



## Research Article

# The Impact of the COVID-19 Pandemic on Medical Services Provided in Orthopedics and Traumatology Departments

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### Abstract

The COVID-19 pandemic has profoundly impacted healthcare systems globally, presenting unprecedented challenges for various medical specialties, including orthopedics and traumatology. This retrospective study examines the effects of the pandemic on hospital admissions and length of hospitalization within orthopedics and traumatology departments at County Clinical Emergency Hospital Oradea in Romania over an eight-year period (2015-2022). The study aims to identify the pandemic's influence on specific hospital management indicators in light of new strategic plans implemented during the pandemic. Hospital admissions experienced significant fluctuations during the pandemic years, with a notable decline observed in 2020-2021, followed by a gradual recovery in subsequent years. Both urgent and chronic case admissions exhibited decreases during the pandemic, particularly in 2020, before showing signs of recovery in the following years. One-day admissions, predominantly chronic cases, also saw a decline during the pandemic years but rebounded steadily thereafter. Similarly, the average length of hospitalization demonstrated fluctuations, with a notable decrease in 2020 followed by a gradual increase in subsequent years. These trends suggest dynamic shifts in patient care pathways and treatment protocols over time. Additionally, there were fluctuations in the availability of beds within the departments, reflecting efforts to adapt to changing patient volumes and acuity levels during the pandemic. The findings underscore the significant impact of the COVID-19 pandemic on orthopedics and traumatology departments, particularly in terms of hospital admissions and length of hospitalization. Despite challenges, healthcare systems have demonstrated resilience in adapting to evolving circumstances. Flexible and adaptive strategies are crucial to ensure timely access to care while maintaining patient safety and quality of care in the post-pandemic era.

**Keywords:** COVID-19 Pandemic; hospitalization; Orthopedics and Traumatology; coronavirus.

## Introduction

The COVID-19 pandemic has caused significant disruptions across various sectors, including healthcare systems worldwide [1]. In particular, orthopedics and traumatology departments have faced unprecedented challenges as they strive to maintain quality patient care amidst the pandemic [2]. The hospitalizations of patients with chronic disease and the average length of hospitalization in the departments have emerged as key indicators of COVID-19 Pandemic impact on healthcare systems [3].

The impact of the COVID-19 pandemic on hospital admissions within orthopedics and traumatology departments is substantial and multifaceted. Analysis of admission trends reveals notable shifts in patient volumes and acuity levels over the study period, reflecting the dynamic nature of healthcare delivery during a public health crisis [4,5].

The present study offers retrospective analysis of orthopedics and trauma cases admitted during the COVID-19 Pandemic and the pre and post pandemic period in a 8 year timeframe (2015-2022). The main goal is to identify how the pandemic affects specific hospital management indicators given that the the pandemic has led to the implementation of new strategic plan, which included the reorganization of hospitals in Bihor County [6]. To achieve the proposed goal, the following objectives were defined:

- evaluation of the number of hospitalizations in Orthopedics and Traumatology departments in County Clinical Emergency Hospital Oradea depending on the type of hospitalization
- evaluation of the average length of hospitalization and available beds in Orthopedics and Traumatology departments in County Clinical Emergency Hospital Oradea reported annually

## Materials and Methods

### Study Design

The study was carried out in the County Clinical Emergency Hospital Oradea (CCEHO) by analyzing the number of hospitalizations, average length of hospitalization and available beds in Orthopedics and Traumatology departments. CCEHO is a tertiary level public hospital located in N-W Romania, which provides medical assistance for approximately 200,000 inhabitants of the Municipality of Oradea and emergency medical services for a territorial population of approximately 600,000 inhabitants [7].

This study is part of a complex doctoral research that aims to assess medical services provided in the departments of orthopedics and traumatology. In previous publication we highlighted that the impact of the COVID-19 pandemic on the number of hospitalizations in the orthopedics and traumatology departments was a negative one, decreasing dramatically starting with April 2020, when 63% fewer

hospitalizations were registered than in the similar period of the previous year [4]. In this study we assessed a larger timeframe that gives a greater perspective over the COVID-19 pandemic on these departments, engulfing the pre and post Covid-19 period.

