

Effects of the Covid-19 pandemic on eye care for patients in a referral training hospital

Efeitos da pandemia da Covid-19 no atendimento oftalmológico de pacientes em um hospital de treinamento de referência

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ABSTRACT

Objective: To assess the impact of the Covid-19 pandemic on the number of medical appointments, exams and procedures performed in a public ophthalmic teaching hospital in Brazil.

Methods: The total number of consultations, outpatient procedures and surgeries performed between March 2018 and March 2021 were reviewed and compared. Number of surgeries per resident was also reviewed.

Results: There was a drop of 31.6% of care provided in the 2020 period compared to the average of the last two pre-pandemic years, with a total of 38.235 ophthalmologic evaluations. All surgical modalities decreased from March to July 2020. There was a drop of 35.27% (4,322 surgeries) in 2020 compared to the average of the years 2018 and 2019. There was a 16.3% decrease in exams performed. Laser capsulotomies and iridotomies followed with a decrease of 35.89% e 23.57% in 2020, respectively. However, there was an increase of 12.7% compared to the average of the last two years before the pandemic in intravitreal injections of anti-VEGF and from photocoagulation therapy.

Conclusion: The Covid-19 pandemic reduced surgical procedures and ophthalmologic consultations in training hospitals when compared to prior years, with the exceptions of intravitreal injections of anti-angiogenic (anti-VEGF) and photocoagulation therapy, which increased.

RESUMO

Objetivo: Avaliar o impacto da Covid-19 sobre o número de consultas, exames e procedimentos médicos realizados em um hospital público de ensino oftalmológico no Brasil.

Métodos: Foi revisado e comparado o número total de consultas, procedimentos ambulatoriais e cirurgias realizadas entre março de 2018 e março de 2021. O número de cirurgias por residente também foi revisado.

Resultados: Houve queda de 31,6% dos atendimentos realizados no período de 2020 em relação à média dos dois últimos anos pré-pandêmicos, com um total de 38.235 avaliações oftalmológicas. Todas as modalidades cirúrgicas diminuíram de março a julho de 2020. Houve queda de 35,27% (4.322 cirurgias) em 2020 em relação à média dos anos 2018 e 2019. Houve redução de 16,3% nos exames realizados. As capsulotomias e as iridotomias a laser seguiram com queda de 35,89% e 23,57%, respectivamente, em 2020. No entanto, houve um aumento de 12,7% em relação à média dos últimos 2 anos antes da pandemia nas injeções intravítreas antiangiogênicas e na terapia de fotocoagulação.

Conclusão: A pandemia da Covid-19 reduziu os procedimentos cirúrgicos e as consultas oftalmológicas em hospitais de treinamento em comparação com os anos anteriores, com exceção de injeção intravítrea antiangiogênica e terapia fotocoagulação.

INTRODUCTION

The World Health Organization (WHO) declared a coronavirus disease 2019 (Covid-19) pandemic on March 11, 2020, prompting the world to adopt contingency measures. Among the guidelines, consultations and elective medical procedures were recommended to be postponed.⁽¹⁻⁵⁾ Brazil has continental dimensions and, therefore, it was up to each state to promote actions to confront the new coronavirus. In the state of Bahia, a contingency plan was put into action on March 27, 2020.

Ophthalmologists are a particularly affected category. According to National Health Service (NHS), cataract surgery was the most performed elective procedure in previous years worldwide. Studies show a reduction of more than 47% cataract surgeries during the pandemic, associated with financial and employment cutback.⁽⁶⁾ Moreover, retinal procedures also decreased in this period. Sue Anschutz-Rodgers Eye Center, US, shows a reduction of up to 56% in the number of retinal detachment surgeries performed and a 50% decrease in laser procedures for retinal treatments during the lock-down period.⁽⁷⁾ In Brazil, the Conselho Federal de Medicina (CFM) reported that cataract surgery, which corresponded to up to 49% cases of treatable blindness,⁽⁸⁾ had a long waiting list of patients eager to perform the surgery after the pandemic. It also impacts doctors in training ophthalmology hospitals.

