

*Research Article***Impact of One Year COVID-19 on Hand and Upper Extremity Injury: A Cross-Sectional Study**Pamudji Utomo^{1,2} , Tito Sumarwoto³ , Naufal Aminur Rahman² , Mochammadsyah Beizar Yulistira² ¹Department of Orthopaedic and Traumatology, Prof. Dr. R. Soeharso Orthopaedic Hospital, Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia²Prof. Dr. R. Soeharso Orthopaedic Hospital, Surakarta, Indonesia³Department of Upper Limb and Micro Surgery, Prof. Dr. R. Soeharso Orthopaedic Hospital, Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia

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ABSTRACT

Background: On March 11, 2020, the World Health Organization declared the COVID-19 outbreak a worldwide pandemic. On March 31, 2020, Indonesia enacted a large-scale societal limitation. As a result, the number of patients seeking medical treatment for emergencies has decreased significantly. Home and fall accidents were the leading causes of a hand injuries, and this trend is anticipated to persist throughout the epidemic. Despite this, there is scarce information about the many forms and causes of hand and upper extremity injuries. This research aimed to see how COVID-19 affected hand and upper extremity injuries.

Methods: The observational cross-sectional research was undertaken from March 2019 to February 2021. The Pre-COVID-19 phase was measured from March 2019 to February 2020, while the COVID-19 period was measured from March 2020 to February 2021. Patients who presented to Prof. Dr. R. Soeharso Orthopaedic Hospital with hand and upper and lower extremity injury-related diagnoses from the emergency unit, outpatient, or inpatient were included in the study.

Results: The overall number of patients in this study was 2644, with a mean total number of patients of 141.83 (SD 43.21) in the pre-COVID-19 era and 78.5 (SD 32.55) in the COVID-19 era, a significant reduction ($p < 0.001$).

Conclusion: There is a substantial drop in hand and upper extremity injury patients during the timespan of COVID-19 compared to the Pre-COVID-19. The findings might aid in the development of new ways for better understanding the service provisions needed in the case of injury during a pandemic.

Keywords: COVID-19; Upper extremity; Injury; Cross-sectional study; Human and medicine

INTRODUCTION

Coronavirus disease-2019 (COVID-19) is an infectious illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), affecting systemic and respiratory problems.¹ On March 11, 2020, the World Health Organization (WHO) confirmed the COVID-19 outbreak was a worldwide pandemic.² COVID-19 has been linked to about 76 million reported cases and 1.6 million deaths as of December 21, 2020.³ According to data collected in Indonesia around the middle of December 2021, there are over 600.000 con-

firmed cases.⁴ The large-scale social restriction was implemented in Indonesia on March 31, 2021.

This restriction was a preventive policy to combat COVID-19 spread in some Indonesian areas.⁵ Only public places, such as grocery stores, gas stations, and hospitals, were left open, restricted non-essential activities. During this pandemic, all public health services had dynamic changes. As a result, the number of patients seeking medical assistance for emergencies has decreased significantly. In developing countries,

hand injuries accounted for a high percentage of trauma situations. Home and fall accidents were the dominant causes of hand injuries, and this trend is predicted to persist throughout the epidemic.⁶

Despite this, there is scarce information about the many forms and causes of hand and upper extremity injuries. Changes in behavior and habits during the pandemic will indirectly provide differences in activity patterns and shift the etiological causes that have the most potential to cause injury. The purpose of this research was to examine how the COVID-19 pandemic era with protocol in all activities influenced injuries to the hands and upper extremities, including the incidence of injury, the most common etiology of all cases of injury, and length of hospital stay.

MATERIAL AND METHODS

This cross-sectional research compared the population group in Indonesia during the COVID-19 pandemic to the same time frame a year prior. This research took place in Surakarta, Indonesia, at the Prof. Dr. R. Soeharso National Referral Orthopaedic Hospital. The research lasted three months, from February to April 2021.

Digital medical records provided the data for this investigation. Beginning with the initial months after the Indonesian government declared the initial COVID-19 case (March 2020 – February 2021), anonymized data was collected for a year. The control duration (March 2019 – February 2020) was one year before the COVID-19 pandemic. Predefined characteristics collected were dates, age, sex, primary and secondary conditions, surgical treatment, etiology, doctor, and installation. The ICD-10 system was used to classify diagnoses and treatments.

This study covered all patients presented to Prof. Dr. R. Soeharso Orthopedic Hospital with diagnoses relating to hand and upper and lower extremity injuries in the emergency room, outpatient clinic, or inpatient setting. Patients enrolled

in supporting facilities, such as lab, radiography, physiotherapy, were exempt.

Following ethics approval, data were extracted from Prof. Dr. R. Soeharso Orthopedic Hospital's medical records using inclusion and exclusion criteria. Inclusion criteria included all hand and upper extremity injury patients who underwent inpatient or outpatient treatment. Patients' age was divided into 3 categories, namely <18 years, 18 - 64 years, and ≥ 65 years. The data were then categorized based on the above-predefined characteristics. The research results worksheet was used to keep track of the data monthly. To compare the data, statistical analysis was used. Different conditions were compared before and after the pandemic. During the pandemic, the difference between different time points (Months) was also measured.

The statistical data were assessed using the independent sample t-test or the Mann Whitney U-test. IBM's Statistical Package for the Social Sciences (SPSS) version 26.0 was operated to conduct the research. The findings were judged statistically significant if the difference in total instances between the two classes was less than 0.05. The same approach examined variations in sex, ages, charge, admission, duration of stay, operation cause, and injury site.

