

## Impact of COVID-19 Lockdown in Ophthalmologic Care and Subsequent Restoration of Clinical and Surgical Activity

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### Abstract

**Purpose:** To evaluate the impact of coronavirus disease 2019 (COVID-19) lockdown on ophthalmology practice and evaluate the recovery of activity after this period.

**Methods:** This cross-sectional study was performed with data collected from Puerta de Hierro- Majadahonda University Hospital administrative services. Number of outpatient visits, emergency room (ER) visits, surgeries and intravitreal injections were analyzed.

**Results:** Total number of outpatient visits, retina visits and ER visits fell significantly during the lockdown compared with prepandemic data ( $P = 0.0007$ ,  $P = 0.0009$  and  $P < 0.0001$ , respectively), but no significant differences were observed after this period compared to prepandemic data. Similarly, a significant decline in total number of surgeries was observed during the lockdown ( $P = 0.0005$ ) but after no differences were found. Number of retina surgeries dropped during the lockdown ( $P = 0.0021$ ) and remained low after ( $P = 0.0056$ ). We found no significant differences in number of weekly intravitreal injections throughout the pandemic.

**Conclusion:** A reduction on number of visits and surgeries was observed during the lockdown, but after this period there were no differences compared to prepandemic data. Remarkably, although reduced, no statistically significant differences were found regarding number of intravitreal injections during the lockdown.

**Keywords:** COVID-19; Pandemic; Lockdown; Retina; Medical Practice; Intravitreal Injection

### Abbreviation

ER: Emergency Room

### Introduction

The disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), COVID-19, has infected millions of people around the world. On March 11<sup>th</sup> 2020, the World Health Organization declared the pandemic status. This unprecedented situation led to a lockdown declaration in many countries, in which

population's movements were strongly restricted. Healthcare services were limited to emergencies, routine visits were cancelled and patients were encouraged to avoid visiting hospitals. In Spain, a country severely affected by this pandemic, the nationwide lockdown lasted for more than three months, from March 15<sup>th</sup> to June 21<sup>st</sup> 2020 and affected remarkably how outpatient care was provided in health facilities.

To deliver safe and effective eye care, a series of infection control measures following the American Academy of Ophthalmology

and other publications recommendations were adopted [1-5]. In this study, we wanted to evaluate the impact of the lockdown on number of visits, intravitreal injections and surgeries in the department of ophthalmology of a Hospital in Madrid, Spain. Deeper understanding of the effects of this situation will allow us to optimize resources and design new strategies to mitigate the negative effect of this pandemic and therefore improve ophthalmologic care.

## Materials and Methods

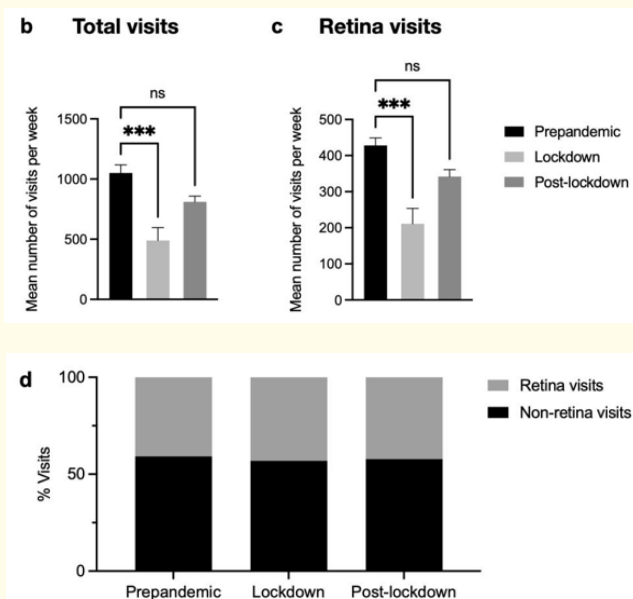
A retrospective, cross-sectional study with data collected from the administrative services of Puerta de Hierro-Majadahonda University Hospital was performed. We reviewed the data from the year 2020 and compared the variables before the lockdown (February 1<sup>st</sup> - March 15<sup>th</sup> 2020), during (March 15<sup>th</sup> - June 21<sup>st</sup>) and after the lockdown in Spain (June 21<sup>st</sup> - December 28<sup>th</sup> 2020). Primary outcome measures studied were number of outpatient visits (total and retina), emergency room (ER) visits, number of surgeries and number of intravitreal injections per week.

Statistical analysis was performed with GraphPad Prism 9 (GraphPad Inc, La Jolla, CA). Data were assessed with one-way analysis of variance followed by Dunnett's multiple comparisons test. A P value <0.05 was considered statistically significant. All the results are expressed as mean  $\pm$  standard deviation.

