

Original Research Article

Profile of injury cases before, during and after lockdown of COVID-19 pandemic: a hospital based study

Aishwarya R. G.^{1*}, Pallavi Sarji Uthkarsh², Suresh Krishnarao³

¹Department of Public Health, Rajiv Gandhi Institute of Public Health and Centre of Disease Control, Bangalore, Karnataka, India

²Department of Community Medicine, Kamineni Institute of Medical Sciences, Hyderabad, Telangana, India

³School of Environment science and Public Health and Sanitation management, Karnataka State Rural Development and Panchayat Raj University, Bangalore, Karnataka, India

Received: 02 February 2023

Revised: 08 March 2023

Accepted: 09 March 2023

*Correspondence:

Aishwarya R. G.,

E-mail: aishwaryarg16@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Injuries show a significant burden of morbidity, disability and mortality throughout world, especially in lower-middle income nations. Injuries result from road traffic crashes, falls, burns, and acts of violence against oneself or others, among other causes. Road Traffic Accidents are especially dominant among injuries, which are unintentional. The lockdown has resulted in dramatic changes in service provision from emergency departments and hospitals. And the pattern of the injuries has differed because of different reasons being reduced mobility, isolation at home, boredom and so on. The aim of this study was to assess the type of injury cases reaching a tertiary care hospital in Bangalore before, during and after lockdown of the COVID-19 pandemic and its profile.

Methods: The data was collected from the hospital records of all inpatients of selected tertiary care hospitals.

Results: Incidence of RTA and Assaults are observed to be high constituting 52.5% and 31.4% respectively. The change in trend of injuries indicated a dropdown in injury cases during lockdown and the increase of cases after lockdown relaxations.

Conclusions: Road traffic accidents was the most common cause of injury observed in this study, with specifically 2-wheeled vehicles were most involved. The development of trauma registries all over the country containing minimum epidemiologically desired data is the need of the time for India. The data in the hospital records should be standardized and centralized.

Keywords: Injuries, COVID-19 lockdown, RTA, Assault, Falls, Trend of injuries

INTRODUCTION

Injuries and violence are a significant cause of death and burden of morbidity and disability throughout world, especially in lower-middle income nations. Injuries results from traffic collisions, drowning, poisoning, falls or burns - and violence - from assault, self-inflicted violence or acts of war which kill more than five million people worldwide

annually and cause harm to millions more. They account for 9% of global mortality and are a threat to health in every country of the world.¹ For every death, it is estimated that there are dozens of hospitalizations, hundreds of emergency department visits, and thousands of doctors' appointments. A large proportion of people surviving their injuries incur temporary or permanent disabilities. It is estimated that nearly 1.5 to 2 million persons are injured

and 1 million succumb to death every year in India which is 10% of total no of cases in the world. Trauma in India is an increasingly significant problem and is an increasing cause of morbidity and mortality in India. In India, it is estimated that nearly 1.5 to 2 million persons are injured and 1 million succumb to death every year which is 10% of total no of cases in the world. Injuries in India are an increasingly significant problem and is an increasing cause of morbidity and mortality in India. A study says that a road traffic accident was the most common mode of injury.² But because of mass quarantine due to COVID-19 pandemic, mode of injury might show different trends. Since the movement of the population is abolished except for carrying out daily essential activities (groceries, daily medical requirement etc), the prevalence of injuries might have decreased or the trends of injuries would have differed, for example, home violence, self-harm, fall on level ground and so on incidence might be increased. The aim of the study was to know the impact of Lockdowns during COVID-19 Pandemic in major cities on the profile of injuries and its trends before, during and after lockdown.