A survey conducted in 2020, during the pandemic peak, among United Kingdom (UK) ophthalmology fellowships, showed that lack of training in cataract surgery was the most frequent concern, reaching rates above 89%. In addition, there is an expressive proportion of trainees who felt their mental health had been negatively impacted by the pandemic (46%).⁽⁹⁾

The purpose of this study was to describe the impact of the Covid-19 pandemic on the number of consultations, tests and medical procedures performed in a training ophthalmology hospital.

METHODS

Study population

A retrospective review was performed on medical records at Hospital Humberto Castro Lima (HHCL), Salvador (BA), between January 1st, 2020, to December 31st, in 2018, 2019 and 2020 years. The HHCL is a medical residency teaching center, with a well-structured program that was established over 30 years ago and that has since grown in patient care hospital. Currently, there are 24 residents and five fellowships. The program consists of a curriculum based on clinical and surgical skills over a three-year

period. Data collected was used to observe the impact of the Covid-19 pandemic in a teaching hospital.

Bioethical aspects

The plenary of the Teaching and Research Committee understands that submission for bioethical analysis is not necessary since this protocol proposes an investigation that does not involve human beings as recommended by the legislation of the national ethics commission in human research (Comissão Nacional de Ética em Pesquisa [CONEP]) system. The data proposed for collection are related to purely administrative issues, which goes against the mission of an Ethics Committee in Research involving human beings that is of social control and protection to research participants.

Data collection

The data used for collection is linked to the hospital's administration, provided by its Technology and Information System Service HHCL, after its authorization. The responsible researcher signed an agreement to use hospital record data, which was collected from care practices and admissions in all sectors of the hospital. A direct search was carried out in the electronic medical records of the hospital. Ophthalmologic evaluations, generally and by subspecialty, were evaluated. Invasive and non-invasive surgical procedures and complementary exams were also included. To assess the acquired surgical skills, the number of surgeries performed per resident was collected during the periods mentioned, by counting the surgical maps per month.

Statistical analysis

Quantitative variables were expressed by mean and standard deviations. Quantitative variables were expressed by absolute and relative frequencies. A p-value < 0.05 was considered statistically significant. The Mann-Whitey test was used to compare the mean between the years analyzed. The Statistical Package for Social Sciences (SPSS, Inc., version 21.0) for windows software was used for statistical analysis.

RESULTS

There was a drop of 31.6% in care provided in the 2020 period compared to the average of the last two pre-pandemic years, with a total of 38.235 ophthalmologic evaluations. In 2018, there were 54.143 ophthalmological evaluations and in 2019, there were 57,658. Cataract, glaucoma and general consultations were the highest demands in

