

Presence of SARS-Cov-2 in Nasopharyngeal and Conjunctival Swab of Residents of Hotspot Areas of JaipurGupta Madhu¹, Goyal Girdhar², Atreya Tanu³, Gupta Nidhi⁴¹Principal Specialist, Department of Ophthalmology, RDBP Jaipuria Hospital²Principal Specialist, General Surgery, SMS Hospital, Jaipur³Associate Professor, Department of Physiology, SMS Medical College Jaipur⁴Professor Department of Physiology, SMS Medical College Jaipur

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Conflict of interest: Nil

Abstract:

Introduction: The COVID-19 pandemic, is an on-going (COVID19), caused by severe acute respiratory syndrome coronavirus 2 (SARSCoV2). This is still a big question, whether the coronavirus is present in conjunctival secretion or not? The relationship between COVID-19 and the ocular surface (conjunctiva, corneal epithelium and tear film) as a potential portal of entry and as a transmission mechanism is currently under discussion due to the high transmission rate of the disease. We did this study to identify presence of the virus at the conjunctiva and prevention of spread in the ophthalmology context.

Methods: This Community based descriptive observational study was done in different hot spot areas by Department of Ophthalmology of Government RDBP Jaipuria Hospital (attached RUHS-CMS) Jaipur, Rajasthan in collaboration with CMHO Jaipur team. Total 158 subjects from the 4 hotspot areas of 18 years to 60 years age group (those who had history of contact with COVID positive patient) were included in our study and ophthalmological evaluation is done by torch light and tested for presence of SARS-Cov-2 by RT-PCR method in nasopharyngeal and conjunctival swab samples.

Results: Out of total 158 subjects, in all 4 hotspot areas (A+B+C+D), 37 (23%) were symptomatic, rest 121 were asymptomatic. In hotspot area C (closed campus), out of total 37 subjects, 20 were symptomatic. At all the 4 hotspots (A+B+C+D) out of total 158 screened subjects 29 (18.35%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctiva swab. At hotspot C (closed campus) out of total 37 screened subjects 16 (43.24%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab.

Conclusions: This study shows that out of total 158 subjects, in all 4 hotspot areas (A+B+C+D), 37 (23%) were symptomatic, rest 121 were asymptomatic. In hotspot area C (closed campus), out of total 37 subjects, 20 were symptomatic. SARS-CoV-2 was negative in conjunctival secretion swabs of all the subjects living in hotspot areas. Hotspot C (closed campus) which was a closed area had a very high positivity of nasopharyngeal swab for COVID-19 disease (43.24%) but none of them had positive conjunctival swab testing by RT-PCR method. On the basis of our study, we can conclude that risk of transmission of SARS-CoV-2 is unlikely through conjunctival secretions if patient is asymptomatic.

Keywords: Conjunctival swab, COVID-19, nasopharyngeal swab, SARS CoV- 2.

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Introduction

The COVID-19 pandemic, is an on-going pandemic of coronavirus disease 2019 (COVID19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

The outbreak was first identified in Wuhan, China, in December 2019. The World Health Organization declared the outbreak a public health emergency of international concern on 30 January, and a pandemic on 11 March. [1] Human CoVs mostly spread through respiratory droplets expelled by

infected individuals and direct contact with virus contaminated fomites. [2]

Symptoms of COVID-19 can be relatively non-specific; the two most common symptoms are fever and dry cough. Less common symptoms include fatigue, sputum production (phlegm), loss of the sense of smell, loss of taste, shortness of breath, muscle and joint pain, sore throat, headache, chills, vomiting, coughing out blood, diarrhoea, and rash. [3]

The respiratory problems caused by this pathogen are well known, but the ophthalmological implications of the syndrome have not yet been well described. Currently, more detailed information about the transmission of 2019-nCoV is urgently needed to prevent its pandemic spread. Anatomically, the conjunctiva of the eye is easily exposed to infectious droplets and fomites during close contact with infected individuals and contaminated hands. Although tears have been reported by the World Health Organization in 2003 to be one of the body fluids that might contain SARS-CoV, the infectivity and clinical importance is not yet understood. [4] Recent investigations have revealed that highly infectious human CoVs (mainly SARS-CoV and 2019-nCoV) are rarely detected by RT-PCR and never isolated by virus culture in tears and conjunctival secretions from SARS and COVID-19 patients. [5] Hence, it is hard to assess the infectivity of tears and conjunctival secretions and their roles in virus transmission. We did this study to identify presence of the virus on the conjunctiva and prevention of spread in the ophthalmology context.

Methods

This Community based descriptive observational study was done by Department of Ophthalmology of Government RDBP Jaipuria Hospital (attached RUHS-CMS) Jaipur, Rajasthan in collaboration with CMHO Jaipur after getting approval from institutional ethical committee.