Operational definitions

Injury: An injury is considered as a physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance or from a lack of one or more vital elements (for example, oxygen). The energy could be mechanical, thermal, chemical, or radiant. It is usual to define injuries by intention. The main causes of unintentional injuries are road crashes, poisoning, drowning, falls and burns. Intentional injuries result from violence and can be directed at others (interpersonal violence), to the self (self-directed violence) or at groups (collective violence). Violence is the intentional threat or use of physical force against oneself, another person or a group or community that results in injury, death, psychological harm, maldevelopment or deprivation.¹ **Road traffic accident (RTA):** RTA is any injury due to crashes originating from, terminating with or involving a vehicle partially or fully on a public road. It is projected that road traffic injuries will move up to the third position by the year 2020 among leading causes of the global disease burden.³ **Fall:** A fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level.⁴ **Self-inflicted injury:** The centre for disease control (CDC) defines self-directed violence as anything a person does intentionally that can cause injury to self, including death, For example: Cutting, Suicide.⁵ **Assault:** A threat or attempt to inflict offensive physical contact or bodily harm on a person (as by lifting a fist in a threatening manner) that puts the person in immediate danger of or in apprehension of such harm or contact, violent physical or verbal attack.⁶ **Occupational injury:** An occupational injury is defined as any personal injury, disease or death resulting from an occupational accident; an occupational injury is therefore distinct from an occupational disease, which is a disease contracted as a result of an exposure over a period of time to risk factors arising from work activity.⁷

Objectives

Objectives of current study were to; to assess the type of injury cases seen in a tertiary care hospital in Bangalore before, during and after lockdown of the COVID-19 pandemic and to study the socio demographic and profile of all injury cases admitted in the selected tertiary hospitals before, during and after COVID-19 lockdown.

METHODS

The type of this study is a descriptive cross-sectional hospital-based study. The time period of the study was 3 months, the data was collected from September 2021 to November 2021. The sampling design used was purposive sampling, through which two tertiary care hospitals (Sanjay Gandhi Institute of Trauma and Orthopaedics, and Bowring and Lady Curzon Hospital) in Bangalore were selected. There was no particular sample size for the study, the records of the trauma/injury patients available from January 2020 to October 2020 were collected. This was decided after dividing the pre-lockdown, lockdown and post-lockdown days of the COVID-19 pandemic equally into 76 days each. The the data was categorised as before lockdown (January, February and until March 16), during lockdown (March 25 to 31, April, May, July 14 to 22) and after lockdown (July 23 to 31, August, September, and October 1 to 6).

Secondary data of socio-demographic and other factors associated with injuries was collected from hospital records of all inpatients of Sanjay Gandhi institute of trauma and orthopaedics, and Bowring and lady Curzon hospital, Bangalore. All the records of the victims injured by road traffic accidents, poisoning, drowning, fall on level ground, burns, violence, and self-inflicted violence, suicides were included for the study and the records of the study subjects whose data is incomplete or unavailable were excluded. Before the study, permission was taken from the medical superintendent of the hospital and concerned authorities. Data collected was entered in Microsoft excel sheet and formatted as required. All the necessary categorization and modification were done, and statistical analysis done by SPSS version 20. Descriptive analysis of obtained data is done. The categorical data is presented in the form of frequency tables along with percentages and graphically wherever necessary. Continuous variables are summarized using mean (standard deviation) and median (inter quartile range).

RESULTS

Out of 2340 study subjects, majority of them were male (1834) that has endured with injuries, 3 times more than females (589) and only 6 persons were transgenders. The injuries were more in two age groups of 17-30 (1030) years and 31-45 years (782). The two age groups contribute 77.4% of total injury cases reaching this hospital. The age group, 17-30 years (1030) alone contributed 42.3% of population at risk the most active, mobile, and using

vehicles for transport. The children less than 5 years of age are least prone to because they are mostly accompanied or

under the care and constant surveillance of the parents or guardians or care takers (Table 1, Figure 1).

Table 1: Injury numbers according to age and gender and male and female ratio.

Age category	Gender		Transgender	Unknown	Total	M: F
	F	M				
<5	3	11	0	0	14	3.6:1
0-16	25	72	0	0	97	02:01
17-30	234	793	3	0	1030	2.96:1
31-45	189	592	1	0	782	3.38:1
46-60	85	258	2	0	345	3.13:1
>60	48	102	0	0	150	3.:1
Unknown	5	6	0	1	12	1.2:1
Total	589	1834	6	1	2430	3.1:1

Table 2: Frequencies of injury wise before, during and after lockdown.

Duration and type of injury								
Duration	Type of injury							Total
	Assault	Fall	Injury	Occupational injury	Railway traffic accident	RTA	Self-inflicted injury	
Before lockdown	417	66	26	34	8	590	28	1177
During lockdown	70	51	27	6	3	248	7	412
After lockdown	277	54	16	15	4	438	29	841
Total	764	171	69	55	15	1276	64	2430

There was substantial and sudden decrease in injury cases during lockdown (412), to the level of 1/3rd of pre lockdown injuries, due to restricted movement. After completion of lockdown, the situation is reverting back as injury cases (841), have already reached 2 times that of during lockdown, as a result of relaxations in restricted mobility and may reel back to normal level soon.

