



ORIGINAL RESEARCH ARTICLE

EFFECT OF THE COVID-19 LOCKDOWN ON ORTHOPEDIC SERVICES IN A TERTIARY HOSPITAL IN NEPAL

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ABSTRACT

Background: The Corona virus disease (COVID-19) pandemic has been a global health crisis and has affected Nepal also. As a strategy to control the disease outbreak, the government of Nepal had introduced a four-month nationwide lockdown. This study aims to evaluate the impact of the national lockdown in orthopedic services in Chitwan Medical College.

Methods: This cross-sectional analytical study included all the patients admitted and treated in the orthopedic department of Chitwan Medical College during lockdown period from 24 March to 21 July 2020, which was compared with the same four-month interval from 24 March to 21 July in 2019. Data collected included patient demographics, mechanism of injury, anatomical location, waiting time before surgery and hospital stay.

Results: A total of 247 patients were treated during lockdown, with a reduction of 45.4% from 2019 (452 patients). Also, there was 39.1% (340 vs 207, p=0.009) reduction in trauma cases and 35.7% (347 vs 223, p=0.000) reduction in cases operated in lockdown. There was a decrease in pediatric patients during lockdown (p=0.044). Fall was the most common mechanism of injury in both groups (p=0.158) with decrease in road traffic accidents during lockdown 27.1% (n=56) vs 45% (n=153) in 2019 (p=0.000). The waiting time before surgery and hospital stay were also shortened (p=0.000).

Conclusions: The impact of lockdown resulted in decreased number of orthopedic trauma admissions and cases operated. On such a crisis, only urgent and semi-urgent cases need to be managed while also protecting healthcare workers and patients.

INTRODUCTION

Corona virus disease (COVID-19) caused by novel coronavirus (SARS-COV2) has created a worldwide health crisis. Started in the city of Wuhan, China in December 2019,¹ it was declared a global pandemic on 11 March 2020 by World Health Organization.² The first case of COVID-19 in Nepal was confirmed on 23 Jan 2020.³ Government of Nepal announced a country-wide lockdown on 24 March 2020, which lasted till 21 July 2020.⁴

Ministry of Health and Population has timely implemented different health policies to readjust the functioning of health institutions.⁵ We adopted guidelines to manage the orthopedic trauma during this pandemic crisis prioritizing urgent and semi-urgent cases.⁶⁻⁸ Safety measures were strictly followed during patient examination and orthopedic procedures or surgery. Such recommendations have been put forward by various affected countries.⁹⁻¹⁵

In such an adverse situation, lockdown has restricted the movement of people, and also people are less likely to visit hospitals for minor ailments. Despite this, patients continue to come to seek orthopaedic services and there may be a need to

categorize the treatment provided so that maximum hospital resources are directed towards the needful patients.

The aim of this study was to evaluate the impact of national lockdown in orthopedic services in Chitwan Medical College and to analyse the patients admitted and operated in the orthopaedics department during the lockdown period. This will help us to be prepared for similar disaster in future.

METHODS

This was a cross-sectional study of all patients operated or admitted for conservative management to the Department of Orthopedics, Chitwan Medical College during the lockdown period from 24 March to 21 July 2020. This was compared with the same four-month interval from 24 March to 21 July of the previous year 2019. A predetermined format was used to collect data from hospital records obtained from medical record section, indoor ward records and operation theater records. Demographic data including age, sex, diagnosis, mechanism of injury, anatomical location, number of days of admission before surgery and total days of hospital stay were recorded. Approval for the study was taken from Institutional Review Committee of Chitwan Medical College.

All patients admitted to orthopedic department during the study period were included irrespective of the method of treatment given. Patients who left against medical advice (LAMA), who deceased during the hospital stay, or those with an incomplete medical record, were excluded from the study.

Data entry and statistical data analysis was done using Statistical Package for Social Sciences (SPSS) version 16.0. Analysis was done using frequencies, descriptive option for mean and standard deviation and median. Mean age between the two groups was compared using Independent samples t test. Categorical data were compared using Pearson's Chi-Square test or Fisher's exact test, and data not normally distributed compared using Mann-Whitney U test. A value of $p < 0.05$ was considered significant with confidence interval of 95%.