Among the 10 hotspot areas (1km radius area from the epicentre) from containment area (3km radius area from the epicentre), we randomly selected 4 hotspots and named them – A,B,C,D and performed random sampling. We randomly selected 35-43 subjects of age 18 years to 60 years age group (those who had history of contact with COVID positive patient) from each hotspot for our study. Pregnant females, critically ill patients and patients who refused for consent were excluded from the study.

Our Ophthalmologist examined eyes with torch light and took conjunctival secretion swab from the lower conjunctival for nice of right eye with sterile nylon flocked swabs without topical anesthesia. At the same time nasopharyngeal swab was taken by CMHO team. The tips of the swab sticks were broken off and placed into a viral transport medium. Conjunctival secretion sample was collected in aseptic conditions in labelled Viral Transfer Media (V.T.M). VTM sealed and kept in plastic zipper bag and sealed samples were sent for RT- PCR in sample carrier box at 2-to-6-degree centigrade temperature. Cold chain maintained during the sample transportation to laboratory.

Data collection is done and analysed by using appropriate statistical methods.

Observations & Results

1. Asymptomatic Subjects Vs Symptomatic Subjects

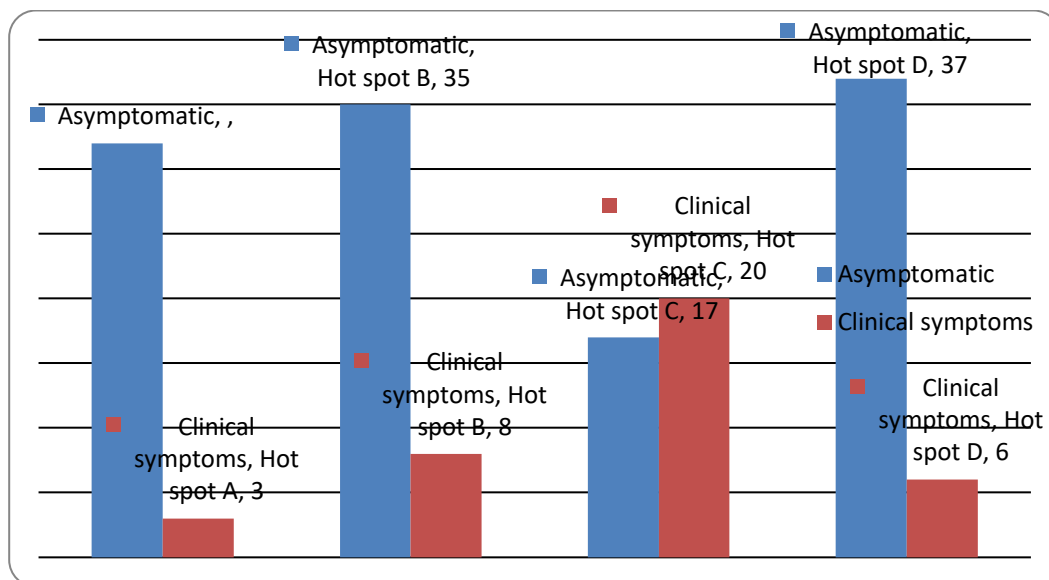


Figure 1:

Table 1:

Hot spot areas	Subjects			Asymptomatic subjects	Clinical symptomatic subjects	Positive Nasopharyngeal swab	Positive Conjunctival swab
	Male	Female	Total				
Hot spot A	17	18	35	32	3	4 (11.43%)	0
Hot spot B	24	19	43	35	8	6 (13.95%)	0
Hot spot C	37	0	37	17	20	16 (43.24%)	0
Hot spot D	24	19	43	37	6	3 (06.98%)	0
Total	102	56	158	121 (77%)	37 (23%)	29 (18.35%)	0

In hotspot area A, out of total 35 subjects, only 3 were symptomatic.

In hotspot area B, out of total 43 subjects, only 8 were symptomatic. In hotspot area C (closed campus), out of total 37 subjects, 20 were symptomatic. In hotspot area D, out of total 43

subjects, only 6 were symptomatic. Out of total 158 subjects, in all 4 hotspot areas (A+B+C+D), 37 (23%) were symptomatic, rest 121 were asymptomatic.

