Original Article :

Evaluation of Perception, Perspective and Practice toward Coronavirus disease - 2019 outbreak among the Eye Care Professionals in the Kingdom of Saudi Arabia

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Abstract

Background & Aims:

Knowledge, attitude, and practice towards precautionary measures are important in limiting the COVID-19 spread. This study aims to assess the Saudi ophthalmic healthcare workers' awareness, attitude, and practice towards the spread and prevention of COVID-19.

Methods:

This cross-sectional survey was conducted through a social media web based survey on 800 ophthalmic health-care workers between September 2020 and November 2020. A 38-item questionnaire comprised socio-demographic characteristics, knowledge, attitude and practice related questions were distributed to eye care professionals. The Kruskal Wallis test and Mann-Whitney tests were used to compare the awareness level scores among ophthalmic health workers groups.

Results:

Among 800 participants, 10.5% were ophthalmologists, 21.3% were optometrists and ophthalmic assistants and 68.3% were ophthalmic nurses. Nearly 90% showed adequate awareness, positive viewpoints, and better practices towards COVID-19 and its management. Ophthalmic nurses and ophthalmologists showed greater knowledge, a better attitude, and optimal practices when compared with optometrists and ophthalmic assistants' groups ($p< 0.05$). Seventy-five percent were aware that conjunctivitis and conjunctival congestion are seen in established COVID-19 patients. However, 57.8% of practitioners reported avoiding patients who seek eye care with the signs and symptoms of COVID-19, whereas 31.8% were willing to render eye care to these patients.

Conclusion:

Two-thirds of the eye care professionals were not willing to provide eye care services for the patients who presents with COVID-19 symptoms. Hence, a comprehensive health education and infection control practices

training programs for COVID-19 is needed to prevent its spread.

Keywords:
awareness, attitude, practice, coronavirus disease, ophthalmic professionals, Saudi Arabia.

Introduction

The initial known occurrence of novel coronavirus disease 2019 also termed "COVID-19" was identified in Wuhan, China due to a case series of viral pneumonia symptoms manifested in December 2019 [1,2]. The new strain of coronavirus was identified from the affected patients' respiratory tract on January 7, 2020, and the International Committee on Taxonomy of Viruses (ICTV) has found that this new strain of coronavirus is the same species as "Severe Acute Respiratory Syndrome Coronavirus" (SARS-CoV-2) with different strain. Hence, ICTV named this novel coronavirus as SARS-CoV-2 [1-6]. Due to the rapid spread, illness severity, and fatality caused by SARS-CoV-2 from Wuhan to several countries made World Health Organization (WHO) to declare "COVID-19" as public health emergency on January 20, 2020, and a global pandemic on March 11, 2020 [1,3,4]. From the Eastern region of the Kingdom of Saudi Arabia (KSA), the occurrence of SAR-Cov-2 case was first identified on 2nd March 2020 [7,8]. Till April 26, 2021 COVID-19 accounted for 147 million laboratory-confirmed cases and 3.11 mortalities due to this deadly virus, worldwide. In the KSA, there are currently 412,953 confirmed cases and the death toll rose to 6,913 [9]. SARS-CoV-2 is reported to be a highly infective which spreads through saliva or mucus secretions derived from the respiratory tract, air borne transmission from very small droplets that stay suspended in the air for longer period, direct contact with contaminated surfaces, and fecal-oral transmission [10,11].

The extensively reported manifestations of COVID-19 are pyrexia, cough, muscle aches, expectoration, headache, hemoptysis, diarrhea, dyspnea, poor appetite, stuffy and runny nose, anorexia, and pain in the pharynx [12-16]. The widely documented complications are acute respiratory distress syndrome (ARDS), acute cardiac injury, acute renal injury, septic shock, ventilator-associated pneumonia, and arrhythmia [12-16]. Several studies and researches showed that COVID-19 affects multiple parts of the body beyond the lungs [17-22].

In the KSA, the authorities have imposed precautionary measures such as lockdown, curfews quarantine, isolation social distancing to the community, and financial penalties for the public who violate the

rules on 2nd March 2020 to reduce the incidence of SARS-CoV 2 infection [23]. Ministry of Health (MOH) approved an app called "Tawakkalna (COVID-19 KSA)" developed by National Information Center, is the official "contact tracing app" to suppress the COVID-19 spread effectively by identifying, isolating and monitoring the "close contacts". Also, the MOH's 937 call center provides specific information about the COVID-19 [7,8,24,25].

