

The Effect of The Stay-At-Home Policy On Ophthalmology Outpatient Clinic Applications During The Covid-19 Pandemic: A Comparative Study

Ali Ceyhun Gedik¹, Muhammet Derda Ozer^{2*}

¹Lüleburgaz Devlet Hastanesi, Göz Hastalıkları, Lüleburgaz, Kırklareli, Türkiye

²Van Yüzüncü Yıl Üniversitesi, Tıp Fakültesi, Göz Hastalıkları ABD, Van, Türkiye

ABSTRACT

To report the effects of the stay-at-home policy on requests for ophthalmology outpatient clinic visits at a secondary care hospital during the COVID-19 outbreak.

March 11, 2020, was the date on which the first confirmed coronavirus case was reported in Turkey and was therefore selected as the boundary date in the design of this study. All applications with urgent and non-urgent complaints were made to a secondary care hospital during the two months duration during the pandemic curfew period in 2020 and the same date interval in 2019 (March 11, 2019 – May 11, 2019) were examined retrospectively using the hospital's automation system.

Of the patients who participated in the study, 7.6% (n = 512) were aged between 0 and 18 years, 62.2% (n = 4190) were between 18 and 65 years. The number/ratio of patients who visited the hospital during the pandemic period between the ages of 0–18 years and 65 years and older were found to be statistically significantly lower than the non-pandemic period ($P < 0.001$). The rate of patients who applied to the hospital during the pandemic period with an urgent eye complaint was statistically significantly higher than that of the non-pandemic period ($P < 0.001$; odds ratio = 3.7).

The spectrum of ophthalmic conditions that led individuals to request ophthalmology outpatient clinic visits was similar during both periods; however, certain age groups showed decreased application rates during the pandemic period. The application of conjunctivitis cases significantly increased during the pandemic period.

Keywords: COVID-19, Ophthalmology, Outpatient, Pandemic, Ocular Disease

Introduction

Coronavirus 2019 disease (COVID-19) was declared a global pandemic by the World Health Organization (WHO) on March 11, 2020 [1]. On June 24, 2020, the WHO reported 9,129,146 cases and 473,797 deaths with a confirmed diagnosis of COVID 19 in 216 countries (1). On June 24, 2020, the total number of cases confirmed by the Republic of Turkey Ministry of Health was 190,165, and the total number of deaths was reported as 5001 (2).

In December 2019, the new enveloped RNA betacoronavirus, which shows phylogenetic similarity to severe acute respiratory syndrome coronavirus (SARS-CoV), was identified in Wuhan, the capital city Hubei province in China. The virus was named SARS-CoV-2, and the disease caused by this novel virus was called COVID-19 (3). The rapid spread of the disease

also affected Turkey. The first case of the disease in Turkey emerged on March 11, 2020, and the first death related to COVID-19 occurred on March 15, 2020. Numerous preventative precautions, such as intercity transportation restrictions, the transition to a distance education system, social distancing, mask usage, weekend curfews, and a stay-at-home policy, were applied to control the spread of the disease. As with all specialties in medicine, these precautions and limitations affected ophthalmology departments' outpatient clinics (4, 5). However, application numbers to ophthalmology outpatient clinics reportedly decreased by more than a third (–39%) compared to other specialties during the pandemic (6).

In this study, we aimed to reveal the change in the number of patients who applied to a secondary care hospital in Turkey for ophthalmologic complaints during the pandemic compared to that during the non-pandemic period (March 11, 2019

*Corresponding Author: Muhammet Derda Ozer, Van Yüzüncü Yıl Üniversitesi, Göz Hastalıkları ABD, Tuşba, Van, TR 65080, Türkiye
E-mail: muhammetderda@gmail.com, Tel: 0 (553) 785 14 81

ORCID ID: Ali Ceyhun Gedik: 0000-0002-2438-3689, Muhammet Derda Ozer: 0000-0002-3954-270X

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– May 11, 2019). We also compared the variations in emergency applications to the same hospital before and during the pandemic period. This is the first study to evaluate the rebound effect of the pandemic situation on ophthalmology outpatient clinic applications in Turkey to the best of our knowledge.

