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## Transmission of covid 19 through eyes — Review article

Shivani Sanjay Ingole<sup>1</sup>, Roshna Bhutada\*<sup>2</sup><sup>1</sup>Research Scholar, Mahatma Gandhi Ayurved College Hospital & Research Center, Salod (H), Wardha, Datta Meghe Institute of Medical Sciences (DU), Nagpur, India<sup>2</sup>Shalakyatantra department, Mahatma Gandhi Ayurved College Hospital & Research Center, Salod (H), Wardha, Datta Meghe Institute Of Medical Sciences (DU), Nagpur, India

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### ABSTRACT

The Corona virus Covid19 is a severe respiratory disorder which is caused due to infection, previously known as 2019-nCoV. The infection is caused due to the contagious virus, which leads to a severe respiratory disease known as COVID-19. Patients who are suffering from conjunctivitis, fever, cough and shortness of breath and those who traveled from hot spot area of corona virus or their family members are suffering from corona virus come to an ophthalmologist could be the patient suffering from corona virus or may have an infection due to covid19. The corona virus is a contagious disease which spreads from person to person through their respiratory droplets of an infected person after their coughing and sneezing. A healthy person could be infected by corona virus if people touch an object or surface with virus present from an infected person, and then touch their mouth, nose or eyes. In some recent articles and reports, it is suggested that corona virus can cause conjunctivitis either as an early sign or during hospitalization during severe covid19. There are chances of spreading of corona virus to eyes through aerosols or due to hands to eye contact. Covid19 patients have single-stranded RNA virus throughout the body and also in the tears of eyes, but there is no evidence of corona virus cultured in the conjunctiva of eyes. Conjunctiva congestion and follicular conjunctivitis are found in patients having confirmed diagnosis of covid19.

### \*Corresponding Author

Name: Roshna Bhutada

Phone: 8766866422

Email: [drroshnarathi@gmail.com](mailto:drroshnarathi@gmail.com)

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### INTRODUCTION

The outbreak of highly contagious, recently identified coronavirus infection has become a pandemic (Deshpande and Parwe, 2020). Coronavirus

is transmitting from person to person through aerosols or nasal secretion, but eyes or tears play a role in transmitting coronavirus has been discussed. Here we describe the genomics and morphology of coronavirus in systemic and ophthalmic manifestation (Cao *et al.*, 2020). The conjunctiva surface of eyes directly comes in contact with different ocular pathogens and upper respiratory tract is joined by nasolacrimal duct. However, the upper respiratory tract can transmit the virus to the ocular surface and cause conjunctivitis and various ocular infection. There are various Clinical disorders which can be diagnosed, and manageable such as conjunctivitis, retinitis, optic neuritis and many others have been reported (Loon, 2004).

Coronavirus can spread from person to person by direct contact, oral secretion of respiratory droplets,

and it has been confirmed. There are possibilities that coronavirus can spread through air particles and small airborne particles that stay in the air for a longer time can transmit the virus (WHO, 2020a). In different articles, it shows that human coronavirus is bound to angiotensin enzymes two binds to the cell entry receptors. It helps to invade the lung epithelium through spike protein that causes severe respiratory disorders and shows symptoms such as shortness of breathing and coughing. However, It is seen that angiotensin enzymes two is mainly found in posterior aspects of eyes and not in the anterior surface of eyes, it is found on the retinal surface of retinal pigment epithelium and not found on conjunctivas surface or corneal epithelium. Tears supply nutrients and oxygen to eyes and are constantly renewed through the lacrimal system.

Therefore, the virus goes into the tears through the lacrimal system via a nasolacrimal duct in the form of aerosols or respiratory droplets, and it infects the respiratory tract (Wu *et al.*, 2020). The ocular surface is composed of conjunctiva, cornea and lacrimal apparatus and having clear fluid from the eyes, which gives an immune system of the mucosal surface of eyes. It is connected to the inferior meatus of the nose (Yasri and Wiwanitkit, 2020). Therefore, if respiratory droplets are deposited on the ocular surface, then the aerosols or respiratory droplets containing virus goes into the inferior meatus of the nose, from the nose it transports to the respiratory system and goes into lungs produces many symptoms. Thus, eyes are the gateway of entry for the contagious respiratory virus, and there is a possibility of transmission of the virus through direct injection into conjunctivas surface (American Academy of Ophthalmology, 2020).