RESULTS

A total of 452 patients were treated in 2019, which dropped down to 247 patients in the lockdown, resulting in 45.4% reduction (Table 1). Similar reduction was seen in total trauma cases (39.1% reduction; $p = 0.009$) and total cases operated (35.7% reduction; $p = 0.000$) from 2019 to the lockdown period (Table 2 and 3).

Table 1: Comparison of total number of cases in 2019 and during lockdown

Variable	2019	Lock-down	% decrease 2019 vs lockdown
Total cases	452	247	45.4%
Trauma cases	340	207	39.1%
Operated cases	347	223	35.7%

There were 304 male (67.3%) and 148 female patients (32.7%) in 2019. Similar gender distribution was seen during lockdown-165 (66.8%) and 82 (33.2%) males and females respectively. The mean age was 33.3 ± 21.6 years (range six month to 97 years) in 2019 and 35.5 ± 20.7 years (range three to 97 years) during lockdown (Table 2). Majority of patients were adults in both periods, however there was a decrease in patients of pediatric age group, 15.8% in lockdown versus 23.5% in 2019 and increase in adults, 72.9% in lockdown versus 66.2% in 2019 ($p \leq 0.05$).

The median waiting time before surgery was zero day during lockdown and one day in 2019 ($p = 0.000$, Table 2). After operation patients were discharged earlier (median hospital stay three days during lockdown and six days in 2019, ($p \leq 0.001$). Similarly patients managed conservatively had a shorter hospital stay during lockdown, median stay two days versus four days in 2019 ($p = 0.018$). The delay before surgery ranged from 0-14 days during lockdown and 0-20 days in 2019. Hospital stay of operated patients ranged 0-65 days during lockdown and 0-108 days in 2019; and 0-9 days and 0-17 days in non-operated patients in lockdown and 2019 respectively.

Table 2: Demographic data of patients admitted and treated in orthopedic ward

Variable	2019 (n=452)	Lockdown (n=247)	p value
Male	304 (67.3%)	165 (66.8%)	0.903 [†]
Female	148 (32.7%)	82 (33.2%)	
Age, mean (years)	33.3	35.5	0.199 [†]
Age group*			
0-14 years	106 (23.5%)	39 (15.8%)	0.044 [†]
15-64 years	299 (66.2%)	180 (72.9%)	
≥65 years	47 (10.4%)	28 (11.3%)	
Management*			
Operative	347 (76.8%)	223 (90.3%)	0.000 [‡]
Conservative	105 (23.2%)	24 (9.7%)	
Wait before surgery, median (days)*	1	0	0.000 [§]
Hospital stay, median (days)*			
Operative	6	3	0.000 [§]
Conservative	4	2	0.018 [§]

* $p < 0.05$

[†]Independent-Samples T-test

[‡]Pearson's Chi-Square test

[§]Mann-Whitney U test

Though there was a decrease in total number of trauma cases from 2019 to lockdown period, the number of patients with pathological fracture (two (0.6%) 2019; one (0.5%) lockdown; $p = 1.000$) and with associated neurovascular injury (three (0.9%) 2019; three (1.5%) lockdown; $p = 0.678$) remained constant. The incidence of open fracture was reduced during lockdown, 16 cases (7.7%), when compared to 2019, 38 cases (11.2%); but this difference was not statistically significant ($p = 0.237$) (Table 3).

During lockdown there was decrease in proportion of fractures, 76.3% ($n = 158$) versus 90% ($n = 306$) in 2019 ($p = 0.000$). Cases of amputation and soft tissue injury increased ($p < 0.05$) whereas cases of dislocation were similar between the two-time period ($p = 0.557$) (Table 3).

There was difference in the mechanism of injury of trauma cases between the two groups (Table 3). During lockdown only 27.1% ($n = 56$) sustained road traffic accident (RTA) compared to 45% ($n = 153$) in 2019 ($p = 0.000$). There was an increased proportion of direct impact injury during lockdown 10.6% ($n = 22$) when compared to 2.9% ($n = 10$) in 2019 ($p = 0.000$), however there was no significant difference in other mechanism of injuries including fall ($p > 0.05$ for all).

Regional distribution showed that cases of upper limb, hip and pelvis remained constant ($p > 0.05$ for all) (Table 4). Though the number of cases of lower limb decreased from 2019 to lockdown period, the proportion increased during lockdown (37.7% ($n = 93$) versus 29.9% ($n = 135$) in 2019, $p = 0.043$). There was a decrease in patients with spine pathology during lockdown ($p = 0.028$).

