Innovative application of ultraviolet rays and hydrogen peroxide vapor for decontamination of respirators during COVID-19 pandemic- An experience from a tertiary eye care hospital

Dear Editor:
As we all know, due to the growing coronavirus pandemic the daily demand and utilization of personnel protective equipment’s (PPE) have increased exponentially. Moreover, this has also resulted in acute shortage of PPE.[1] The need of the hour is to minimize this shortage by decontaminating these respirators, so that they can be optimally reused. We already have evidence for Ultraviolet light and Hydrogen Peroxide ($\text{H}_2\text{O}_2$) as a good source for decontamination of PPE.[2] Hence, we implemented an innovative idea of decontamination of the respirators by using old condemned air tight freezer boxes [Fig. 1a] which are installed with Ultra Violet C (UV-C 254 nm, 60 mJ/cm$^2$) tube lights [Fig. 1b].[3]

The respirators are placed in the freezer box with the help of copper hangers [Fig. 1c] and $\text{H}_2\text{O}_2$ is sprayed over the respirators [Fig. 1d].[4,5] The freezer box also has mirrors on walls and the base to reflect the light [Fig. 1c]. This increases the efficiency of decontamination and prevent the need for flipping the respirators. When UV-C light comes in contact with $\text{H}_2\text{O}_2$, free hydroxyl radicals are generated by advance oxidation process. These free radicals further destroy the germs, viruses, and microbes over the surface.[5] The recommended cycle for decontamination is 15–20 minutes.[5] An automatic safety feature is included in the freezer box. The light gets switched off once the box is opened and automatically gets switched on once the box is closed, to prevent health hazards to the operator.

Once the respirators are decontaminated, they are kept in sterilized zip lock bags, which can be used whenever needed. The respirators and the zip lock bags are tagged with the name of the health care worker, so as to avoid confusion [Fig. 2a and b]. These respirators can be effectively decontaminated for 5 cycles[6] in this chamber. We recommend this economical technique of PPE decontamination, in health care facilities to combat the COVID-19 pandemic.

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Conflicts of interest
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