Material and Methods

Study Design: This was a retrospective study. The patients who requested an ophthalmology outpatient clinic visit at a secondary care Hospital before and during the pandemic period were reviewed using data from the hospital's automation system. Before conducting the study, approval was obtained from the Surgical and Pharmaceutical Research Ethics Committee (IRB no: 20/184). The study adhered to the principles of the Declaration of Helsinki.

The date March 11, 2020, on which the first confirmed coronavirus case was reported in Turkey, was selected as the starting date in the study's design. All applications with urgent and non-urgent complaints were made to the ophthalmology clinic of Luleburgaz State Hospital during the two months pandemic period, and the same date interval in 2019 (non-pandemic period) were examined retrospectively using the hospital's automation system. Multiple applications by the same patients were excluded from the study.

All the patients who were admitted to the ophthalmology clinic of Luleburgaz State Hospital between March 11, 2019 – May 11, 2019, and March 11, 2020, and May 11, 2020, were included in the study. The patients were divided into two groups. Urgent and non-urgent applications were classified according to the duration of the patient's complaint and the diagnosis made by the physician (A.C.G.). Patients whose complaints had lasted longer than a week were classified as non-urgent and the patients who had experienced complaints for less than a week were classified as urgent with due consideration of the physician's diagnosis. Demographic features, age, gender, duration of the complaint, diagnosis, and the form of application (urgent vs. non-urgent) were noted. The total number of applications, the age distribution among the patients, whether the application was urgent or not, and the diagnoses of the patients in the two groups were compared.

Statistical Analysis: The Number Cruncher Statistical System (NCSS) 2007 software program (Kaysville, UT) was used for the statistical analysis. Descriptive statistical methods

(frequency, percentage) were used while evaluating the study data. Pearson's chi-square test was used to compare qualitative data. Statistical significance was set at $P < 0.05$.

Results

The study included the data of 6738 patients. Among the patients, 7.6% ($n = 512$) were between 0 and 18 years of age (Group 1), 62.2% ($n = 4190$) were between 19 and 65 years old (Group 2), and 30.2% ($n = 2036$) were 65 years or older (Group 3). In this study, 43.2% ($n = 2910$) of the patients were male and 56.8% ($n = 3828$) were female (Table 1, Graphic 1). It was noted that 78% ($n = 5259$) of the patients who participated in the study applied to the hospital before the pandemic period (March 11, 2019 – May 11, 2019), and 22% ($n = 1479$) applied to the hospital during the pandemic period (March 11, 2020, and May 11, 2020). Only 4.5% ($n = 304$) of the patients had urgent complaints, while 95.5% ($n = 6434$) had non-urgent complaints when applying. The diagnostic distribution of the patients who applied to the hospital before and during the pandemic period is shown in Table 2. The most common urgent and non-urgent ophthalmic conditions during the pandemic were acute conjunctivitis ($n = 108$, 72.4%) and dry eye-related conditions ($n = 281$, 21%), respectively.

The distribution of both urgent and non-urgent cases in non-pandemic and pandemic periods in all three age groups is statistically significantly different ($p < 0.001$). The rate of male patients admitted to the hospital during the pandemic period was found to be statistically significantly higher than the status during the non-pandemic period ($P = 0.020$). The percentage of patients who applied to the hospital during the pandemic period with an urgent eye complaint was found to be statistically significantly higher than that during the non-pandemic period ($P < 0.001$, odds ratio = 3.7) (Table 1, Graphics 2). Additionally, The percentage of patients with acute conjunctivitis among the urgent applications was increased significantly during the pandemic period (44.5% vs. 77.4%, $P < 0.001$).