To carry out the study, consent regarding access to the database was initially requested and obtained, later data was retrieved and processed. The data was provided by CCEHO Statistical department.

During the study period (2015-2022), there a total of 19950 patients from County Clinical Emergency Hospital Oradea were included, without any exclusion criteria. Regarding COVID-19 pandemic data, a total number of 92159 cases were included in the study, this corresponding to all confirmed cases of infection with SARS – CoV –2 (COVID – 19) in Bihor county between 2020-2022, the public data being retrieved from Romanian Ministry of Health public information bulletin and from Covid19.stirioficiale.ro, a project carried out within the Code for Romania Task Force in partnership with the Government of Romania through the Authority for Digitization of Romania and the Department for Emergency Situations [8-10].

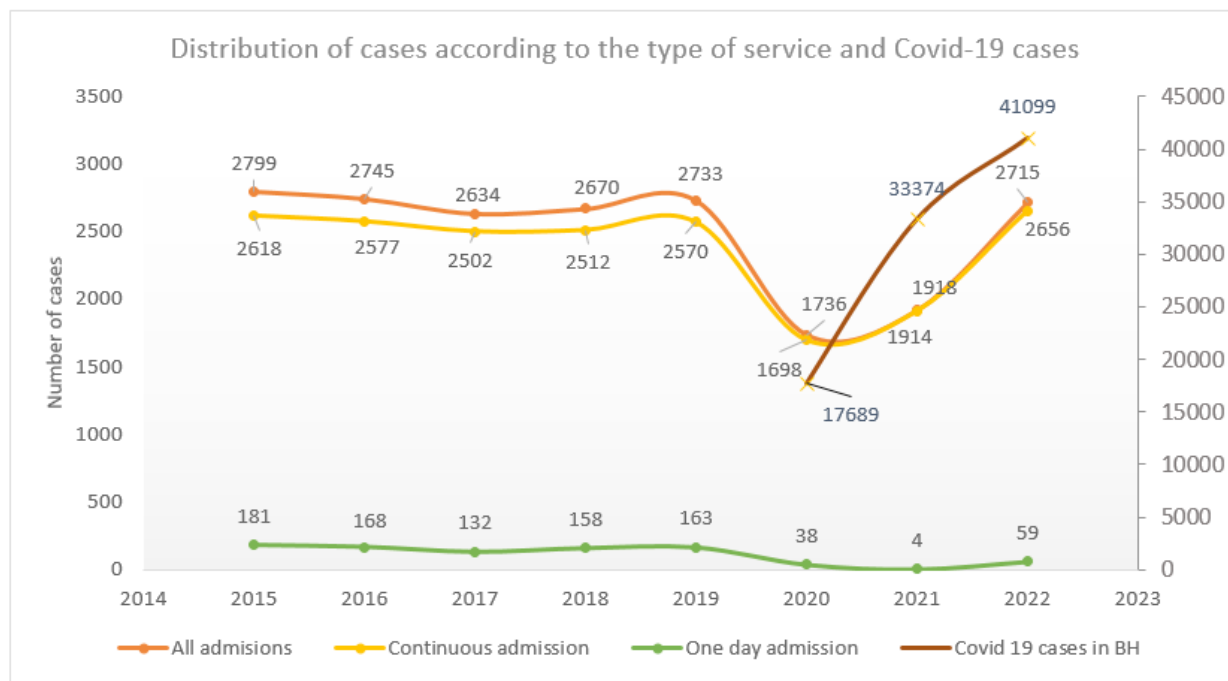
### Statistical Analysis

To ascertain the impact of the COVID-19 pandemic on the number of hospitalizations in the orthopedics and traumatology departments and average length of hospitalization, linear regression analyses were employed. The results were considered significant at a p-value lower than 0.05. Data compilation and statistical analyses were conducted using Microsoft Word and Excel software applications [11,12].

