



Ocular Findings and Blurring of Vision Associated with COVID-19 Virus during Pandemics in Iraq

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Abstract:

Background: Coronavirus disease 2019 (COVID-19) emerged with a number of ophthalmologic manifestations. The most significant ocular symptoms included conjunctival discharge, redness, tears, itching, and a feeling of a foreign body in the eye.

Aim: To review and critically appraise ophthalmologic manifestations of COVID-19 in the form of rate and severity of visual impairment following ocular and systemic COVID-19 infections.

Methods: A cross-sectional study that was carried out at the outpatients' clinic in Al-Diwaniyah Teaching Hospital from October 2020 to October 2022 were 135 patients seeking advice regarding their ocular complaints. They are PCR and /or CT-scan approved COVID-19 infection. Comprehensive eye examination done for these patients started with visual acuity assessment by Snellen chart, then refraction followed by examination of the eye and its adnexa by slit lamp for signs of inflammation.

Results: The patients had a mean age of 47.5 years, and the rate of blurring of vision was 39.3%, whether they had ocular manifestation or not, and it showed substantial association with disease severity.

Conclusion: COVID-19 infection was associated with visual impairment, and the ophthalmologic manifestations severity was related to systemic morbidity.

Keywords: Blurred vision, COVID-19, Red eye, Conjunctivitis, Viral infection, Pandemic.

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Cite as: Hashim Z, Salih S, Abdulla M. Ocular Findings and Blurring of Vision Associated with COVID-19 Virus during Pandemics in Iraq. *Open Ophthalmol J*, 2024; 18: e18743641277380. <http://dx.doi.org/10.2174/0118743641277380231212063936>



Received: August 15, 2023
Revised: November 17, 2023
Accepted: November 28, 2023
Published: February 02, 2024



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1. INTRODUCTION

There have been 2,465,545 confirmed COVID-19 infections and 25,375 corona virus-related death in Iraq since the pandemic began. Some individuals will develop serious complications and may require hospital admission and critical help [1]. Geriatrics and those with systemic disease, especially diabetics, hypertensive and cancer patients, are more prone to serious illness [2]. The virus can spread from mouth or nose secretions that particulate

during breathing, speaking and coughing. Advice to the population: get vaccinated, keep a physical distance of at least 1 meter, wear a mask, and if you develop symptoms, ask for medical help [3]. COVID-19 hit Iraq in February 2020; the topographic presentation of the disease showed that it reached its maximum from spring 2020 to August 2020, then another increment in cases through spring and summer 2021, subside to increase in winter 2022 [1].

2. AIM OF THE STUDY

To review and critically appraise ophthalmologic manifestations of COVID-19 in the form of rate and severity of visual impairment following ocular and systemic COVID-19 infections.

3. MATERIALS AND METHODS

3.1. Study Design and Setting

A cross-sectional study that was carried out at outpatient' clinics in Al-Diwaniyah Teaching Hospital from October 2020 to October 2022.

3.2. Participants

This study enrolled 135 patients seeking advice regarding their ocular complaints at the ophthalmology outpatient clinic presenting with ocular irritation and discomfort that passed through an indolent course and was slowly responded or even refractory to usual treatment items used for such conditions and their Polymerase chain reaction (PCR) found positive. Another group of patients came after they got improvement from respiratory or any other COVID-19 comorbidities; both above groups were examined for complaints related to vision impairment.

3.3. Variables/ Data Measurements

Age, gender, ocular manifestations, visual acuity, systemic manifestations of COVID-19 infection, severity of COVID-19 disease. All cases were PCR and /or Computerized topography (CT)-scan-approved COVID-19 virus infection. Comprehensive eye examination done for

these patients started with visual acuity assessment by Snellen chart, then refraction followed by examination of the eye and its adnexa by slit lamp for signs of inflammation. Ophthalmoscopy was done after iris dilatation using tropicamide eye drops. The severity of ocular manifestations according to visual acuity (reduced visual acuity of 1 to 2 lines in comparison to the last examination before infection was considered mild-moderate, while more than two lines were considered severe). The association between categorical variables was recorded. Ocular manifestations involved a wide spectrum of presentations in the form of ocular pain, itching, chemosis and corneal infiltrate, conjunctival hemorrhage; blurring of vision. The same Ophthalmologist examined all cases.