## Results and Discussion

### COVID-19 pandemic caused a decrease in outpatient visits

Mean number of weekly visits was  $1050.5 \pm 164.21$  before,  $489.2 \pm 419$  during and  $811.11 \pm 243.48$  after the lockdown (Figure 1). The total number of visits fell by 53.43% during the lockdown and 22.79% after compared to prepandemic data. There was a significant decline in number of outpatient visits during the lockdown period ( $P = 0.0007$ ; Dunnett's multiple comparisons test). Among all outpatient visits, retina visits per week were  $428.33 \pm 50.29$  prior,  $210.93 \pm 165.1$  during and  $342.07 \pm 98.89$  after the lockdown. Retina visits decreased by 50.76% during and 20.14% after the lockdown. A significant reduction in retina visits was found throughout the lockdown ( $P = 0.0009$ ; Dunnett's multiple comparisons test). There were no significant differences in number of total nor retina visits after the lockdown compared to prepandemic values.



**Figure 1:** Outpatient visits throughout the COVID-19 pandemic. (a) Timecourse of outpatient visits to ophthalmology service per week. The lockdown period appears highlighted in light blue. (b) Comparison of total number of weekly visits between prepandemic, lockdown and post-lockdown periods. (c) Weekly retina visits comparison among the aforementioned groups. (d) Proportion of retina visits and non-retina visits during the pandemic. \*\*\* $P < 0.001$ . ns: non-significant.

### ER visits shrinkage due to COVID-19 lockdown

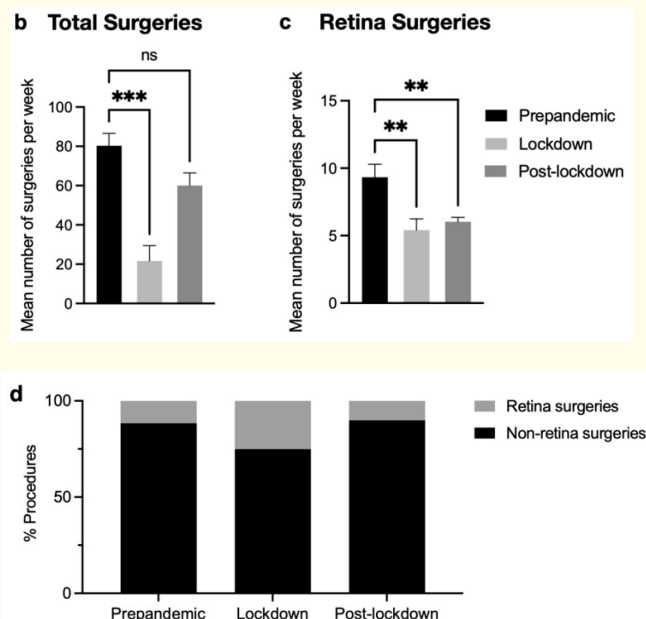
Similarly, ER weekly visits were on average  $174 \pm 53.56$  before, during  $93.40 \pm 51.05$  and after  $154.3 \pm 18.61$  the lockdown (Figure 2). The mean number of ER visits dropped by 46.32% during and 11.32% after the lockdown, A significantly reduced number of ER

visits was observed during the lockdown ( $P < 0.0001$ ; Dunnett's multiple comparisons test). After the lockdown, we found no differences in ER visits compared to prepandemic data.

**Figure 2:** Emergency Room (ER) visits during the COVID-19 pandemic. (a) Mean number of weekly ER visits. The lockdown period appears highlighted in light blue. (b) Comparison between the prepandemic, lockdown and postpandemic periods regarding weekly ER visits. \*\*\*\* $P < 0.0001$ . ns: non-significant.

#### Number of surgical procedures dropped during COVID-19 lockdown, and after this period, retina surgeries remained low

Mean number of weekly surgeries was on average  $80.33 \pm 15.49$  before,  $21.53 \pm 30.47$  during and  $60.04 \pm 33.39$  after the lockdown (Figure 3). Among these, retina surgeries were  $9.33 \pm 2.34$ ,  $5.4 \pm 3.29$  and  $6.04 \pm 1.63$  respectively per week. Total surgeries fell by 73.2% during and 25.26% after the lockdown. A significant decline in total volume of surgeries was observed during the lockdown ( $P = 0.0005$ ; Dunnett's multiple comparisons test), but after this period no differences were seen compared to prepandemic numbers, whereas number of retina surgeries decreased not only during ( $P = 0.0021$ ; Dunnett's multiple comparisons test) but also after the lockdown ( $P = 0.0056$ ; Dunnett's multiple comparisons test). Mean number of retina surgeries declined by 41.94% during and 31.41% after the lockdown compared to prepandemic period.