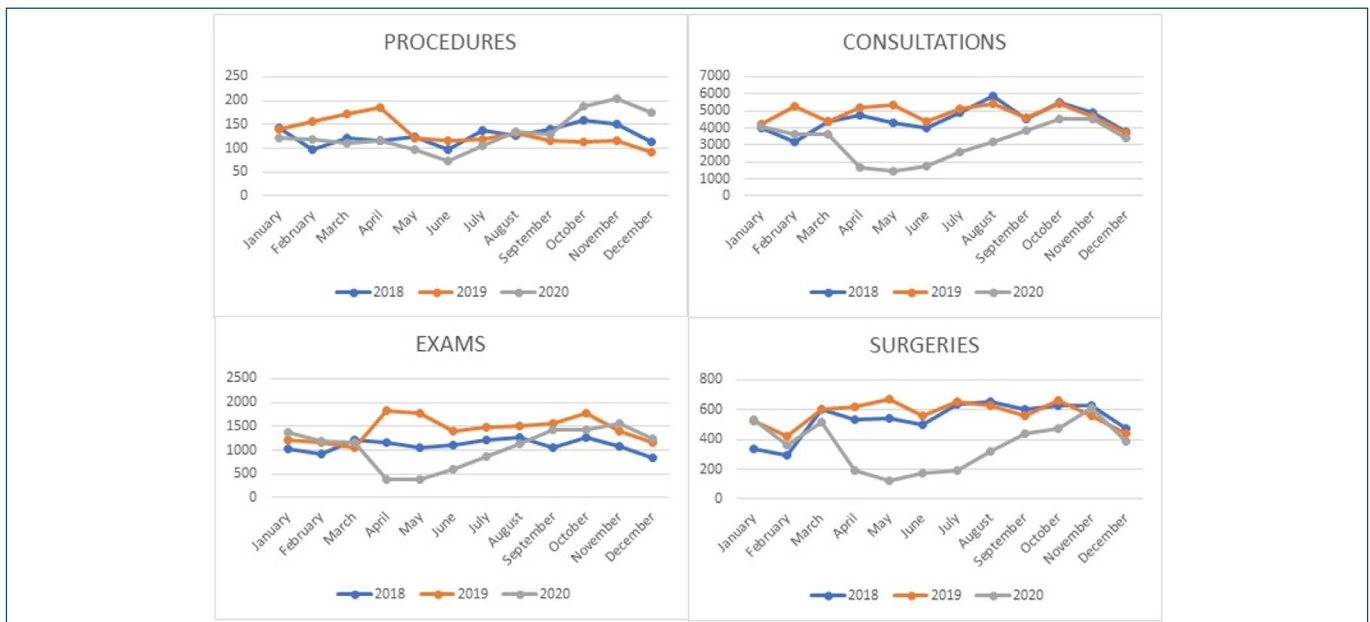


Figure 1. Surgeries, ophthalmology consultations, exams, and procedures performed in 2018, 2019, and 2020.

the analyzed period, corresponding to 71% of the total consultations. Even during the pandemic, they remained the main reason for consultations. The most prominent decreases in 2020 were in refraction (70%), sickle cell anemia (60.5%), and neurophthalmology (51%) consultations, compared to the average of previous years.

Figure 1 shows a relevant reduction in ophthalmological evaluations from the end of March to July, followed by a growing increase in the second half of 2020. The lowest attendance rate in the period covered was from April to June 2020, which coincides with the period in which more restrictive actions were taken to prevent coronavirus spread.

Surgical procedures

All surgical modalities decreased from March to July 2020. There was a drop of 35.27% (4,322 surgeries) in 2020 compared to the average of the years 2018 and 2019. Cataract surgery was the most performed surgery in all years evaluated (50%), followed by pterygium excision (20%). The drop in the number of surgeries started in March and ended in December, with the exception of November. In the month of May, it presented the biggest reduction: only 46 cataract surgeries and 16 pterygium surgeries were performed, which represents 85% and 87% compared to the last 2 years. Corneal transplants were not performed in April and May.

Complementary exams

A total of 13,176 (2018), 17,360 (2019) and 12,779 (2020) complementary exams were performed, including

biometry, campimetry Humphrey, keratometry, diurnal tension curve, fluorescein angiography, specular microscopy, optical coherence tomography, pachymetry, retinography, corneal topography and eye ultrasound. The most performed ones were biometrics and keratometry. Following the drop in care provided, in 2020, there was a 16.3% decrease in exams performed. The months that showed decline were April, May, June, and July. The other months continued to carry out exams similar to the years 2018 and 2019. Despite the observed reduction in the total number of exams in 2020, some exams, such as optical coherence tomography, specular microscopy, and pachymetry showed an increase, driven by the increase in the number observed in the second half of 2020.

