ORIGINAL ARTICLE

A Bird's Eye View on Firearm Injuries Lady Reading Hospital MTI, Peshawar - A Pilot Project for Public Health Alert

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ABSTRACT

Background There is a concern that firearm injuries are very common reported at lady Reading hospital Peshawar MTI, but there are no contemporary studies. Gunshot wound are persistent burden on community as well as on hospitals

Aim: To evaluate trends of firearm injuries reporting to LRH their anatomical distributions and their outcomes.

Methods: This prospective randomized study (a pilot project for public health alert) was conducted in Accident & Emergency Department of Lady Reading hospital MTI, Peshawar KPK, from 1st May, 2020 to 1st October, 2020. Hundred patients with firearm injuries to different region shot were included in this study. Data collected on predesigned proforma and entries in HMIS used after stabilizing the patient. A prospective pilot study done over a period of six months from 1st May, 2020 to 1st October, 2020 in trauma section of Accident Emergency department of Lady Reading hospital MTI Peshawar.

Results: Patients of all age groups with firearm injuries were included in this study from May 2020 to October 2020. Data was collected on predesigned proforma as well as HMIS (health management information system) of ED department. A total of 100 patients presented to LRH with firearm injuries during six months. Males outnumbered female by 6:1 accounting for 100(85%) of injured. : Domestic violence was found to be the most common reason for the firearm use 44(44%), Don't know or refuse to share was 29(29%), rivalry 12(12%), land and property conflict 9(9%), street fight 3(3%) accidental gunshots 2%, (n=25) and robbery 1.1% (n=1). The most common firearm used for inflicting injury was pistol (70%), shot gun (2.2%), curiously 16% were either reluctant or were never knowing about the weapon

Conclusion: Firearm injuries are common public health problem globally, in our set up situation is more grievous and less highlighted, the most common cause being domestic violence, lack of education, easy availability of arms, illegal or legal weapon ownership making situation worst in the form of premature deaths and disability. Understanding the nature of problem can prevent this violence

Keywords: Firearms, violence, gunshot wounds, homicides, suicides

INTRODUCTION

Globally, Gun-related accidents are becoming an increasingly serious issue about 35.8% (89 790/251 000) of all firearm-related deaths. Firearm injury is a significant source of adverse outcomes and death in the World, contributing for over 350 000 deaths and a much greater number of non-fatal injuries from 2005 to 2015¹. There is a great variation in epidemiology of penetrating trauma throughout the world. Each year approximately 30 000 patient in USA are hospitalized for gunshot wounds (GSW) and die 25 000 die in hospital⁴. In 2018, firearm arm related deaths in the US exceed those from motor vehicle crashes¹. The demographic distribution of patients' was consistent with known epidemiological patterns in firearm injuries, with rates much higher for the men than women, assaultive injuries concentrated among young black and Hispanic individuals from urban, lower-income areas and self-inflicted injuries concentrated among white individuals². Firearm injuries cause significant morbidity and mortality and are an important medical and public health problem. Traffic accidents collisions, attacks, gunshots, falls, sports

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injuries, and blast injuries are all common causes of facial trauma. Firearm injuries account for 10% of all maxillofacial trauma and have risen significantly in recent years as a result of terrorism and interpersonal abuse³. In Scandinavian trauma center there has been increase of fire arm injuries in recent years the lower extremities followed by the abdomen and the dominating injured regions and there has been an increase in associated vascular injuries⁴. In Colombia, gun-related deaths remain the leading cause of death and illness, accounting for 9.3% of all years of life lost between 1990 and 2017⁵. Although gun violence in the pediatric populations traditional viewed as an URBAN problem among teens, our research shows that young children also suffer the consequences of firearm injuries and that young children suffer the consequences of fire arm injuries and that rural areas afflicted particularly by accidental firearm discharges. This may represent a new targeted audience for outreach⁴. To avoid firearm injuries and death, healthcare professionals must concentrate on safety and seek to ensure that while weapons are available, patients and their family members understand the risk of firearms and take all calculate the probabilities. Millions more are injured or emaciated as a result of burns,

which have psychological, social, and economic consequences for patients and their families. Burn damage is a problem that disproportionately affects the world's poor: Low- and middle-income countries account for 95 percent of fire-related burn deaths (LMICs)⁶. FAI was declared a global public health concern by the World Health Assembly (WHA) due to its substantial morbidity and long-term physical, social, emotional, and economic impairment in people, families, populations, and nations.