## Results

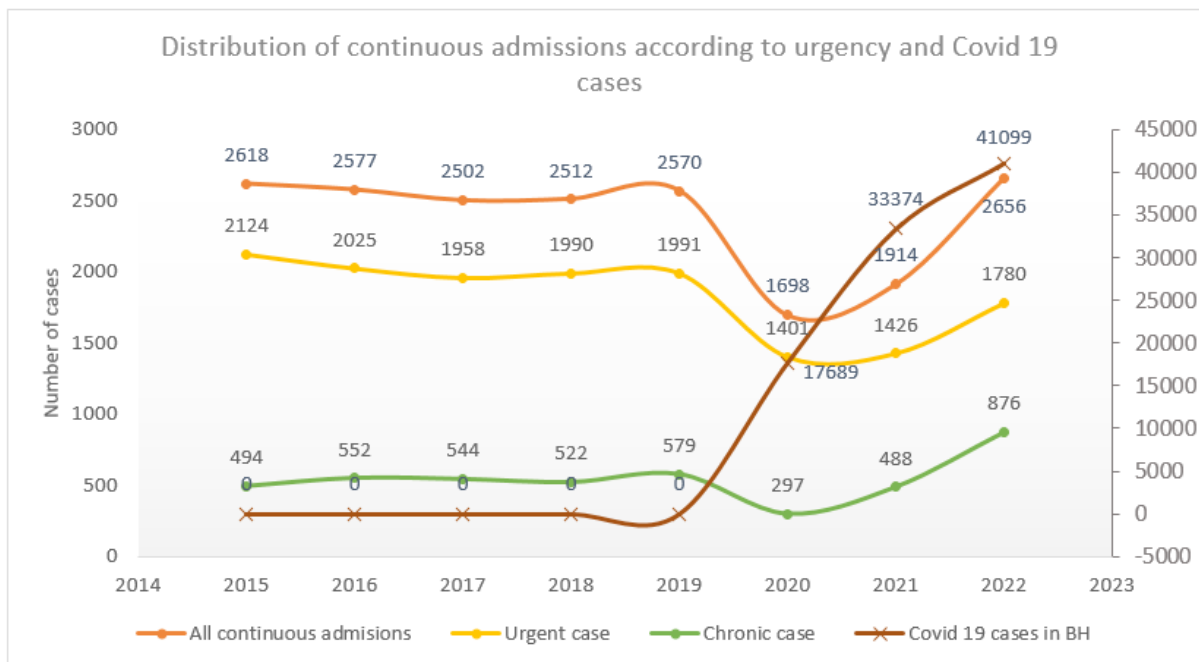
### Hospital Admissions

Regarding the number of all inpatients admitted to Orthopedics and Traumatology departments, there were a relatively stable number of admissions from 2015 to 2019, ranging from about 2500 to 2800 cases per year. Following Figure 1, hospital admissions dropped with 36.5% in 2020, coinciding with the onset of the Covid-19 pandemic. In 2021, activity slowly resumed with an 9.5% increase. In 2022 hospital admissions returned to normal, being approximately the same as before pandemic. The number of patients admitted for continuous stays dropped with 33.9% in 2020, also with a slow resume in 2021 and 2022. Regarding the number of patients admitted for one day, there was a drop with 76.7% in 2020, in 2021 reaching near zero admissions, with a slow resume in 2022. Regarding the statistical analysis, we found a strong correlation between Covid-19 outbreak in 2020 and the admissions in Orthopedics and Traumatology departments ( $p < 0.001$ ) and a low correlation in 2021 and 2022. This data highlights the substantial impact of the Covid-19 pandemic on healthcare services in Orthopedics and Traumatology departments, altering typical admission patterns due to new healthcare demands and restrictions.