RESULTS

About 2644 participants were joined in this trial. During the pre-COVID-19 timespan, the mean number of hand and upper extremity injuries was 141.83 (SD 43.21) patients. In contrast, during the COVID-19 period, the mean number of hand and upper extremities injuries was 78.5 (SD 32.55) patients. A significant decrease of patients visit is recorded in 1 year of pandemic, compared to the same timespan in 2019 ($p < 0.05$). With 24 visits in April, the lowest number of patients visited. Figure 1 shows the visitors number per month.

We also looked at how COVID-19 affected patient sex, age, payment, duration of stay,



admission, surgical etiology, and injury location. Except for the patient's length of stay ($p = 0.773$), work-related accident ($p = 0.136$), and fracture phalanx ($p = 0.087$), we detected a significant decrease ($p < 0.05$) in all variables in Table 1.

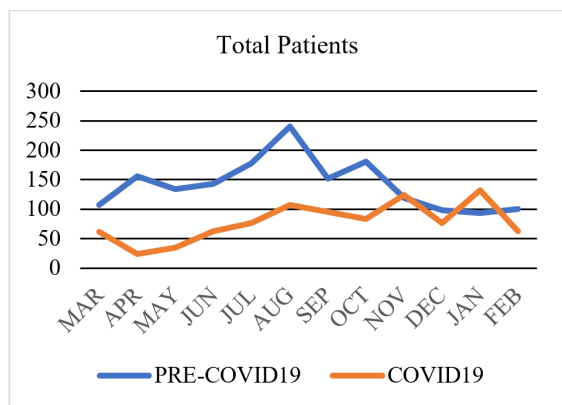


Figure 1. Total Number of Hand and Upper Extremity Injury Patients

DISCUSSION

Our findings demonstrate a significant drop in total patients during the COVID-19 era compared to the pre-COVID-19 period ($p = 0.001$). A decline also followed this in the total number of sex, age, and payment method data. These results concordance with research that reported that there had been a significant decline in patient admissions with hand injuries in French since the pandemic of COVID-19.⁷ This finding is probably due to the Indonesian government's large-scale social restriction policy, which started on March 31, 2020, resulting in decreased mobility, one of the risk factors for accidents.⁵ Another plausible explanation for the reduction of the admission was the patient's fear of contagion, leading to death.⁸

Patient length of stay did not show any significant changes ($p = 0.773$) during the pan-

Table 1. The total number of hand and upper extremity injuries during COVID-19 compared to Pre-COVID-19.

	Pre-COVID-19 Mean±SD	COVID-19 Mean ±SD	p-value
Total Patients	141.83±43.21	78.5±32.55	0.001*
Sex			
Male	86.83±28.03	52.67±21.09	0.003*
Female	55±17.02	25.83±12.63	0.00009*
Age			
<18 years old	39.17±12.87	23.75±10.34	0.004*
18-64 years old	92.17±30.81	49±21.04	0.001*
≥65 years old	10.5±4.93	5.75±2.67	0.008*
Payment			
Public	56.75±19.68	25.17±9.67	0.0001*
Insurance	85.08±27.88	53.33±26.11	0.009*
Length of Stay (days)	2.58±0.31	2.54±0.34	0.773
Admission			
Surgery	65.17±11.01	38.25±12.31	0.00001*
Outpatient	75.92±35.34	40.08±23.83	0.008*
Surgery etiology			
Transport Accident	30.83±5.61	15.17±6.16	0.00001*
Home Accident	17.17±5.18	13±4.35	0.044*
Work-related Accident	1.08±0.9	0.58±9.00	0.136
Location of injury			
Fracture Phalanx	6.58±3.42	4.33±2.67	0.087
Fracture Metacarpal	5.42±2.27	3.00±1.81	0.009*
Fracture Radius	25.5±7.32	13.42±9.41	0.003*
Fracture Ulna	11.67±7.48	5.2±3.77	0.018*
Fracture Humerus	32.33±10.87	17.67±7.48	0.001



demic period. This result was similar to a research held by Atia et al., which stated insignificant changes ($p = 0.059$).⁹ This could be happening because the characteristics of the disease were quite similar between the two periods. Outpatient and surgery decreased significantly. There was also a significant decrease in transport and home accidents in the surgery etiology group. This result was linear with research by Wong et al. which stated a significant decrease in traffic-related and domestic-related trauma about orthopedic accidents during COVID-19.¹⁰ Insignificant changes are shown in a work-related accident because the data was very little (Pre-COVID-19 mean 1.08 ± 0.9 and COVID-19 mean 0.58 ± 9). All data on the location of injury, such as metacarpal ($p = 0.009$), radius ($p = 0.003$), ulna ($p = 0.018$), and humerus ($p = 0.001$) showed significant differences, except for the phalanx ($p = 0.087$).

In conclusion, most of the data showed significant differences in total hand and upper extremity injury during the COVID-19 period compared to the Pre-COVID-19 period. The results were necessary to prepare for the needs in hand surgery for a potential forthcoming identical health situation.

CONCLUSION

There is a considerable drop in the number of hands and upper extremity injury patients at COVID-19 compared to the Pre-COVID-19 timespan. The findings could aid in developing new approaches for better understanding the service provisions needed in the case of a pandemic.

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