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The Impact of Covid-19 on Ophthalmological Emergency Department Visits at King Khaled Eye Specialist Hospital in Riyadh City, Saudi Arabia

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ABSTRACT

Purpose: This study aimed to assess the impact of COVID-19 on ophthalmological emergency department visits at King Khaled eye specialist hospital in Riyadh city, Saudi Arabia.

Method: A Retrospective Record Review was conducted at KKESH in Riyadh city during a pandemic period from 2 March to 30 June of 2019 and same period in 2020. Data include all patients who visited the ophthalmology emergency department with all age groups.

Results: The number of visits to the ophthalmology emergency department decreased by 53.7 % in 2020 compared to 2019. This study conducted on 1479 patients for all age groups. Most of them were male in both periods. The proportion of older adults' visits decreased (from 30.9% to 25.6%) (p =0.005, chi-square test). Most of the patients' visits in 2019 were categorized under the non-determined category (73.2%). Possible emergent cases increased from 10.9% to 32.2% (p = 0.000, chi-squared test). Corneal abrasion was the commonest presentation in 2020, and Keratitis was the most frequent in 2019. On the other hand, among the unlikely emergent diagnoses, in 2019 conjunctivitis was the most common, and it was dry eye disease in 2020. Seven patients required hospital admission in 2019 while 25 patients were hospitalized in 2020.

Conclusion: The overall number of eye emergency department visits decreased when compared to the previous year, while the rate of emergent cases increased. Patients were more likely to be hesitant to seek ophthalmological care, delaying less necessary assessment.

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Keyword: COVID-19, ophthalmology ED, emergency visits.

Introduction

The current Coronavirus disease 2019 (COVID-19) pandemic is caused by the virus Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). [1] Covid-19 belongs to SARS-CoV and MERS-CoV viruses' family [1]. It first appeared in China, specifically in the city of Wuhan, at the end of December 2019 in the form of acute pneumonia [2].

It is spread through close contact with infected people via respiratory droplets released when they cough, sneeze, or speak [3]. Covid-19 affects the lungs primarily, and it may be asymptomatic or may cause pneumonia and severe acute respiratory distress syndrome [4].

Following the outbreak in Wuhan, the infection spread quickly to other countries around the world. [5] By June 26, 2020, it would have affected 181,175,561 people in 220 countries [5]. The World Health Organization (WHO) declared the outbreak a public health emergency on January 30, 2020. The Saudi Ministry of Health confirmed the infection of the first case in Saudi Arabia on March 2, 2020. Furthermore, on March 11, 2020, WHO declared COVID-19 a pandemic, resulting in an international lockdown that limited social mobility and affected daily life [6].

To control the outbreak, self-isolation and restrictive measures were imposed. In addition, the number of people seeking emergency medical care has decreased in some medical specialties. The ophthalmology emergency department in particular observed a delay in the presentation of patients to the hospital[6-8].

Several studies have been conducted to evaluate eye injuries at various times. They were all attempting to determine the impact of the COVID-19 period in comparison to other times in history. One of the previous studies, published in 2020, was conducted on all children and adolescent patients presenting to an Italian emergency department for ophthalmology. This study found that

the rate of ocular trauma decreased from 354 to 112, or from 14.7 to 8.0 percent. Accidents during home activities increased significantly, while falls and sports injuries decreased significantly. Fifty percent of the participants were diagnosed with a foreign body on external eye. And the rate of eye injuries reported in the last month has decreased significantly by 68.4% [9].

Another comparative study was conducted in Italy to forecast the number of emergency visits in 2020 and 2019. In this study, the total number of visits during the research period in 2019 was 2902 and was expected to fall to 776 by 2020. In addition, the proportion of children and adolescents decreased from 10% to 5.3 %. During the 2020 study period, the rate of possible emergent diagnoses increased, with foreign bodies on the external eye being the most common. In contrast, the number of unlikely emergent diagnoses decreased, and conjunctivitis was the most common diagnosis. There were 27 patients who required hospitalization in 2019 and 9 in 2020. Furthermore, during the six weeks of national COVID-19 lockdown, the number of visitors to the ophthalmological emergency department decreased by 73% compared to the same period last year [8].

Little studies assessed the impact COVID-19 lockdown on ophthalmological emergency department visits, especially in Saudi Arabia. Thus, there is still a gap needs to be clarified. Therefore, this study aimed to assess the impact of COVID-19 on ophthalmological emergency department visits at King Khaled Eye Specialist Hospital, Riyadh City.

Methods

Study design and setting

A retrospective record review study was done in the emergency department (ED) of King Khaled Eye Specialist Hospital (KKESH) in Riyadh, Saudi Arabia. Patients who visited ED from 2 March to 30 June 2020 were compared to patients visits of the same period in 2019. A total of 1479 patients from all age groups and both genders were included in the study, with no exclusion criteria.

