Review Article

Impact of Covid-19 Lockdown on Frequency of Trauma Cases in Surgical Emergency of Mayo Hospital

Ayesha Shaukat[1], Muhammad Asad Saleem[2], Ghazanfar Ali[3], Fadumo Liban[4], Beenish Zulfiqar[5]

[1]Professor & Head of Department, West Surgical Ward, KEMU/ Mayo Hospital, Lahore; [2]Senior Registrar, West Surgical War, Mayo Hospital, Lahore; [3]Senior Registrar, West Surgical Ward, Mayo Hospital, Lahore; [4]PG Resident, West Surgical Ward, Mayo Hospital, Lahore; [5]Ex House Officer, Bahawal Victoria Hospital, Bahawalpur

Abstract

Introduction: Trauma is the leading cause of morbidity and mortality in Pakistan where tertiary care hospitals bear huge burden of trauma cases daily. We observed the effect of Covid 19 lockdown on presentation of trauma.

Objective: To look for the impact of Covid-19 pandemic on frequency of trauma cases presenting to surgical emergency of Mayo Hospital, Lahore.

Methods: This Cross-sectional study was carried out at the Department of Accident and Emergency, Mayo Hospital, Lahore from 23 Jan 2020 to 23 May 2020. All patients presenting with trauma were included in the study. Ethical Approval from IRB of KEMU was taken. SPSS v26.0 was used to enter and analyze data. Comparison of proportions between both groups were made by using the $\chi 2$ test. Data were stratified for Age and gender to address the effect modifiers. A p-value $\leqslant 0.05$ was considered significant.

Results: A total of 4657 patients(n=4657) presented with an injury to surgical emergency of mayo hospital. There were 4057 males(87.1%) and 600 females(12.9%). Overall mean age was 30.7±13.37 S.D. Of the total patients, 2709(58.2%) presented before lockdown while 1948(41.8%) after lockdown. There was reduction by 30% in RTA cases, 2373 presented before lockdown while after lockdown 1663 cases reported. Assault-Blunt injury and Burn showed same pattern i-e 173 and 64 before while 134 and 45 after lockdown, respectively. On the contrary, FAI and Assault-Penetrating showed slight increase (6% and 7%) in cases reported i-e 72 and 18 before while 76 and 22 after lockdown, respectively. Fall showed no change i.e remained 0.2%(p-value=0.086)

Conclusion: The Covid-19 lockdown has secondary impact of reducing trauma especially RTAs. However, the rates of FAIs and penetrating assault injuries may not be reduced by social distancing and lockdown measures; it is in fact linked to higher rates.

Received | 00-00-0000: **Accepted** | 00-00-0000

Corresponding Author | Dr. Muhammad Asad Saleem, Senior Registrar, West Surgical War, Mayo Hospital, Lahore

Email: asadsaleem202@gmail.com

Keywords | Covid-19 lockdown, Road traffic accidents, FAIs, Assault-Penetrating injury

Introduction

Traumatic injury ranks among the world 's leading causes of death and disability. Injuries cause about 5.8 million deaths every year. It constitutes 10% of deaths worldwide, higher than mortality from HIV / AIDS ,

tuberculosis and malaria combined.[1] In addition, low-middle-income (LMIC) countries constitute 90% of such injury deaths.[2] Pakistan, the 6th largest country in the world, is an LMIC with a gross national product of USD 1,260 per capita and a population of 180 million approximately.[3]

Since trauma affects a comparatively young people, it involves more productive years of missed employment than other diseases, with considerable economic and social effects. Understanding and systematically addressing gender disparities will allow ED staff to better recognize, diagnose and treat trauma patients. It should be emphasized however that traumatic injuries can take on varied clinical presentations between two sexes, and may require distinct treatment approaches.[4]

Mayo hospital is equipped with advanced level tertiary care facilities and well trained emergency department, and also dedicated staff working tirelessly. Most tertiary care EDs have a huge patient load with an annual count of more than 75 thousand patients and a routine patient-to-doctor ratio of over 25:1.[5]

As global trauma estimates have consistently shown that injury - related deaths are more commonly accounted by road traffic accidents in low-income countries, similarly the majority of trauma patients presenting at this Tertiary Care Hospital are RTA patients.

