

# Assessment of the Effects of the COVID-19 Lockdown on Trauma at AaBET Hospital in Addis Ababa, Ethiopia

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**Introduction:** A novel coronavirus disease (COVID-19) broke out in Wuhan, Hubei Province, China, in December 2019 that continues to pose major challenges to trauma care around the world. The objective of this study was to assess the effects of COVID-19 on the pattern of traumatic injuries and outcomes.

**Methodology:** This retrospective, descriptive study was conducted over a three-month period at Addis Ababa Burn Emergency and Trauma (AaBET) Hospital, Addis Ababa, Ethiopia. It compared pre- and post-COVID-19 data from the hospital registry and reports. Specifically, data from March through May, 2019 (pre-COVID-19) were compared to data from March through May, 2020 (during COVID-19). The data were analyzed using SPSS 20.0. Descriptive analyses of the variables are reported as numbers and percentages.

**Results:** There were a total of 5179 emergency visits during the study period, of which 2763 were trauma cases (53.4%). Among trauma cases, 1441 (52.1%) were attributable to road traffic injuries. During the COVID-19 period, 1901 patients were admitted, of which 1412 (74.3%) were trauma cases. Of the trauma cases during the COVID-19 period, 476 (33.7%) were attributable to road traffic injuries. There was a 42% decrease in emergency visits during the COVID-19 period. Although there was a 4.5% rise in trauma cases during the COVID-19, traffic injury-related trauma cases decreased by 50.7% during the same period. A significant increase in non-road traffic injury was noted during the lockdown period. These include interpersonal and domestic violence, and significant decreases were noted in multiple site injuries. Further, admissions were significantly decreased.

**Conclusion:** During the period of lockdown, there was a significant decrease in road traffic injuries in AaBET hospital and an increase in non-road traffic injuries. Implementation of preventive measures will decrease road-traffic injury burden.

**Keywords:** COVID-19, trauma, pandemic, road traffic injury

## Background

A novel coronavirus disease (COVID-19) that broke out in Wuhan, Hubei Province, China, in December 2019 continues to affect the provision of healthcare in many countries worldwide.<sup>1</sup> The World Health Organization (WHO) designated COVID-19 a Public Health Emergency of International Concern (PHEIC) in late January and a pandemic on March 11th 2020.<sup>2</sup> Thereafter, the Ethiopian government initiated strict passenger screening protocols at Addis Ababa's international airport. On March 13th, the first COVID-19 cases were reported in the country, after which the government proclaimed a state of emergency on April 8.<sup>3,4</sup>

The Ministry of Health and local health offices conducted house-to-house screenings of more than 11 million households and 40 million people in the capital provinces and increased diagnostic testing in the first three months.<sup>2,3</sup> In February 2020, the Ethiopian authorities implemented strict contact tracing, isolation, compulsory quarantine, and treatment. The government

converted public universities' dormitories to increase the capacity of quarantine centers to over 50,000 beds, established additional isolation centers with a total of 15,000 beds, and set up treatment centers with a 5000-bed capacity.<sup>5</sup>

As of July 17, 2020, Ethiopia, which has a population of 109 million, reported 9503 cases with 167 deaths and 4941 recoveries.<sup>6</sup> COVID-19 is a major challenge to the provision of trauma care around the world. The Addis Ababa Burn, Emergency and Trauma center (AABET) is located in the capital of the second most populous country in Africa. This opportunity allows researchers to effectively study the effects of COVID-19 on road-traffic injuries, particularly those related to traffic accidents, falls, and interpersonal violence.<sup>7</sup>

The goal of this study was to assess the effects of the lockdown on the presentation of patients to AABET's Emergency Department (ED) because of injuries from road traffic and non-road traffic injuries during the pandemic.

## Methodology

### Study Area

AaBET Hospital was established in 2015 as a part of St. Paul's Hospital Millennium Medical College (SPHMMC). The hospital's ED has approximately 15–20,000 annual emergency visits. The hospital also provides inpatient/outpatient services, elective and emergency surgeries, orthopedics, and plastic/reconstructive surgery. AaBET hospital was providing routine care and accepting trauma referrals from all over the country while tending to additional needs related to COVID-19.