Table 3: Frequency of injuries by days.

Days	N	%
Monday	324	13.3
Tuesday	339	14
Wednesday	361	14.9
Thursday	374	15.4
Friday	290	11.9
Saturday	345	14.2
Sunday	397	16.3
Total	2430	100

The injury when compared between pre lockdown period, post lockdown period to during lockdown period, the injuries during pre-lockdown (1177) is almost 3 times higher than during lockdown, and post lockdown injuries (841) is 2 times higher than that of during lockdown (Table 2, Figure 2). When the injury data is segregated lockdown wise, RTA and Assaults follow the same trend. During lockdown, there is sudden descent in both RTA and Assault cases compared to pre lockdown. The Assault cases are seen to drop down by 6 times during lockdown as compared to pre-lockdown and RTA cases have reduced

by 50% during lockdown as compared to that of before lockdown (Table 3, Figure 3).

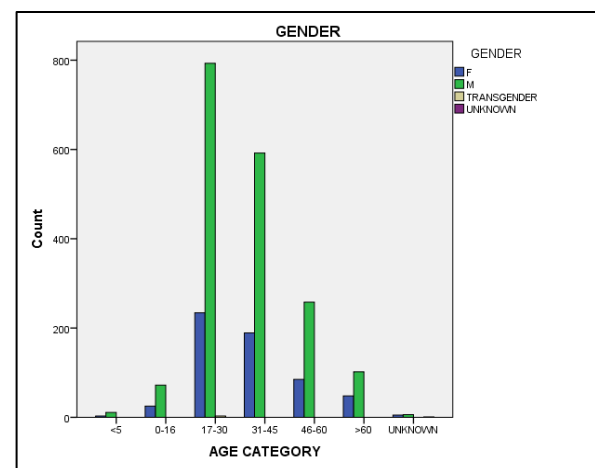


Figure 1: Age-gender graph.

When data is compared in terms of weekdays, it is observed that most of the injury incidence occurred on Sunday (16.3%), followed by Thursday (15.4%), and Wednesday (14.9%). the least injury incidence can be observed on Friday (11.9%) (Table 4, Figure 4). Out of 2430 injuries, the incidence of RTA (1276) and assault (764) were the top two conditions, followed by falls (171), accidental injury (69), self-inflicted injury (64) and occupational injury (55). Very few railway traffic accidents (15) were reported in the hospital.

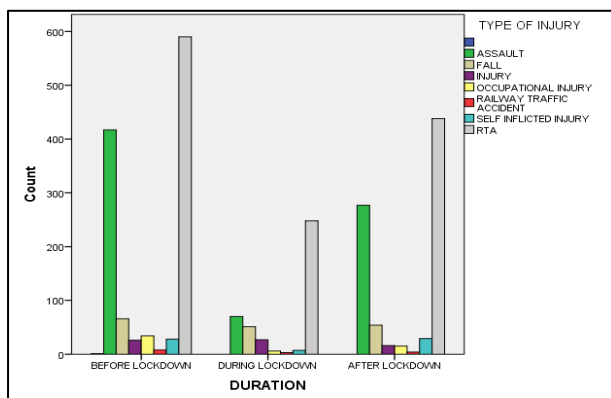
Table 4: Frequencies and percentage of injuries by type and timings.

Type of injury	Time					Total	%
	12 am-5.59 am	12 pm-5.59 pm	6 am-11.59 am	6 pm-11.59 pm	Unknown		
Assault	132	190	100	337	5	764	31.4
Fall	7	68	47	45	4	171	7
Injury	9	24	18	12	6	69	2.8
Occupational injury	3	29	14	8	1	55	2.3
Railway traffic accident	4	6	1	3	1	15	0.6
RTA	125	418	239	482	14	1277	52.5
Self-inflicted injury	4	11	12	25	12	64	2.6
Total	284	754	433	916	43	2430	100

Table 5: Frequencies of cause of injury by type of vehicle.