Other ophthalmological procedure

The ophthalmic procedures included were anti-angiogenic (anti-VEGF) therapy with intravitreal injection, photocoagulation therapy, Nd: YAG laser capsulotomy and laser iridotomy. Laser capsulotomies and iridotomies followed with a fall of 35.89% and 23.57% in 2020, respectively. However, there was an increase of 1,573 (1.35%) of the total procedures performed in 2020. This increase was due to the increase in intravitreal injections of anti-VEGF from 606 (2018), 649 (2019) to 877 (2020) applied and due to photocoagulation therapy, which showed an increase of 12.7% compared to the average of the last two years before the pandemic. There was no decrease in any month in 2020. There was an increase of 152% in the number of intravitreal injections in October, 135.1% in November and 147.6% in December.

Table 1. Surgeries, exams and procedures performed in 2018, 2019 and 2020

	Year		
	2018	2019	2020
Surgeries			
Facetomy	3,231	3,642	2,019
Trabeculectomy	574	612	415
Strabismus correction	102	135	90
Posterior vitrectomy	417	468	374
Corneal transplant	141	103	57
Blepharoplasty	215	229	161
Exeresis pterygium	1,535	1,330	946
Minor surgeries	222	396	260
Exams			
Fluorescein angiography	203	248	214
Biometry	3,999	5,422	3,083
Humphrey campimetry	1,472	1,487	1,414
Keratometry	2,815	4,512	3,086
Diurnal tension curve	1,024	1,530	795
Specular microscopy	308	687	645
OCT	601	485	790
Pachymetry	1,059	1,072	1,119
Retinography	507	645	538
Corneal topography	717	840	719
Eye ultrasound	471	432	376
Procedures			
Intravitreal injection of anti-VEGF	606	649	877
Capsulotomy	587	511	352
Iridotomy	235	202	167
Photocoagulation	98	216	177

OCT: optical coherence tomography; anti-VEGF: anti-vascular endothelial growth factor

DISCUSSION

As a result of the Covid-19 pandemic, drastic action was required, and many training hospitals reduced the volume of non-essential surgeries and allowed only emergency and urgent ones to be performed.⁽¹⁰⁾ Elective surgeries were postponed during the lock-down period, negatively impacting the surgical training of residents. Ophthalmologists are an especially affected category due to the need to stand close to the patient to perform the slit lamp and refraction examinations.⁽¹¹⁾ The present study investigated the impact of the Covid-19 pandemic in an ophthalmologic training hospital. Moreover, it also investigated the perspective of ophthalmology residents on their clinical and surgical learning during this period.

In the present study, we identified a significant reduction in the number of consultations and surgeries, especially in the critical period of March and April. In some European settings, a 97% reduction in cataract surgery volume was reported between March and April 2020 when compared to the same period in 2019.⁽¹²⁾ A report from University of Pittsburgh showed that about 60% of the follow-up of patients with retinal disease or glaucoma was delayed by several months.⁽¹³⁾ These interruptions were likely distressing for patients with glaucoma, diabetes, macular degeneration, and other vision-threatening

conditions. Furthermore, emergency room visits and elective consultations also decreased because patients were resistant to hospital or clinic visits. Delaying the follow-up and treatment of these pathologies may culminate in the progression of the diseases, generating higher medical costs for treatment and visual rehabilitation.^(14,15)

There was a 1.35% increase in the total number of procedures performed in 2020. This increase was due to the increase in intravitreal injections of anti-VEGF and photocoagulation. A study conducted in Milan identified an increase in subretinal hemorrhages in patients with age related macular degeneration (AMD) during the first few months of the Covid-19 pandemic.⁽¹⁶⁾ This study believes that poor adherence to treatment or lack of strict monitoring may be responsible for this deleterious situation.

Screening for diabetic retinopathy was also frequently delayed during the pandemic, particularly in areas with high rates of Covid-19. At the Wilmer Eye Institute, eye examinations for diabetics decreased from 1,145 visits to 59 visits in the first six weeks after restrictive pandemic measures.⁽¹⁷⁾ The progression of retinal disease patients who were left unattended during the pandemic may justify the increase in the number of intravitreal injections and photocoagulation found in our study.