### Study Design and Period

A retrospective, descriptive study design was used. The study period began with the government's implementation of social distancing measures in March, 2020 until the end of May, 2020. The data were compared with the same 3-month period in March–May 2019 before any COVID-19 related measures were implemented to assess its effects during the two years.

### Inclusion Criteria

- All trauma patients who presented to the AaBET hospital's Emergency Department during the study period.

### Data Collection

A structured data collection sheet was used to collect data from AaBET hospital registries and reports. Demographic data, mode of referral and referral source, triage code, mechanism and type of injury, and patients' outcomes were assessed. The modified South African color triaging system was used which includes red, orange, yellow, and green. Mechanism of injury was assessed as RTI or non-road traffic injuries. Trauma patients' outcomes were assessed as death, discharge, admission, or transfer.

### Data Analysis

The data collected were entered into Excel and analyzed with SPSS v. 20.0. Descriptive analyses of variables are reported as numbers and percentages.

### Ethical Clearance

A written legal ethical clearance for the study was obtained from St. Paul's Hospital Millennium Medical College IRB.

## Results

During the six-month study period (pre- and post-COVID months), 5179 patients were seen in the ED, of which 2763 (53.4%) had sustained trauma.

Of the total trauma cases, 2025 (73.3%) were male, while 738 (26.7%) were female. The mean age was 45 years (SD = 20.2 years). 1385 (50.1%) patients came from Addis Ababa, and 1441 (52.2%) had sustained traffic injuries (Table 1).

During the selected three-months period in 2019 and 2020, there was a decrease of 1377 patients (42.0%). The number of trauma patients has increased by 61 (4.5%). In 2019, 975 (72.2%) patients were male and 376 (27.8%) were female. 673 (49.8%) patients came from Addis Ababa; 717 (53.1%) patients were referred from other healthcare centers,

**Table 1** Patient Characteristics Over the 3-Months Period in 2019 and 2020 at AaBET Hospital

Categories	Sub-Categories	2019 (March-May)	2020 (March-May)	Total (6 Month)	Change 2020 and 2019
Total patient		3278	1901	5179	-1377 (-42.0%)
Total trauma patients		1351 (41.2%)	1412 (74.3%)	2763 (53.4%)	+61 (+4.5%)
Gender	Male	975 (72.2%)	1050 (74.4%)	2025 (73.3)	+75 (+7.7%)
	Female	376 (27.8%)	362 (25.6%)	738 (26.7%)	-14 (-3.7%)
Region	Addis Ababa	673 (49.8%)	712 (50.4%)	1385 (50.1%)	+39 (+5.7%)
	Outside Addis Ababa	678 (50.2%)	700 (49.6%)	1378 (49.9%)	+22 (+3.2%)
Referral status	Referred through communication	717 (53.1%)	662 (46.9%)	1379 (49.9)	-55 (-7.7%)
	Direct and referral without communication	634 (46.9%)	750 (53.1%)	1384 (50.1%)	+116 (+18.3%)

and 965 (71.4%) had sustained a road-traffic injury. In 2020, 1050 (74.4%) patients were male and 362 (25.6%) were female; 712 (50.4%) patients came from Addis Ababa; 662 (46.9%) patients had been referred from other healthcare centers. 476 (33.7%) patients had sustained a road traffic injury.

