Personal protective equipment for Health care workers donning for COVID-19 areas: Walking a tight rope between safety and comfort!

Dear Editor,

Coronavirus disease-2019 (COVID-19) pandemic has infected more than 180 million cases worldwide. The frontline healthcare workers (HCWs) battling the disease need to don into personal protective equipment (PPE) to protect themselves from the infection.[1]

An N95 respirator is a protective mask designed to achieve an efficient filtration (block at least 95% of particles >0.3 μm in size). Its incorrect use could compromise its protective effect and may even increase the risk of infection.[2,3] This is especially important for anesthesiologists who are frequently involved in aerosol-generating procedures like noninvasive ventilation, tracheal intubation or extubation.

The most important consideration for the effectiveness of a mask is its fit on the HCWs face and its filtration efficacy. A tightly fit mask may lead to discomfort, claustrophobia, pressure on the face and difficulty in breathing.[1] Previous studies have observed that the HCW's compliance with use of N95 mask and the recommended PPE is generally poor because the respirators reduce the maximal physical work capacity by increasing the inspiratory resistance, expiratory resistance, and dead space. COVID areas have limited air conditioning and the non-valved masks may become wet with usage earlier due to inability to dissipate humidity. The resistance offered by the non-valved masks during expiration may lead to headache, inability to concentrate, shortness of breath, dizziness, rise in blood pressure, and fatigue due to accumulation of carbon dioxide.[4] This may increase mask handling and increase the risk of infection to the HCW. In addition, non-valved N95 masks may increase the fogging of goggles and face shield and that makes procedures like intubation difficult for HCW especially with a prolonged donning (6–8 h period usually), in the already cumbersome conditions (PPE and aerosol box).[5]

The valved variety allows unimpeded exhalation through one-way valve. An exhalation valve in the N95 masks may help to dissipate humidity, heat, and carbon dioxide from the dead space and decrease exhalation resistance. However, an infected person wearing a valved mask may spread the virus to others around him.

No previous study has identified the impact of mask type on COVID-19 transmission. A valved N95 mask may be more acceptable for the HCW, but there is a distinct possibility of transmition of the infection to others. This can be minimized by daily screening of the HCWs before coming for duty, maintaining a safe distance from each other and wearing a surgical mask over it.

The stress of working in COVID areas with PPE during the present pandemic has already dented the morale of HCWs. We should ensure comfort of the HCWs along with the safety for others. Based on logical thinking a valved mask should be avoided when working in non-COVID or COVID suspect areas. However, in COVID positive areas where prolonged continuous donning in full PPE is required and risk of infection from HCW to others is negligible, valved mask would offer the best balance of breathing comfort and safety to the provider. Centers for disease control and prevention (CDC) also mentions that valve in N95 masks reduces the exhalation resistance and makes it more comfortable to wear without reducing their efficacy in prevention of infection to the HCWs caring for COVID positive patients.[6]

Further research could give invaluable insights for clarifying the risks and level of safety associated with the use of either type of devices and in framing appropriate policies regarding the appropriate type of PPE in various circumstances. We would urge the manufacturers to deliberate into mask designs with appropriate certification like 'SITARA' and are universally acceptable to all HCWs in tackling the pandemic of COVID-19.

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