2. Subjects Tested Positive for Nasopharyngeal & Conjunctival Swab

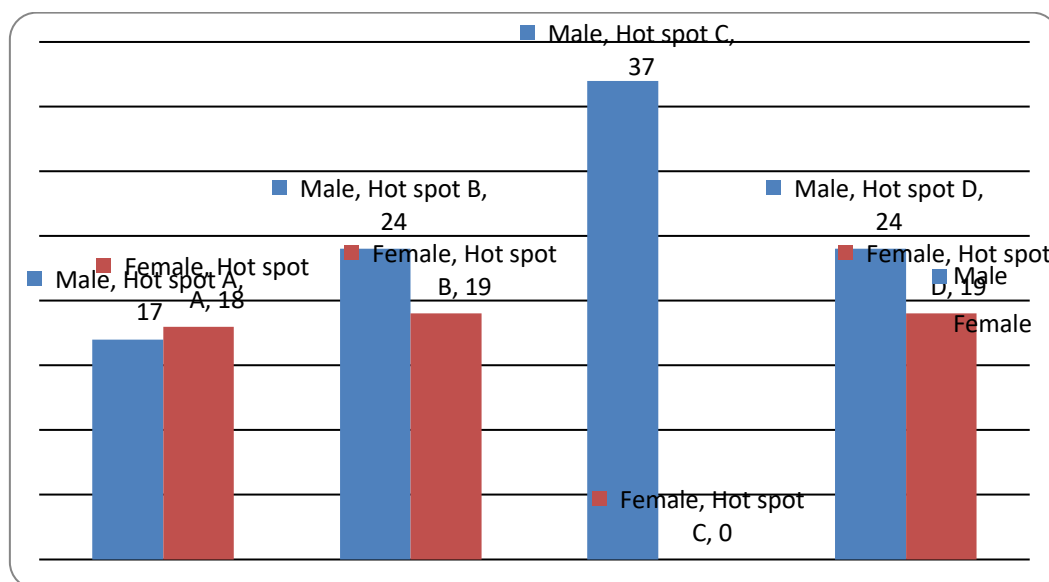


Figure 2:

At hotspot A an out of total 35 screened subjects 4 (11.43%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab.

At hotspot B out of total 43 screened subjects 6 (13.95%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab. At hotspot C (closed campus)

out of total 37 screened subjects 16 (43.24%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab. At hotspot D out of total 43 screened subjects 3 (06.98%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab.

Hotspot (A+B+C+D)

Table 2:

Age (in Years)	Male Subjects	Female Subjects	Total Subjects	Positive Nasopharyngeal Swab	Positive Conjunctival swab
18-30	24	17	41	07 (17.07%)	0
31-40	30	11	41	07 (17.07%)	0
41-50	25	16	41	12 (29.27%)	0
51-60	23	12	35	03 (08.57%)	0
Total	102	56	158	29 (18.35%)	0

At all the 4 hotspots (A+B+C+D) out of total 158 screened subjects 29 (18.35%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab.

Discussion

There are raising concerns about possibility of transmission of SARS-CoV-2 through conjunctival secretions, thereby posing a risk for transmission of infection in eye healthcare providers.

Recently, human CoV RNA in tears and conjunctival scraping samples were tested by reverse transcription-polymerase chain reaction (RT-PCR) assay in patients with SARS and COVID-19, yet the positive rate of the RT-PCR test was extremely low. [6] Zhang and colleagues, reported conjunctivitis in two patients out of 72 laboratory-confirmed COVID-19 cases; however, 2019-nCoV was detected in conjunctival swab samples by RT-PCR in only one patient who was a nurse working in the Emergency Department. [7] Xia and colleagues reported unilateral conjunctivitis in one patient out of 30 confirmed COVID-19 cases; conjunctival swabs sampled from this patient 3 and 5 days after the onset of COVID-19 were both positive for 2019-nCoV by RT-PCR, whereas 58 conjunctival swab samples from the other 29 COVID-19 patients were all negative for 2019-nCoV. [6]

Our study showed that out of total 158 subjects, in all 4 hotspot areas (A+B+C+D), 37 (23%) were symptomatic, rest 121 were asymptomatic. In hotspot area C (closed campus), out of total 37 subjects, 20 were symptomatic.

Our study showed that from all the 4 hotspots (A+B+C+D), out of total 158 screened subjects 29 (18.35%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab for SARS-Cov-2 using RT-PCR. At hotspot C which was closed campus, a closed area with less scope of social distancing, out of total 37 screened subjects, 16 (43.24%) were positive for nasopharyngeal swab for COVID-19 but none of them had positive conjunctival swab. Low level of viral detection in conjunctival swabs can be due to various factors like the time for maximum replication of the virus, the timing of performing of sampling, and possibly less secretion of the virus through conjunctival secretion, and also low sensitivity of RT-PCR. [8] The contribution of antimicrobial agents, including lacto ferrin and secretory IgA, in tears and constant tear rinsing, which continuously eliminates the virus on the ocular surface into the nasal cavity through the

nasolacrimal duct may be the reason for low positivity rate in conjunctival swab.

The limitations of this study are that sampling done only from one eye.

Conclusion

This study shows that out of total 158 subjects, in all 4 hotspot areas (A+B+C+D), 37 (23%) were symptomatic, rest 121 were asymptomatic. In hotspot area C (closed campus), out of total 37 subjects, 20 were symptomatic. SARS-CoV-2 was negative in conjunctival secretion swabs of all the subjects living in hotspot areas. Hotspot C (closed campus) which was a closed area had a very high positivity of nasopharyngeal swab for COVID-19 disease (43.24%) but none of them had positive conjunctival swab testing by RT-PCR method. On the basis of our study, we can conclude that risk of transmission of SARS-CoV-2 is unlikely through conjunctival secretions.

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