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Awareness and knowledge of ocular prophylactic measures and hand hygiene among medical students in the wake of the pandemic- COVID 19

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Objective: To assesses the awareness and knowledge of ocular prophylaxis, hand hygiene, and ocular surface as a mode of spread of SARS-CoV-2 among medical students, in the wake of the pandemic COVID-19. **Methods:** A cross-sectional questionnaire-based study was conducted on 248 medical students. The questionnaire is constructed based on previous publications related to hand hygiene and ocular hygiene. The answers to all the questions were assessed and results were analyzed. **Results:** Out of the 248 people who were included in the study, 99.2% were aware of the importance of handwashing and 97.6% of them agreed that handwashing is required after examining every patient. 85.5% of the participants agreed that the ophthalmologist needs to wear N95 masks during the slit-lamp examination and 92.9% of the students were aware of the need for protective eye goggles. 85.9% agreed that the patients also need to wear protective masks while being examined.74.3% of the participants knew the moments of handwashing, 60.2% knew the correct number of steps of handwashing. 87.6% answered that the slit lamp should be cleaned after every patient. Only 36.5% of the students who participated knew that non-contact tonometry will produce aerosols. The Internet was the most important source of information in about 27% of the participants. **Conclusion:** Medical students' knowledge about COVID-19 and the prophylactic measures needs reinforcement. This is essential to safeguard the health of the medical professionals against less understood and remote routes of viral spread.

Keywords: COVID-19, Ocular prophylaxis, Hand hygiene, Medical students, Awareness, Knowledge

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Introduction

Coronavirus disease (COVID-19) is an infectious disease which is caused by the newly discovered coronavirus (SARS-CoV-2) [1]. The COVD-19 pandemic which first started in the Wuhan province of china and spread exponentially all around the world is claiming the lives of thousands across the world.

The modes of spread of this virus are by droplets, contact, and fomites. Patients with COVID-19 present usually with upper respiratory tract infections and patients with comorbidities develop Acute Respiratory Distress Syndrome [2]. The estimated mortality rate is about 5.3-8.4% [3]. There are no clear treatment protocols that have been instituted and there is no vaccine for COVID-19 yet.

Reports have shown COVID-19 patients presenting primarily with conjunctivitis and such patients harbor the virus in their tears [4]. COVID -19 is reported to be transmitted from the ocular surface of the affected patient in addition to transmission by droplets. This crisis has brought out the fact that many other viruses such as adenovirus, Respiratory Syncytial Virus (RSV), Influenza virus enter the human body through the eye and also use the ocular surface as a medium for proliferation [5]. Reports have suggested the presence of HbsAg and HIV virus in tears and the spread of the virus through contact tonometry [4,5]. Hence ophthalmologists should follow strict hygiene practices and prophylactic measures while treating patients in the days to come. This can be achieved by observing stringent hand hygiene and ocular prophylaxis measures like wearing face masks, breath shields, avoiding non-contact tonometry as it causes aerosolization of tears, and talking as less as possible while examining a patient in a slit lamp [6]. Many randomized control trials showcased the protective efficacy of handwashing in preventing the spread of upper respiratory tract infections [7]. Medical undergraduates, the future frontline warriors of our nation should prepare themselves to be in the frontline health care delivery teams. The awareness of prophylactic measures to safeguard themselves from getting infected is of paramount importance. Hence this study to evaluate the awareness of ocular prophylactic measures and hand hygiene among the medical students can be the foundation for planning educational activities aimed at self-protection.

Materials and Methods

Study design- Cross-sectional study, Study period- 1 month, Study population- All the medical students/interns of Sri Devaraj Urs Medical College willing to take part in the study. The Institutional Ethics Committee approved the protocol.

Inclusion criteria: Medical students –MBBS phase II, phase III, and Interns.

Exclusion criteria: Students unwilling to participate in this study

The sample size was calculated based on a comparable study by Sreejith SS et al., on awareness of hand hygiene practices at 35%. OPENEPI version 3.0 was used to calculate the sample size as 248 at a 90% confidence interval and 5% absolute precision was used. The study included MBBS students of phase 2, phase3 and interns who were willing to take part in the study. A pre-tested semi self-constructed questionnaire was used to evaluate the knowledge, awareness, and source of information. The questionnaire was structured based on previous publications related to hand hygiene and ocular hygiene [8,9]. Written consent was taken by the participants. The questionnaire was in English and consisted of 3 sections. The first section comprises of questions to assess the 'Awareness' of the student regarding hand and ocular prophylaxis. The second section includes a set of questions to assess the 'Knowledge' of the student, and the third section comprises a question about the "Source of the knowledge". The data was collected, entered, and analyzed in Microsoft Office Excel 2010. Descriptive statistics were used when necessary, all qualitative variables are presented as frequency and percentages. All quantitative variables are presented as mean and standard deviation. The expected outcome was to bring out awareness and knowledge among medical students.