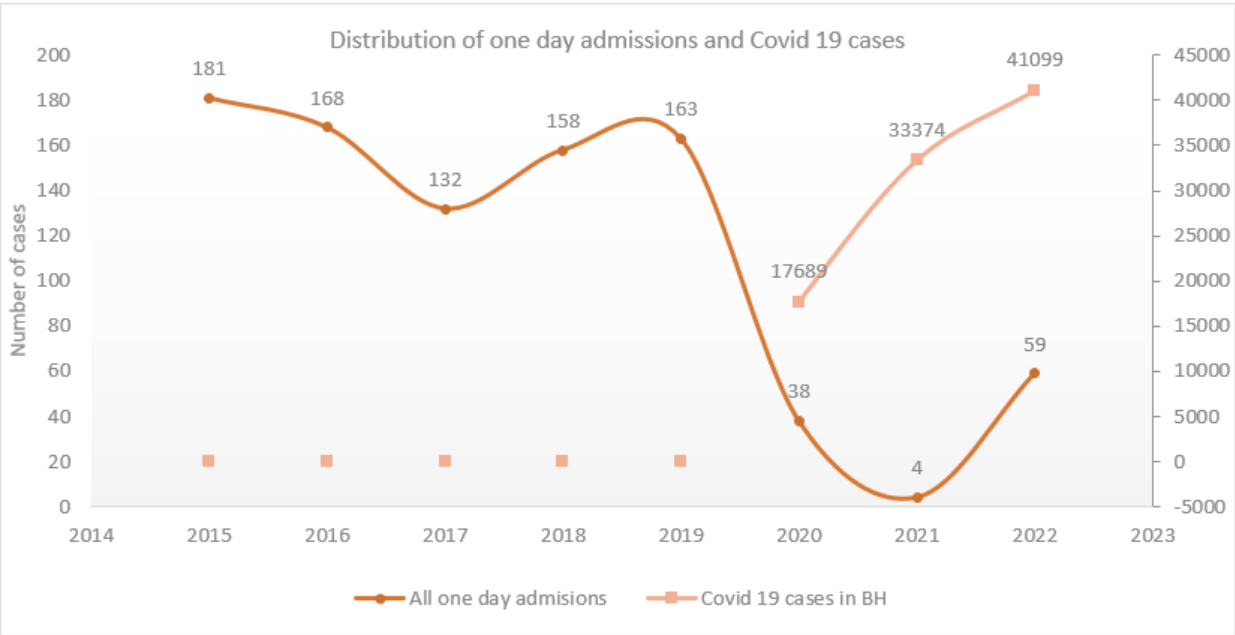
**Figure 1:** The number of hospitalizations according to the type of service provided in correlation with Covid-19 cases in Bihor County.

The total number of admissions appears stable from 2015 until 2019, fluctuating slightly but generally around 2,500 cases per year. In 2020, there's a significant drop to 1,698 cases, which could be attributed to the impact of the Covid-19 pandemic on hospital admissions. In 2020 urgent case admissions dropped with 29.6% from a total of 1991 in 2019 to 1401 in 2020. In 2021, urgent case admissions slowly increased. Regarding chronic patient admissions, we can highlight that after a 48.7% decrease in 2020, in 2021 compared to 2019 it was reduced by 15.7%, followed by a 51.3% improvement compared to 2019, this being considered compensatory mechanism. Regarding the statistical analysis, we found a strong correlation between Covid-19 outbreak in 2020 and the acute and chronic continuous admissions in Orthopedics and Traumatology departments ( $p < 0.001$ ) and a low correlation in 2021 and 2022.



**Figure 2:** Distribution of continuous admissions according to urgency assessed annually in correlation with Covid-19 cases in Bihor County.