Health care workers (HCWs) possess a vital role in reducing COVID-19 induced complications and deaths, whereas HCWs are directly exposed to patients and 2019-nCoV. Two thousand and fifty cases of HCWs were affected in China with COVID-19 as of February 2020 due to poor awareness and knowledge about how to handle the disease [26]. The Chinese ophthalmologist Dr. Li Wenliang from Wuhan was among the first to recognize the possible epidemic of a new virus outbreak, who was later succumbed to COVID-19 on February 7, 2020, [27]. Studies have suggested that COVID-19 can cause conjunctivitis in 30% of cases and 2019-nCOV was isolated from conjunctival secretions [28-30]. Kumar et al (2020) reported: "detectable viral RNA in ocular swabs several days after it was undetectable in nasal swabs" [30]. Studies have shown that tears carry a 'lower risk' whereas coughing, sneezing, talking and intubation possess 'higher risk' for SARS-CoV-2 transmission, however it can be mitigated with personal protective equipment (PPE) usage [31,32]. Regular ophthalmic procedures that emit aerosols would pose risk to patients as well as to the eye care professionals. Alenazi MT (2020) [33] showed that the occupational hazard due to COVID-19 for ophthalmologists, ophthalmic medical technologists and ophthalmic medical technicians were to be 88.4%, 68.5%, and 62%, respectively [33]. Therefore, the current study aimed to assess the current proportion of awareness, attitude, and practices of COVID-19 amongst ophthalmic HCWs in the KSA.

Materials and Methods

Study design and participants:

A questionnaire was designed and developed in August 2020 based on the previously published studies which contained preliminary knowledge items about COVID-19 by Zhong et al. (2020) [34], Taghrir et al. (2020) [35] and Khan et al. (2020) [36] was used to examine the perception, perspective and practice towards COVID-19 on ophthalmic HCWs at private and public healthcare facilities in the KSA. A convenience sampling technique was used, and this study was conducted according to the Declaration of Helsinki, with the consent form that had to be completed before com-

mencing the survey.

Ethical approval for this study was waived because the participation was intentional, and the participants were informed that the study was on eye care healthcare practitioners without any intervention. Even though, ethical approval for this study was waived, confidentiality and voluntary consent forms were attached along with the questionnaire. However, this study was performed as per the guidelines given by the National Committee of Bioethics (NCBE), KSA. The participants were asked to complete an online survey questionnaire that was developed by the researchers. A cover letter explaining the purpose of the study was attached to the survey and also ensured that no computer internet protocol addresses were collected hence the investigator had no way of identifying the participating ophthalmic HCWs while collecting, analyzing, and reporting data.

Any ophthalmic personnel who were unable to comprehend English and those with no access to the internet were excluded from the study. A total of 800 ophthalmic HCWs from private and public health care facilities of different cadres (ophthalmologists, ophthalmic nurses, optometrists, and ophthalmic assistants) from Saudi Arabia participated from September 2020 to November 2020. A questionnaire was designed on google-form and an electronic survey link generated was shared on WhatsApp, emails, and Twitter to reach eye-care professionals working in all the provinces of Saudi Arabia.

Multiple-choice and true-false questions were created and put together to obtain information about respondents' awareness about the disease nature, causative organism, attitude, and common practice of protective measures for the COVID-19 disease during the pandemic outbreak. The study questionnaire consisted of 38 questions (see supplementary file). The study questionnaire took nearly 4-5 minutes to fill out the survey. The first section included the basic information from all the participants regarding their age, gender, nationality, qualification, level of education, region, practice setting, region, and sources of information about COVID-19. The second section contained 14 questions about basic knowledge of COVID-19 with three options namely, “true”, “false”, and “don’t know”. The knowledge was assessed by providing 1 to a correct answer and 0 to the wrong answer and a “don’t know” response. The scale measured knowledge score from a maximum of 14 to a minimum of 0. Scores < 4 were taken as poor, [4-9] as average, and >9 as adequate knowledge of COVID-19. The third section constituted 8 questions on the attitude

