Dental Science

Dr. Bharath Marlecha R * 
Department of Orthodontics and Dentofacial Orthopaedics, Thai Moogambigai Dental College and Hospitals, Dr. M.G.R Educational & Research Institute, Golden George Nagar, Mogappair, Chennai 600107, Tamil Nadu. *Corresponding Author

Dr. Nandhini G Ashok
Department of Orthodontics and Dentofacial Orthopaedics, Thai Moogambigai Dental College and Hospitals, Dr. M.G.R Educational & Research Institute, Golden George Nagar, Mogappair, Chennai 600107, Tamil Nadu.

Dr. Aishwarya K
Department of Orthodontics and Dentofacial Orthopaedics, Thai Moogambigai Dental College and Hospitals, Dr. M.G.R Educational & Research Institute, Golden George Nagar, Mogappair, Chennai 600107, Tamil Nadu.

Dr. Poorna Devadoss
Department of Orthodontics and Dentofacial Orthopaedics, Thai Moogambigai Dental College and Hospitals, Dr. M.G.R Educational & Research Institute, Golden George Nagar, Mogappair, Chennai 600107, Tamil Nadu.

Dr. Siva Kumar Sundar
Department of Orthodontics and Dentofacial Orthopaedics, Thai Moogambigai Dental College and Hospitals, Dr. M.G.R Educational & Research Institute, Golden George Nagar, Mogappair, Chennai 600107, Tamil Nadu.

ABSTRACT
Background: Healthcare professionals, particularly the dental personnel have a higher risk of infection of COVID-19 due to the risk of inhalation of aerosolized particles. Aim: To assess knowledge and analyze the effectiveness of audio-visual (AV) aid on Personal Protective Equipment (PPE) among dental students. Materials and methods: A cross-sectional survey was conducted using google forms among dental students. The first part of the questionnaire comprised of 250 participants which assessed the knowledge whereas the second part consisted of 200 participants which analyzed the effectiveness of AV aid on PPE. Data obtained was analysed using SPSS IBM software version 19.0, Chicago. Results: Overall the knowledge among the dental students on PPE was poor. It was found that 84.4% of the dental students were not confident to handle it and 83.2% never had experience to use the same. More than half of the dental students had misconception on the steps of using PPE and mere 17.2% had the right practice on the steps in donning. Only 44.8% of the students were aware of five moments in hand hygiene. It was found that PPE was not included in the curriculum of 88% students. Over 93% students had a clear view of handling PPE after watching AV tool and it was highly encouraged instead of chalk and talk in the teaching system. Just 23% of the students utilised government websites to get updated. Conclusion: It is important to improve the knowledge of the dental students on PPE through continuing education programs using AV aids.

KEYWORDS
COVID19, dental students, personal protective equipment, audio visual aids, knowledge.

INTRODUCTION:
The principles of universal precautions are centered for infection control. Health care workers (HCWs) are more prone for occupationally acquired infections (OAI’s) due to the exposure of pathogenic micro-organisms harbored in blood, body fluids and other potentially infectious materials. Hence, it is imperative that they don key pieces of personal protective equipment (PPE) and also understand the levels of barrier protection they deliver for patient-care and surgical situations in their clinical setup [1]. As we know that dental practitioners and students have to handle the oral cavity from the examination until the finishing up of treatment, it becomes a matter of concern as any dental procedure involves generation of aerosols that potentially infects patients and practitioners alike. Aerosolization is mostly due to high-speed handpieces and ultrasonic devices. The periodontal disease can be transmitted through the aerosols generated from these devices [2]. Hence, the use of PPE (e.g., masks, goggles, face-shields, gowns, etc.) has become a normal practice in many dental offices due to the COVID-19 pandemic. In these times, it is of utmost importance to ensure the level of preparedness as any dental procedure involves generation of aerosols that may potentially infect patients and practitioners alike.

MATERIALS AND METHODS:
Study population: This paper is based on a cross-sectional survey conducted amongst 250 dental students in Chennai, India using an online survey instrument (google forms) during second week of May 2020. Ethical approval was obtained from the Institutional Review Board.

Questionnaire:
The 18 questions in the questionnaire were divided into two parts – first part of the questionnaire was to assess the level of preparedness for PPE dominating the world market among dental students and the second part of the questionnaire included a video on the proper technique of donning and doffing of PPE and later questions were asked to assess the effectiveness of audio-visual aids in teaching purposes. The video utilized for the study was from the CDC website. The survey material was passed on to each participant using social media platform and responses were recorded. This questionnaire was self-evaluated and validated through a pilot study. A total of 250 dental students participated in part one, of which 200 respondents agreed to participate in part two of the study.

Statistical analysis:
Data was entered in Microsoft excel and later imported to SPSS IBM software tool (version 19, IBM Chicago) for statistical analysis.

RESULTS:
1. For part one of the study questionnaire: Past experience of handling PPE (Chart 1- all questions below it):
To which, 83.2% (n=208) dental students agreed to not have experience in handling PPE in the past.

Confidence to use PPE:
To this question, 84.4% (n=212) of the participants said that they weren’t confident enough.

Wearing of face-shield over the masks and eye shields compulsory:
With respect to which, 84.4% (n=212) dental students agreed that it was compulsory.
Regarding “Five Moments” concept in hand hygiene, only 44.8% (n=112) of the respondents said that they were aware of it. Curriculum of PPE education in bachelor’s degree:

In this regard, majority of 88% (n=220) respondents answered that they had no inclusion of PPE.

To watch video on handling of PPE:

To which 80% (n=200) of the dental students agreed to watch.

