



Changes in Pediatric Fracture Cases during the Coronavirus Disease 2019 Pandemic: Data from a National Referral Orthopedic Hospital in Indonesia

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Abstract

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AIM: This study aims to compare the impact of coronavirus disease 2019 (COVID-19) on pediatric fracture services in a national referral orthopedic hospital in Indonesia to understand the service provisions that may be required during the pandemic.

METHODS: The study compared the population group during 1 year of the COVID-19 pandemic in Indonesia to the same period 1 year before. This cross-sectional study was performed in Prof. Dr. R Soeharso Orthopedic Hospital, Surakarta, Indonesia, from March 2019 to February 2021. The subjects were pediatric fracture patients aged 0–18 years. Patients recorded on other orthopedic service support installations such as radiology, laboratory, or physiotherapy and diagnosed with any other orthopedic sub-specialty were excluded.

RESULTS: A total of 1787 patients were recorded in this study, with the mean of pediatric fracture patients during the pre-COVID-19 period was 90.75 (standard deviation [SD]: 28.5) and during the COVID-19 period was 58.16 (SD: 19.17) monthly. In the 1st year of the pandemic, there was a significant reduction in clinical visits compared to the same period in 2019 ($p < 0.005$).

CONCLUSION: There were significant differences in pediatric fracture cases clinic visits and patients' length of stay in the COVID-19 period than before the COVID-19 occurred.

Introduction

Coronavirus disease 2019 (COVID-19) has been identified as the cause of an infectious respiratory disease outbreak in Wuhan, the People's Republic of China. The global pandemic of COVID-19 is still going on in over 200 countries. As of 24 March 2021, there were 123,902,242 confirmed cases worldwide. The number of deaths related to COVID-19 also reached 2,727,837 worldwide. The pandemic has resulted in a rapid surge in research in response to condition [1].

By March 23, 2021, in Indonesia, there were 1,465,928 confirmed cases. The number of deaths related to COVID-19 also reached 39,711 in Indonesia¹. Instead of a regional quarantine, Indonesia's president decided to enforce a large-scale social restriction/Pembatasan Sosial Berskala Besar (PSBB) in cities and provinces by March 2020. Only essential public services, such as grocery stores, gas stations, pharmacies, and hospitals, were allowed to

remain open. Minister for Education and Culture of Indonesia, Nadiem Makarim, also stated that schools should be closed until the situation is under control. The government also emphasized the importance of all Indonesian people staying at home [2], [3].

Moreover, early data from Austria, Hong Kong, Italy, and California suggested a dramatic decline in the number of people seeking emergency medical services for other causes as the number of people diagnosed with COVID-19 escalated [4], [5], [6], [7]. In addition, hospital visits have been declining in many countries, including in emergency department [5], [8]. Furthermore, according to US centers, emergency department visits in the United States fell by more than half during the pandemic [7].

Early reports of COVID-19 in China centered on the adult population, with no reports of COVID-19 in children [9]. However, as the infection spread around the world, more cases of infected children were reported [9], [10]. It is now known that children are not entirely safe, although, for unknown reasons, children are less susceptible to infection than adults [10].

On the other hand, public concerns about COVID-19, particularly among parents, are also feared to cause delays in child patient treatment. There is a report of a considerable reduction in child cases clinic visits in many countries. Official hospital statistics revealed significant decreases in pediatric emergency departments during Italy's national lockdown for COVID-19 [4]. Following the national lockdown for COVID-19, there has been a significant reduction in all trauma patients in New Zealand [11]. When the numbers were compared to the same period in previous years, a similar reduction in all pediatric fractures also occurred during school closures in the United States [12]. However, it remains unclear whether the pandemic has impacted the number of other pediatric fracture cases.

Materials and Methods

This research is a comparative cross-sectional analysis study. The study compared the pediatric fracture cases during the COVID-19 pandemic with those in the previous year. This study took place in a national referral orthopedic hospital, Prof. Dr. R. Soeharso Orthopedic Hospital Surakarta, Indonesia. The study was carried out from February 2021 until April 2021.