of ophthalmic professionals and was rated using a 5-point Likert scale from "strongly disagree" to "strongly agree". The attitude was scored by giving 1 to "strongly disagree" and 5 to the "strongly agree" from 8 to 40. Scores ≤ 24 were taken as negative while > 24 were taken as a positive attitude towards COVID-19. The fourth section had six questions on COVID-19 related practices rated on a 5-point Likert Scale: "always", "mostly", "sometimes", "rarely", and "never". [34-36] The practice scale measured from a maximum score of 30 to a minimum score of 6. Scores ≤ 18 were taken as poor practice while >18 were taken as good practice towards COVID-19.

Statistical analysis

The data was collected from google form was imported to Microsoft Excel and then imported to SPSS (SPSS Inc., Chicago, IL, USA, Version 24) for analysis. Descriptive statistics were performed by calculating frequencies and proportions. The knowledge, attitude, and practice scores were calculated from a total of 14, 40, and 30 points, respectively. To identify the significant differences among ophthalmologists, ophthalmic nurses, and optometrists & ophthalmic assistants and their scores on knowledge, attitude, and practice, the Kruskal-Wallis test, and a post hoc test was used.

Results

Demographics of participants

Table (1) showed the socio-demographic parameters of 800 eye care professionals participated in this study, most of them were non-Saudis (84.3%), 52.5% were females, 42% were 20 to 25 years old, 26.4% were in 30 to 35 years, 26.3% in 25 to 30 years range and 5.4% were more than 40 years of age. Region-wise, 36.8% were from Qassim, followed by Eastern (15.9%), Northern (15.8%), Riyadh (15.8%), Al Jouf (5.4%), Najran (5.3%), and Tabuk (5.3%). More than half of the participants were single (78.8%), holding bachelor's degrees (68.3%), diplomas (15.9%) and master's degrees (15.9%).

Table: 1: Demographic classification of the respondents

Characteristics	n(%)
Nationality	
• Saudi	126 (15.8)
• Non-Saudi	674 (84.3)
Gender	
• Male	337 (42.1)
• Female	420 (52.5)
• Prefer not to say	43 (5.4)
Age (years)	
• 20-25	336 (42.0)
• 25-30	210 (26.3)
• 30-35	211 (26.4)
• More than 40	43 (5.4)
Region	
• Eastern	127 (15.9)
• Jouf	43 (5.4)
• Najran	42 (5.3)
• Northern	126 (15.8)
• Qassim	294 (36.8)
• Riyadh	126 (15.8)
• Tabuk	42 (5.3)

Characteristics	n(%)
Marital status	
• Single	630 (78.8)
• Married	170 (21.3)
Qualification	
• Ophthalmologist	84 (10.5)
• Ophthalmic assistant	43 (5.4)
• Ophthalmic Nurse	546 (68.3)
• Optometrist	127 (15.9)
Level of education	
• Diploma	127 (15.9)
• Bachelors	546 (68.3)
• Masters	127 (15.9)
Sector	
• Government	380 (47.5)
• Private	420 (52.5)
Source of information on COVID-19	
• World Health Organization	337 (42.1)
• Government sites and media	253 (31.6)
• Social media	126 (15.8)
• News, TV, radio, newspaper	84 (10.5)

n- number of respondents; %- percentage of respondents

Nearly 53% were working in the private sector, 68.3% of participants were ophthalmic nurses, 5.4% were ophthalmologists and 26.4% were optometrists and ophthalmic assistants. Meanwhile, 42.1% of ophthalmic professionals received COVID-19 information from WHO, 31.6% from Saudi government sites and media, 15.8% from social media, and 10.5% from news, television, radio, and newspaper.

Knowledge of ophthalmic HCWs

Eighty nine point five percent and 10.5% scored more than nine and lesser than nine as a score which indicates "adequate" and "average" knowledge, respectively. The knowledge score of these participants was found to be 11.4 ± 2.6. Eighty-nine-point five percent of ophthalmic HCWS were well informed of the manifestations of COVID-19 infection, its spread, precautionary measures to prevent the spread by 'avoiding overcrowded places', 'isolating and treating infected people as an effective means of reducing the further spread', 'hand hygiene reduces the chances of getting COVID-19 infection, and asymptomatic COVID-19 persons can infect others'.

