

# Knowledge, Attitude and compatibility of Personal Protective Equipments among dental practitioners- A Questionnaire survey

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## Abstract:

### Aim:

The risk of cross infection between dental practitioners and patients may be high due to the dental procedures containing aerosols, and splatters so the dental practitioners are at the greatest risk for COVID 19. Proper protocols are to be followed by the dental practitioners is of utmost necessity during this pandemic time. Proper knowledge of selection and usage of PPEs are of paramount importance in the field of dentistry. So this study was undertaken to assess the knowledge, awareness and compatibility regarding personal protective equipment among dental practitioners in such a critical time of COVID 19 Pandemic.

### Methodology:

It was a cross - sectional questionnaire survey based study carried out to assess the awareness, knowledge and compatibility regarding personal protective equipment among dental practitioners. The sampling was done by complete enumeration method and dental practitioners, were included for this study. We forwarded the google form to 100 dental practitioners in Marathwada region. Google forms were used to record responses of the study participants.

### Results:

The results are extrapolated from the online generated graphs.

### Conclusion:

In the present study, dental practitioners have shown positive attitude about use of PPE in protecting dentist against COVID 19 virus though many of the participants are not compatible with its use. More than half of the respondents have knowledge and awareness about guidelines and online refresher courses to boost infection prevention and control (IPC) strategies in healthcare facilities. Further studies can be conducted on the assessment of the knowledge, awareness and compatibility regarding personal protective equipment among dental practitioners with large sample size.

**Keywords:** Covid-19, dental practitioners, blood, gingival crevicular fluid, healthcare professionals.

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**INTRODUCTION:**

Coronavirus disease 2019, known as COVID-19, is a highly expanding pandemic caused by a novel coronavirus, an enveloped single-stranded RNA virus, previously known as 2019-nCoV.<sup>1</sup> The first case of the novel coronavirus was detected in Wuhan city in late December 2019. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is transmitted from person to person through inhalation of aerosols from an infected individual. Spread of SARS-CoV-2 can occur through direct, indirect, or close contact with infected people through infected secretions such as saliva and respiratory secretions or their respiratory droplets, which are expelled when an infected person coughs, sneezes, talks. Airborne transmission of SARS-CoV-2 can occur during medical, dental procedures that generate aerosols ("aerosol-generating procedures").<sup>2</sup>

Worldwide, healthcare systems have been severely challenged since the outbreak of COVID-19. Though dental practitioners and physicians have different scopes of practice, their training share many similarities. Hence, with their knowledge of basic human science and sterile surgical techniques, dental practitioners played an invaluable resource in the COVID-19 pandemic response. Overall, it is commendable that many dentists have risen to the challenge in the fight against COVID-19 by administering COVID-19 diagnostic tests such as nasopharyngeal and oropharyngeal swabs and have also seen to continue their emergency dental services, so the dental practitioners were a prime candidate to volunteer in the fight against COVID-19. In addition to physical risks, the pandemic has triggered extraordinary levels of psychological stress on health workers exposed to high-demand settings for a long duration. Guidelines for healthcare workers and online refresher courses have been developed by World Health Organization (WHO), Centers for Disease Control (CDC), and various governmental organizations to boost the knowledge and prevention strategies.<sup>3</sup> According to the WHO,<sup>4</sup> personal protective equipment "consists of garments placed to protect the health care workers or any other persons to get infected." Personal protective equipment

(PPEs) are designed in a fashion such that they block the portal of entry of microbes during contact with vicious fluids (blood, saliva, and GCF). Each PPE is intended to protect the operator from contamination by aerosols and splatter to skin and mucous membranes. Before COVID 19, pandemic PPE was used for the dental treatment of patients suffering from diseases such as hepatitis B virus, human immunodeficiency virus, Mycobacterium tuberculosis.

Proper knowledge of the selection and usage of PPEs is of paramount importance in the field of dentistry. However, PPE was not routinely used in the medical as well as dental field, not always following the regulations and is also based on their comfort as there is a lack of enforcement of government's occupational and safety regulations also the low-cost, uncertified, and sub-standard products that decrease the safety levels of personnel.<sup>5</sup> Certain factors that control the selection of PPEs are fit, which is important for PPE since comfort improves compliance, biocompatibility, longevity, and cost.<sup>6</sup> The risk of cross-infection between dental practitioners and patients may be high due to the dental environment containing airborne droplets, aerosols, and splatters, so the dental practitioners are at the greatest risk for COVID 19. Proper protocols are to be followed by the dental practitioners are of utmost necessity during this pandemic time. To our knowledge, no such study has been conducted in the past. So this study was undertaken to assess the knowledge, awareness, and compatibility regarding personal protective equipment among dental practitioners in such a critical time of COVID 19 Pandemic.

**MATERIALS AND METHODS:**

A cross-sectional questionnaire survey-based study was used to assess the knowledge, awareness, and compatibility regarding personal protective equipment among dental practitioners. Ethical approval of the institutional research ethics committee was taken before the data collection. Participation in the survey was voluntary, answering these questions considered as participants' consent. Since the country maintained a lockdown and movement restriction to reduce the spread of

COVID-19, participants were conveniently selected using the online method. We used Google forms in the web-based approach. The link was shared through email, different social platforms (Facebook, WhatsApp), and other authors' networks to record the study participants' responses. Undergraduate students, Postgraduate students, and Interns were excluded from this study. The participants were told none of the responses would be associated with personally identifiable information and to answer the question to the best of their knowledge. Data collected will be used for academic purposes only.

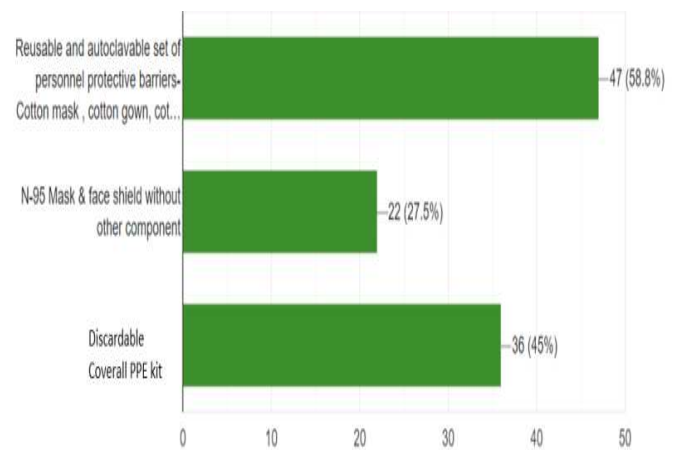
#### QUESTIONNAIRE DESIGN:

The questionnaire comprised 10 closed-ended questions designed based on a considerable literature review, PPE wearing guidelines for the healthcare providers by WHO,<sup>7</sup> guidelines issued by CDC,<sup>8</sup> to assess the knowledge, awareness, and compatibility regarding personal protective equipment among dental practitioners. A pilot study was previously conducted with five dental practitioners and assessed question understanding and completion time. We approached each participant individually by sharing a link to the questionnaire using Google forms via social media. According to the pilot study, practitioners completed the questionnaire within 5-8 minutes. After accomplishing the pilot study, we made several changes in the questionnaire to simplify technical words to understand the participants.

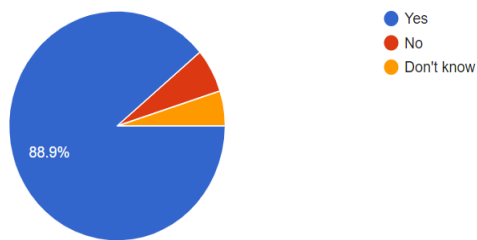
#### RESULTS:

We approached 100 dental practitioners out of them, responses were recorded from a total of 81 dental practitioners (BDS or MDS) 26 were males, and 55 were females in the Marathwada region. Responses were recorded from a total of 81 dental practitioners. Results of knowledge, attitude, and compatibility of personal protective equipment among dental practitioners have revealed the following graphs. About 81.5 % of participants have not used the PPE kit before COVID 19 pandemic. More than half (58.8%) participants use a reusable, autoclavable set of PPE, which includes a cotton mask, cotton gown, cotton head cap, goggles, face shield; only 45% of participants use discardable coverall PPE. Only 25.9 % of them use PPE for OPD (**Graph-1**). About 88.9%