Cause of injury	Type of vehicle							Total
	2-wheeler	3-wheeler	4-wheeler	Bicycle	Heavy gauge vehicle	Pedestrian	Unknown	
Collided to a vehicle	13	1	2	0	0	0	1	17
Hit by a 2-wheeler	174	4	2	9	0	157	3	349
Hit by a 3-wheeler	51	1	0	1	0	37	2	92
Hit by a 4-wheeler	149	13	5	0	0	67	8	242
Hit by a heavy gauge vehicle	28	9	13	1	4	29	6	90
Hit by an unknown vehicle	3	0	0	0	0	4	2	9
Hit by bicycle	0	0	0	0	0	2	0	2
Others	94	64	31	0	8	2	53	252
Skid	221	3	0	0	0	0	0	224
Total	733	95	53	11	12	298	75	1277

RTA are the major burden among injuries that causes both high morbidity and mortality which in turn increases DALY of the individual and the country. The more injury incidence is seen on Sunday (397) (Table 5, Figure 5).

**Figure 2: Injury wise details before, during and after lockdown.**

The incidence of RTA and Assault is most during 6PM - 11.59PM (482 and 337 respectively), followed by more incidence at 12 pm-5.59 pm (418 and 190 respectively). Least incidence of RTA (125) and Assault (100) is observed during 12 am-5.59 am and 6 am-11.59 am respectively. RTA and Assault follows almost the same time trend. The time trend of RTA, more incidence was observed between the timings 6PM and 11.59PM (482) and least during 12 am and 5.59 am (125) naturally due the fact that many people are on the road at that hour. The highest incidence of RTA's is seen more during night, may be because of lack of appropriate street lighting, more vehicles, full beam lights of the opposite vehicles causing temporary visual problems, drunk and drive. The vehicles that posed extra risk to RTA were identified as 2-wheeler (bike, scooty etc), 3-wheeler (auto-rikshaw), 4-wheeler (tata ace, car), bicycle, heavy gauge vehicles (truck, lorry, tempo traveller, bus etc). The highest number of RTA's were observed in 2-wheeled vehicles (733 out of 1277), followed by pedestrian (298 out of 1277). The lowest

number of incidences is observed in non-motorised bicycles, being the safest mode to travel due to low speed.

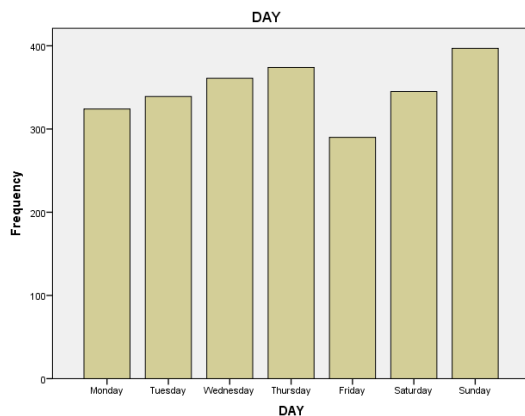


Figure 3: Graph of injury frequency by days.

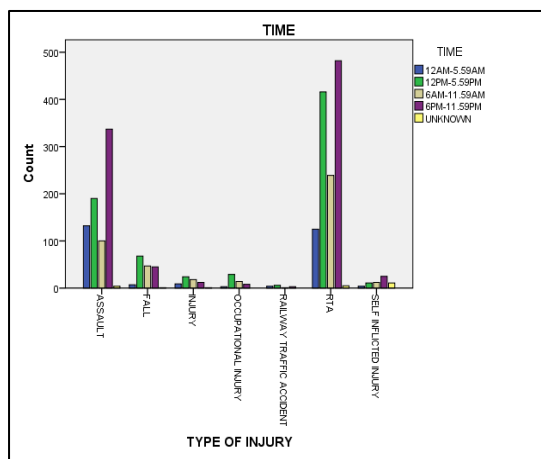


Figure 4: Graph of injuries by type and timings.