All of our participants were aware of absence of established therapy available to treat this viral infection during the moment of data collection for our study. Around 95% of respondents revealed that 'patients with comorbidities are the victims of severe disease course and progression', 84.1% believed that 'wearing a face mask is effective in preventing the spread', 78.9% responded that they were aware of '14 days of self-quarantine or quarantine for anyone who is a contact of the person infected with the SARs-CoV-2', 75% of eye care professionals were aware that 'conjunctival congestion and conjunctivitis are seen in patients with established COVID-19 infection', 73.6% were aware that 'even healthy individuals have to adapt appropriate steps to limit the spread coronavirus', 68.5% reported that 'consuming meat or keeping touch with wild animals would not increase the risk of nCoV-19 infection', 63.1% were aware of gastrointes-

tinal symptoms are seen with COVID-19 infection, and 57.9% were aware that the common symptoms of upper respiratory tract infection are not always seen in coronavirus infected persons'. Table (2) shows the frequency distribution for each knowledge item's responses.

Table 2: Responses to COVID-19 knowledge items

QUESTIONS	True n (%)	False n (%)	Don't know n(%)
The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, shortness of breath and myalgia...	716 (89.5)	84 (10.5)	
Unlike the common cold, stuffy nose, runny nose and sneezing are less commoner symptoms in persons infected with COVID-19 virus	463 (57.9)	337 (42.1)	
Gastrointestinal symptoms such as nausea, vomiting, diarrhea and abdominal pain are part of COVID-19 symptoms?	505 (63.1)	295 (36.9)	
Conjunctivitis and conjunctival congestion are seen in patients with established SARS-COV infection	600 (75)	80 (10)	120 (15)
Currently there is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection	800 (100)		
Not all persons with COVID-19 will develop to severe cases. Only those who are elderly, immunocompromised, pregnant people, have chronic illnesses like diabetes, hypertension, etc. and are obese are more likely to be severe cases.	758 (94.8)	42 (5.3)	
Eating or contacting wild animals would results in the COVID-19 infection	210 (26.3)	548 (68.5)	42 (5.3)
Persons with COVID-19 cannot infect the virus to others when he is asymptomatic (i.e., when fever, dry cough or myalgia are not present)	42 (5.3)	716 (89.5)	42 (5.3)
The COVID-19 virus spreads via direct contact of respiratory droplets of infected individuals or indirect contact with contaminated surfaces	716 (89.5)	84 (10.5)	
Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus	673 (84.1)	43 (5.4)	84 (10.5)
It is not necessary for children and young adults to take measures to prevent the infection by COVID-19 virus	127 (15.9)	589 (73.6)	84 (10.5)
To prevent the infection by COVID-19, individuals should avoid going to crowded places such as malls, restaurants, train stations and taking public transportations	716 (89.5)		84 (10.5)
Isolation and treatment of COVID-19 infected people are effective ways to reduce the spread of the virus	716 (89.5)		84 (10.5)
People who have contact with someone infected with COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days?	631 (78.9)	85 (10.6)	83 (10.4)
Washing hands with water and soap or rubbing hands with alcohol-based hand sanitizer regularly can reduce the chances of getting infected with COVID-19?	716 (89.5)		84 (10.5)

n- number of respondents; %- percentage of respondents

Table 5: Comparison between level of qualification of the ophthalmic HCWs and their knowledge, attitude and practice

Characteristics	Study group	p-value
Total score on knowledge	Ophthals- Optoms /Ophthal.assistants	0.03
	Nurses - Optoms/ophthal. assistants	0.000
	Ophthals - Nurses	0.312
Total score on attitude	Ophthals- Optoms /Ophthal.assistants	0.001
	Nurses - Optoms/ophthal. assistants	0.000
	Ophthals - Nurses	0.137
Total score on practice	Ophthals- Optoms /Ophthal.assistants	0.04
	Nurses - Optoms/ophthal. assistants	0.000
	Ophthals - Nurses	0.156

Ophthals-Ophthalmologists; optoms-Optometrists, Ophthal. Assistants-Ophthalmic assistants.