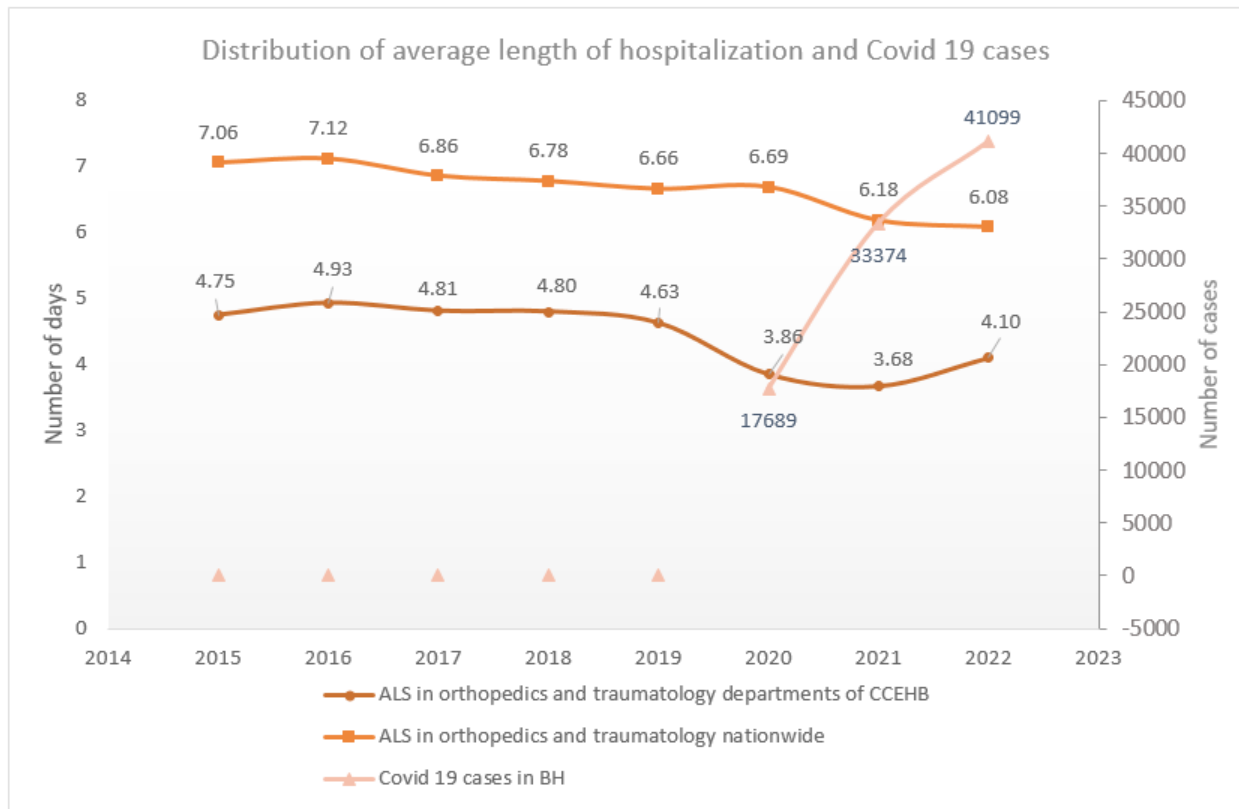
The one-day admissions are relatively stable from 2015 to 2019, suggesting a consistent pattern of healthcare usage for conditions or procedures that require only a one-day hospital stay. Almost 99.6% were chronic patient admissions, and only a few urgent cases. The number of inpatients drastically decreased during 2020-2021 in orthopedics and traumatology departments, from a total of 163 in 2019 to 38 in 2020 and 4 in 2021, followed by a sustained increase in 2022 (59 patients). Regarding the statistical analysis, we found a strong correlation between Covid 19 cases in 2020-2021 and one-day admissions in Orthopedics and Traumatology departments ( $p < 0.001$ ) and a low correlation in 2022.



