636
2. WorldHealthOrganization. https://www.who.int/news-room/detai l/30-01-2020-statement-on-the-second-meeting-of-the-international health-regulations-(2005)-emerg envy-committee-regarding-the-outbreak-of-novel -corona virus-(2019-ncov).
3. Ather, A.; Patel, B.; Ruparel, N.B.; Diogenes, A.; Hargreaves, K.M. Coronavirus Disease 19 (COVID-19): Implications for Clinical Dental Care. J. Endod. **2020**. [CrossRef] [PubMed]
4. Meng, L.; Hua, F.; Bian, Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. J. Dent. Res. **2020**. [CrossRef]
5. Zemouri C, de Soet H, Crielaard W, Laheij A. A scoping review on bio-aerosols in healthcare and the

dental environment. Plops One 2017;12(5):e0178007 [FREE Full text] [doi: 10.1371/journal.pone.0178007] [Medline: 28531183]

6. The workers who face the greatest coronavirus risk. The New York Times (New York) 2020March15.Availableat https://www.nytimes.com/interactive/2020/03/15/business/economy/coronavirus-worker-risk.html (accessed March 2020).
7. World Health Organization. 2020 March 13. Clinical management of severe acute respiratory infection when COVID-19 is suspected URL: https://tinyurl.com/s23yv4p
8. Centers for Disease Control and Prevention. 2020 March 27. CDC recommendation: postpone non-urgent dental procedures, surgeries, and visits URL: https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html
9. The American Dental Association. 2020 March 27. Coronavirus frequently asked questions URL: https://success.ada.org/en/ practice-management/patients/coronavirus-frequently-asked-questions.
10. Elizabem Bancroft, Goul Carson, WHO expert advisory panel) Rational use of personal protective equipement for coronavirus disese (COVID-19) and consideration during severe shortages. Interim guidance. April 6 2020
11. luzzi V, Ierardo G, Bossu M, polimeni A. COVID-19: Pediatric Oral Health during and after the Pandemics. Appl Sci [Internet]. 2020;10(April):1–8. Available from: www.mdpi.com/journal/applsci
12. World Health Organization. Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance, March 19 2020. World Health Organization; 2020.
13. www.cdc.gov/niosh/topics/aerosols/pdfs/Aerosol_101.pdf
14. Dr. D. Mucchala, Dr. S Joshi, Dr. V Reddy. Indian dental association protocol COVID-19. Pg no. 1-23. www.ida.org.in: April 20 2020-06-20.
15. World health Organisation. Infection prevention and control during health care when COVID-19 is suspected: Interim guidance, March 19 2020. World health Organisation; 2020.
16. https://www.nationalelfservice.net/dentistry/oral-medicine-and-pathology/mouthwash-reduce-levels-covid-19-mouth/.
17. Yoon JG, Yoon J, Song JY, et al. Clinical Significance of a High SARS-CoV-2 Viral Load in the Saliva. *J Korean Med Sci*. 2020;35(20):e195. Published 2020 May 25. doi:10.3346/jkms.2020.35.e195
18. CDC and ICAN. Best Practices for Environmental Cleaning in Healthcare Facilities in Resource-Limited Settings. Atlanta, GA: US Department of Health and Human Services, CDC; Cape Town, South Africa: Infection Control Africa Network; 2019. (https://www.cdc.gov/hai/pdfs/resource-limited/environmental-cleaning-RLS-H.pdf, accessed May 6 2020)