Discussion

The COVID-19 pandemic dramatically changed the number of outpatient applications to hospitals across all medical specialties. The suggestions in national and social media to avoid applying to hospitals unless necessary to reduce the disease's

Table 1. Evaluation of Age, Gender, and Application Status by Periods

		Period		
		Pandemic (-)	Pandemic (+)	P-value
		(n=5259)	(n=1479)	
		n (%)	n (%)	
Age	0-18 years (Group 1)	435 (8,3)	77 (5,2)	a <0,001**
	19-64 years (Group 2)	3122 (59,4)	1068 (72,2)	a <0,001**
	≥65 years (Group 3)	1702 (32,4)	334 (22,6)	a <0,001**
Gender	Male	2232 (42,4)	678 (45,8)	a 0,020*
	Female	3027 (57,6)	801 (54,2)	
Admission Type	Urgent	155 (2,9)	149 (10,1)	a <0,001**
	Non-Urgent	5104 (97,1)	1330 (89,9)	

^aPearson Chi-Square Test *P<0,05 **P<0,001

spread across the world might also contribute to this outcome. Likewise, the curfew restrictions for people ≥ 65 years of age and ≤ 18 years reduced their applications to outpatient clinics in Turkey. In a study conducted using records of outpatient visits in the United States, all outpatient clinic applications were shown to have decreased by 60% during the pandemic (6). In the same study, it was stated that the department in which the outpatient clinic applications fell the most was the ophthalmology clinic, with an 80% decrease overall. Our analysis similarly detected a reduction of 56% in the number of patients admitted to the ophthalmology clinic in the pandemic period compared to the non-pandemic period. We think that this decline can be attributed to the national and social media pressure about unnecessary applications to hospitals, the country's administrators' suggestions about not leaving the house unless necessary, and the curfew restrictions applied to specific age groups.

We have found a statistically significant decrease from 32.4% to 22.6% in the application of the older age group (Group 3) to the ophthalmology outpatient clinic during the pandemic period compared to the non-pandemic period ($P < 0.001$). We interpreted the reason for this outcome as the application of curfew restrictions on this age group of individuals in Turkey from March 21, 2020. The awareness of this age group of individuals about the severity of the COVID 19 infection might also contribute to this outcome. Conversely, due to the more flexible restrictions applied for those aged between 19 and 64, the rate of applicants in this age group in the non-pandemic period was 59.4%. The rate of applications of this group of individuals to the ophthalmology outpatients clinic relatively increased to 72.2% in the pandemic period ($P < 0.001$). In individuals aged ≤ 18 years, in which

the curfew restrictions were also applied, the ophthalmology outpatient clinic's rate of applications decreased from 8.3% to 5.2% ($P < 0.001$). In our study, the most frequent diagnoses in patients admitted during the non-pandemic period were conjunctivitis, corneal foreign body, and hordeolum. Similarly, conjunctivitis, hordeolum, and corneal foreign body were the most frequently seen ocular conditions during the pandemic period. Interestingly, the percentage of acute conjunctivitis diagnosis in urgent settings during the pandemic period increased significantly ($P < 0.001$), even though the rate of most of the other urgent or non-urgent ocular conditions fell during the pandemic period (Table 2). As it has been established, COVID-19 manifests with acute conjunctivitis, and the spread of the virus may be facilitated by hand-eye contact [7-10]. We do not know whether these conjunctivitis cases were related to COVID-19 infections. Still, we can speculate that the increased number of acute conjunctivitis cases during the pandemic period put the ophthalmologists in a high-risk situation that they may encounter with possible COVID-19 cases when dealing with these kinds of patients in an acute setting.

The variations in outpatient clinic applications during the pandemic period have been reported in various medical specialties (11, 12). For example, Wickham et al. from Moorfields Eye Hospital described an increase in emergency applications rate among outpatient applications during the pandemic period. In the non-pandemic period, blepharitis, posterior vitreous detachment, and acute anterior uveitis were identified as the most common emergency admission diagnoses. In contrast, acute anterior uveitis, corneal abrasion, and posterior vitreous detachment were the most common emergency admission diagnoses in the post-pandemic period (12). Szeles R et al. have

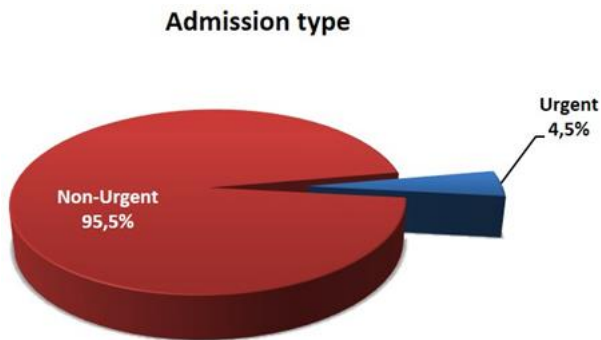
Table 2. The distribution of the diagnosis among groups

