RESEARCH INSIGHTS

Human health, climate change and PPE use during the COVID-19 pandemic

The planetary health effects of COVID-19 in dental care: a life cycle assessment approach. *Br Dent J* 2022; https://doi.org/10.1038/s41415-022-4906-2

With most of personal protective equipment (PPE) containing more than 50% plastic, there is no doubt that its increased use during the COVID-19 pandemic has caused undeniable environmental harm. This study carried out at Dublin Dental University Hospital (DDUH) aimed to assess environmental effects of different PPE before and after COVID-19.

The products analysed in this study were chosen based on PPE guidelines in the DDUH clinics. It considers the change in guidelines caused by COVID-19 (eg use of reusable gowns prior to and disposable gowns after the pandemic). The PPE were divided into three groups:

1. Body protection: disposable gown, reusable gown
2. Eye protection: visor with disposable face shield, reusable visor
3. Respiratory protection: respirator FP2SLw, respirator FFP2, surgical mask.

The product can cause harm to population health, plants, animals, soil, or water by any process in its life cycle from production to disposal. It can also affect the future availability of natural resources. The impact could be global (eg climate change) or local (eg water pollution). The impact categories included in this study were divided into the following groups:

- Climate change
- Ecosystem quality
- Human health
- Resources.

The results of this study showed that disposable gowns are the main contributor to global warming, while damage to human health was more significant for the reusable gowns in the body protection category of PPE. Water consumption was the main contributor to human health damage for the reusable gowns, while disposable gowns used three times more fossil fuels and four times more dissipated water.

In the eye protection category, a visor with a disposable face shield had a higher environmental impact than the reusable visor. Furthermore, a visor with a disposable face shield used three times more fossil fuels, four times more dissipated water and released five times more carbon dioxide equivalent emissions than reusable ones.

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In the respiratory PPE group, the FP2SLw respirator had the highest environmental burden in all impact categories, followed by the FFP2 respirator and surgical mask, respectively.

The study concluded that dental PPE has notable environmental impact, which could be reduced by using eco-friendly domestic products and increased usage of reusables. Production of PPE can be optimised by using recycled materials with the least environmental impact. Any new PPE product introduced to dental industry should be carefully analysed to assess its effects on human and environmental health.

By Joanna Kociubinska
DCT2, Glasgow Dental Hospital and School, UK