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Understanding the pattern and volume of various orthopaedic disorders observed at a tertiary care hospital, before and during the COVID-19 pandemic

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ABSTRACT

Background: The COVID-19 pandemic has lead to a huge loss of life and disruption of lifestyle. The pandemic has also led to disruption in the health sector, as significant changes in the pattern of hospital admissions, medical care and variations in disorders have been observed especially in the orthopaedics department. To assess the change in pattern and volume of trauma in our region, we evaluated data from our center for the pandemic period and compared it with the previous years' data (pre-pandemic period).
Methods: Comparison of orthopaedic in-patient records was carried out of the pre-pandemic and during the COVID-19 period, to assess the effect of COVID-19 on the orthopaedic in-patient load and prevailing diseases. Medical records of the patients were analyzed and the data collected were subjected to statistical analysis using IBM SPSS software version 1.0.
Results: Significant reduction in patient load was observed during the pandemic period. Cases of various types of fractures were observed to be high in number, followed by arthritis. The only disorder that was observed to be highly prevalent in both the periods is proximal femur fractures.
Conclusions: A high variation was observed in both the volume and nature of trauma presentations during the COVID-19 lockdown. A significant decrease in overall admissions was observed, this could be related to the period of societal restrictions and nationwide lockdown.

Keywords: Orthopaedics, Tertiary care hospital, COVID-19, Fracture, Intervertebral disc prolapse, Arthritis

INTRODUCTION

The COVID-19 pandemic was first reported in December 2019 in Wuhan, China.[1] In India, the first COVID-19 case was registered on 30 January 2020. The WHO declared it a global health emergency and called upon for combined efforts of all nations to curb the outbreak.[2] With the nationwide lockdown, a disruption in health services was observed. Various countries then adopted several mitigation and containment measures including the nationwide lockdown. In India too, the government implemented a strict nationwide lockdown on 24 March 2020, to prevent disease transmission. The societal restrictions and lockdown has had a significant impact on the pattern and volume of trauma admissions in health-care centers too.[3] The enforcement of the nationwide lockdown led to significant decline in social mobility, which was hypothesized to affect the epidemiology of trauma patients presenting to the orthopaedic department.[4] In the present observational study, we aimed to assess and document the impact of COVID-19 on the orthopaedic in-patient load and prevailing orthopaedic disorders at our tertiary care

hospital, which is also a COVID-dedicated center. The findings from the present study could be used for formulating and implementing better guidelines for management of patient load and resources for future emergency situations.

METHODS

The study conducted was a retrospective one, carried out at the orthopaedics department of Bhaktivedanta Hospital and Research Institute, Mumbai, India.

Sample size was of 727, number of patients admitted in pre-pandemic period were 452 and number of patients admitted during the COVID-19 pandemic period were 275.

Subjects and selection method

Post obtaining ethical clearance from the institutional ethics committee, data of patients who were admitted for various orthopaedic disorders from March 2019 to February 2021 was retrieved for the study. Mentioned below are the eligibility criteria of the study.

Table 1: Study eligibility criteria.

Inclusion criteria	Exclusion criteria
Patients of all age groups	Patients whose data was not available
Patients of orthopaedic in-patient department	Patients admitted for post-operative complications

Methodology

The following parameters were compared of the data obtained from both the periods-patient demographics, patient load, disorder type and fracture types.

Statistical analysis

For analysis, only those patients' data were taken into consideration that fulfilled the eligibility criteria. IBM SPSS software version 1.0 was used for the statistical data analysis.

RESULTS

Patient demographics

The average age of the patients of the study population was found to be 48 years. The 7.74% of the patients in pre-COVID-19 period and 8.31% of the patients admitted during the COVID-19 period were found to be below 13 years of age. Female patients were found to be slightly more as compared to male patients. The gender distribution is documented in Table 2.

Table 2: Gender distribution of the study population.

Variables	Males	Females	Total
	N (%)	N (%)	N (%)
Pre-COVID-19 period	219 (48.45)	233 (51.55)	452 (100)
COVID-19 period	133 (48.36)	142 (51.64)	275 (100)

Trauma presentations

Various orthopaedic presentations were observed which is shown in Figure 1. Proximal femur fractures were found to be highly prevalent before and even during the COVID-19 period. Huge variation in overall patient admissions were observed for the following disorders-tibia shaft fracture, total knee replacement, ankle fracture, arthritis, forearm shaft fracture, knee meniscal injury, proximal humerus fracture and proximal tibia fracture.