3.4. Statistical Analysis

Descriptive statistics included frequency and percentages, data input, manipulation and analysis were done using Microsoft Excel 2021.

4. RESULTS

This study involved 135 patients aged 25-70 years, 71 males and 64 females. There were 111(82.2%) with some ocular manifestations of COVID-19 and 53 (39.3%) with reduced visual acuity (Table 1).

The ocular manifestations included Conjunctivitis (39.3%), Hyperemia (2.2%), Ocular pain (3.7%), Epiphora (12.6%), Photophobia (10.4%), Chemosis (5.9%), Corneal infiltrates (2.2%), Itching sensation (5.9%), Severe effect on visual acuity were seen in 37 (69.8%) patients (Table 2).

Table 1. Basic characteristics of the study group.

Variables	N	%
Gender	-	-
Male	71	52.6
Female	64	47.4
Ocular manifestations	-	-
Yes	111	82.2
No	24	17.8
Post-COVID blurring *	-	-
Yes	53	39.3
No	82	60.7

Note: *Blurring of vision in patients with covid-ocular presentations and those with only systemic COVID-19.

Table 2. Ocular manifestations.

Characteristic *	N	%
Conjunctivitis	53	39.3
Hyperemia	3	2.2
Ocular pain	5	3.7
Epiphora	17	12.6
Photophobia	14	10.4
Chemosis	8	5.9
Corneal infiltrates	3	2.2

Characteristic *	N	%
Itching sensation	8	5.9

Note: * The above table refers to the main presenting symptoms. Some patients presented with 2 or 3 ocular signs; ocular manifestations for patients with ocular and systemic COVID-19.

Table 3. Blurring of vision with systemic and ocular COVID-19.

Characteristic *	N	%
Respiratory distress	35	25.9
Flue like illness	7	5.2
Diarrhea and vomiting	2	1.5
Ocular COVID-19	9	6.7
Total	53	39.3

Note: *24 patients in the study group had visual acuity impairment without manifest ocular signs with history of covid infection.

Table 4. Classification of patients regarding impaired visual acuity.

Visual Acuity	N	%
Partial 6/6	14	26.4
6/9-6/36	21	39.6
Others 6/60 or worse	18	34.0

Table 5. Impaired visual acuity related to disease severity.

COVID-19 Disease Severity	Patients Presented with VA Impairment	
	N	%
Severe	37	69.8
Mild-moderate	16	30.2

Note: *Severity of ocular or systemic disease, VA: visual acuity.

Systemic manifestations included respiratory distress (25.9%), flu-like illness (5.2%), diarrhea and vomiting (1.5%), as shown in Table 3.

There were 14 (26.4%) patients with visual acuity (VA) of 6/6 (partial), 21 (39.6%) with 6/9 to 6/36, and the other 18 (34%) had VA of 6/60 or worse, as shown in Table 4.

There were 37 (69.8%) with a severe reduction in VA, as shown in Table 5.

5. DISCUSSION

In individuals diagnosed with COVID-19, the occurrence of dry eyes or the feeling of having a foreign object in the eyes might not be directly attributed to the virus itself. Rather, the symptoms can be exacerbated and become more prevalent during the COVID-19 pandemic due to people frequently touching their eyes, particularly when wearing loosely fitted masks that press against the face. This is particularly true for individuals who already have pre-existing dry eye or insufficient tear quality, as Liao et. al. reported evidence for worsening dry eye disease following COVID-19 infection. [4] The act of wearing face masks and the resulting airflow directed towards the surface of the eyes can expedite the evaporation of tears, potentially leading to the manifestation of dry eye symptoms [5].

Access to lubricants is restricted out of concern about contaminated hands and medication containers, which worsens the symptoms of dry eyes [6]. Furthermore, with the onset of the pandemic, individuals have devoted increased amounts of time to gazing at screens, a factor that has the potential to exacerbate dry eye symptoms. The frequency and vigor of blinking significantly decrease when using a screen, intensifying the discomfort associated with dry eyes. The ocular surface may experience tiny fiber neuropathy as a long-term side effect of COVID-19 [7].