While writing the Covid-19 pandemic, the capacity and capability of community-based and emergency care care facilities in Pakistan are being challenged. When the number of patients seeking hospital care due to Covid-19 increases, the available services are likely to be allocated to reduce the morbidity and mortality due to virus, affecting the care provided for other diseases including trauma. However, while this acute care need may rise, traumatic injuries will continue to happen in our society. Health care professionals and physicians must balance the needs of these patients with those of Covid-19 patients (along with other medical and surgical emergencies) at the same time in this complex situation.

In light of the Covid-19 Lockdown, where vehicular movement within and out of city both public and private transport has been restricted by the public government, little is known about the patterns and volumes of injury that may affect hospital resources given the novelty of this situation. There is a substantial evidence that socioeconomic deprivation is associated with increased risk of trauma, particularly penetrating trauma, requiring hospital care.[6]

Method

The cross-sectional study was conducted in Department of Accident and Emergency, Mayo Hospital, Lahore for period of four months from Jan 23, 2020 to May 23, 2020 using non-probability consecutive sampling technique. This includes 2 month period before lockdown for covid-19(23-01-2020 to 23-03-2020) and 2 month period after lockdown(23-03-2020 to 23-05-2020). The research aimed to compare the nature and frequency of trauma patients presenting to the accidents & emergency before and after the Covid-19 lockdown.

The study population included patients of both gender aged between 13-85 presenting to surgical emergency with traumatic injuries. Excluded from the study were the patients below age of 13 or above 85. Approval from institutional review board(IRB) of king edward medical university (KEMU) and affiliated hospitals was taken. Patients or next of kin gave written informed consent. Data collection was done through a pre-designed pro forma including questions regarding demographics, date of admission, reasons for visiting ED, injury nature and mechanism.

Data entry was done at KEMU using Statistical Packages for Social Sciences (SPSS) v26.0. An 'injury' was described as any accidental or intentional damage to any part of the body that required the patient to visit ED during the study period. Injury 'mechanisms' or causes included Road traffic accidents (RTAs), Fire arm injury (FIA), Assault-Blunt Injury, Assault-Penetrating Injury, Burns and Falls. Data were stratified for Age and Gender. Quantitative data like Age were presented by using Mean±S.D. Frequencies and percentages were used for qualitative data like Gender, Mechanism of injury etc. Comparison of proportions between both groups were made by using the $\chi 2$ test. . A p-value ≤ 0.05 was considered significant.

Results

A total of 4657 patients (n=4657) presented to the surgical emergency of mayo hospital with traumatic injuries including RTA, FAI, assaults, burn and fall. There were 4057 males(87.1%) and 600 females (12.9%). Overall mean age was 30.7±13.37 S.D. with 987(21.2%) less than 20yrs of age and 2560(55%) between 20 and 39 years of age (Fig 1). Mean age before lockdown was 30.3±13.29 S.D. and after lockdown 31.1±13.45 S.D. Distribution among age groups remained same before and after lockdown (Table1). Of the males, 2492(53.5%) presented before lockdown while 1565(33.6%) presented after lockdown. On contrary, 217(4.7%) females presented before lockdown while 383(8.2%) presented after lockdown(Table 2). Majority of patients (89.1%) were from lahore while 10.9% were from other nearby cities.