**Figure 3:** Impact of COVID-19 pandemic on volume of surgeries. (a) Mean number of surgeries per week during the studied period representation. The lockdown period appears highlighted in light blue. (b) Comparison between prepandemic, lockdown and post-lockdown periods in total number of surgeries per week and (c) retina surgeries per week. (d) Proportion of retina surgeries and non-retina surgeries throughout the pandemic. \*\* $P < 0.01$ . \*\*\* $P < 0.001$ . ns: non-significant.

#### Intravitreal injection number remained unchanged despite the lockdown

Mean number of weekly number of intravitreal injections was  $89.17 \pm 15.96$  before,  $72.00 \pm 34.96$  during and  $99.67 \pm 25.64$  after the lockdown (Figure 4). There was a 19.26% reduction of intravitreal injections during the lockdown. After the lockdown we observed a 11.77% increase in this value compared to prepandemic data. However, no significant differences in mean number of intravitreal injections throughout the pandemic (during nor after the lockdown) compared to prepandemic values were found.

In this study, we report the effect of COVID-19 pandemic on the volume of outpatient visits, ER visits, surgeries and intravitreal injections comparing data before, during and after the lockdown.

**Figure 4:** Number of intravitreal injections along the pandemic caused by COVID-19. (a) Mean number of weekly intravitreal injections representation. The lockdown period appears highlighted in light blue. (b) Comparison between prepandemic, lockdown and post-pandemic periods. ns: non-significant.

Particularly, we analyzed data after the lockdown to evaluate the long-term impact this period may have caused.

The days following the lockdown declaration, we found a dramatical decrease in all visits and interventions.

However, soon after, the implementation of measures to prevent the COVID-19 infection [1-4] (Shih et al.; Wickham et al.; Borrelli, Sacconi, et al.; Safadi et al.) along with the reorganization of medical attention allowed us to promptly recover baseline activity.

Among medical specialties, ophthalmology receives an enormous amount of patients. Shrinkage in clinical activity due to COVID-19 pandemic has also been reported by other groups [2,5-8]. Furthermore, ophthalmology has been considered as the medical specialty in which number of outpatient visits has decreased the most [9]. Mean number of total outpatient visits fell by 50% during the lockdown in our sample. Other groups have reported a similar decline in outpatient visits [2,8]. We found a parallel trend in retina visits, where many patients suffer sight-threatening conditions, such as age-related macular degeneration or diabetic retinopathy, that require close monitoring and frequent intravitreal injections. A relative increase in proportion of retina visits compared to non-retina visits has been reported by other group [5]. However, we did not observe this trend in our sample, where the proportion of retina visits remained unchanged amidst the pandemic. Further investigation is mandatory to assess the impact of the decrease in visits during the lockdown on the outcome of patients. Fortunately,

after the lockdown no statistically significant differences were observed compared to prepandemic values.

Remarkably, despite healthcare services remained active for emergencies throughout this pandemic, we observed a significant decrease in ER visits and, during the lockdown ER visits fell by 50% approximately. We speculate that this may be mainly due to the apprehension related to COVID-19 exposure at healthcare facilities, which limited the ER visits to the most severe ones. In fact, other recent reports also show a reduction in number of ER visits with a relative increase of the proportion of urgent visits [2,10-12]. Moreover, nonemergent visits have been reported to comprise half of ER visits, and this is consistent with our data [13].

The analysis of surgical activity revealed a reduction up to 75% in total number of procedures during the lockdown, and eventual restoration of these numbers after this period. Cataract surgery is certainly the most frequent surgery performed in ophthalmology services worldwide. Despite the negative impact that cataract-associated vision loss can have on the quality of life of patients, it is yet considered an elective surgery and almost all of the procedures can be delayed. This can also be applied to the rest of general ophthalmology surgeries and explains the significant reduction we observed in total number of surgeries during the lockdown, and the subsequent normalization of these numbers.

Number of retina surgeries fell approximately 42% during the lockdown, consistent with other series [14], and contrary to our expectations, remained low after this period compared to prepandemic data. Approximately half of retina surgeries in our department correspond to urgent retinal detachment repair or trauma, and the rest of them include macular hole, epiretinal membrane and other that can be deferred (data not shown). Interestingly, a 62% reduction on the incidence of retinal detachment has been recently reported with the introduction of COVID-19 isolation measures, arguing that this may be a consequence of decreased population activity, patients neglecting symptoms or fear to contracting COVID19 in hospitals (Wickham et al.). Our ophthalmology department is located within a general hospital. Hence, surgical personnel and operating rooms were in many occasions required for other purposes to relieve the excessive hospital overload due to COVID-19, severely affecting our surgical activity.