Diagnosis	Non-Pandemic Period	Pandemic Period	Chi-Square Test
	n (%)	n (%)	P- value
Urgent Ophthalmic Conditions	n=155 (2,9%)	n=149 (10,1%)	<0,001**
Acute Conjunctivitis	69 (44,5)	108 (72,4)	<0,001**
Corneal foreign body	32 (20,6)	10 (6,7)	<0,001**
Hordeolum	15 (9,7)	19 (12,7)	0,395
Recently Onset Diabetic Macular Edema	12 (7,7)	1 (0,7)	0,002*
Acute Iridocyclitis	9 (5,8)	4 (2,7)	0,178
Acute Orbital/Periorbital infection	7 (4,5)	1 (0,7)	0,036*
Keratitis	4 (2,6)	4 (2,7)	0,954
Optic neuritis	6 (4)	1 (0,7)	0,062
Episcleritis	1 (0,6)	1 (0,7)	0,977
None-Urgent Ophthalmic Conditions	n=5104 (97,1%)	n=1330 (89,9%)	<0,001**
Dry Eye	881 (17,3)	281 (21)	0,001**
Astigmatism	754 (14,8)	177 (13,3)	0,176
Hypermetropia	520 (10,2)	130 (9,8)	0,655
Presbyopia	518 (10,2)	179 (13,5)	<0,001**
Cataract	512 (10)	85 (6,4)	<0,001**
Blepharitis	466 (9,1)	144 (11)	0,059
Myopia	428 (8,4)	101 (7,6)	0,349
Routine Ophthalmic examination	223 (4,4)	56 (4,2)	0,800
Postoperative follow-up visit	219 (4,3)	43 (3,2)	0,082
Retinal degeneration	158 (3,1)	24 (1,8)	0,011*
Glaucoma	85 (1,7)	51 (3,8)	<0,001**
Glaucoma suspect	59 (1,2)	13 (1)	0,581
Ambliopia	57 (1,1)	22 (1,7)	0,112
Eyelid problems/malpositions	76 (1,5)	4 (0,3)	<0,001**
Pterygium	43 (0,8)	7 (0,5)	0,242
Chalazion	31 (0,6)	2 (0,1)	0,037*
Strabismus	25 (0,5)	7 (0,5)	0,866
Unilateral blindness	7 (0,1)	1 (0,1)	0,568
Degenerative myopia	7 (0,1)	2 (0,1)	0,908
Aphakia	1 (0)	1 (0,1)	0,305
Color blindness	1 (0)	0 (0)	-
Optic atrophy	1 (0)	0 (0)	-
Miyastenia gravis	1 (0)	0 (0)	-
Iris atrophy	1 (0)	0 (0)	-
Corneal degeneration	23 (0,5)	0 (0)	-
Nystagmus	4 (0,1)	0 (0)	-
Accommodation spasm	2 (0)	0 (0)	-
Macular degeneration	1 (0)	0 (0)	-

Pearson Chi-Square Test *P<0,05 **P<0,001

also compared the ophthalmology outpatient clinic applications during the pandemic and pre-pandemic period (4). They have stated that the

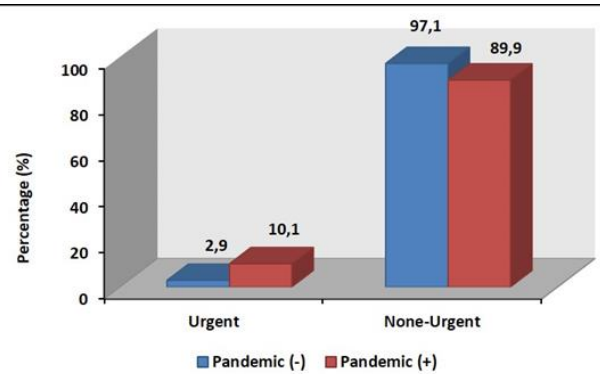
proportion of emergency applications was significantly increased during the pandemic period. The ratio of glaucoma, conjunctivitis, and