The Conselho Brasileiro de Oftalmologia (CBO) establishes a minimum annual workload of 2,880 hours and a minimum number of procedures to be performed of 1,000 clinical visits and 50 surgical visits, also each year. Randleman et al. suggest that residents need to perform 80 cataract surgeries during their training program.⁽¹⁸⁾ Thus, there is a drastic reduction in the practical training of physicians. This loss may never be recovered and result in failure to acquire the surgical and clinical skills necessary for appropriate resident training in ophthalmology.

Since Covid-19, cases were first reported in the United States, drastic action has taken place, including many training hospitals reducing their volume of non-essential surgeries and allowing emergency, or time-sensitive only surgeries to be performed.⁽¹⁹⁾

Following international health guidelines, hospitals postponed elective surgery during lockdown, leading to a negative impact on residents' surgical training. University hospitals must balance priorities between maintaining patient care and educating residents with the need to reduce face-to-face care. Classroom lectures, practical clinical demonstrations and surgical training are crucial components of medical education. Training institutes will have to adapt to current conditions, which impose canceled classroom teaching, and a significantly reduced surgical volume.

Most residents, not only in ophthalmology, but also in all specialties, will finish their academic education without having performed clinical activities or the minimal surgical modalities required. In this research, we identified a reduction of 31.6% in care provided and a reduction of 16.3% in tests performed in the 2020 period. The impact of deficiencies generated by the reduction in the flow of care during the Covid-19 pandemic is greater for residents in their last years of training, since a few months of reduced clinical activity for a first-year ophthalmology resident in a 3-year-long residency may be compensated later in the program.⁽⁵⁾ Since the beginning of the lockdown, there has been an increase in the number of webinars, podcasts, and virtual activities to maintain residencies around the globe. Although this virtual format does not replace clinical practice itself, these technological advances opened up possibilities for this new way of learning.⁽²⁰⁾

Regarding surgical activity, the impact on training was even greater. All surgical modalities decreased from March to July 2020, especially in May when it presented the greatest reduction of 85 and 87% when compared to the last two years of cataract and pterygium surgical rates. In order to address deficiencies in surgical training, new simulators were developed, which allows trainees to practice procedures repeatedly in order to improve their skills. Some include performance measures where doctors get to experience different clinical scenarios without exposing patients to any risk.⁽²¹⁾ In a study carried out in Saudi Arabia, almost half of the participants were satisfied with the new method. In line with this finding, after the pandemic, medical education will likely adopt this teaching method, in addition to the traditional in-person format.⁽²²⁾

It is important to note that most residents did not have adequate availability of surgical simulation or access to a wet laboratory to practice their surgical skills, including those at the hospital studied. Thus, the pandemic caused irreparable damage to the training of interns in ophthalmology.⁽²⁰⁾

The Covid-19 pandemic caused an important reduction in the number of consultations, procedures and ophthalmic surgeries. Therefore, clinical and surgical learning suffered devastating consequences related to lack of training in ophthalmology. Although new technological learning modalities have emerged, they do not replace in-person learning, and that option was not available to most residents. These newly developed teaching strategies are a great opportunity to increase ophthalmological

knowledge. They could enable the ophthalmological community to ensure continuity in medical education despite any other future restrictions or potential disasters.

AUTHORS' CONTRIBUTIONS

Substantial contribution to conception and design: Koch CR, Torres EN, Junior GAS. Acquisition of data: Cunha RF. Analysis and interpretation of data: Koch CR, Lima CC, Alves MR. Drafting of the manuscript: Koch CR, Lima CC, Cunha RF, Alves MR. Critical revision of the manuscript for important intellectual content: Torres EN, Junior GAS. The following have given final approval of the submitted manuscript (mandatory participation for all authors): Koch CR, Lima CC, Torres EN, Junior GAS, Novaes LO, Cunha RF, Alves MR. Statistical analysis: Koch CR, Junior GAS. Administrative, technical, or material support supervision: Cunha RF. Research group leadership: Alves MR.

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