COVID-19 encompasses a broad spectrum of short-term and long-term symptoms, which may include potentially lasting issues related to respiratory function, vascular abnormalities, or persistent fatigue. These symptoms are similar to those of any eye illness and diabetic neuropathy [8, 9]. A recent study showed tissue and sub-basal plexus changes in the cornea, which are typically observed in cases of small fiber neuropathy. Conversely, the images obtained from healthy individuals did not exhibit notable damage to the nerve fibers or corneal tissue [10]. Instead, a significant number of them displayed neuroma-like images, and another group on confocal microscopy displayed dendritic cells [11]. Scientists from the University of Hong Kong in China have

brought attention to a positive connection between viral load and an increased likelihood of encountering symptoms related to the surface of the eye [12]. and this is what we also figured out in our study: that a small number of patients who have blurring of vision or prominent dry eye symptoms gave a history of severe COVID-19 illness. On the other hand, fewer follow-up visits and decreased care seeking in individuals with a history of dry eye conditions during quarantine may have been other variables that led to an increase in dry eye symptoms during the pandemic [12].

Here in this study, we concentrate, in addition to ocular manifestations of COVID-19 on the visual acuity and quality of vision following COVID-19 infection. Some patients who complain of blurring of vision during covid-19 epidemic were found to have dry eye and persistent ocular irritation that could cause on some occasions, visual impairment, as explained above. On the other hand, retinal lesions in the form of white area or dot blot hemorrhage [13]. found in a small number of patients, as mentioned by other studies. In our study, we found one patient with Roth spot. She gave a history of two covid attacks. The last one was one month ago after she had been submitted to a thorough ocular examination involving ophthalmoscopy and she had visual acuity of 20/40 thrombotic events, primarily affecting veins could explain this, and these events are linked to the progression of the disease and poorer clinical outcomes. Furthermore, COVID-19 is characterized by specific abnormalities in the microvasculature, which include endothelial inflammation, damage to intercellular junction and development of micro-thrombi [11, 14]. A distinctive coagulopathy associated with COVID-19, characterized by elevated levels of cytokines and the activation, endothelial cells-activation, and initiation of complement cascade. In addition, these events are more prevalent in cases of severe disease [12]. COVID-19-associated coagulopathy is characterized by the dysregulation of a host defense mechanism, resulting in an excessive formation of immunologically mediated blood clots that primarily impact the microvasculature, and there are some reports of retinal damage duo to coagulopathy in COVID-19 patients [15, 16], in our study we did not identify such finding, in addition retinal vein occlusion can be caused by such mechanism [17], but again we did not observe retinal vein changes, and none on our patients had an indication to have fluorescein angiography.

Mental health status can be affected in some COVID-19 survivors, and they may keep complaining of insomnia, fatigue, depression or anxiety [18, 19]. In the ophthalmology department, we found that they had dry eye, photosensitivity, and other complaints from a decrement in quality of vision as compared to their own vision before getting diseased.

Visual acuity impairment in the studied group can't be explained only by COVID-19 infection. In fact some of the patients are diabetic and have retinopathy others had moderate cataracts, but during history, they confirmed that their poor vision either started after or even

aggravated after the infection. Many of them had medical records, and multiple visits to the ophthalmology clinic previously were taken as basic data for comparison.

One limitation of the current study was the difficulty in examining some patients with respiratory distress who were on ambulatory oxygen using a slit lamp. These patients were instead examined by direct ophthalmoscopy with magnification for anterior segment examination and indirect ophthalmoscopy for posterior segment examination. At the time when this study was carried out, the number of patients with COVID-19 was high, but in our country, the majority did not seek medical care in hospitals, rather, they stayed at home, so the sample may not represent the actual community. Contextual factors like differences in healthcare systems between countries, cultural and religious practices, and other environmental factors may affect generalizability of the results to other countries.

CONCLUSION

COVID-19 infection was associated with visual impairment, and the ophthalmologic manifestations severity was related to systemic morbidity.

LIST OF ABBREVIATIONS

COVID-19	=	Coronavirus Disease 2019
PCR	=	Polymerase chain reaction
CT	=	Computerized topography
VA	=	visual acuity

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the scientific committee of the Al-Diwaniyah Teaching Hospital and followed the ethical standards of the institutional research committee and its subsequent update of ethical standards (Code: 2019/C081).

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Every individual participant included in the study provided written informed consent.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data are available from Hashim ZA, Salih SKM, Younis Abdulla M. Ocular findings and blurring of vision associated with COVID-19 virus during pandemics in Iraq.xlsx. figshare; 2023. <https://ndownloader.figshare.com/files/42220668>

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

Declared None.

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