Of the total patients, 2709(58.2%) presented before lockdown while after lockdown 1948(41.8%) patients presented to surgical emergency of mayo hospital. Majority of the cases, 4036 (86.7%) were RTAs while fall constituted the least i.e.17 patients (0.4%). Others include FAI 148(3.2%), Assault-Blunt Injury 307 (6.6%), Assault-Penetrating Injury 40(0.9%) and Burn 109(2.3%). Of RTA cases showing reduction (30%), 2373 presented before lockdown while after lockdown 1663 cases reported. Assault-Blunt injury and Burn showed same pattern i-e 173 and 64 before while 134 and 45 after lockdown, respectively. On the contrary, FAI and Assault-Penetrating showed slight increase (6% and 7%) in cases reported i-e 72 and 18 before while 76 and 22 after lockdown, respectively. Fall showed no change i.e remained 0.2%(Table 3 & 4)(Fig2).

Figure 1.

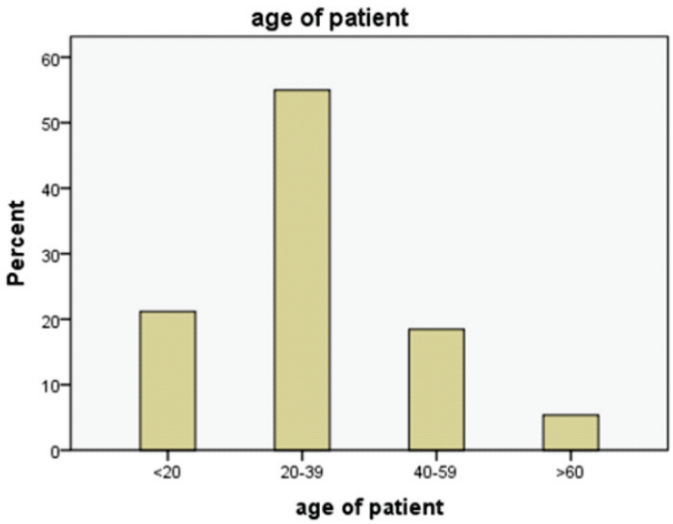
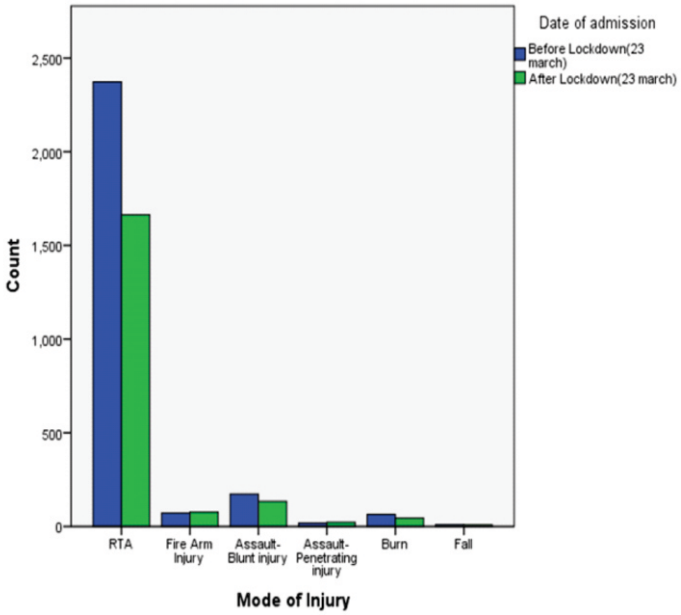


Figure 2.



Percentage of cases before lockdown constituted RTAs 87.6%, FAI 2.7%, Assault-Blunt Injury 6.4%,

Table 1: *Frequency and Percentage of Patients in Age Groups before and after Lockdown*

			Date of admission		Total	P-value
			Before Lockdown (23 march)	After Lockdown (23 march)		
age of patient	<20	Count	589	398	987	0.215
		% within Date of admission	21.7%	20.4%	21.2%	
	20-39	Count	1503	1057	2560	
		% within Date of admission	55.5%	54.3%	55.0%	
	40-59	Count	475	385	860	
		% within Date of admission	17.5%	19.8%	18.5%	
	>60	Count	142	108	250	
		% within Date of admission	5.2%	5.5%	5.4%	
Total		Count	2709	1948	4657	
		% within Date of admission	100.0%	100.0%	100.0%	

Assault-Penetrating Injury 0.7%, Burn 2.4% and Fall 0.3%. And percentage of cases after lockdown constituted RTAs 85.4%, FAI 2.9%, Assault-Blunt Injury 6.9%, Assault-Penetrating Injury 1.1%, Burn 2.3% and Fall 0.4% which shows increase in physical assault and violence related injuries(Table 4).