As virus was detected in tears and conjunctival secretion it produces disorders like conjunctivitis, and its secretion play an important role in developing other symptoms, in some cases earlier only conjunctivitis seen and then other respiratory symptoms seen and this conjunctivitis are also infectious. (Xia *et al.*, 2020) Transmission of corona virus through eyes is still under discussion. (Lu *et al.*, 2020) While examining the Patients during the slit-lamp examination and ophthalmic examination during treatment procedures may produce an immediate risk of transmission of the virus from an infected patient (Rothe *et al.*, 2020). Pandemic is a word, used for the infection or disease that are spread worldwide, is not a word to use lightly or carelessly. If misused, can cause unreasonable pain in population which leads to mental suffering and death (Nisargandha and DadaraoParwe, 2020). Four key areas for prevention. 1) Always prepare and be ready.

2) Detect the virus, protect and treat specifically. 3) Reduce transmission by following all preventive aspects. 4) Creative and learn. Virus isolation continues from infected patients with coronavirus (WHO, 2020a,b). WHO will provide different activities at a national and international level, which can be used to assess the spread of severe acute respiratory syndrome (WHO, 2003).

#### Aim

To study the role of transmission of covid19 through eyes.

#### Objectives

The main aim of this study to assess the role of transmission of corona virus through eyes and to find out the weather coronavirus is found in tears, conjunctival secretion in the infected patients' eyes. This study is done based on different research articles on covid19.

#### RESULTS AND DISCUSSION

According to our study, it is observed that the patient having conjunctivitis and had direct contact with an infected person of coronavirus may suffer from a severe acute respiratory disorder. It is found that virus transmits from eyes to nasal passage through nasolacrimal duct and then it passes to the respiratory duct and lungs leads to many symptoms such as shortness of breath, coughing etc. conjunctivitis is an ocular infection which shows symptoms early diagnosis of coronavirus or during hospitalization of coronavirus. So there are chances of spreading of direct contact of the infected person to a healthy person. If the patient has ocular manifestation or conjunctivitis with other symptoms, then that person could suffer from covid19. The primary purpose of this study was to know the transmission of covid 19 through eyes. Our study shows that the extraocular pathogens directly come in conjunctival surface and mucosa of eyes and it is connected to the nasolacrimal duct by the lacrimal system and share same receptors and cause acute respiratory syndrome and different manifest symptoms. While an examination of ophthalmic patients we have to follow two rules,

#### 1) SCREEN

S-sanitize, C-consent, R-restrict the entry of attendant, E-examination of the patient with all precautions, E-encourage social distancing, N-No to cash/encourage digital.

#### 2) STAFF

S-sanitize hands, T-Thermal screening, A-Avoid duty if fever, F-follow all precautions and training, F-Face

mask. Covid19 is a pandemic disease as a doctor; we must treat the patient without taking the risk.

## CONCLUSION

We concluded that the coronavirus could be found in the tears and conjunctivas secretion of the infected patient with conjunctivitis. Although respiratory droplets and direct contact with infected person have been identified as the main routes of transmission for above highly infectious human coronavirus, how the eye plays a role in transmitting human coronavirus from an infected person is still under discussion. Now it is understood that ocular surface of conjunctiva directly comes in contact with pathogens and infectious droplets also it is in contact with the lacrimal system through nasolacrimal duct and goes in the respiratory system and cause the acute respiratory disorder. Firstly, it is the target organ for human coronavirus. Secondly, the conjunctiva may be a gateway of entry for or transporter of human coronavirus to infect the respiratory tract. Thirdly, tears and conjunctival secretions may be a transport medium to spread the virus from infected person to healthy person. Now, this possibility cannot be excluded that pathogens that exposed to the eyes go into the nasopharyngeal membrane which is made from mucous by constant tear renewed through lacrimal apparatus then goes into the respiratory tract and cause infection leads to a severe acute respiratory syndrome, symptoms may arise mild to moderate and develop nasal and conjunctival inoculation of coronavirus which is induced by bronchial and nasal inoculation of coronavirus. All health care professional should wear PPE kit, goggles, mask or face shield to prevent from infection.

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## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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