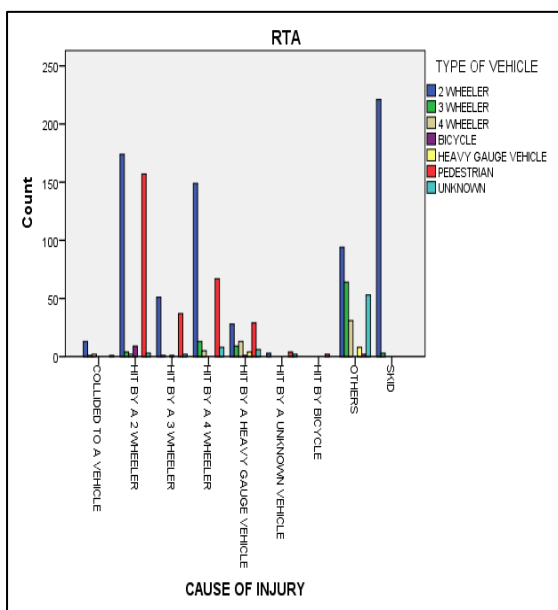


Figure 5: Graph of cause of injury by type of vehicle.

DISCUSSION

In the present study, the injuries are observed to be more in economically productive age group, that is from 17-30 years of age, which is consistent with other studies. But not consistent with the national data by NCRB reports 2020 Gender-wise analysis reveals that male and female constitute 80.5% and 19.5% of total victims respectively. Age group of majority of the victims was between 30 to 45 years.² This analysis of profile of injury cases in selected tertiary care hospitals of Bangalore, indicates that substantial burden of acute injury involving male population. The most common type of injury were road traffic accident and assaults. Nearly 50% of injury events were unintentional with road traffic injuries comprising the leading causes of injury morbidity and admissions respectively. Assault were the leading causes of intentional injury morbidity and hospitalisation.^{8,9}

The current study showed that among those who injured in RTAs, 57.4% of them were two-wheeler users and 23.3% were pedestrians, which is like findings of other study on profile of injury cases admitted to tertiary care hospital of south Bangalore.⁸ The suspicion of alcohol use prior to all types of injuries, is consistent with the other studies also.⁹ Males were 3 times more prone to injuries than in females is the observation noted in the is study, which is similar in other studies too.¹⁰

The current study found that 52.5% of the cases that are admitted in the tertiary care hospitals are due to road traffic accidents, followed by assaults (31.4%), and falls (7%) which is consistent with the RTA and falls data by the study report of Bengaluru Injury/Road Traffic Surveillance Program conducted by NIMHANS, the data was as follows; Road traffic injuries were the major cause of death (46%), falls resulted in 7% of deaths. And is also consistent with the NCRB 2020 report regarding road traffic accident data. (In Collaboration with Bengaluru surveillance programme surveillance programme injury/road traffic injury/road traffic injury, accidents in India).^{9,11} Lockdown for minimizing spread of Covid19 affected positively as, there was a fall in number of injury cases during lockdown period and the substantial rise is seen after the lockdown rules were relaxed, the similar observations are seen in other studies too, except there is no changes in admission cases due to falls, and domestic injuries. But there is fall in number of admissions due to RTA and assaults.¹² The prediction of assaults to increase during lockdown is contrary to the belief in this study. The reasons might be that during lockdown men stayed at home, lost earnings or it may be due to inaccessibility to Alcohol during lockdown. In the present study, more road traffic accidents occurred between 6PM and 12 AM and falls occurred between 12PM and 6PM. This finding is not consistent with the findings of the study done by Gururaj (2008), which states that most injuries occurred between Indian Standard Time (IST) 15:00 and 18:00 hours, followed by between IST 12:00 and 18:00 hours and between IST 18:00 and 00:00 hours. The report of road accidents in India-2019

conducted by Ministry of Road Transport & Highways reveals that Two wheelers account for 35% of total road accident deaths on National Highways falling under NHAI, followed by cars, taxis, Vans & LMVs (18.6%) and pedestrians (13.9%) followed by share of Trucks of (10.7%) and share of buses of (4.9%) and share of bicycles at (2.9%). This study reports are not consistent with this above given data.¹³

Limitations

The current study has only data of 2 tertiary care hospitals of Bangalore, therefore the findings is not applicable for whole population of Bangalore. The data was collected from MLC and TRAUMA registers of the tertiary care hospital, where so many data variables were missing. This study is the one of its kind, the comparative study between lockdowns with many variables. Therefore, the data observed with few variables could not be compared with any other studies. The data related to location and type of injury (e.g., fractures etc) was not recorded in both the hospitals.

