



Viewpoint

Contact lens use at the time of SARS-CoV-2 pandemic for healthcare workers

There are around a 140 million contact lens users in the world¹. The number is globally increasing every year due to ease of availability, low pricing options, improvement in vision without affecting physical appearance, non-interference with many sports and other activities and enhancement of quality of life². These also apply to healthcare workers (HCWs), particularly with reference to coronavirus disease 2019 (COVID-19). The World Health Organization (WHO) declared it as a pandemic on March 11, 2020. It is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)³. This has resulted in a substantial change in the international social interactions. There has been a strong emphasis by the WHO on hand hygiene, face protection and avoidance of touching face, mouth and eyes⁴ to contain the spread of this novel virus.

Contact lens-related microbial keratitis is the infection of the cornea of the eye where the lens rests. It is a complex multi-factorial disease⁵. Although the absolute rate of such infections is low among contact lens users, the risk may be enhanced in a hospital setting with an increased exposure to pathogenic organisms⁶. It can lead to serious complications including blindness and need for corneal transplants. The ocular surface of the eye is connected to the respiratory tract *via* the nasolacrimal duct. This would allow viruses to spread to the respiratory tract from the eye. Air-borne droplets can easily infect the exposed ocular surface⁷. Certain strains of coronaviruses can cause a variety of ocular complications in both animals⁸ and humans⁹. The possibility that SARS-CoV-2 can also infect the ocular tissue cannot be ruled out. SARS-CoV-2 is thought to spread *via* respiratory droplet transmission¹⁰ and presents with a myriad of clinical symptoms. The novel coronavirus has been detected in the tears and conjunctival epithelium of SARS-CoV-2 positive patients^{11,12}. A case has been reported where a COVID-19 patient has presented with conjunctivitis

several hours before development of any respiratory symptoms¹³; however, the transmission rate from ocular tissue is suggested to be low¹⁴. The frequency of conjunctivitis in patients with COVID-19 is estimated to be <3 per cent¹⁵. Droplet transmission occurs from COVID-19 patients with respiratory symptoms (within 1 m distance); this increases the risk of HCWs of having their mucosa (nose and mouth) and conjunctiva exposed to potentially infective respiratory droplets in clinical settings^{12,16}.

Risk for contact lens-related infections includes non-modifiable factors such as younger lens wearers, male sex, high refractive error, higher socio-economic status (unexplained, perhaps attributed to behaviour in lens wear) and previous ocular disease¹⁷. The modifiable risk factors are smoking, overnight use of lenses, use of water as solution to disinfect lenses, poor lens and hand hygiene, poor replacement schedule of lenses and lens cases and use of multiple day lenses compared to daily replaceable lenses¹ as these cause increased bioburden production over lenses. These risk factors remain valid for HCWs working during the COVID-19 pandemic.

Currently, available advice for the general public is conflicting as the Centers for Disease Control and Prevention (CDC) claims “no evidence to suggest contact lens wearers are more at risk for acquiring COVID-19 than eyeglass wearers”. It also claims that “hydrogen peroxide-based systems for cleaning, disinfecting, and storing contact lenses should be effective against the virus that causes COVID-19”¹⁸. While the American Academy of Ophthalmologists advises to switch to eyeglasses as people who wear lenses touch their face more due to increased irritation with lenses¹⁹. Current data are equivocal for contemporary lens solutions containing hydrogen peroxide to completely disinfect viruses^{20,21}. There is no study yet done to look at the current contact lens solutions and SARS-CoV-2 disinfection. As

hands remain a vector for spreading the contracting microbes through contact lenses²², the significance of hand hygiene cannot be stressed more as it has been recommended by both the CDC and the WHO. Hand hygiene should also be followed before application and removal of contact lenses. This advice can be followed to reduce the risk of contracting the virus. Contact lenses should be immediately removed and discarded if the eye gets infected.

Nosocomial spread of SARS-CoV-2 has been a major concern for both patients and HCWs²³. In the increasing layers of personal protective equipment (PPE), contact lenses may be a liability as it requires extra care before and after use. Although the rates of transmission are low, the current solutions do not guarantee full disinfection. A risk all HCWs face in clinical environment is increased exposure to pathogens compared to the general public; even though the rate of contact lens-associated complications is low, seeking medical attention during the time of a global lockdown can be a potential issue. It has been postulated that there may be an increase of ocular surface infections in HCWs wearing contact lenses as the novel virus is transmitted *via* aerosol droplets and contamination of finger tips while applying and removing lenses. It is acknowledged that eyeglasses are a more suitable alternative to contact lenses, but that does not mean that it will protect against SARS-CoV-2. Eyeglasses are advised in busy clinical environments as these are easier to clean with soap and water and dried with a paper towel, unlike lenses which may need to be replaced or thoroughly disinfected. Wearing and removing eyeglasses may inadvertently result in touching one's face; however, contact lenses cause dry eyes in up to 40 per cent of wearers, leading to discomfort and more frequently touching one's eyes²⁴. Despite this, certain advantages of contact lenses remain such as a safe way of correcting vision problems, especially in corneal dystrophies²⁵, and it may be more comfortable when worn with PPE than eyeglasses for HCWs. If HCWs still want to wear contact lenses, it is advised to wear daily disposable lenses²⁶ to minimize any contaminants in lens storage systems and to practice fastidious hand hygiene techniques.

Finally, further research is required to investigate the transmission and infectivity of SARS-CoV-2 through ocular tissue and secretions, to ascertain the interaction of lens material with the virus and to

determine which lens solution components will fully disinfect this new virus.

Conflicts of Interest: None.

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