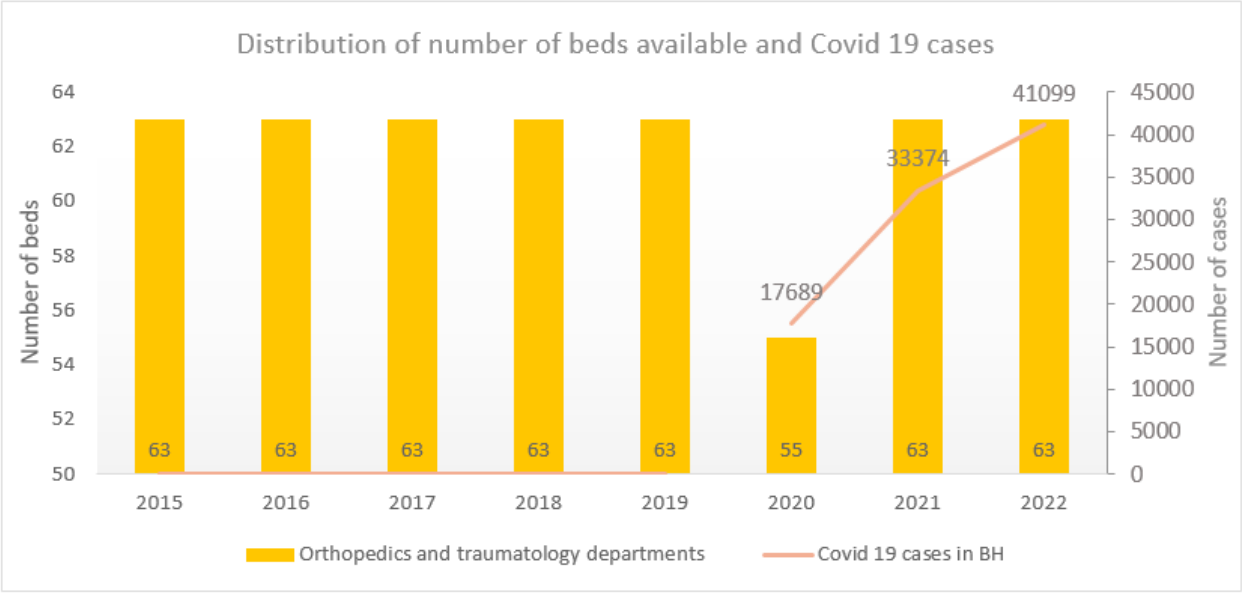
**Figure 3:** Distribution of one day admissions according to urgency assessed annually in correlation with Covid-19 cases in Bihor County.

**Average length of hospitalization and available beds**

The average length of stay/hospitalization (ALS) within the orthopedics and traumatology departments of CCEHB demonstrated fluctuations during the study period. Notably, there was a considerable decrease of 16.6% in the average length of hospital stay in 2020, followed by a slight 4.7% decrease in 2021. However, in 2022 there was an increase of 11.1% in the average length of hospitalization. These trends suggest dynamic shifts in patient care pathways and treatment protocols within the orthopedics and traumatology departments over time. Regarding the beds available in the departments, we can notice a drop of 12.7% in 2020 followed by an increase to previous values in 2021 and 2022. Regarding the statistical analysis, we found a strong correlation between Covid 19 cases in 2020-2021 and average length of hospitalization in Orthopedics and Traumatology departments ( $p < 0.001$ ).



**Figure 4:** Distribution of the average length of hospitalization reported annually in correlation with Covid-19 cases in Bihor County. Regarding the beds available in the departments, from 2015 to 2019, the number of beds remains stable at 63 beds annually. In 2020 we can notice a drop of 12.7% in 2020. This reduction in bed availability in 2020 directly correlates with the rise in Covid-19 cases ( $p < 0,001$ ). This inverse relationship highlights the immediate impact of the pandemic on non-Covid medical services. In 2021 and 2022 beds available return to 63 beds, despite the continuing increase in Covid-19 cases, indicating successful adaptation measures.



**Figure 5:** Distribution of beds available in the orthopedics and traumatology departments reported annually in correlation with Covid-19 cases in Bihor County.