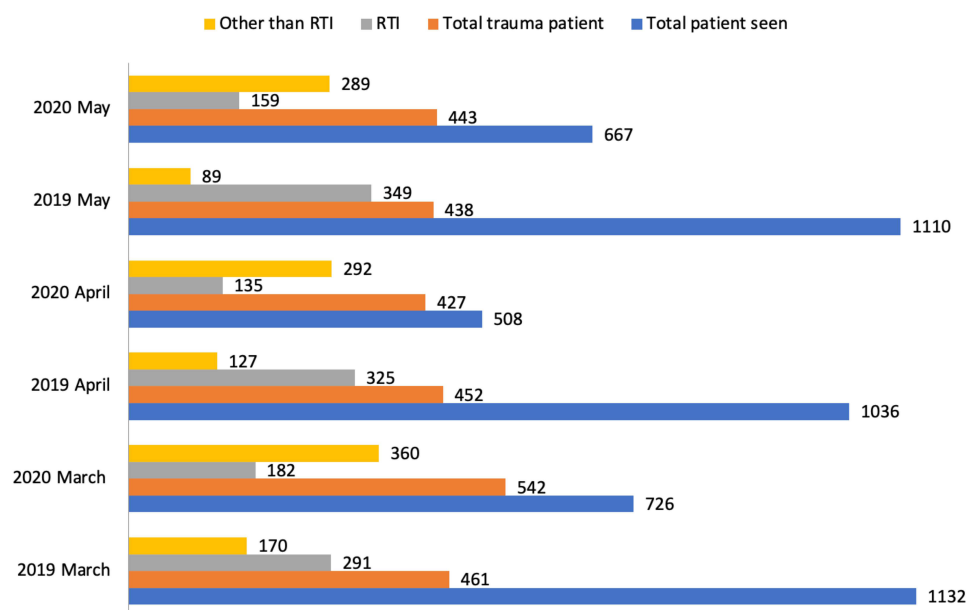
In 2020, there were more injuries attributable to non-road traffic injuries (142%) than road traffic injury. Furthermore, a 50.2% decrease in road traffic injury (RTI) was noted.

Over the three-month period in 2019, 49 (3.6%) patients triaged to red. In 2020, 116 (8.2%) patients triaged to red. The most common pattern of injuries in 2019 and 2020 were extremity and pelvis injuries at 33.8% and 35.5%, respectively (Table 2).

The number of patients, both trauma and non-trauma cases, seen in the Emergency Department in 2020 also drastically decreased from 2019. The monthly differences in total patients, trauma patients, road traffic injury, and non-road traffic injury traumas each year during the lockdown are shown in Figure 1.

**Table 2** Injury Characteristics and Outcomes Over 3-Month Periods in 2019 and 2020 at AaBET Hospital

Categories	Sub-Categories	2019 (March-May)	2020 (March-May)	Total (6 Month)	Change 2020 and 2019
Mechanism of injury	Road traffic injury	965 (71.4%)	476 (33.7%)	1441 (52.2%)	-489 (-50.7%)
	Non-Road traffic injury	386 (28.6%)	936 (66.3%)	1322 (48.8%)	+550 (+142.5%)
Triage	Red	49 (3.6%)	116 (8.2%)	165 (6.0%)	+67 (+136.7%)
	Orange	154 (11.4%)	255 (18.1%)	379 (13.7%)	+101 (+65.6%)
	Yellow/Green	1148 (85.0%)	1041 (73.7%)	2189 (79.2)	-107 (-9.3%)
Body site injury	Head or neck	325 (24.1%)	460 (32.6%)	785 (28.4%)	+135 (+41.5%)
	Extremity and pelvis	456 (33.8%)	501 (35.5%)	957 (34.6%)	+45 (+9.9%)
	External/soft tissue injury	266 (19.7%)	393 (27.8%)	659 (23.8%)	+127 (+47.7%)
	Multiple site injury	304 (22.5%)	58 (4.1%)	362 (13.1%)	-246 (-80.9%)
Outcome from ED	Admitted	631 (46.7%)	292 (20.7%)	923 (33.4%)	-339 (-53.7%)
	Died	53 (3.9%)	45 (3.2%)	98 (3.5%)	-8 (-15.1%)
	Discharged	637 (47.2%)	1028 (72.8%)	1665 (60.3%)	+391 (+61.4%)
	Referred	30 (2.2%)	47 (3.3%)	77 (2.8%)	+17 (+56.7%)



**Figure 1** Monthly changes in total patients, total trauma patients, and mechanism of injury over the 3-month periods in 2019 and 2020 at AaBET hospital. RTI- (Road traffic injury), other than RTI (Violence, falls, etc).