Data collection instrument

Our study revised the medical records of 1479 patients who visited the ED in the selected period. By using Google form, the data were collected and then transformed to Microsoft Excel 2021. The variables were broadly divided into demographic data (age, gender), the year of visit, diagnosis, Category of diagnosis, and the hospital admission requirement. Additionally, Diagnoses were categorized as unlikely to be emergent, likely to be emergent, and not determined, as described in. We classified the age groups into three categories: children and adolescents, working-age, and elderly [10,11].

Data analysis

The data were analyzed using the Statistical Package for the Social Science (SPSS) version 21 by IBM. The frequency test was conducted for categorical variables, and they were analyzed using chi-square test. Median ± Interquartile Range was calculated for the continuous variables. Mann-Whitney test was used for non-parametric variables. P value < 0.05 was considered statistically significant.

Research Ethics

This study was approved by the institutional review board at King Khalid Eye Specialist Hospital.

Results

There were 22113 and 10237 visits to the ophthalmology ED between March and June 2019 and 2020. Regardless of the randomized sample size, the overall number of visits to the ED decreased by 53.7% in 2020 compared to 2019.

This study was conducted on 1479 patients for all age groups. The median age of patients in 2019 was 36 ± 38 and 37 ± 33 in 2020 (P= 0.404, Mann-Whitney test).

Most of them were male in both periods. 53.6% of male patients were presented in 2020, while 50.3 % of them were in 2019 (P= 0.192, chi-square test). The proportion of children and young adolescents increased (from 18.6% to 19.2%), working-age group also increased (from 62.6% to 67.5%), while the percentage of elderly patients decreased (from 18.8% to 13.3%)(P= 0.014, chi-square test). There was a significant association between the visit years and the age categories. In contrast, the data showed no significant association between patient gender and the visit years to the emergency department and the P-value summarized in Table1.

Table 1: Association between Patient demographics and the visit years to the ophthalmology emergency department

Demographic category	2019	2020	P-value
Sex: Male Female	No. (%) 372 (50.3) 368 (49.7)	No. (%) 396 (53.6) 343 (46.4)	0.221
Age Category (years): Children and young adolescents (0-14) Working age (15-64) Elderly (65+)	 138 (18.6) 463 (62.6) 139 (18.8)	 142 (19.2) 499 (67.5) 98 (13.3)	0.014

Most of the patients' visits to the ophthalmology emergency department in 2019 were categorized under the non-determined category (72%). On the other hand, there were no big differences in the category of diagnosis in 2020. Therefore, the prevalence of each possible emergent, unlikely to be emergent, and not determined cases was 33.2%, 34.2%, and 32.6%.

In terms of the shift in visit urgency, the proportion of possible emergent cases increased from 11.5% to 33.2% (P= 0.000, chi-squared test). Corneal abrasion was the commonest presentation in 2020, while Keratitis was the most frequent in 2019. Moreover, the data revealed that the Vitreous hemorrhage was the second diagnosis in both years of study. Interestingly, the unlikely emergent diagnoses also elevated from 16.5% to 34.2% (P= 0.000, chi-squared test). In 2019 Conjunctivitis was the most common between them, followed by retinopathy. In comparison, dry eye disease was the leading diagnosis in 2020. The not determined diagnoses represent a significant decrease from 72% to 32.6% (P= 0.000, chi-squared test) in 2019 and 2020. All diagnoses and their percentages in 2019 and 2020 are summed up in Table 2.

Table 2: Number and percentages of diagnosis

Diagnosis	2019	2020
Unlikely emergent, No. (%)	122 (16.5)	253 (34.2)
Dry eye disease	2 (0.3)	127 (17.2)
Conjunctivitis	47 (6.4)	46 (6.2)
Hordeolum, chalazion, dermatitis	12 (1.6)	15 (2.0)
Retinopathy	30 (4.1)	19 (2.6)
Other visual disturbances	18 (2.4)	33 (4.5)
Subconjunctival hemorrhage	5 (0.7)	0
Entropion, ectropion, trichiasis	3 (0.4)	0
Cataract	4 (0.5)	12 (1.6)
Epiphora	0	7 (0.9)
Possibly emergent:	85 (11.5)	245 (33.2)
Corneal abrasion	7 (0.9)	138 (18.7)
Keratitis	28 (3.8)	20 (2.7)
Vitreous hemorrhage	15 (2.0)	21 (2.8)
Retinal detachment	8 (1.1)	14 (1.9)
Corneal ulcer	5 (0.7)	15 (2.0)
Retinal detachment and Retinal break	4 (0.5)	13 (1.8)
Cranial nerve palsy	7 (0.9)	3 (0.4)
Retinal vascular occlusion	5 (0.7)	2 (0.3)
Uveitis	0	5 (0.7)
Open globe injury	3 (0.4)	5 (0.7)
Optic neuropathy	0	3 (0.4)
Eyelid laceration	1 (0.1)	3 (0.4)
Retinal break	2 (0.3)	1 (0.1)
Foreign body	1 (0.1)	1 (0.1)
Ocular hypertension	0	1 (0.1)
Not determined:	533 (72.0)	241 (32.6)
Surgery-related problem	22 (3)	6 (0.8)
Other	511 (69.1)	229 (31.0)
Total	740 (100)	739 (100)

Seven patients required hospital admission in 2019. The indication for hospitalization was emergent in three cases, and the other four patients' diagnosis was non-determined. On the other hand, 23 patients were hospitalized in 2020, 11 of them were labeled as possibly emergent diagnoses, 1 were non-determined, and 1 patient had unlikely to be an emergent diagnosis. It was summarized In Table 3 the diagnosis and the number of patients who required hospitalization in two years of the study period.