Table 2: *Gender Distribution of Patients*

			Sex of Patient		Total	P-Value
			male	female		
Date of admission	Before Lockdown (23 march)	Count	2492	217	2709	<0.001
		% of Total	53.5%	4.7%	58.2%	
	After Lockdown (23 march)	Count	1565	383	1948	
		% of Total	33.6%	8.2%	41.8%	
Total		Count	4057	600	4657	
		% of Total	87.1%	12.9%	100.0%	

	Change after lockdown	Percentage Change(%)
RTA	Decreased	30%
FAI	Increased	6%
Assault-Blunt Injury	Decreased	22%
Assault-Penetrating Injury	Increased	7%
Burn	Decreased	29%
Fall	Unchanged	0%

Discussion

To our understanding, this is the prime report on the burden of traumatic injuries that presented during the Covid-19 pandemic to the oldest and largest hospital in Pakistan's 2nd most populous city. Giving a rate of 80-100 trauma patients daily per hospital, this amount of burden on health threatens every public health care system and presents a constant threat to the health sector in Pakistan.[1]

On March11, 2020, SARS-CoV-2 virus (COVID-19) outbreak was declared a global pandemic by the World Health Organization (WHO).[7] On March 23, 2020, the guidelines for community lockdown in Pakistan were implemented, whereby public was advised to minimize social interaction and stay at home, to go outside only to buy food, essential items, medicines, or go to work only if they were daily wagers or unable to work at home.[8]

In accordance with Pak-NEDS study, the majority of trauma patients presenting to the ED of tertiary care hospitals are of 10-29 age range, with peak age at 20-29 years, which represents the most economically active age group among youth / young professionals.[9] In our study, majority of patients(55%) were from 20-39 age group and there was no impact of

Table 4: *Frequency and Distribution of Modes of Injury before and after Lockdown*

			Date of admission		Total	P-Value
			Before Lockdown (23 march)	After Lockdown (23 march)		
Mode of Injury	RTA	Count	2373	1663	4036	0.086
		% within Date of admission	87.6%	85.4%	86.7%	
		% of Total	51.0%	35.7%	86.7%	
	Fire Arm Injury	Count	72	76	148	
		% within Date of admission	2.7%	3.9%	3.2%	
		% of Total	1.5%	1.6%	3.2%	
	Assault- Blunt injury	Count	173	134	307	
		% within Date of admission	6.4%	6.9%	6.6%	
		% of Total	3.7%	2.9%	6.6%	
	Assault-Penetrating injury	Count	18	22	40	
		% within Date of admission	0.7%	1.1%	0.9%	
		% of Total	0.4%	0.5%	0.9%	
	Burn	Count	64	45	109	
		% within Date of admission	2.4%	2.3%	2.3%	
		% of Total	1.4%	1.0%	2.3%	
	Fall	Count	9	8	17	
		% within Date of admission	0.3%	0.4%	0.4%	
		% of Total	0.2%	0.2%	0.4%	
Total		Count	2709	1948	4657	
		% within Date of admission	100.0%	100.0%	100.0%	
		% of Total	58.2%	41.8%	100.0%	

lockdown on each age group. Thus, even in lockdown, it was mostly younger population presenting to emergency with traumatic injuries. Trauma in this cohort result in inability to work or absence from education which has social, personal and financial repercussions.