The World Health Organization's (WHO) Eastern Mediterranean region, which includes Pakistan, has some of the highest mortality rates from accidents such as RTIs and war; a new study found 146,000 fatalities and 2.8 million injuries from road traffic accidents specifically⁷. A study worked out that 16.9% participants were students, 12.9% had no significant profession, 12% were labor and 14.6% were unemployed. In the civilian trauma area, there is a lack of information on firearm wound infection and the risk factors associated with it. This, together with the comparatively high occurrence of gunshot wound infection in civilian trauma settings in developed countries, prompted this research to evaluate the risk factors associated with gunshot wound infection in our environment. This study was conducted to analyze the trends of fire arm injuries reporting to trauma section of lady reading hospital Peshawar, where access to arms is very easy and the patterns of fire arm injuries have diverse and in variety.

Study Objective:

1. To analyze different trends of firearm injuries and their outcomes reporting to trauma section of Emergency Department Lady Reading Hospital.
2. To assess anatomical distribution of firearm injuries.

MATERIALS AND METHODS

Study design and Setting: This is a prospective Pilot study conducted over a period of 6 months during a shift of 6 hours only from May 1 2020 to 1October 2020, after approval from ethical committee. In the trauma section of emergency department of Lady Reading Hospital, MTI Peshawar Pakistan. The LRH MTI, is a government 1691-bedded, free-for-service, urban tertiary care teaching hospital located in Peshawar, total population of Peshawar 2,203,000(2020) and the growth rate is 3.17% according to world population Review. This study is single center study of all firearm injuries reporting to trauma section ED LRH MTI.

Eligibility and Data collection: Patients of all age groups with firearm injuries were included in this study from May 2020 to October 2020. Data was collected on predesigned proforma as well as HMIS (health management information system) of ED department. Patients of all the genders and all age group were included in this study during the period of May 1, 2020 to -October1, 2020. The patients with self-inflicted and accidental firearm injuries were also included. Proforma includes biodata basic demographics details of victim, along with their date, time of arrival, time since injured, stay in trauma room, referral to and from hospital, team involved team response, circumstances surrounding injuries and eventual outcome (admission vs discharge vs operation theatre). 100 patients were included in these studies who reported to trauma section with firearm

injuries. Patients were managed in the form of intactness of primary survey followed by secondary survey, dealing with life-threatening injuries like airway obstruction, SHOCK, hemorrhage control. And pertinent imaging. The attributes of etiology were domestic violence, rivalry accidents and stray bullets. Anatomical distribution of regions shot were defined: head and neck, thorax, abdomen, upper and lower limbs. A proforma was filled after stabilizing the patients and their medicolegal proceeding done and then entered in HMIS for information and tracking of patient beyond trauma hall, and a fate beyond casualty. Categorical variables were calculated as frequency and percentages whereas numeric variable that is age in years was calculated as minimum and maximum. SPSS 24 version was used for data analysis.

Statistical analysis: All the data was manually checked, coded and entered into a then analyzed using SPSS version 24 software. The descriptive statistics for demographics of injured, length of hospital stay, body parts injured and the outcome were calculated.

RESULT

Gender Distribution: A total of 100 patients presented to LRH with firearm injuries during six months. Males outnumbered female by 6:1 accounting for 85% (n=100) of injured. About half of the patients (48%) were in the age group of 21-40 years followed by 40-50 years (15%), 41-50 years (13%), ≥50 years (9%) and 0-10 years (4%).

Distribution of firearm injuries by gender

Category of age	Male	Female	Total
0-10years	2(2.3%)	2(13%)	4
11-20 years	10(11.7%)	1(6%)	11
21-30years	40(47%)	8(53%)	48
31-40years	12(14.1%)	3(20%)	15
41-50years	12(14.1%)	1(6%)	13
50 and above	9(22%)	0	9
Total	85	15	100

Reason of rage (cause for being shot)

	Male	Female	Total
Accidental shot	2(2.3%)	0	2
Domestic issue	35(41%)	9(60%)	44
Unknown	23(27%)	6(40%)	29
Land & property conflict	9(10%)	0	9
Rivalry	12(10%)	0	12
Robbery	1(1.1%)	0	1
Street fight	3(3.5%)	0	3
Total	85	15	100

Reason of injuries: Domestic violence was found to be the most common reason for the firearm use (44%), don't know or refuse to share was 29% , rivalry 12%, land and property conflict 9%, street fight 3% accidental gunshots 2%, and robbery 1.1%. The most common firearm used for inflicting injury is a pistol (70%), a sniper (9%), a shotgun, and other weapons (5%), and a curious fact is that 16% of people do not know the weapon that caused the injury. Overall, homicide was the most common cause of injuries (72%), followed by suicide (14%), and others (13%). Surprisingly, a high incidence of homicide was registered in both males (64 percent) and females (8%), respectively.