Results

The responses of participants to the questionnaire are elaborated in the table below.

Questions	Correct answer	% Population Answered (Correctly)	% Population Answered (Incorrectly)
Are you aware of the importance of hand washing?	Yes	99.2	0.8

Is it required to practice handwashing after examining every patient?	Yes	97.6	2.4
Do you think it is required for ophthalmologists to wear N95 masks while doing a slit lamp examination?	Yes	85.5	14.5
Are you aware of protective eye goggles?	Yes	92.7	7.3
Is it necessary for patients to wear protective masks while being examined?	Yes	86.3	13.7
How many steps are involved in handwashing	7	59.3	40.7
How many moments of hand hygiene according to WHO?	5	75	25
Hand hygiene will prevent the spread of infection:	All the above	100	0
Is it necessary to clean the slit lamp after examination of every patient?	Yes	87.9	12.1
Will non-contact tonometry produce aerosols?	Yes	37.1	62.9
Which of the following infections spread through conjunctiva?	All the above	57.7	42.3

Awareness: Out of the 248 study subjects, 99.2% were aware of the importance of handwashing while only a mere 0.8% were not aware of the importance. About 97.6% of the population who participated agreed that handwashing is required after examining every patient. When asked if it was necessary for ophthalmologists to wear N95 masks while doing the slit-lamp examination, 85.5% of them agreed and 92.9% of the students were aware of protective eye goggles. 85.9% agreed that it is necessary for patients to wear protective masks when being examined.

Knowledge: When knowledge about the prophylactic and hygiene practices was assessed, 60.2% of the students who participated knew the correct number of steps of handwashing whereas 74.3% knew the moments of handwashing. All the students(100%) who participated knew that handwashing will prevent the spread of infections from the doctor to the patient, patient to the doctor, and also from patient to patient.87.6% answered that the slit lamp should be cleaned after every patient. Only 36.5% of the students who participated knew that non-contact tonometry will produce aerosols whereas 46.1% did not know about it.

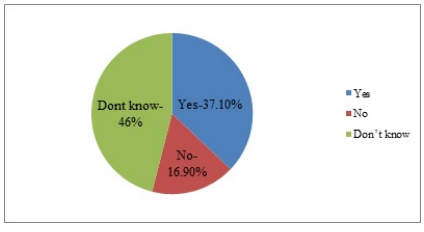

Fig-1: Will contact tonometry produce Aerosols?

57.7% of the students knew that all the mentioned diseases were spread by conjunctiva.

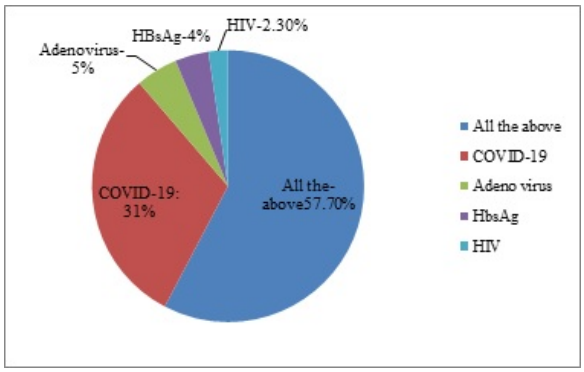

Fig-2: Which of the mentioned infections spread through conjunctiva?

Internet was the most important source of information in about 27% of the participants followed by Practicing doctors, who were the important source of information in 26.6% of the participants.

Discussion

World health organization announced a state of emergency in the event of the COVID-19 outbreak which started in Wuhan, China, and quickly escalated into an international health crisis [10] As of 8th July 2020, about 1,16,69,259 cases and about 5,39,906 deaths globally were reported to WHO [11]. India's first COVID case was a student from Kerala with a travel history to Wuhan, reported on January 30,2020[12]which quickly escalated to 7, 67, 295 cases by the month of July [13].

