

Impact of COVID-19 pandemic on carbon footprint and strategies to mitigate waste generation

Dear Editor,

Since the onset of the global coronavirus pandemic, health care and frontline workers have been at high risk of contracting the deadly COVID-19 infection.^[1] The use of face masks, gowns, respirators, and personal protective equipment (PPE) have multiplied exponentially.^[2] A majority of centers sought newer alternatives and suppliers as a reasonable substitute to meet the daily demand of PPE and the mindset shifted towards conserving PPE.^[3] The effects were seen on outpatient departments, in the form of regular care of patients getting a big setback, and emergency services being provided only during peak COVID-19 waves. Ophthalmology as a speciality was no exception to this. Ophthalmic anterior segment surgeries are mostly elective surgeries.^[4] All centers had to cancel or postpone elective surgeries during lockdown, including the most commonly performed routine cataract surgery. After the lockdown, once elective surgeries were restarted, there was a need to adapt to new triage guidelines, RT-PCR testing, increased use of masks, face shields, and PPE kits during examination and even while performing surgeries.^[5] All these not only resulted in increased waste generation, but also added extra burden in the form of resource consumption, and detrimental impact on the environment via emission of greenhouse gases. These greenhouse gases further added significantly to the global carbon footprint. Maintaining a healthy environment for survival is our responsibility, and this can be achieved by reducing our carbon footprint.^[6]

Many studies from the West have reported increased greenhouse gas emissions and have highlighted the contribution of these gases to air pollution; secondary to increased waste generation during ophthalmic surgeries.^[7] The significant contributors from ophthalmic units include cataract surgery, glaucoma surgery, disposable gowns, gloves, mask, and head caps.^[8] Moreover, a large number of patients had to use personal transport to reach the healthcare facility.^[9] All of these further

impacted the global carbon footprint. The scenario is the same in India and other developing countries. Cleaning of equipment and instruments between each patient examination has also increased waste generation and human energy expenditure. The next big step should be to reduce dependence on single-use disposable supplies and equipment. We should adapt to solutions and innovations during the pandemic, and look for alternatives like biodegradable materials rather than single-use supplies.^[10]

Strategies to mitigate waste generation

Implementation of reusable supplies

Reusable PPE and multidose pharmaceuticals should be implemented in daily clinical practice as an adaptation and mitigation strategy. There is enough evidence from low-income, low-resource settings that OT gowns, cloth masks, and caps can be sterilized and reused in the operating room. The reusable PPE are designed with a higher life span, and can be safely and efficiently implemented while performing elective surgeries for multiple cases. This will help in reducing waste generation and leave a lower carbon footprint as compared to disposable PPE.^[11]

Same-day elective surgery and discharge

The COVID-19 pandemic taught us many things, and adapting to challenges is the need of the hour. There is need to look for practical options like same-day admission, elective surgery, and discharge in the evening. This will help in reducing multiple patient visits to the hospital, reduce transport and travel to the health care facility. The existing vision centre model in India can play a vital role as most patients can be examined and reviewed at the nearby vision centre mostly located in peripheral areas, thus cutting down the need for travelling to base hospitals only when necessary. This, in turn will play a considerable role in reducing the global carbon footprint.^[12]

Single-use device (SUD)

This is another method of reuse, which is beneficial when other supplies are in shortage. SUDs like oximeters, monitors, tubing, phacoemulsification tips, compression sleeves can be sterilized and reused. There are separate SUDs for each elective surgery in the West. We should prefer SUDs that can

be used for multiple cases following meticulous sterilization and autoclaving techniques.^[13]

Respirator sterilization

The COVID-19 pandemic opened gateways for numerous innovations, and one such innovation was sterilization of respirators using hydrogen peroxide and ultraviolet rays. In this technique, the respirator can be sterilized for 6–8 cycles with an efficiency of approximately 95%. When hydrogen peroxide encounters ultraviolet rays, free radicals are generated, which in turn destroy microbes, bacteria, and viruses. This allows safe re-utilization of the respirators. Similarly, in the outpatient department and operating theaters, reusable cloth drapes, gowns, and instruments can be implemented to reduce waste generation, thus reducing the carbon footprint.^[2]

Renaissance of telemedicine

Telemedicine is a boon which needs to be explored during the COVID-19 pandemic. With the help of telemedicine, patients sitting in remote parts of the country can have access to eyecare without the need for travelling. This will also help in reducing the risks of COVID-19 infection. They can be examined for common ailments and guided regarding management. Those needing emergency evaluation can be referred to a nearby vision centre or a base hospital. This will go a long way in reducing the carbon footprint by minimizing the number of hospital visits, travel costs, and loss of pay/work experienced by the patients.^[14]

Uberization of eyecare

This is a rapidly growing innovative concept of door-to-door patient examination. This can help in reducing hospital visits and can be very useful during the pandemic. Visual acuity examination with portable Snellen's chart or apps; intraocular pressure examination with handheld tonometer (such as ICare); gross ocular examination with torchlight, detailed examination with handheld slit lamp; portable, virtual, reality-based perimetry; and fundus photos with portable nonmydriatic fundus camera can be revolutionary, allowing detailed patient examination equivalent to hospital-based evaluation. This, in turn, can help in reducing cost, travel, and the number of patient visits to the eye care facility, further alleviating the carbon footprint.^[15]

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