To the statement, “PPE completely eliminates the risk for cross-contamination” (Chart 2-all questions below it), 55.6% (n=139) dental students agreed that the statement was incorrect.

To the statement, “Order of doffing and donning of PPE is the same”, more than half of the respondents, 76% (n=190) agreed that statement was correct.

Same components in PPE to be worn by all the staff:

To this question, surprisingly 65.2% (n=163) of the dental students answered it wrong.

Highest risk for cross-contamination through PPE (Chart 3-all questions below it):

In this regard, only 40.8% (n=102) dental students answered that doffing of contaminated PPE had the highest risk, which was the right answer.

To choose the right option out of 4 choices given:

To this, mere 17.2% (n=43) chose the right option that gowns and gloves had to be removed as one unit.

II.

For part two of the study questionnaire:

Awareness of the information in the video (Chart 4-all questions below it):

To this question, 37% (n=74) said that they were not aware of it earlier.

Change in perception on handling PPE:

To which, as many as 93% (n=186) of the respondents said that they had a clear view after watching a video that demonstrates the same.

Donning and doffing of PPE is in the same order:

This time, 61% (n=122) of the students said that the statement was wrong.

Encourage audio-visual teaching:

In regards to this, a majority of 87% (n=174) dental students agreed to having such teaching over theoretical approach.

PPE not just during pandemics:

Concerning to this question, 82% (n=164) of the participants agreed that PPE had to be worn throughout the practice of an individual.

To choose the right option out of 4 choices given (Chart 5-all questions below it):

A majority of 88% (n=176) of the respondents chose that hand hygiene is equally important while donning and doffing of PPE, which was the right option.

Source of information on PPE so far:

A majority of 47% (n=94) had agreed to rely on YouTube videos whereas just 23% (n=46) of the respondents relied on government websites.

DISCUSSION:

Infection among health workers have played a pivotal role in outbreaks of many pandemics in the pasts [8]. Incorrect PPE technique can lead to pathogen transmission and thus, former training is mandatory for all the HCWs. Now that the world is already in a crisis due to the contagious COVID19, it becomes imperative that dental practitioners and students master the art in handling PPE. Therefore, this study reveals the level of preparedness for handling of PPE among dental students.

On stressing the importance of former training, the current study revealed that a majority of 83.2% participants had no past experience in handling PPE due to which 84.4% were not confident to use the same. PPE undoubtedly reduces the risk for cross-contamination but it does not eliminate completely. It is effective at decreasing the exposure to bodily fluids but its presence is simply not enough [9-10], to which 55.6% of the respondents agreed to it in this study. In many previous studies it was found that incorrect removing of contaminated gloves and gowns lead to the highest risk for cross-contamination [11-12]. In the current study, less than half (40.8%) of the participants agreed to it. The order of doffing and donning of PPE is not the same because the personnel is at the highest risk for getting cross-infected while doffing it [13]. Hence, the steps would vary with due precautions for the same (Table 1). In this study, only 24% of the students were aware of this difference. Hand hygiene, though seems simple yet it is proven to be one of the most important procedure which when performed meticulously can lead to a great fall in the spread of infectious diseases [14-15]. To understand hand hygiene in a multi-faceted and multidimensional strategy, WHO (World Health Organization) had devised “five moments of hand hygiene” which when followed, definitely reduces the chances of cross-infection [16-17] (Table 2). Amidst COVID19, it is highly appreciable if one practices these 5 moments while handling patients. In our study only 44.8% of the students were aware of these principles. As it is well versed that COVID19 transmits through either direct or indirect contact, dentists are at the highest risk as the they work in an aerosolized environment. Aerosol particles less than 0.1 micron or ultra-fine particles like COVID19 virus can enter the blood stream which is hazardous [18]. Hence, it is made mandatory to wear a face shield over the face mask and safety googles as a part of the precautionary measure [19-20]. A majority of 84% students were already informed for the same, in this study. A little in depth was asked about the order of doffing of gloves and gowns, to which a handful of 17.2% of the participants agreed to the right choice that they had to be removed as one unit. It is advised to fit the gloves in the cuffs of the gown so that while doffing, it can be removed as a single unit and
Table 1: Order of donning and doffing of PPE

<table>
<thead>
<tr>
<th>Order of PPE</th>
<th>Doffing of PPE</th>
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<tbody>
<tr>
<td>1. Perform hand hygiene</td>
<td>1. Before touching a patient</td>
</tr>
<tr>
<td>2. Put on shoe covers</td>
<td>2. Before clean/aspective procedure</td>
</tr>
<tr>
<td>3. Put on gown</td>
<td>3. After body fluid exposure risk</td>
</tr>
<tr>
<td>4. Put on mask/respirator</td>
<td>4. After touching a patient</td>
</tr>
<tr>
<td>5. Put on eye protection</td>
<td>5. After touching patient surroundings</td>
</tr>
<tr>
<td>6. Put on gloves</td>
<td>6. Perform hand hygiene</td>
</tr>
</tbody>
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Table 2: Five Moments of hand hygiene

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CONCLUSION:
As the global threat of COVID-19 continues to rise, it is important to improve the knowledge, attitude and practice of the dental professionals through continuing education programs and webinars to help create awareness, prevent the spread and reduce the risk to the patient's dental health care professionals. It is better to use audio-visual aids over chalk and talk to involve the students into the topic and also to remodel their perception through visuals. Education on PPE has to be included in the curriculum hereafter, so that chaos and stress in understanding during the pandemic is avoided. It is popularly said that, “Prevention is better than cure” and it is high time to implement the same.

ACKNOWLEDGEMENT:
Nil

CONFLICT OF INTEREST:
None declared

REFERENCES: