

## **STUDY ON KNOWLEDGE OF PPE FOR CORONAVIRUS DEFENSE AMONGST HEALTH CARE WORKERS: A QUALITATIVE RESEARCH**

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### **ABSTRACT:**

**Introduction:** PPE includes gloves, medical masks, goggles or a face shield, and gowns, as well as for specific procedures, respirators (i.e., N95 or Filtering Face-piece type 2-FFP2 standard or equivalent) and aprons. precautions are required by healthcare workers to protect themselves and prevent transmission in the healthcare setting.

**Materials & Methods:** The questions were based on about personal protective equipment's and the guidelines related to the same which have been issued by Ministry of health and family welfare, India. Questions were in an open-ended format and in English language for medical doctors and in local languages for nurses, paramedical staff and the ASHA health care workers. The survey was sent by email as well as WhatsApp mobile application to the survey participants.

**Results:** Among respondents, 86% reported knowing when their patients had been placed on droplet (respiratory) precautions, with significantly more physicians (i.e., house-staff, faculty, and fellows) than nurses and paramedical staff, knowing when precautions had been instituted. 12% of the survey participants indicated a higher level of respiratory protection.

**Conclusion:** To have an appreciable impact on patient and provider safety, efforts to improve PPE adherence and effectiveness must address both organizational factors associated with safety climate and knowledge barriers among clinicians.

**Key words:** PPE, Coronavirus Protection, Health Care Professionals

### **INTRODUCTION**

Human-to-human transmission has been documented, including in healthcare workers, and aerosol-generating procedures (AGP) may play a role in the spread of the disease.<sup>1</sup> There are uncertainties in the natural history of the 2019-nCoV, including source(s), transmissibility mechanisms, viral shedding, and persistence of the virus in the environment and on fomites. The use of personal protective equipment (PPE) by healthcare workers requires an evaluation of the risk related to healthcare-related activities.<sup>2</sup>

PPE includes gloves, medical masks, goggles or a face shield, and gowns, as well as for specific procedures, respirators (i.e., N95 or Filtering Facepiece type 2-FFP2 standard or equivalent) and aprons. precautions are required by healthcare workers to protect themselves and prevent transmission in the healthcare setting. Precautions to be implemented by healthcare workers caring for patients with COVID-19 disease include using PPE appropriately; this involves selecting the proper PPE and being trained in how to put on, remove and dispose of it.<sup>3</sup>

Specifically, for aerosol-generating procedures (e.g., tracheal intubation, non-invasive ventilation, tracheostomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy) healthcare workers should use respirators, eye protection, gloves and gowns; aprons should also be used if gowns are not fluid resistant.<sup>4</sup>

Respirators (e.g., N95, FFP2 or equivalent standard) have been used for an extended time during previous public health emergencies involving acute respiratory illness when PPE was in short supply.<sup>5</sup> This refers to wearing the same respirator while caring for multiple patients who have the same diagnosis without removing it, and evidence indicates that respirators maintain their protection when used for extended periods. However, using one respirator for longer than 4 hours can lead to discomfort and should be avoided.<sup>6</sup>

In healthcare settings, the most common pathway of human-to-human transmission has been the contact of the mucosae with infectious respiratory droplets or fomites.<sup>7</sup> However, prior studies have also detected coronaviruses in sputum, nasal or nasopharyngeal secretions, endotracheal aspirate, bronchoalveolar lavage, urine, feces, tears, conjunctival secretions, and blood and lung tissues.<sup>8-11</sup> Other research has also shown that SARS-CoV can survive in sputum, serum, and feces for at least 96 hours and in urine for 72 hours,<sup>12</sup> and it can survive on surfaces up to 9 days.<sup>13</sup> Thus, the recommended mitigation strategies may need to be sufficiently broad to control these transmission modes.

Since the first case of COVID-19 was reported in Ethiopia on 13 March 2020, the Ministry of Health in collaboration with its partners, conducted different trainings on preventive measures for HCPs at several hospitals and health centers, with supplies of PPE materials. The HCPs in Ethiopia have worked tirelessly and played a crucial role in the management of COVID-19 cases, despite high personal risks and worries about the current pandemic crisis. However, no study has been undertaken in the country on risk perception and preventive practices of HCPs during the current COVID-19 pandemic. In addition, emotional reactions and feelings of healthcare workers such as worries about COVID-19 crisis have not been studied. To address this research gap, this study was conducted to assess preventive practices, perceived risk and worry about COVID-19 crisis among HCPs. Understanding the preventive practices, risk perception and worries of HCPs would help in protecting them and preventing the COVID-19 pandemic through effective risk communication.

## **METHODOLOGY**

Total 200 people participated in this survey which consisted of 56 medical doctors, 68 nurses and paramedical staff and 76 ASHA health care workers. Questions were in and open-ended format and in English language for medical doctors and in local languages for nurses, paramedical staff and the ASHA health care workers. The survey was sent by email as well as WhatsApp mobile application to the survey participants. The questions were based on about personal protective equipment's and the guidelines related to the same which have been issued by Ministry of health and family welfare, India. They were also asked to respond about various types of masks that they use and the sanitation measures as well as disposal of hospital waste.

### Data management and analysis

We extracted information related to COVID-19 transmission dynamics, clinical presentations, and exposures that may facilitate the transmission while reviewing the literature. For guidelines, we extracted title, country or organization, department, target audience, and the different control measures recommended to control COVID-19. The lead author extracted the information from the guidelines, and all coauthors reviewed and validated it. We performed a content analysis of all data and summarized it under certain themes, and we then compared and contrasted our findings as they related to COVID-19 IPC measures.

