## EFFECTS OF PERSONAL PROTECTIVE EQUIPMENT ON THE PHYSIOLOGICAL PARAMETERS OF HEALTH CARE WORKERS

To the editor:

We would like to add to the study, Understanding the physiological effects of wearing enhanced personal protective equipment while providing patient care by Bulson and Shawl from the November/December 2019 issue of *Journal of Emergency Management*.[1]

Personal protective equipment (PPE) is the key necessity for health care worker's (HCWs) protection from COVID-19. Apart from its scarce availability in the times of progressively widening use, the other major issue is the difficulty faced by HCWs while working with PPE in ICUs for long durations. The three factors that affect the adherence to PPE to enhance workplace safety are individual factors, environmental factors. and organizational characteristics.[2] Environmental factors have a significant impact in countries with high temperatures. It is considered mandatory to have negative pressure facilities for managing patients with COVID-19, but most of the institutions are deprived of these facilities.[3] Therefore, most ICUs rely on exhaust fans with neutral ventilation that hinder the effective cooling of the facility. The other important factor is the inevitable need to transfer these patients for diagnostic procedures, especially radiological imaging, that can be very laborious for health care workers. As the temperature has crossed 40 degrees celsius with humidity reaching up to 80 percent in the northern states of India, the working conditions have become more hostile for HCWs wearing PPE. This has resulted in frequent breaches, often due to syncopal attacks, that make them susceptible to infection.

The length of time on duty varies among different institutions depending upon the burden of illness. Prolonged hours enhance the propensity for adverse events among HCWs. We did a small observational study to assess the physiological parameters of five ASA I HCW volunteers while wearing PPE for six hours (Figure 1). Health care workers were also doing routine physical activity in the operation theatre neces-

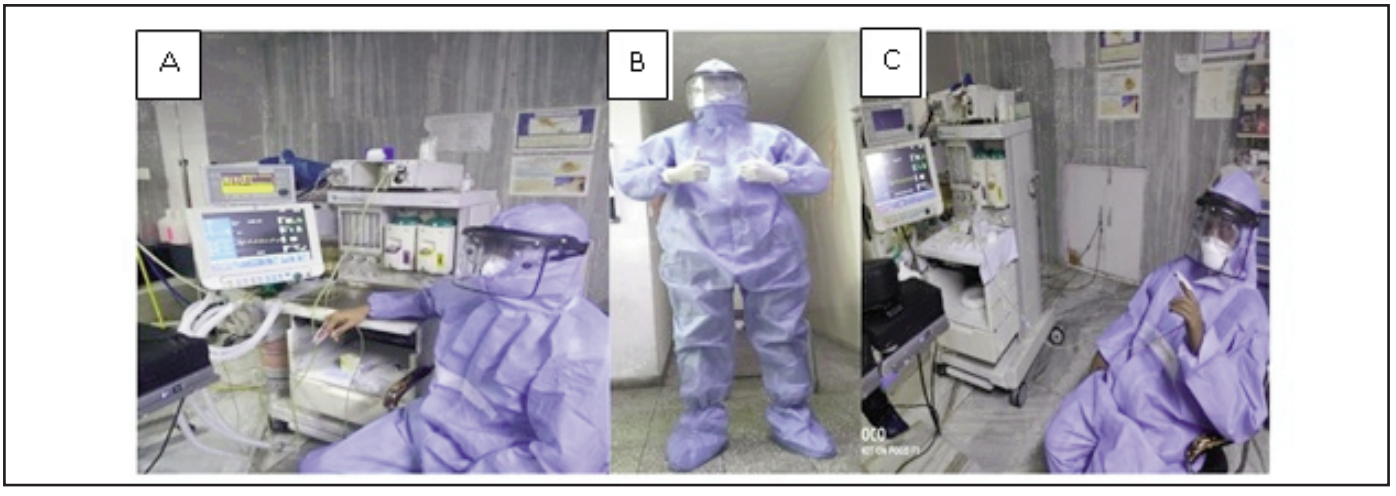


**Figure 1. Monitoring vitals of subjects (A and B). PPE while working (C).**

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| Table 1. Vitals of health care workers during PPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Subject** | **Vitals** | **0 hours** | **1 hour** | **2 hours** | **3 hours** | **4 hours** | **5 hours** | **6 hours** |
| 1 | Oxygen saturation | 99 | 99 | 98 | 99 | 98 | 98 | 98 |
| | Heart rate | 77 | 72 | 70 | 65 | 70 | 82 | 76 |
| | Blood pressure | 126/80 | 120/84 | 120/80 | 128/78 | 124/78 | 120/80 | 128/86 |
| 2 | Oxygen saturation | 98 | 99 | 99 | 98 | 99 | 98 | 98 |
| | Heart rate | 80 | 77 | 72 | 74 | 65 | 76 | 87 |
| | Blood pressure | 120/80 | 126/80 | 130/84 | 120/80 | 128/78 | 126/78 | 120/80 |
| 3 | Oxygen saturation | 99 | 99 | 99 | 97 | 98 | 98 | 98 |
| | Heart rate | 72 | 77 | 72 | 70 | 68 | 75 | 85 |
| | Blood pressure | 126/80 | 120/84 | 120/80 | 128/78 | 124/78 | 120/80 | 128/86 |
| 4 | Oxygen saturation | 98 | 99 | 99 | 98 | 99 | 98 | 98 |
| | Heart rate | 70 | 77 | 72 | 70 | 65 | 70 | 78 |
| | Blood pressure | 126/80 | 120/84 | 120/80 | 128/78 | 124/78 | 120/80 | 128/86 |
| 5 | Oxygen saturation | 99 | 98 | 97 | 96 | - | - | - |
| | Heart rate | 74 | 88 | 90 | 92 | - | - | - |
| | Blood pressure | 126/80 | 120/84 | 120/80 | 128/78 | - | - | - |

sary for patient care during the observation period. All physiological parameters including heart rate, blood pressure, and oxygen saturation were monitored every hour for 6 hours. Four volunteers did not have any abnormalities on physiological parameters except one HCW who had to remove the PPE prematurely as the oxygen saturation dipped from 99 percent to 96 percent within 3 hours of donning the PPE. It was also accompanied by tachycardia, while the blood pressure remained stable (Table 1).

In our study we found that even in volunteers wearing PPE and the ones performing usual OT work have significant changes in their vital physiological parameters which might sometimes be alarming. This is more so in case of HCWs who have underlying compromised physiological conditions but are presumed to be healthy due to lack of any proper health assessment before being recruited for donning a PPE. Therefore, a mechanism should be in place to have a thorough physiological assessment of HCWs to find out their capacity to work under these strenuous conditions. Since the healthcare workers are the backbone of the health system of a country, saving the lives of HCWs is equivalent to saving the lives of many!

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