Data were collected from hospital digital medical records. First, anonymized records were gathered for 1 year from the 1st month of the Indonesian government's statement about the first COVID-19 infection on its people (February 2020 – February 2021). Then, the data from 1 year before the COVID-19 pandemic were used as a control (March 2019–February 2020). Predefined characteristics: dates, age, sex, primary and secondary diagnosis, surgical therapy, etiology, supervisor, and installation were extracted. In addition, the nomenclature for diagnosis and therapy was based on ICD-10.

The inclusion criteria of this study were all patients who came to Prof. Dr. R. Soeharso Orthopedic Hospital with a pediatric fracture-related diagnosis from the emergency department, outpatient clinic, and inpatient. However, patients recorded on other orthopedic service support installations such as radiology, laboratory, or physiotherapy and diagnosed with any other orthopedic subspecialty were excluded.

Following ethics approval, the data were gathered from the medical records of Prof. Dr. R. Soeharso Orthopedic Hospital based on inclusion and exclusion criteria. The collected data were then classified based on the predefined characteristic aforementioned. The worksheet consisted of the study outcomes used to record the data monthly. Statistical analysis was employed to compare the data. In this case, different conditions before and during pandemics were compared. The difference between multiple

time points (Months) during the pandemic was also calculated.

Statistical data were analyzed using an independent sample t-test or Mann–Whitney. The analyses were performed utilizing the Statistical Package for the Social Sciences (SPSS) for Windows version 26.0, manufactured by IBM in New York, USA. The difference between the number of outpatient visits between the two groups was considered statistically significant if $p < 0.05$. The same method was used to analyze the differences in sex, ages, the number of different types of fracture, and the patient's length of stay.

Results

A total of 1787 patients were enrolled in this study. The mean of pediatric fracture patients during the pre-COVID-19 period was 90.75 (Standard Deviation [SD]: 28.5) patients, and during the COVID-19 period was 58.16 (SD 19.17) patients. Inpatient visits decreased significantly in the 1st year of the pandemic compared to the same period in 2019 ($p < 0.005$). March 2020 had the lowest number of patient visits, which were only 22 visits. The monthly number of visits is shown in Figure 1.

The monthly number of patients according to their gender was also decreased. There were 43.3 (SD 15.3) boy patients per month in the COVID-19 period, compared to 63.6 (SD 22.3) per month 1 year before the COVID-19 period. There were 14.8 (SD 5.4) girl patients per month in the COVID-19 period, compared to 27 (SD 9.8) per month 1 year before the COVID-19 period. The monthly number of patients related to sex is displayed in Figures 2 and 3.

A decrease in several fracture locations and age groups was recorded in the 1 year of the pandemic period compared to the previous period, as shown in Tables 1 and 2. The researchers also analyzed the impact of COVID-19 on the patient's length of stay. Again, the researchers found a significant decrease ($p < 0.05$), shown in Figure 4.

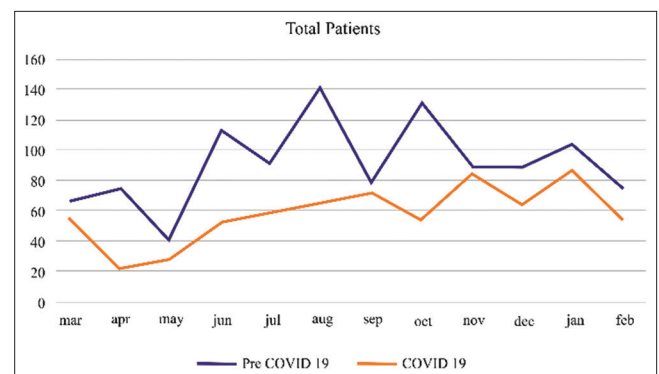


Figure 1: Total pediatric orthopedic patients

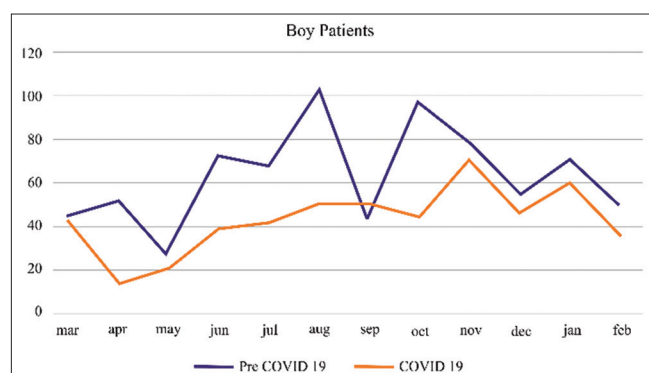


Figure 2: Total boy patients

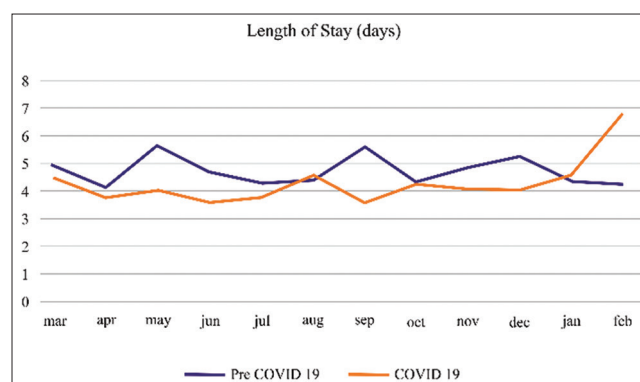


Figure 4: Length of stay

Discussion

The findings of this study indicate that the total patients decreased significantly in each month during COVID-19 compared to the total patients during the comparison period ($p < 0.05$). In addition, the data revealed that the number of pediatric fracture cases decreased significantly in April, with only 22 cases reported.

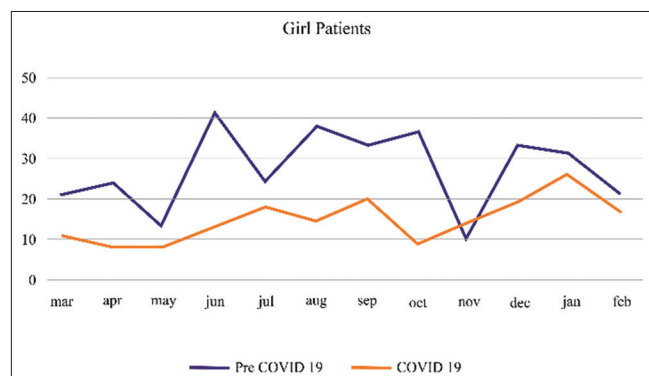


Figure 3: Total girl patients

These results might happen because of activity limitations, including school closure, preventing trauma events in children. These findings support the previous research that found a significant decline in inpatient visits in Austria since the pandemic [5]. Another report backs up these research findings, stating that the number of visits to the emergency department in Hong Kong decreased significantly compared to the same period in the previous year, including emergency and life-threatening cases like acute coronary syndrome [6]. Another research uncovered a significant decrease in the number of visits to pediatric emergency departments, including in cases of acute illness and trauma, supporting the current study results. The number of people needing emergency care services has decreased significantly in many countries. These considerations and the parents' worry of infecting their children by going to the hospital should all be taken into account [4]. When the numbers were compared to the same period in the previous year, a similar reduction in all pediatric fractures also occurred during school closures in the United States [12]. When the Indonesian limitation activity policy, known as PSBB, began on

March 31, 2020, the total number of patients dropped dramatically a month later [3].

Table 1: Location of fracture (*significant)

Location of pediatric fracture	Mean number of patients monthly		
	Pre-COVID 19 (SD)	COVID-19 (SD)	p-value
Fracture of lumbar spine and pelvis	2.41 (1.37)	1.41 (1.08)	0.078*
Fracture shoulder and upper arm	25.17 (8.06)	16.5 (6.31)	0.008*
Fracture of forearm	30 (11.26)	19.5 (8.71)	0.018*
Fracture at wrist and hand level	6.08 (2.19)	3.25 (2.52)	0.008*
Fracture of femur	14.41 (7.05)	9.25 (4.09)	0.039*
Fracture of the lower leg, including ankle	12.67 (6.45)	8.25 (5.42)	0.083

The general trend was the same in the COVID-19 and pre-COVID-19 periods. However, the difference in the number of fractures in boys and girls has narrowed significantly in the COVID-19 period. It could be partly due to the floor effect. The total number of cases has decreased in both sexes, but the prevalence of cases in certain age girl groups was so low that they could not decline as much as boys. Furthermore, in the pre-COVID-19 period, boys were likely more involved with lockdown activities than girls [13], [14], so the effect of lockdown was more significant in boys.

Further, there was a decrease in all age groups in pediatric fracture cases. There was a significant reduction in the 11–15 years and 16–18 years age groups. These results are similar to the study that stated a significant decrease in pediatric fracture admission [15], [16]. Whereas, in the age group 0–5 years and 5–10 years, the decrease was not significant. In contrast to similar studies, there was a significant decrease in emergency cases, which was relatively high in the 0–14 years old group [8], [17], [18].

Thus, it is necessary to consider the differences in activity limitation policies in each country. The studies mentioned above were conducted in countries with stricter quarantine or lockdown policies than Indonesia. Because of the effectiveness of each policy, the outcomes may differ. The people's habit of

Table 2: Age group (*significant)

Age group	Mean number of patients monthly		
	Pre-COVID 19 (SD)	COVID-19 (SD)	p-value
0–5 years	15.08 (6.38)	12.25 (2.76)	0.173
6–10 years	23.41 (11.7)	16.41 (8.02)	0.125
11–15 years	31.08 (11.6)	18.41 (6.5)	0.003*
16–18 years	21.16 (9.97)	11.08 (5.58)	0.004*

using traditional medicine also needs to be considered a factor influencing this study's findings.

For both before and during the COVID-19 pandemic, the most common fracture locations were the forearm, shoulder and upper arm, and femur fractures. In the shoulder, upper arm, forearm, wrist, hand, and femur groups, there was a significant reduction in cases. These results are in line with a study that showed a considerable difference in the number of outpatient visits and orthopedic surgery procedures during the beginnings of the pandemic relative to the time before the outbreak [19], [20], [21], [22], [23]. In contrast, the decrease was not significant in the lumbar spine, pelvis, lower leg, and ankle. It differs from a report disclosing that patients diagnosed with vertebral fractures during the COVID-19 pandemic were significantly reduced [16]. It could happen because the characteristics of the subject studied were different.

COVID-19 pandemics have caused substantial disruptions to orthopedic and trauma services with more pronounced reductions in elective surgery [24]. Early data from Indonesia revealed dramatic declines in the number of surgery loads in March, April, and May 2020 [19]. Pediatric orthopedic practice has also been seriously affected, as the number of elective surgeries and outpatient clinics have had to be reduced [18]. We hypothesized that the volume of elective pediatric orthopedic surgery in Indonesia would also decrease. However, there has been no research on changes in the number of elective pediatric orthopedics surgeries in Indonesia. Further research is needed about this matter.

Furthermore, there was a significant reduction in the patient's length of stay. Along with the WHO interim guidance, this finding indicates that inpatient admission processes may need to be adjusted as the risks and benefits of hospital-based care change suggest that inpatient admission processes may need to be modified [25]. Other studies from many countries also uncovered a decrease in patient's length of stay due to pandemic [26], [27]. Discharge planning coordinated with primary care follow-up can also help to shorten hospital stays.

Conclusion

There were significant differences in total pediatric fracture cases clinic visits and patients' length of stay in the COVID-19 period than before the COVID-19 occurred. Further research is needed to identify the efficacy of PSBB compared to other nations' activity limitation policies since several categories show insignificant changes before and during the COVID-19 period.

Author Contribution

Pamudji Utomo, Muhammad Yogatama Wirawan, Hendra Cahya Kumara, and Mochamadsyah Beizar Yudistira contribute the same and equally in conceptualization, collecting the data, analyzing, writing, and reviewing the manuscript to report this case series.

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