Over the total study period, 923 (33.4%) patients were admitted to the hospital, 1665 (60.3%) were discharged, and 77 (2.8%) patients were referred. The overall mortality rate during the study period was 3.5%.

Of the trauma patients in 2019, 631 (46.7%) were admitted, 637 (47.2%) were discharged, and 30 (2.2%) were referred. The mortality rate in 2019 was 3.9%, while it was 3.2% in 2020.

## Discussion

During the lockdown period, the total number of total patients decreased significantly along with road traffic injuries. However, there was an increase in non-traffic injuries. Other reports showed a significant decline in the number of acute trauma patients and admissions after social distancing and lockdowns were implemented.<sup>8–10</sup>

The number of patients who sustained road traffic injuries decreased by 50.2% in 2020. This could be attributable to the various policies the Ministry of Transport implemented. Effective April 2020, the Ministry of Transport limited the use of private cars. This reduced the number of passengers in cars and readjusted service fees for cross-country public buses. Private cars were used through a rotation system based on the last number of the registration plate. Specifically, odd and even numbers were allowed on the road on alternate days. Further, various initiatives that allowed private and public employees to work remotely may have reduced the number of road traffic injuries in the city. The closure of primary and secondary schools may have played a role in the reduction in the number of cars on the road in the country as well.<sup>11–16</sup> This finding suggests the importance of the implementing preventive policies to decrease the burden of road traffic injuries.

In this study, non-road traffic injuries were significantly higher, which corroborates other studies.<sup>10</sup> The decrement in poly-trauma could be attributable to decreases in road traffic injuries. Also, the increase in specific site injuries (head, extremity) could be attributed to an increase in non-road traffic injuries. Studies show that violence and falls lead to injuries to the extremities, pelvic and face.<sup>17</sup> The increase in interpersonal violence during the COVID-19 pandemic has been witnessed globally because of intrafamilial and domestic violence during home confinement.<sup>18–21</sup> This study also reveals an increase in injuries to the extremities and pelvis, which are common in falls and interpersonal violence.<sup>22,23</sup>

The number of trauma patients in our hospital who were admitted decreased significantly during the lockdown period, while discharges and referrals to another healthcare facility increased during the same period. Even though mortality remained relatively the same, the decline in the admission rate and increase in discharge shows that many patients had

minor injuries during the lockdown period. As AaBET hospital was not a designated COVID hospital at the time of the study, admission rate was not affected by COVID patients or resources.

## Limitations

The study had several limitations. First, there was no detailed analysis of the mechanism of the injury. Hence, further analysis of non-RTI specific injuries is required. Second, the study assessed trauma patients in only one hospital. Therefore, the results cannot be generalized to other hospitals. Our study was limited to a three-month period of two years because of a lack of resources to analyze data from a full year. The most effective intervention occurred during the first three months of the lockdown, which decreased individuals' mobility during the study period. Therefore, we selected these three months (March–May 2020) for the comparative analysis.

## Conclusion

This study shows that there was a significant decrease in road traffic injuries during the COVID-19 lockdown period, while there was an increase in injuries attributable to interpersonal violence and falls. The implementation of preventive measures will have a positive effect on decreasing road traffic injury burden.

## Abbreviations

AaBET Hospital, Addis Ababa Burn Emergency and Trauma Hospital; ED, emergency department; RTI, road traffic injury; SPHMMC, St. Paul's Hospital Millennium Medical College.

## Data Sharing Statement

The data used to support the findings of this study are available from the first author upon request.

## Ethical Clearance

A written legal ethical clearance for the study was obtained from St. Paul's Hospital Millennium Medical College IRB. St. Paul's Hospital Millennium Medical College IRB does not require patient consent to review medical records as it does not impose harm on the patients. Patient's data were kept confidential and compliant with the principles of Declaration of Helsinki.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors declare no conflicts of interest in relation to this work.

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