CONCLUSION

The current study is unique, there are limited injury research papers published on lockdown/pandemic, let alone comparative studies between pre, during and post-lockdown. This study advances knowledge and understanding in the field of trauma and injury by demonstrating the impact of the pandemic on injuries. The study provides important insights into the changes in injury patterns and outcomes during the pandemic, which can give insights on injury prevention strategies and resource allocation in trauma care during pandemic. Road traffic accidents was the most common cause of injury observed in this study, with specifically 2-wheeler vehicles were most commonly involved. The trend of injury is observed to decrease during lockdown because of the restricted mobility of vehicles. After the lockdown restrictions were relaxed, there is gradual rise in injury cases. The males are observed to be more affected population for injuries and age group affected is the productive age group of 17-30 years. The development of trauma registries all over the country containing minimum epidemiologically desired data is the need of the time for India. The data in the hospital records should be standardized regarding the information collected for the patients admitted to the hospital.

Realtime data should be collated from each major institutions to start with made available online or the easy access, transparency, and epidemiological analysis for action. A systematic analysis of data and sharing with the stakeholders for decision makers for the appropriate preventive measures to reduce the burden of the injuries and disabilities. Despite there being IDSP, the NCDs component including injury surveillance system is weak in India and needs to be further strengthened.

ACKNOWLEDGEMENTS

Authors would like to thank Dr. Yuvraj and dean and directors of the Sanjay Gandhi Institute of Trauma and Orthopedics, Bangalore and Bowring and Lady Curzon Hospital, Bangalore for their support in present study. Authors would also like to thank officers and supervisors of the register sections of the selected hospital for research.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Injuries and violence. Available at: <https://www.who.int/news-room/fact-sheets/detail/injuries-and-violence>. Accessed on 20 November 2022.
2. 1.2 lakh deaths in road accidents in 2020. Available at: <https://www.thehindu.com/todays-paper/12-lakh-people-died-in-road-accidents-in-2020-ncrb/article36559618.ece>. Accessed on 20 November 2022.
3. Road traffic accidents. Available at: https://www.nhp.gov.in/road-traffic-accidents_pg. Accessed on 20 November 2022.
4. Falls. Available at: <https://www.who.int/news-room/fact-sheets/detail/falls>. Accessed on 20 November 2022.
5. Self-Directed Violence and Other Forms of Self-Injury. Available at: <https://www.cdc.gov/ncbddd/disabilityandsafety/self-injury.html>. Accessed on 20 November 2022.
6. Assault Definition & Meaning - Merriam-Webster. Available at: <https://www.merriam-webster.com/dictionary/assault>. Accessed on 20 November 2022.
7. Occupational injuries. Available at: http://www.ilo.org/stat/Publications/WCMS_173153/lang-en/index.htm. Accessed on 20 November 2022.
8. Gururaj G. Injuries in India: A national perspective. Available at: https://www.nimhans.ac.in/wp-content/uploads/2019/02/BD_7-India-Injury-Report_0.pdf. Accessed on 20 November 2022.
9. Crime rates. Available at: https://ncrb.gov.in/sites/default/files/NCRB_Journal_October_2019.pdf. Accessed on 20 November 2022.
10. Dandona R, Kumar GA, Gururaj G, James S, Chakma JK, Thakur JS, et al. Mortality due to road injuries in the states of India: the Global Burden of Disease Study 1990–2017. *Lancet Public Heal*. 2020;5(2):e86-98.
11. Surveillance programme surveillance programme injury / road traffic injury injury / road traffic injury. Available at: <https://nimhans.ac.in/wp-content/uploads/2021/02/Bengaluru-Injury-Road-Traffic-Injury-Surveillance-Programme>. Accessed on 20 November 2022.
12. Quraishi AM, Sahu S, Tongse P, Agrawal A. Impact of COVID-19 lockdown on the spectrum of trauma

patients at a major trauma center in central India: A retrospective observational study. *Int J Crit Illn Inj Sci*. 2021;11(1):25.

13. Road accidents in India. Available at: www.morth.nic.in. Accessed on 20 November 2022.
14. Road accidents in India. Available from: www.morth.nic.in. Accessed on 20 November 2022.

Cite this article as: Aishwarya RG, Uthkarsh PS, Krishnarao S. Profile of injury cases before, during and after lockdown of COVID-19 pandemic: a hospital based study. *Int J Community Med Public Health* 2023;10:1506-12.