During this pandemic, our priority was to maintain the treatment of sight-threatening diseases. For this reason, during the lockdown the appointments to receive intravitreal injections remained unchanged, and, although the first month this number was considerably reduced, we observed no differences in mean number of injections during nor after the lockdown. Other groups have reported significant reduction in this number (Borrelli, Grosso, et al.; Hamichi et al.), but we think this may be due to the fact that Spanish lockdown lasted longer compared to other countries. This allowed us to adopt new protocols in order to optimize resources and workforce to deliver treatment when needed to our patients during the lockdown. Curiously, after this period, we observed an increased number of injections compared to prepandemic data, although this difference was not statistically significant. This finding may be due to the worsening of some patients during the lockdown, that required more intensive therapy after the release of the mobility restrictions.

This study has some limitations. First, the retrospective nature of the design limits the information that can be analyzed. Second, the analysis is limited to a single population, and further investigations would be needed to confirm our findings. Also, the city of Madrid has been one of the most affected regions worldwide by this pandemic, so our results may not apply to other populations. However, we analyzed data collected before, during and most importantly after the lockdown. We strongly believe that data analysis after the lockdown may provide valuable information to evaluate the real impact of COVID-19 on ophthalmologic care.

## Conclusion

In order to overcome the present and future pandemics, the analysis of the effect of this lockdown in the delivery of eye care is mandatory. The impact of this pandemic on healthcare should be evaluated in detail to prevent the deleterious effects that healthcare paralyzation may have in our patients, and may help us adapt our resources accordingly.

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## Conflict of Interest

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## Bibliography

1. Shih C Kendrick., *et al.* "Maintenance of Ophthalmic Specialist Out-Patient Service during the COVID-19 Outbreak: The University of Hong Kong Experience". *Eye* 34.7 (2020): 1241-1242.
2. Wickham Louisa., *et al.* "The Impact of COVID Policies on Acute Ophthalmology Services—Experiences from Moorfields Eye Hospital NHS Foundation Trust". *Eye* 34.7 (2020): 1189-1192.
3. Borrelli Enrico Domenico Grosso., *et al.* "Impact of COVID-19 on Outpatient Visits and Intravitreal Treatments in a Referral Retina Unit: Let's Be Ready for a Plausible 'Rebound Effect'. *Graefe's Archive for Clinical and Experimental Ophthalmology* 258.12 (2020): 2655-2660.
4. Safadi Khaled., *et al.* "Ophthalmology Practice during the COVID-19 Pandemic". *BMJ Open Ophthalmology* 5.1 (2020): e000487.
5. Sethi Karan., *et al.* "Modeling the Impact of COVID-19 on Retina Clinic Performance". *BMC Ophthalmology* 21.1 (2021): 206.
6. Borrelli Enrico., *et al.* "Taking the Right Measures to Control COVID-19 in Ophthalmology: The Experience of a Tertiary Eye Care Referral Center in Italy". *Eye* 34.7 (2020): 1175-1176.
7. Ting Darren Shu Jeng., *et al.* "The Impact of COVID-19 Pandemic on Ophthalmology Services: Are We Ready for the Aftermath?" *Therapeutic Advances in Ophthalmology* 12 (2020): 2515841420964099.
8. Hamichi Sophia El., *et al.* "Impact of the COVID-19 Pandemic on Essential Vitreoretinal Care with Three Epicenters in the United States". *Clinical Ophthalmology* 14 (2020): 2593-2598.
9. Mehrotra Ateev., *et al.* "The Impact of the COVID-19 Pandemic on Outpatient Visits: A Rebound Emerges". 19 May (2020).
10. Moon Jade Y., *et al.* "The Impact of the COVID-19 Pandemic on Ophthalmic Care at an Eye-Specific Emergency Department in an Outbreak Hotspot". *Clinical Ophthalmology* 14 (2020): 4155-4163.

11. Pellegrini Marco., *et al.* "The Impact of COVID-19 Pandemic on Ophthalmological Emergency Department Visits". *Acta Ophthalmologica* 98.8 (2020): e1058-1059.
12. González-Martín-Moro Julio., *et al.* "Impact of the COVID-19 Lockdown on Ophthalmological Assistance in the Emergency Department at a Spanish Primary Level Hospital". *Journal of Ophthalmology* 2021 (2021): 8023361.
13. Hall Leangelo N., *et al.* "Utilization Trends of an Ophthalmology-Specific Emergency Ward: The Massachusetts Eye and Ear Infirmary Experience". *Digital Journal of Ophthalmology* 26.4 (2020): 31.
14. Awan Muhammad Amer., *et al.* "Impact of COVID-19 Lockdown on Retinal Surgeries". *Pakistan Journal of Medical Sciences* 37.7 (2021): 1808-1812.

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