Table 3: Characteristics of trauma admissions by type and mechanism of injury

Variable	2019	Lockdown	p value
Total trauma cases	340 (75.2%)	207 (83.8%)	0.009*
Open fractures	38 (11.2%)	16 (7.7%)	0.237
Associated neurovascular injury	3 (0.9%)	3 (1.5%)	0.678
Pathological fracture	2 (0.6%)	1 (0.5%)	1.000
Injury type			
Fracture	306 (90.0%)	158 (76.3%)	0.000*
Dislocation	16 (4.7%)	12 (5.8%)	0.557
Amputation [†]	1(0.3%)	10 (4.8%)	0.000*
Soft tissue injury	17 (5.0%)	27 (13.0%)	0.001*
Mechanism of injury			
Fall	155 (45.6%)	108 (52.2%)	0.158
RTA [‡]	153 (45.0%)	56 (27.1%)	0.000*
Sports	9 (2.36%)	4 (1.9%)	0.775
Machine	4 (1.2%)	7 (3.4%)	0.113
Crush	5 (1.5%)	5 (2.4%)	0.515
Direct impact	10 (2.9%)	22 (10.6%)	0.000*
Physical assault	3 (0.9%)	2 (1.0%)	1.000
Animal attack	1 (0.3%)	1 (0.5%)	1.000
Electric shock	0	1 (0.5%)	0.378
Gunshot	0	1 (0.5%)	0.378

*Fisher's exact test $p < 0.05$, [†]Includes cases of amputation and near total amputation, [‡]Road Traffic Accident

Surgery was required in higher percentage of patients admitted during lockdown 90.3% (n = 223) as compared to 76.8% (n = 347) in 2019 (p = 0.000, Table 2). Out of the total patients operated, there was less proportion of implant removed during lockdown (4.9% (n = 11) versus 14.1% (n = 49) in 2019,

p = 0.000); however, cases of trauma, infection and soft tissue procedures remained constant (p > 0.05, Table 4). Among the cases managed conservatively, there was no significant difference between the two groups.

Table 4: Characteristics of orthopedic cases managed

Variable	2019 (n=452)	Lockdown (n=247)	p-value
Region			
Upper limb	229 (50.7%)	117 (47.4%)	0.429
Lower limb	135 (29.9%)	93 (37.7%)	0.043*
Hip	35 (7.7%)	20 (8.1%)	0.884
Pelvis	10 (2.2%)	5 (2.0%)	1.000
Spine	43 (9.5%)	12 (4.9%)	0.028*
Operative			
Trauma	276 (79.5%)	191 (85.7%)	0.074
Infection	13 (3.7%)	10 (4.5%)	0.668
Implant removal	49 (14.1%)	11 (4.9%)	0.000*
PIVD [†]	0	5 (2.2%)	0.009*
Soft tissue procedures	9 (2.6%)	6 (2.7%)	1.000
Conservative			
Trauma	64 (61.0%)	16 (66.7%)	0.649
Infection	18 (17.1%)	6 (25.0%)	0.389
Back pain	18 (17.1%)	1 (4.2%)	0.197
Arthritis	4 (3.8%)	1 (4.2%)	1.000
Knee contracture	1 (1.0%)	0	1.000

*Fischer's exact test $p < 0.05$, [†]Prolapsed intervertebral disc

DISCUSSION

COVID-19 pandemic has affected all sectors of Nepal including

health. National and institutional guidelines have been followed in managing the patients presenting to orthopedic facility.

The number of patients attending orthopedic services

decreased considerably during lockdown. There was 45.4% reduction in cases admitted and treated when compared to 2019. This was because of lockdown affecting transport and public movement, reduction in injuries sustained as people were confined indoors, and also patients being reluctant to visit hospital for fear of COVID infection. A similar 53.7% reduction in orthopedic trauma admissions was seen in UK lockdown,¹⁶ and Park et al found 46.3% reduction in acute trauma referrals in London.¹⁷ During initial five weeks of national lockdown orthopedic admissions reduced to one third in Patan hospital.¹⁸

Generation of aerosol during reaming and use of drill, hammer and electrocautery increases the chance of infection among healthcare workers.^{9, 13} Different studies have recommended minimizing hospital admission and non-urgent surgery to reduce the disease impact.^{8-10, 13, 19} Similar strategy was adopted by our hospital and we found that there was 77.1% reduction in patients admitted for conservative management and 35.7% reduction in cases operated during lockdown. Hampton et al also found a reduction in patients requiring no intervention (4% in lockdown versus 17% in 2019),¹⁶ and the number of operated cases reduced by a third following COVID as studied by Park et al.¹⁷