This study has revealed a 28 percent reduction in the overall amount of traumatic injuries presenting during lockdown as compared to pre-lockdown period of same duration. Major injuries such as RTAs and males showed the greatest reductions: this means males are at high risk for non-lockdown events such as road traffic crashes, work , school and sports. While almost doubled from pre-lockdown levels, an increase was seen in females, suggesting that females are more prone to assault and home violence related injuries. Similar results were seen in study by Christey et al., showing decrease in overall injuries but least reductions were seen in females.[10]

Not surprisingly, the numbers of road traffic accidents (RTAs) dropped significantly during lockdown (30 %, see Table 3) as road usage has declined, but if essential road users remain committed to safe driving, we would expect them to be close to zero. Data in this pandemic situation is difficult to compare, but in the UK the Royal College of Emergency Medicine reported a 25 percent drop in attendance to emergency departments in the first week during lockdown; thought maybe partially attributable to fewer injury events due to lower vehicle usage.[11]

Several doctors in Italy have reported lower volumes of injury but those who were more severely injured required acute care management.[12] A multicenter comparative study in UK showed a 55.7% (12,935 vs 5,733) decrease in total accident and emergency (A&E) visits along with fall in trauma admissions during lockdown by 53.7% (354 vs 164) when compared to 2019.[13] Another study in cardiff showed 48% reduction in trauma related surgery.[14] However, these data are recent (and limited in scope) and no firm trends and analysis are currently available to the public.

On contrary to RTAs, Fire arm injuries (FAIs) and Assault-Penetrating injuries have increased during lockdown by 6% and 7% respectively (see Table 3). Although, Assault- Blunt injuries have reduced overall by 22% but their proportion in comparison to other modes of injury in period of lockdown have increased by 0.5% i-e from 6.4% to 6.9% (see Table 3 & 4). This shows that lockdown has not affected the fire arm, assault and voilence related injuries, instead it has led to increase in such injuries specifically FAIs and penetrating injuries. Thus we can say lockdown has negatively affected the social behaviour and led to increase in physical assault and social violence. This can also be linked to increased socioeconomic deprivation during lockdown, as a study in Scotland clearly showed a strong correlation between socioeconomic deprivation and an increased incidence of trauma, particularly penetrating trauma.[6]

Paradoxically, a study in the US demonstrated an increase firearm-related incidents during the Covid 19 pandemic in the heavily populated cities of NY, Chicago and Baltimore (11.7%, 23% and 2% respectively) compared to 2019.[15] According to a U.S. Labor Department survey, count of claims related to lack of employment have raised during this pandemic. With a growing rate of unemployment, the probability of involvement in a firearm-related incidents correlate with the length of time people spend outside the workforce.[16] Furthermore, increased sales and use of alcohol during this period of time possibly contributed to the rise in firearm violence. Prior researches have found that alcohol enhances the behavior involving risk, the chances of participating in a dispute, and crimes of violence.[17] Doctors in Australia have reported a surge in preventable injury cases immediately prior to public lockdown initiatives, with considerations that risk-taking behaviors related to alcohol were behind some of that increase.[18]

Our study showed reduction in burn patients by 29% while there was no change in patients of fall, which remained at 0.2%. Similarly, in Newzealand, about one-third reduction in home and fall related injuries in first week of lockdown was reported.[19]

Conclusion

Covid-19 lockdown is primarily implemented to curb the spread of virus in the community but it has a secondary impact of reducing trauma especially road traffic accidents due to the precautionary measures in place. However, the rates of gun violence and assaults may not be reduced by social distancing and lock-

down measures; in addition, the Covid-19 pandemic is actually linked with higher rates. Although the growing number of FAIs and assaults are likely to be influenced by multiple factors; unemployment, increased alcohol consumption and socioeconomic deprivation likely contribute to such injuries. In efforts to devise long-term strategies to mitigate firearms and violence-related incidents/mortality across Pakistan and lead to a safer and healthy environment once the pandemic has been dealt with, more detailed data compilation is advocated and what variables strongly impact the higher rates of such incidents need to be thoroughly investigated.

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