All the participated ophthalmologists (5.5%) were shown to have "adequate" knowledge about COVID-19 i.e., >9 with an average score of 11.9 ± 0.2, and all ophthalmic nurses (68.3%) also reported to have adequate knowledge with an average score of 12.5 ± 0.7; whereas optometrists and ophthalmic assistant group (26.4%) showed mean knowledge score of 8.4 ± 3.6; 39.8% showed average knowledge score from 4 to 9 and 60.2% showed adequate knowledge score of >9. (Figure 2) 3.3 The attitude of ophthalmic HCWs towards COVID-19: Overall, 89.7% of participants scored >24, showing a good attitude, with a mean score of 36.3 ± 6.8. The majority of the eye care professionals (>89%) believed that KSA could mitigate the impact of COVID-19 successfully, the eye care specialty clinics have provided precautionary measures to safeguard their HCWs and patients from the risk of SARS-CoV-2 infection, its HCW's duty to abide MOH's infection control practices, using a face mask is mandatory to prevent COVID-19 spread. Nearly 79% agreed that it is necessary to reveal recent travel history before reporting back to work even though he/she doesn't have any symptoms (Table 3). All the participated ophthalmologists (5.5%) were shown to have a positive attitude about COVID-19 i.e., >24 with an average score of 39.9 ± 0.2, and all ophthalmic nurses (68.3%) also reported to have a positive attitude with an average score of 38.6 ± 2.4; whereas optometrists and ophthalmic assistant group (26.4%) showed a positive attitude with a mean score of 29.6 ± 9.3. (Figure 2)

Practice and risk assessment among ophthalmic HCWs:

Nearly 90% of ophthalmic healthcare professionals (HCPs) scored >18 and showed better practices towards disease management with the mean score of 25.6 ± 4.3; staying home and away from others as

Table 3: Responses to COVID-19 related attitude Questions

Attitude	Agree n (%)	Disagree n (%)	Neutral n (%)
Do you agree that COVID-19 will finally be successfully controlled?	632 (79)	42 (5.3)	126(15.8)
Do you have confidence that Saudi Arabia can win the battle against the COVID-19 virus?	716(89.5)	84 (10.5)	
Are you aware about measures taken by your hospital to address COV-ID-19 pandemic?	674 (84.3)	126 (15.8)	
You believe that your hospital has taken all the necessary protective measures to protect healthcare providers and patients from getting infect-ed with COVID-19	716 (89.5)	84 (10.5)	
You feel that you have social responsibility to protect the public health by following Ministry of health's recommendations to decrease the spread of COVID-19	716(89.5)		84 (10.5)
Do you feel there is no need to declare recent travel history before re-porting back to work if you don't have any symptoms?	84 (10.5)	632 (79)	84 (10.5)
Do you think that you can't be a virus carrier if I don't have symptoms of fever or cough?	84 (10.5)	632 (79)	84 (10.5)
Do you think wearing a well-fitting face mask is effective in preventing COVID-19?	716(89.5)		84 (10.5)

n- number of respondents; %- percentage of respondents

much as possible and washing their hands before and after handling each patient. More than 84% of participants reported that they always worn a mask while going out and during their working hours in the clinics, and aware of visual triage score from MOH for COVID-19; 63.3% prac-ticing of not going to any crowded places, whereas 26.3% have shown the practice of going to crowded places and 10.5% report-ed they rarely go to crowded places. Five-point three percent participants were not practicing mask wear and 10.4% reported rarely uses masks while at work and out of home, 10.5% were rarely practicing social distancing, rarely washing/disin-fecting hands before and after handling each patient, and rarely avoid seeing any symptomatic patients. More than 55% of participants showed a practice of avoiding patients with COVID-19 signs and symp-toms whereas 31.8% reported that they never avoid treating patients who present with COVID-19 (Figure 1).