Majority patients fell in the adult age group (15-64 years) which is the main working and economically active age group. The proportion of elderly patients remained constant and this may be because most injuries in the elderly are the result of trivial falls within their homes.²⁰ Schools remained closed during lockdown restricting outdoor activities of children and so the pediatric patients were less when compared to previous year. Hampton et al found a decrease of around 50% in both adult and pediatric services during lockdown as compared to previous year,¹⁶ but we found 40% reduction in adult and 63% reduction in pediatric cases. Park et al had 44.4% and 55.6% reduction in adult and pediatric trauma referrals respectively during lockdown though not statistically significant.¹⁷

Trauma remained the most common surgery performed during both periods. During lockdown period there were 85.7% cases with trauma surgery, which was comparable to 84.1% in the study of Pradhan et al.¹⁸ Emphasis was given for non-operative management and routine implant removal surgery was postponed whenever possible. Only 11 cases (4.9%) of implant removal were done during the lockdown as compared to 49 (14.1%) in 2019.

Fall was the most common mechanism of injury in both the study periods. RTAs reduced significantly during lockdown and open fractures also decreased though not significant. This was probably because motor vehicle accidents are the most common cause of open fractures,²¹ and transportation was restricted in the lockdown period. Park et al found 26.1% reduction in open injuries during lockdown as compared to 2019,¹⁷ whereas we found a greater reduction of 57.9%. Direct impact injuries and finger/toe amputations increased during lockdown as compared to last year. Other studies also found a similar increase in proportion of low energy falls and a decrease in road traffic collisions during lockdown.^{16, 17} Fall

injury accounted for 67% and RTA for 6.9% in the study of Hampton et al,¹⁶ and 67.8% fall and 14.9% RTA in the study of Park et al,¹⁷ whereas we found 52.2% cases of fall and 27.1% RTA during lockdown. The reason for these RTAs might be due to increased speeding in roads that are quieter as an effect of lockdown. Most of trauma cases were due to fall with no RTA admissions in the study of Pradhan et al.¹⁸

Time to wait before surgery and hospital stay both decreased significantly during lockdown. Patients were operated as soon as possible and discharged early to shorten the hospital stay. 92.4% cases were operated within two days of admission (same day 50.7%, first day 34.5%, and second day 7.2%). Only five patients (2.2%) had a waiting period of more than five days. Two patients had associated head injury, one had local swelling and one had spleen injury for which laparotomy was done. The longest delay was 14 days in a patient with pelvic injury with Morel-Lavallee lesion which was managed conservatively but later required open debridement. In other patients, there were co-morbidities which required optimization before surgery. In the study of Pradhan et al the average wait before surgery was 3.12 days (0-16 days).¹⁸

Lockdown also affected the length of hospital stay due to lack of transportation, complicated by financial constraints, patients from remote areas who had difficulty in follow-up, and also due to type of injury which required multiple interventions. Among the operated patients, the median hospital stay was three days (range 0-65 days) with majority (79.8%) discharged within one week. There were eight patients (3.6%) who stayed for more than three weeks. These were patients with polytrauma, associated head injury, spinal injuries, and open or mangled injuries who required multiple and staged surgeries. The average hospital stay was 6.14 days (range 1-22 days) in the study of Pradhan et al.¹⁸

This study is not without limitations. This is a single centre study and may not represent the nationwide effect of lockdown on orthopedic services. We assume that similar trends have been observed in all the orthopedic departments throughout the country. Though this was a retrospective study we have tried to collect complete data of the study periods from the hospital records. COVID pandemic continues to impact the healthcare services including orthopedics, however our study focused on the four-month lockdown period only, and further researches are required to evaluate the overall impact of COVID.

CONCLUSION

National lockdown implemented to limit the COVID 19 outbreak has caused reduction in total number of orthopedic cases managed in our institution. RTAs, though decreased during lockdown, are the cause of polytrauma with associated head/ abdomen injuries and open fractures that require staged multidisciplinary approach, leading to prolonged hospital stay. Total trauma cases operated have also decreased, with a priority to shorten the waiting time before surgery as well as the hospital stay.

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