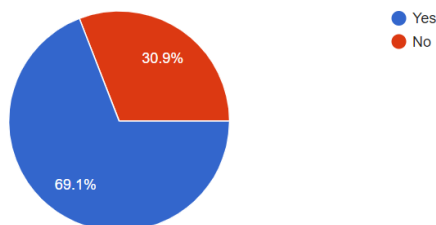
of participants agreed on personal protective equipment (PPE) useful in protecting dentists from COVID 19 suspected or infected patients; among the remaining participants, 4.9% are unaware whether it is effective or not (**Graph-2**). About 45 % of dental professionals use coverall discardable PPE kits mainly for aerosol-generating procedures. Of most participants, 58% do not change PPE for every patient, and 69.1 % of participants particularly reuse N-95 masks (**Graph-3**). Only 8.6% of participants do not feel breathlessness and anxiety after wearing PPE, the remaining participants sometimes feel breathlessness. 44.9 % of participants know the recommended grams per square meter (GSM) of the PPE kit, and 33.3 % were unaware. 54.3% of participants have attended a free online information course on COVID 19 safety measures available to all medical and dental operators promoted by Integrated Government Online Training (IGOT) (**Graph-4**). 36.3% of participants have separate space for donning and doffing, and 30% have separate but not adequate space for donning and doffing (**Graph-5**).



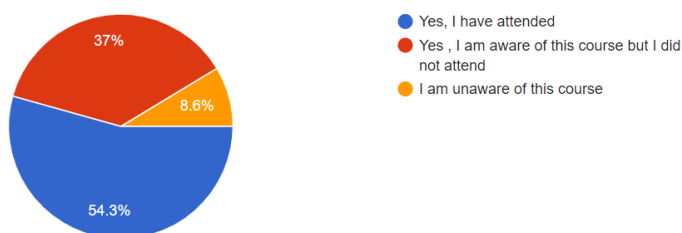
**Graph 1: Participants who use discardable coverall PPE kit**



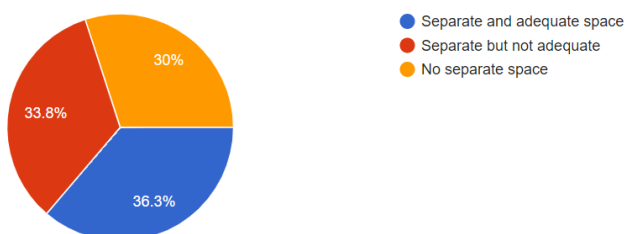
**Graph 2: Responses of participants on effectiveness of Personal protective equipment's (PPE) useful in protecting dentist from COVID 19 virus**



**Graph 3: Percentage of respondents who reuse N-95 mask**



**Graph 4: Percentage of respondents who have attended free online information course on COVID 19 safety measures promoted by Integrated Government Online Training (IGOT)**



**Graph-5 Percentage of respondents who have separate and adequate space in the clinic for donning and doffing of PPE**

## DISCUSSION:

As the covid-19 virus affecting a wide population, health care professionals are also at high risk of getting affected. To treat these increasing numbers of patients every day, we need better protective measures to protect them. Exposure to people infected with the disease in their work leads to the death of a large number of doctors and also affects a wide range of healthcare professionals, while the general population is in lockdown.<sup>9</sup> The infection chain of any disease consists of a susceptible host, pathogen, and a portal of efficient entry. Effective infection control strategies are intended to break this chain of infection at any particular point. The best way for practitioners to prevent this infection is through proper personal protective equipment and competency in donning and doffing.<sup>10</sup> The PPE is designed with this concept as the prime focus to protect the skin and mucous membranes of dental healthcare personnel's eyes, nose, and mouth from exposure to blood or other potentially infectious material.

This study provides an insight into the level of knowledge, attitude, and preparedness of health care professionals towards PPE and decontamination protocol during the outbreak of COVID-19. In our study, 88.9% of the dental practitioners agreed that the PPE could protect from COVID 19 infected or suspected patients. Among them, 81.5 % of participants had not used PPE before COVID 19 pandemic; as such a widespread outbreak had not happened in recent history, it is expected that not every health care worker (HCW) would have used PPE before this pandemic. About 58.8 % of participants use a reusable and autoclavable set of personnel protective barriers- Cotton mask, cotton gown, cotton head cap, goggles/face shield, and 45 % of dental practitioners use coverall disposable PPE kit mainly for aerosol-generating procedures. Only 25.9 % of them use PPE for OPD. WHO recommends: contact and droplet precautions to be applied during care for patients with suspected, probable, and confirmed COVID-19. Additionally, airborne precautions are recommended to be used during aerosol-generating procedures.<sup>11</sup>