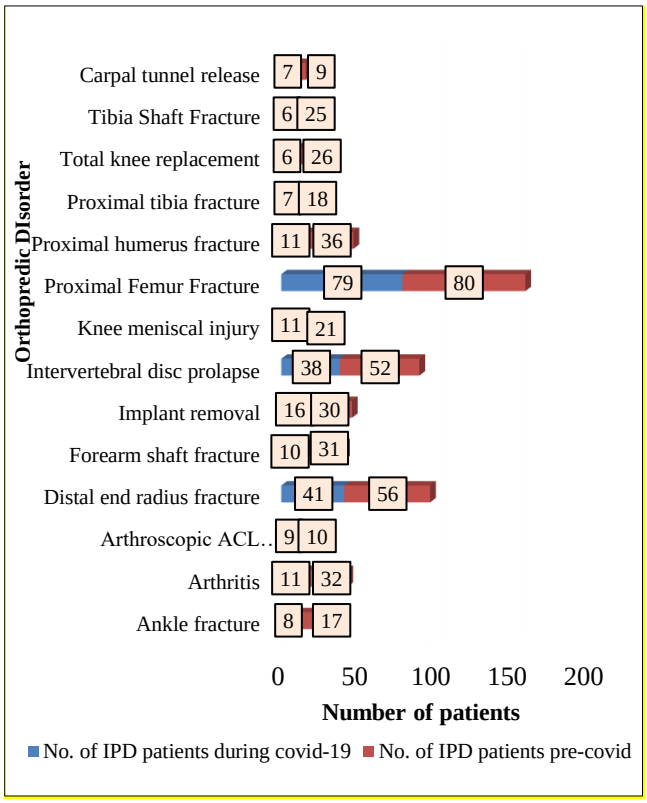

Figure 1: Number of patients with disorders observed during and pre- COVID-19 period.

Comparison of various orthopaedic disorders observed before and during the COVID-19 period

During the COVID-19 period, increase in trauma admissions were observed for only two disorders, one is femur shaft fracture and the other vertebral fracture. High decrease in trauma admissions was observed for total knee replacement and tibia shaft fracture. Detailed results are documented in Table 3.

Table 3: Comparison of IPD patients with disorders during and pre-COVID-19 period.

Orthopaedic disorder	No. of IPD patients before COVID-19 period	No. of IPD patients during COVID-19 period	Changes observed in patients' admissions during COVID-19 (%)
Ankle fracture	17	8	-53
Arthritis	32	11	-66
Arthroscopic ACL reconstruction	10	9	-10
Distal end radius fracture	56	41	-27
Forearm shaft fracture	31	10	-68
Implant removal	30	16	-47
Intervertebral disc prolapse	52	38	-27
Knee meniscal injury	21	11	-48
Proximal femur fracture	80	79	-1
Proximal humerus fracture	36	11	-69
Proximal tibia fracture	18	7	-61
Total knee replacement	26	6	-77
Tibia shaft fracture	25	6	-76
Carpal tunnel release	9	7	-22
Femur shaft fracture	3	4	25
Vertebral fracture	6	11	84

DISCUSSION

The aim of the present study was to assess the epidemiological profile of various orthopaedic presentations observed in our hospital during and before the COVID-19 period. At the onset of the pandemic, the Indian government initiated many security measures like lockdown to prevent the spread of the disease, which was started on 24 March 2020. Through our study, we report that the nationwide lockdown was found to be associated with a statistically significant decrease in the cases of trauma admissions. A study conducted in Midland, New Zealand, reported a 43% decrease in the total volume of injury admissions during the nationwide lockdown; with a statistically significant reduction in patients with severe injuries that are moderate in number (ISS≤12), and an absolute drop in number of road accidents and falls.[5] Another study conducted in Ainhui, China, showed a notable decrease in outdoor injuries during the initial phases of lockdown, and a multiple linear regression analysis exhibited a noteworthy association between the number of COVID-19 cases and outdoor/road injuries.[6] Nunez et al from Barcelona, Spain recorded almost 1/4th cases of emergency trauma visits in 1st 20 days in Spain's emergency phase.[7] Another study by Kamine et al showed a 57.4% reduction in hospital trauma admissions, with an 80.5% decrease in road accidents during lockdown period in Portsmouth, America.[8] Our study data parallels effects on trauma admissions noted during pandemic period of other countries too; details of same are shown in Figure 2.