Graphic 1. The distribution of the total ophthalmology outpatient clinic applications in terms of admission type

chalazion was found increased in contrast to cataract and dry macular degeneration during the pandemic period. We have also found a significantly increased proportion of urgent applications to the ophthalmology outpatient clinic. We have also seen an increased conjunctivitis diagnosis and decreased rate of cataract diagnosis during the pandemic period. Agarwal R et al. also evaluated the ophthalmic outpatient clinic application alterations during the curfew restriction period (5). They have found an increase in the number of male applicants, and the percentage of children applications was decreased significantly. Overall, the routine ophthalmology outpatient flow was reported to be reduced considerably. They have found ocular trauma, keratitis, and conjunctivitis as the most common reasons for presentation during the curfew period. We have found a significantly increased male predominance in the outpatient clinic applications during the pandemic period. Our study also showed that the rate of emergency applications among all applications increased from 2.9% non-pandemic to 10.1% during the pandemic period ($P < 0.001$). Additionally, We have found a statistically significant increase in conjunctivitis during the pandemic period. In contrast, the application of patients with corneal foreign body, recently onset of diabetic macular edema, acute periorbital-orbital infection, dry eye, cataract, presbyopia, retinal degeneration, glaucoma, eyelid malpositions, and chalazion was significantly decreased during the pandemic period (Table 2).

Our study aimed to show the effects of the COVID-19 pandemic on applications to a second-level public hospital eye clinic. It is known that droplets transmit SARS-Cov-2 and that the eyes or throat can receive the virus after touching surfaces containing these droplets and then touching the eyes, nose, or mouth (13). It has also been shown that ocular surfaces are a potential risk for SARS-



Graphic 2. The distribution of ophthalmology outpatient clinic applications during the non-pandemic and pandemic periods according to urgent and non-urgent ophthalmic conditions

Cov-2 transmission (14). Accordingly, it can be said that ophthalmologists carry a high risk of transmission of infection by direct contact. Therefore, we believe that the stay-at-home policy and curfew imposed by managers contributed positively to the fight against the pandemic by reducing the number of outpatient applications to eye clinics and reducing the rate of non-urgent applications. Lai et al. stated that personal protective equipment is crucial for the protection of ophthalmologists (15). In our study, we observed that the rate of urgent applications requiring a biomicroscopic examination increased during the pandemic period. Therefore, we recommend that ophthalmologists should pay particular attention to personal protective equipment since it is challenging to avoid close contact with individuals during biomicroscopic examinations during the pandemic period.

A limitation of our study was its retrospective nature. Furthermore, due to the study's design, we were not able to consider the impact of various factors on the distribution of ocular diseases among the ophthalmology outpatient clinic applications. On the other hand, we believe that our study results may provide considerable insights into the variations in the ophthalmologic disease spectrum seen in outpatient clinics during a pandemic.

Our understanding is that our study is the first to evaluate the frequency of applications for ophthalmology outpatient clinic visits and the most frequent ophthalmic diagnoses during the COVID-19 pandemic in Turkey. We believe that investigating the effects of the COVID-19 pandemic on the distribution of ophthalmic disorders seen at the ophthalmology outpatient clinics during the pandemic period is necessary for ophthalmologists to orient their preparations.

Ethics approval and consent to participate: All the procedures performed in the study that involved human participants were conducted in accordance with the ethical standards of the institutional and national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The study was approved by Sağlık Bilimleri University, Hamidiye Faculty of Medicine, Surgical and Pharmaceutical Research Ethics Board (IRB: 20/184).

Availability of data and materials: The data supporting our findings can be found at Luleburgaz State Hospital, Ophthalmology Department Secretary.

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Authors' Contributions: M.D.O. and A.C.G. performed the data collection, and M.D.O. and A.C.G. were involved in planning and supervising the work. M.D.O. and A.C.G. processed the experimental data, performed the analysis, drafted the manuscript, and designed the tables and graphics. Both authors discussed the results and commented on the manuscript.

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