About 42% of dental practitioners change PPE for every patient after the dental procedure as WHO

does not recommend PPE reuse.<sup>11</sup> About 60.1% of dental practitioners reuse the N-95 mask. Here we found a remarkable absence of knowledge regarding the use of the mask. These may be because of the factors influencing the purchase of PPE are cost-effectiveness and its availability. N95 masks are designed for one-time use.<sup>8</sup> The CDC and National Institute for Occupational Safety and Health (NIOSH) do not formally recommend the reuse of N95 masks but acknowledge that in times of scarcity, these strategies are options that can be considered based on individual clinical judgment and the institutional resources available. These methods are options for times of crisis and should not be used routinely if mask supply is sufficient.<sup>12</sup> The CDC reports that prolonged N95 mask use (including between patients) can be safe for up to 8 hours. Current guidelines encourage wearing a face shield over the N95 to decrease the chances of contamination of the mask. Because coronaviruses lose their viability significantly after 72 hours, many organizations have promoted a rotation and reuse strategy.<sup>13</sup> Assuming there is minimal to no viral contamination to the mask, the CDC suggests that masks can be reused up to 5 times by acquiring a set number of N95 masks (at least 5 as per the CDC), and rotate their use each day, allowing them to dry for long enough that the virus is no longer viable (> 72 hours). Proper storage for this technique requires either hanging the mask to dry or keeping them in a clean, breathable container like a paper bag between uses. Make sure the masks should not be kept closed and that you should not share your mask with other people. A user seal check should be performed before each use.<sup>14</sup> The masks should be changed regularly to forbid the risk of transmission of the infection. Although studies have shown that human coronavirus like SARS-CoV & Middle East respiratory syndrome (MERS-CoV) have limited capacity to live on dry surfaces, it has also been proved that they can remain viable on a surface for a few days, especially those which are suspended in human secretion.<sup>15</sup>

Nearby 44.9 % of dental practitioners prefer the PPE kit of  $\geq 90$  GSM, and 33.3 % of dental practitioners were unaware of GSM of PPE. There are no specific recommendations about the GSM of PPE. However,

as per the Integrated Government Online Training (IGOT) course, it was suggested  $\geq 90$  GSM could protect from the COVID 19 virus to a greater extent. Around 54.3% have attended free online information course on COVID-19 safety measures available to all medical and dental operators promoted by IGOT, while the 8.6% were unaware of this course. Nearby 36.3 % of dental practitioners have separate and adequate space in their clinic for donning and doffing of PPE and about 30% of participants do not have separate space. Aside from factors related to PPE knowledge, meticulous donning and doffing of PPE is a vital step in reducing contamination of healthcare workers treating patients with transmissible infectious diseases, so there should be separate and adequate space for donning and doffing.<sup>16</sup> Pandit AP et al. have conducted a study to observe the personal protective equipment used for infection control in dental practices.<sup>6</sup> They stated that it is also important to increase the awareness among HCWs about the standards of infection control that should be followed at their dental clinics and introduce training initiatives with superior quality PPE to ensure personnel and patient safety. Thus, the need of the hour is to enforce and implement superior measures of infection control to improve the practice of dentistry in India. Alharbi G et al., in their study, showed that dental undergraduate students and faculty members at KSU (King Saud University, Riyadh, Kingdom of Saudi Arabia) demonstrated good adherence to infection control guidelines. On the other hand, there was a lack of knowledge of the basics of infection control standards.<sup>17</sup> Arora S et al., in their study, concluded that Indian dentists have presented satisfactory knowledge with adequate preparedness as the majority of them had a fair level of knowledge with significantly higher knowledge among female respondents and those with post-graduation studies.<sup>18</sup>

Our study's limitation is that we could not collect more responses from participants as the study was conducted through an online platform. We could not interact with practitioners in person.

**CONCLUSION:**

In the present study, dental practitioners have shown a positive attitude about the use of PPE in protecting dentists against the COVID 19 virus though many of the participants are not compatible with its use. More than half of the respondents have knowledge and awareness about guidelines and online refresher courses developed by WHO and various governmental and private organizations to boost infection prevention and control (IPC) strategies in healthcare facilities. As the global threat of COVID-19 continues, more strategic efforts through educational campaigns that target HCWs are urgently needed. Dental practitioners should make judicious utilization of all the precautionary measures to practice dentistry safely. Proper preparation for a potential second wave or another virus should be undertaken. As we are going through an evolutionary phase where new advances are expected to evolve, dental clinics should be designed in accordance with separate and adequate space for donning and doffing. We will arise successfully out from the crisis of the COVID-19 pandemic. Further studies can be conducted to assess the knowledge, awareness, and compatibility regarding personal protective equipment among dental practitioners with large sample size.

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