**Discussion**

The COVID-19 pandemic has posed unprecedented challenges to healthcare systems worldwide, affecting various medical specialties, including orthopedics and traumatology. This discussion aims to explore the impact of the pandemic on medical services provided in orthopedics and traumatology departments, with a focus on the number of admissions and length of hospitalization. By analyzing trends in hospital admissions and lengths of stay, we can gain insights into the disruptions and adaptations within orthopedic and traumatology departments during the pandemic [13,14].

The COVID-19 pandemic has significantly altered the patterns of hospital admissions in orthopedics and traumatology departments. During the initial phases of the pandemic, many hospitals experienced a decrease in elective surgeries and non-urgent procedures to accommodate the influx of COVID-19 patients and conserve resources. Consequently, the number of admissions for elective orthopedic procedures, such as joint replacements and arthroscopic surgeries, declined sharply. Additionally, patients may have been reluctant to seek medical attention for musculoskeletal issues due to fears of contracting the virus in healthcare settings, further contributing to the decrease in admissions [9,15].

While elective surgeries saw a decline, the demand for urgent and trauma care in orthopedics and traumatology departments remained steady or even increased during certain periods of the pandemic. Traumatic injuries, such as fractures and dislocations, continue to occur regardless of the pandemic, necessitating prompt medical attention and surgical intervention. Moreover, the implementation

of lockdown measures and restrictions on outdoor activities may have led to an increase in certain types of trauma, such as falls and sports-related injuries, further impacting the workload of orthopedic departments [16-18].

The length of hospitalization for orthopedic and traumatology patients has also been influenced by the COVID-19 pandemic. In response to the need to optimize hospital bed capacity and reduce the risk of virus transmission, hospitals may have implemented strategies to expedite patient discharge and shorten lengths of stay. For instance, patients undergoing elective surgeries may have been discharged earlier than usual to free up beds for COVID-19 patients or to minimize their exposure to the virus in healthcare settings. Conversely, delays in elective surgeries and non-urgent procedures may have resulted in prolonged hospital stays for certain patients awaiting treatment [19-22].

**Limitations of the Study**

The analysis focuses on a single hospital’s orthopedics department, which was designated as a Covid-19 support hospital during the pandemic. This specific hospital reduced the number of beds in the orthopedics department by 8 beds to accommodate the increasing number of Covid-19 patients. The data spans from 2015 to 2022, providing insight into the distribution of hospitalizations according to the type of service and correlating these figures with the Covid-19 case counts.

**Conclusions**

The findings presented in this study underscore the significant



impact of the COVID-19 pandemic on medical services provided in orthopedics and traumatology departments, particularly in terms of hospital admissions and length of hospitalization. We found a strong correlation between Covid-19 outbreak in 2020 and the admissions in Orthopedics and Traumatology departments ( $p < 0.001$ ). The data highlights the substantial impact of the Covid-19 pandemic on healthcare services in Orthopedics and Traumatology departments, altering typical admission patterns due to new healthcare demands and restrictions. The observed decrease in hospital admissions for elective procedures during the pandemic reflects the challenges faced by healthcare systems in managing resources and prioritizing care for COVID-19 patients. Despite the decrease in elective admissions, the demand for urgent and trauma care remained resilient, highlighting the essential role of orthopedic and traumatology departments in responding to emergent musculoskeletal diseases. Moreover, the fluctuations in the average length of hospitalization demonstrate the dynamic nature of patient care pathways and treatment protocols during the pandemic. While efforts to expedite discharge and optimize bed capacity may have led to shorter hospital stays for some patients, delays in elective surgeries and non-urgent procedures may have prolonged hospitalization for others. These trends underscore the importance of implementing flexible and adaptive strategies to ensure timely access to care while maintaining patient safety and quality of care.

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**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethical Committee of County Clinical Emergency Hospital Oradea, Romania with no. 459/08.01.2019.

**Informed Consent Statement:** “Informed consent was obtained from all subjects involved in the study.”.

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**Conflicts of Interest:** The authors declare no conflict of interest.

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