The mode of transmission of COVID-19 is through droplet transfer from patients or by fomites from contaminated surfaces. Asymptomatic people are also known to cause transmission. The patients may present with a wide spectrum of symptoms ranging from being asymptomatic to presenting with acute respiratory distress syndrome which may lead to multiorgan failure and eventually death. One known way to curb transmission is by breaking the chain of transmission [14]. That can be done by prophylactic hygiene measures like frequent hand washing, donning a face mask, avoiding close contacts, and practicing social distancing.

Numerous infectious agents like herpes simplex virus, Epstein-Barr virus, hepatitis B, measles, adenovirus including the SARS coronavirus of 2003

Has been isolated from the tears of patients with the polymerase chain reaction technique [15]. The virus responsible for COVID-19 belongs to the coronaviridae family and has an identical binding receptor as that of SARS –CoV-1. The genes related to the entry of SARS-CoV-2 namely, ACE2 and TMPRSS2 were found in the ocular surface in addition to the respiratory and intestinal epithelium. In addition, the ocular surface and the nasal mucosa are connected via the nasolacrimal duct. The above two factors warranted the fact that the ocular surface serves as another route of transmission of COVID-19 [16]. In the present study, about 57% of people knew that Adenovirus, COVID-19, HIV, and HBsAg can be transmitted through the conjunctiva.

In a study conducted on 38 COVID patients in Hubei province, China, RT-PCR of the conjunctival swab was positive for 2 patients (5.2%) [17]. Xia et al revealed that one patient out of 30 COVID patients tested positive for SARS-CoV-2 in a sample collected by conjunctival swab [18]. When Kumar et al conducted a study on 45 hospitalized patients in a tertiary COVID-19 hospital in south India, he found that one out of 45 COVID-19 patients tested positive for SARS-CoV-2 in conjunctival swab came positive. He also postulated that low viral detection may depend on numerous factors like the time of procuring sample, the time a patient presents to the hospital, reduced sensitivity of RT-PCR, or feasibly due to reduced load of virus in the conjunctival secretions [19].

Symptoms of conjunctivitis like congestion, ocular discomfort, burning sensation, epiphora, and chemosis can be a part of the clinical spectrum of SARS-CoV-2.Patients with advanced systemic manifestations of COVID-19 present with the above symptoms. Rarely ocular manifestations can be the initial presenting feature of COVID-19 [17].

Health care workers are at direct risk of exposure to this deadly disease and hence have higher chances of acquiring the disease than the general population [20]. The current deficiency of the doctor-patient ratio in India [21] may require medical students in the final phase of their training and internship to be a part of the pandemic management task force. Understanding the status of their awareness will enable planning of focused areas for the practice of prophylaxis. In fact, the government of India has proposed to involve medical students of higher grades to join the fight against COVID-19 [22].

Numerous health care workers globally have lost Their lives due to COVID-19. The global stats of health care worker deaths as of 8th May was 1413 [23]. This puts a strain on the already understaffed and overworked health care workers. Providing training, support, and maintaining an interactive feedback system is essential for safeguarding our health care workers [24].

Hospital-acquired infection is the most important mode of spread of COVID-19 among health care workers as exposure to COVID-19 is inevitable [25]. Hence it is important for all hospital workers including medical students who will be involved in treating COVID patients in the near future to know and practice hand hygiene and other prophylactic measures to prevent acquiring an infection. 95% of the study subjects knew the importance of handwashing and the need to perform it after examining every patient.75% of the participants knew about the correct number of moments of hand hygiene, 59% knew the correct number of steps of handwashing.

Any patient attending an ophthalmology clinic should be screened for fever, asked for history suggestive of being a possible primary contact. Any ophthalmic emergency in such patients will be attended to by an ophthalmologist equipped with PPE. A patient without any history or suspicion of being a case of primary contact should be examined with universal precautions [12].

Limitations

Larger studies are required to give more information about health education.

Conclusion

The current study unveils the lacunae in knowledge about the ocular prophylaxis measures that should be followed. Medical students' knowledge about COVID-19 and the prophylactic measures is found to be unsatisfactory. If the involvement of the medical students in the fight against COVID is made mandatory in the days to come, the health authorities should take serious measures in educating them about the same.

What does the study add to the existing knowledge

The present study helps in assessing the awareness about prophylactic measures among medical students which will in-turn help reveal the lacuna in

Knowledge. This helps in incorporating more educational activities concerning the same.

Author's contributions

Dr. Varsha V.: Data collection, study design, search for review of literature, manuscript preparation

Dr. Sandhya Ramachandra: Study design, search for review of literature, manuscript correction

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