### RESULTS

Among respondents, 86% reported knowing when their patients had been placed on droplet (respiratory) precautions, with significantly more physicians (i.e., house-staff, faculty, and fellows) than nurses and paramedical staff, knowing when precautions had been instituted. 12% of the survey participants indicated a higher level of respiratory protection (N-95 filtering facepiece or powered air-purifying respirator). (TABLE 1)

**Table 1- Survey characteristics related to PPE amongst medical professionals, nurses, paramedical staff and ASHA workers.**

Survey points	Medical professionals	Nurses and Paramedical staff	ASHA health care workers
Identification of PPE used for protection against coronavirus	92.3%	66%	33%
Waste management knowledge related to PPE	75.1%	56%	14%
Cumbersome condition of wearing PPE	93%	90.2%	80%
Shortage of PPE	69%	46.3%	81.5%
Reusing PPE			
Adherence to PPE guidelines	84%	63.1%	33%
Knowledge about how frequently to change PPE	71%	37%	16%
PPE can help against coronavirus	78%	48.3%	34%

Many of the health care professionals find it cumbersome to wear the PPE for around close to 10 hours at one stretch as the amount of these equipment's are in shortage. They also have a hard time trying to reuse the basic PPEs like masks and gloves.

Many hospitals have people to check how properly the PPE has been worn by the HCWs before going for treatment of coronavirus patients especially the ICU. The cleaning staff is also less equipped with knowledge about how to dispose the medical waste laced with virus.

Only 32% of ASHA workers, correctly identified the equipment that would provide adequate protection. These health care workers who generally take up the primary screening in containment zones have knowledge of gloves and surgical mask only and thus they are underequipped with the adequate PPE knowledge. They also aren't equipped with knowledge of how frequently they should change gloves as well as masks when they are screening patients as well disposal of the medical waste even though they do comprise of a large part of frontline health care workers.

## **DISCUSSION**

Despite the fact that infection prevention and control practices can significantly improve patient outcomes, adherence with these practices is generally poor. Previous studies have indicated that addressing workplace factors related to infection control practices will have the greatest impact on adherence behaviour.<sup>15</sup>

The British Columbia Interdisciplinary Respiratory Protection Study Group found that "organizational and individual factors can explain much of the variations in self-protective behaviour in healthcare settings, especially with respect to applying universal standard precautions".<sup>16</sup> Henry et al, demonstrated that point estimates of self-reported adherence with all barrier precautions (with the exception of gloves) overestimated observed adherence by at least a factor of 3.<sup>12</sup> Similarly, O'Boyle et al, found that the correlation between reported and observed adherence with hand-washing recommendations among nurses was quite low.<sup>17</sup>

Infection prevention and control practices are essential at all levels of healthcare delivery. However, recent concerns about respiratory epidemics, such as SARS and pandemic influenza, have highlighted gaps in our knowledge specific to the nosocomial spread of respiratory viruses and drawn attention to concerns that critical care providers are at a particular risk.<sup>18</sup> Initial clinical presentation of pandemic coronavirus will likely be similar to, if not indistinguishable from, seasonal influenza or other viral respiratory infections. Research strongly supports early containment as the best strategy for controlling the potentially devastating consequences of an unchecked outbreak.

The guidelines should include a strong statement against the use of cloth or material masks, and HCPs should be encouraged not to wear 2 products simultaneously. Although 4 guidelines recommend the reuse of PPE or extended wear, no current guidelines address this behavior, and strict hand hygiene and donning/doffing procedures should be followed. For example, the UK guideline recommends that PPE be used between 2 and 6 hours, whereas the ECDC guidelines recommend wearing PPE for up to 4–6 hours.<sup>19-21</sup> If countries resort to these strategies, it would be useful for the wider international community that observations studies be undertaken so that the

results can be applied to future guidelines. Lastly, the WHO guidelines lack a recommendation on fit testing. It cannot be assumed that staff members have been fit tested for their respirators, so hospitals should be encouraged to fit test or at least fit check members of staff, including ancillary staff (ie, cleaning and support staff) and pharmacists who frequent the wards.

This was three months after the first confirmed case of COVID-19 was reported in Ethiopia. Addis Ababa city is the most affected part in the country, and the study was conducted when strict measures were taken to contain the COVID-19 pandemic. The study aimed to assess protective behaviors, risk perceptions, and worry about the COVID-19 crisis among HCPs in six public hospitals the city. The study participants included medical doctors, interns, nurses, midwives, pharmacists, medical laboratory technologists, and technicians. These categories of HCPs have direct or indirect close personal exposures with suspected or confirmed COVID-19 patients while performing their clinical duties. The study revealed widespread practices of preventive measures, the highest perceived risk and worry about COVID-19 crisis among healthcare workers. The majority of the partici

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## CONCLUSION

We observed significant gaps in knowledge about correct PPE use among all the HCWs. The inconvenience of PPE use and perception of organizational norms significantly influenced adherence behaviours. Critical care HCWs may be at a substantial risk of developing and/or transmitting nosocomial respiratory viral infection, and 77% of critical care practitioners believe they can improve their infection control practice. To have an appreciable impact on patient and provider safety, efforts to improve PPE adherence and effectiveness must address both organizational factors associated with safety climate and knowledge barriers among clinicians.

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