There were many variations observed in the injury mechanisms when comparison was made with data obtained before the COVID-19 period. A significant reduction in sports injuries was observed during the lockdown period indicating the impact of societal restrictions. A marked decrease in road accidents was also observed. The same findings were also obtained in another study conducted in Ireland. However, increase in femur shaft fractures during COVID times possibly implies that low traffic might have led to a comparative increase in high velocity trauma. High prevalence of various fractures in our study indicates fall at home being the most common mechanism of injury. In such situations, high emphasis should be placed on public health initiatives like increase in awareness of the preventable measures of falls, and aim to lessen the rate of falls among the aged population.[9] In fact in United Kingdom, a dedicated public health initiative was launched by the ROSPA (Royal society for the prevention of accidents) to reduce the rates of domestic injuries during the pandemic.[10]

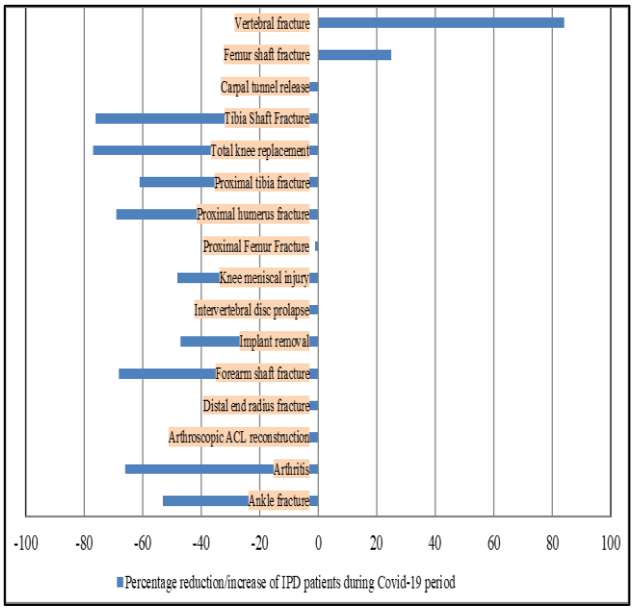

Figure 2: Variations in hospital admissions (%) WRT disorders observed during COVID-19 period.

In the present study, pediatric trauma was also observed to follow a similar trend as trauma due to fractures, but is not highly statistically significant. For the patients above 60 years of age, the pattern observed was the same, but for both the age groups (young and old), the findings were not statistically significant, implying that falls causing fractures to children and the aged continued to occur, despite people being home-bound.

A survey study of many international surgeons revealed remarkable changes in orthopaedic trauma management worldwide; it showed that from twenty-eight countries, sixty-three orthopaedic centers informed that ninety-one percent centers had reduced workload and only seventeen percent of these centers were performing elective surgeries.[11] We compared our data to different other studies that accessed orthopaedic patients in countries likes New Zealand and Spain.[7,12] From the data obtained from Spain, we noted a similar decrease in workplace and traffic accidents, with decrease in hospital trauma admissions too. Another inference to low hospital admissions during the COVID-19 period was that since our hospital was a COVID-19 dedicated hospital, it was our impression that many trauma cases who otherwise would have come to our hospital for treatment for fractures, injuries were diverted to other private health-care centers and hospitals, owing to the fear of acquiring the disease from our centre.

During pandemics or emergency situations, resource utilization by doctors must always be optimal as it becomes important for all orthopaedic surgeons to understand the trauma pattern of the patients presented to them; this would allow surgeons to be better prepared to use all available resources efficiently. In some cases, depending on the severity, non-operative management maybe done as per the guidelines of other national bodies.[13] This must be done with great care and caution as other problems such as bone non-union or malunion must not arise.

In Italy during the pandemic, the hospitals were re-organized in such a manner that patients not requiring multi-specialty care were shifted to 2 particular hubs created only for orthopaedic trauma injuries. The elective surgeries were put to a halt along with outpatient services, and only emergency OPD-based services were operating; all patients in the emergency department were tested for the presence of the coronavirus and subsequent separation was done according to the patients' reports. By the early phase of lockdown, we also adapted the same protocol in our hospital for better management of high patient load. Two eye opening cases of the importance of testing patients prior to any interventions was shown in studies conducted by Joob et al (who operated in Thailand) and Mi et al (who came in contact with the initial cases in China).[14,15] Thus, the findings of the present study have important public health implications like resource allocation and planning of proper management of trauma services at a hospital.

CONCLUSION

As a result of firm travel restrictions, it was observed that very few traumas occurred outside home. However, a large increase in home-based injuries (fractures) was observed in the present study, specifically occurring as a result of mechanical falls or injuries. A significant decrease in the overall number of trauma admissions during the COVID-19 was observed. The high prevalence of traumas like fractures, and arthritis during the COVID-19 period highlights the importance of maintaining trauma service capacity and capability to manage the patient load, even during a pandemic. More detailed studies in the future could really help in identifying patients with various traumas and classifying them according to the severity of the injury, likely for a longer period of time to identify a larger patient population. The present study could help in building appropriate division of resources and planning of proper management of trauma services at various health-care centers and hospitals.

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