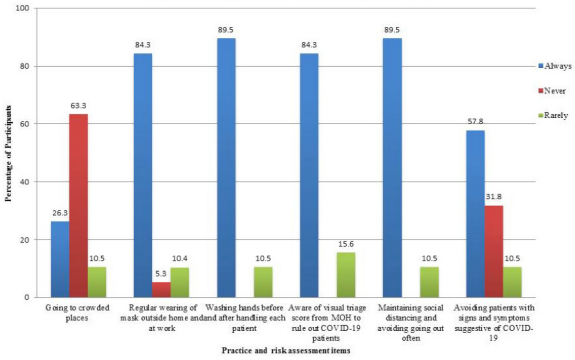


Figure 1: Practice of respondents towards COVID-19

All the participated ophthalmologists (5.5%) were showed better practices to-wards disease management i.e., > 18 with a mean score of 25.9 ± 0.1 -19 and all oph-

thalmic nurses (68.3%) also reported to have better practice score with an average score of 26.9 ± 1.7; whereas optometrists and ophthalmic assistant group (26.4%) showed better practicing patterns against COVID-19 with a mean score of 22.0 ± 6.7 (Figure 2).

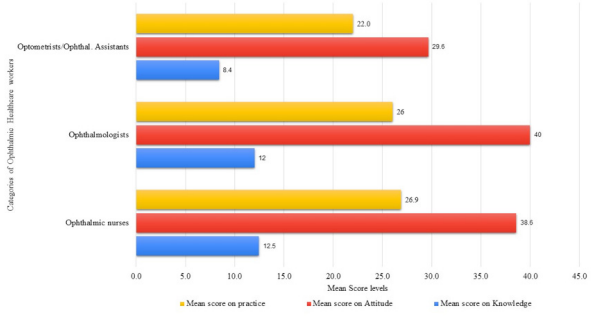


Figure 2: Mean scores on knowledge, attitude and practices of ophthalmologists, ophthalmic nurses and optometrists and opthalmic assitants

The intergroup analysis was done using the Kruskal-Wallis test which showed significant difference in knowledge, attitude, and practice scores among ophthalmologists, ophthalmic nurses, optometrists, and ophthalmic assistants as shown in Table 4. Overall, the ophthalmic nurses and ophthalmologists groups achieved significantly greater average scores on awareness compared to the optometrists and ophthalmic assistants as shown in figure (2), whereas no difference in average awareness scores was noted between ophthalmologists and ophthalmic nurses (Table 4).

Table 4: Responses to COVID-19 related practices

Practice	Always n (%)	Never n (%)	Rarely n(%)
In the recent days, have you gone to any crowded place?	210 (26.3)	506 (63.3)	84 (10.5)
In the recent days, have you worn a mask when leaving home and when in contact with patients?	674 (84.3)	42 (5.3)	83 (10.4)
In the recent days, have you washed your hands before and after handling each patient?	716 (89.5)		84 (10.5)
Are you aware about visual triage score from Ministry of Health MOH to triage patients of COVID-19?	674 (84.3)		125 (15.6)
Are you practicing social distancing and avoiding going out unnecessarily?	716 (89.5)		84 (10.5)
In the recent days, have you avoided patients with signs and symptoms suggestive of COVID-19?	462(57.8)	254 (31.8)	84 (10.5)

n- number of respondents; %- percentage of respondents

Discussion

Our study has shown that the majority (90%) of ophthalmic HCPs in Saudi Arabia possessed better awareness about COVID-19, optimistic attitude and good practice of preventive measures during this pandemic. These findings are as per the previous studies conducted on other HCPs regarding their awareness about COVID-19 [37-42]. Current study found that there is better awareness (with the knowledge score >9) about COVID-19 causes and prevention among all ophthalmolo-

gists (average score of 11.9 ± 0.2) and all ophthalmic nurses (average score of 12.5 ± 0.7) when compared with optometrists and ophthalmic assistants (60.2% showed an adequate knowledge score of > 9). Similarly, Ekpenyong et al. (2020) [43] showed that "eye care professionals who work under healthcare setup were more knowledgeable compared to opticians" in Nigeria [43]. Nearly 58% of eye care practitioners expressed a lack of confidence in providing eye care services to the patients with manifestations suggestive of COVID-19 hence they mentioned that they will always avoid seeing patients with COVID-19 suspicion. Similarly, a study from Nigeria reported that "more than half of the ophthalmic practitioners showed lack of confidence in caring for patients at risk of COVID-19" [43]. COVID-19 related awareness was identified to be higher among HCPs in Nigeria and China as well as the public [42,43]. In contrast, a study conducted on 100 eye care practitioners in the UK during the time of WHO's announcement of coronavirus outbreak as a pandemic showed "lack of knowledge and understanding of Public Health guidelines related to COVID-19 which might be due to the time of the study conducted in the UK" [44]. When compared with the UK study, our study found higher (55% Vs 89.5% with the difference of 34.5%) knowledge scores among ophthalmic HCPs, and this could be due to time of study conduction and the time gap has allowed respondents to increase their experience and extent of awareness about COVID-19 which in turn demonstrated greater awareness scores as found in Nigeria [43].