Table 3: Numbers and diagnosis of patients who required hospitalization

Year of visit	Diagnosis	Hospital admission requirements
2019	Glaucoma	2
	Retinal detachment	1
	Keratitis	1
	Corneal degeneration	1
	open globe injury	1
	mechanical complication of other ocular prosthetic device	1
2020	glaucoma	5
	corneal ulcer	1
	retinal detachment with retinal break	3
	uveitis	2
	retinal detachment	2
	Vitreous hemorrhage	1
	Keratitis	1
	Conjunctivitis	1
	retinoblastoma	1
	Other malignant neoplasm	1
	open globe injury	2
	Ocular pain	1
	Hyperlipidemia	1
	Hypothyroidism	1

Discussion

The purpose of this study was to determine the effect of COVID-19 on ophthalmological emergency department visits at KKESH in Riyadh, Saudi Arabia. In 2020, we discovered a 53.7 percent decrease in ophthalmological emergency department visits when compared to the same period the previous year. Regardless of the randomized sample size, there were 22113 visits during the 2019 study period and 10237 during the 2020 study period.

On the other hand, previous research performed in Italy showed that the ophthalmological emergency visit was 2902 in 2019, reduced to 776 in 2020. The decrease in the number of visits is represented by 73%, which is entirely compatible with our study. [8] Moon et al. investigated the number of visits to the ophthalmology emergency department. In comparison to the same period in 2018 and 2019, they discovered a reduction of 18 visits per day following the announcement of public health recommendations in 2020 [12].

Moreover, a study in the United States assessing general emergency department visits has shown that the percentage of people seeking emergency during the pandemic year (2020) was 42% lower than during the same period of 2019 [6]. These changes could be attributed to social guidelines as well as strong evidence that the ocular surface is a possible entry point for coronavirus, increasing the risk of infection. As a result, patients may have been discouraged from seeking eye care as a result of this risk [12].

According to this study, the percentage of possible emergent diagnoses increased from 11.5 percent to 33.2 percent. In 2020, the most common presentation was corneal abrasion. Similarly,

the rate of diagnoses that were unlikely to be emergent increased from 16.5 percent to 34.2 percent. Conjunctivitis was the most common disease. Another study found that the percentage of potentially emergent diagnoses increased from 30.7 percent to 38.1 percent. The most prevalent condition that visited the ED during the pandemic was a foreign body on the external eye. Furthermore, research revealed that 50.0% of patients had been diagnosed with a foreign body on the external eye during the COVID-19 pandemic in 2020. [9] Contrary to our study, the unlikely-to-be emergent diagnoses reduced from 65.9% to 57.3% Conjunctivitis was the commonest among them in 2020 [8].Due to the limited availability of outpatient clinics during the pandemic era, some people may have gone to the ED for non-urgent reasons, which may explain the increase in non-urgent visits [12].

Our findings revealed that seven patients required hospitalization during the 2019 study period, with the majority of their diagnoses falling into the undetermined category. In 2020, the number of people who needed to be admitted to the hospital was 23. The most common indication was glaucoma, followed by retinal detachment and break. According to other research, the number of patients requiring hospitalization in 2019 was 27. The common indication was retinal detachment followed by open globe injury; compared to 2020, nine patients were admitted[8].

Limitations

The limitation in our research was that some patients might have visited the emergency room several times for the same problem. This may overestimate the rate of unlikely to be emergent diagnosis. And, our study was done in KKESH, which is an eye-specific center: there was a massive number of visits which we could not cover all. There were many diagnoses classified as non-determined, which may underestimate the proportion of severe ocular conditions. Many cases of COVID-19 swap positive who required hospital admission were not admitted. And some patients were transferred to other hospitals to maintain the infection control. This was related to a new hospital policy during the pandemic period to reduce its spread. Therefore, we recommend ruling out frequent ED visitors from the study regardless of the number of emergency department visits to find the actual number of diagnoses. Also, we were unable to identify how many patients came to the ophthalmology ED with COVID-19 related eye problems, especially those who had viral conjunctivitis. We recommend adding a conjunctival swap as a routine to recognize the type of viral infection.

Conclusion

This study aimed to assess the impact of COVID-19 on ophthalmological emergency department visits. We recognize that some patients may intentionally avoid serious care rather than the risk of Covid19 virus exposure at clinics. This carries the danger of irreversible vision loss. As a result, when planning their recovery efforts, ophthalmologists must consider the hidden burden of ocular illness. Moreover, it is critical to educate patients about the need of receiving appropriate ophthalmological care as soon as possible. In addition, measures to enable phone-based triage and telemedicine should be implemented to minimize ocular morbidities.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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