SARs-CoV-2 can spread through the ocular mucous membrane via indirect contact with droplets. Ophthalmic HCPs are vulnerable to SARS-CoV-2 infection because of unprotected eye contact during slit-lamp examination, direct ophthalmoscopy which is usually done with close doctor-patient contact [45]. It was postulated that "different types of novel coronavirus are found in the tears and conjunctival secretions of COVID-19 pneumonia patients with conjunctivitis and these secretions may pose a significant risk of virus transmission" [28-31]. Seventy-five percent of our participants were aware that conjunctivitis and congestion are seen in patients with established SARS-CoV-2 infection, whereas a study conducted among eye care professionals in Nepal reported that 94% of participants were aware that conjunctivitis is the commonly outlined ocular manifestation of SARS-CoV-2 infection [46].

Ophthalmic HCPs should keep SARS-CoV-2 in mind and be cautious while examining conjunctivitis patients as there may be a risk of infection spread. Therefore, knowledge about conjunctivitis and

conjunctival congestion is important hence they are at risk of being exposed to the virus is high if they don't take adequate precautionary measures [45]. There are several guidelines on how to adjust practice to prevent the virus spread in a clinical setup, but still, the evidence is limited. However, ophthalmic HCWs will have to adapt and make use of the best for their clinical practice. Nearly 90% of participants had an adequate awareness level regarding the COVID-19 pandemic. This level of higher awareness could be attributed to the participants' educational status i.e., 68.3% of eye care professionals have bachelor's degree, 15.9% were having master's degree and also due to the comprehensive health awareness promotions launched by the Saudi MOH. In Saudi Arabia, 84.3% of eye care professionals were wearing face masks during work and when they go outside, washing and disinfecting hands were reported by 89.5% of study participants. A survey conducted in Germany, Austria and Switzerland among optometrists and opticians showed that 75% are planned to wear masks, 62% were expected their patients to wear masks and in addition to hand washing, 90% would like to disinfect their hands [47].

Our participants reported that they strictly follow the recommendation of at least 20 seconds of hand wash practice suggested by the CDC and WHO [9]. The COVID-19 precautionary guidelines issued by MOH, Saudi Arabia were followed by all who worked in private and public sectors. Our study showed that WHO and Saudi MOH websites are reliable source of COVID-19 information for the eye care professionals. Al Nasser et al. (2021) reported that "well-versed knowledge related to COVID-19 indicated that Saudi governmental health websites are an important source of health information for the public as well as HCWs" [48]. Study conducted in Egypt, North-Central Nigeria, India and Ethiopia, showed that internet/social media and television/radio are the most common sources of information about this pandemic [48, 49]. This good knowledge and positive attitude of most of our study participants could be attributable to the intensive health awareness promotions launched by the MOH, KSA [50]. Limitation of this study was the low number responses from optometrists and ophthalmic assistants were lower than estimated from the MOH registry, and this could affect the responses and scores obtained from this group. The strength of this study is that it obtained the responses from all the cadres of ophthalmic HCWs who were involved in the eye care services delivery during the lockdown and curfews in Saudi Arabia. If the general awareness of ophthalmic HCWs is not addressed, it may

cause these cadre professionals and their patients at risk of contracting the novel coronavirus infection during consultation.

Conclusion:

Acceptable levels of awareness about COVID-19 were seen from ophthalmic HCPs, particularly ophthalmic nurses of Saudi Arabia. The results also demonstrated that eye care professionals seek information from WHO and MOH, Saudi Arabia. Compliance with precautions for infection control needs to be emphasized which can be achieved through comprehensive educational programs. This study provides an insight into the COVID-19 pandemic awareness among eye care professionals even though they are not frontline essential HCPs during the early stages of lockdown and curfew, in Saudi Arabia.

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nil

Conflicts of interest:

The author has no conflicts of interest to declare.

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