More than half of the population arrives in safe (56 percent), critical (22 percent), Ill shock (7 percent),

unstable (7 percent), and dead conditions before reaching the hospital (6 percent). Lower limb injuries were found to be the most common (28%), accompanied by Multiple area injuries (19%), abdominal and pelvic injuries (15%), chest injuries (14%), head and neck injuries (13%), and upper limb injuries (13%). Overall, 88 percent of patients survived and were transferred to another department; however, 9 percent of patients left against medical advice, and 3 percent died. Patients who mostly survived were referred to orthopedics (33%), transferred immediately to the operating room (26%), admitted to the thoracic ward (21%), and others (8%).

Common cause of injuries

Weapon used

Cause reported	Male	Female	Total
Accidental	2	1	3
Aerial firing	3	1	4
Bystander	1	0	1
Cross fire	1	0	1
Homicide	64	8	72
Stray bullet	2	0	2
Suicide	9	5	14
Unknown	2	0	2
Total	85	15	100

Outcome

	Male	Female	Total
Admitted to ENT	1(1.1%)	0	1
admitted by cardiovascular	0	1(6.6%)	1
admitted by	2(2.3%)	0	2

casualty surgical			
admitted by neurotrauma	4(4.7%)	0	4
admitted to orthopedics	29(34%)	4(4.7%)	33
admitted to thoracic	19(16.1%)	2(2.3%)	21
Dead	0	3(3.5%)	3
LAMA	9(10%)	0	9
Shifted to OT	21(24%)	5(33%)	26
Total	85	15	100

Anatomical distribution

Region shot	Male	Female	Total
Abdomen & Pelvis	12(14.1%)	3(20%)	15
Chest	11(12.9%)	3(20%)	14
Head and Neck	10(11%)	3(20%)	13
Lower Limb	25(29%)	3(20%)	28
Multiple region	19(22.3%)	0	19
Upper limb	8(9.4%)	3(20%)	11
Total	85	15	100

DISCUSSION

Strategies to prevent firearm violence that focus only on the firearms themselves, as a modifiable target for intervention, are often delayed because of political and implementation challenges⁸. Although the misuse of firearms is necessary to the occurrence of firearm violence, there also is other contributing but modifiable factors that might be more feasibly changed to prevent firearm violence⁹.

Injury is a major global public health concern being the largest single factor of death and severe disability in the individual younger than 45 years¹⁰. There is great variation in penetrating trauma throughout the world. Each year approximately 30,000 patients in USA are hospitalized for gunshot wounds (GSW) and 2500 die in hospital¹¹. Illegal weapons and gun violence is rising problem in European countries. There is a concern that injury and death caused by firearms is increasing. However, only few European epidemiological studies of firearm injuries can be found in recent literature^{12,13}.

In country like Pakistan injuries are a huge public health problem. In Sweden, every year almost 3000 people die in accidents where falls and traffic accidents are dominating¹⁴. This study was conducted to evaluate patterns of firearm injuries, their anatomical distribution and their outcomes reported to LRH MTI, Peshawar. The majority of the victims were males aged between ages of 18 to 85 years keeping the fact in view that men being more aggressive and adventurous. Data revealed that majority of the cases were due to domestic violence which is comparatively unlike to other studies¹⁵.

The area of most concern here is reason of rage being domestic violence, homicidal intent. Weapon usage by youth population with unknown status of ownership of weapon, which is alarmingly high. The trend is suggestive of intolerance, lack of education and easy access to weapons. Next to follow is suicides and aerial firing where most common victim was a pediatric population. Firearm details were unknown in few of cases, but in majority case pistol was used suggestive of easy access and easy handling and easy availability.

Civilian gunshot has more focal pattern and considered as distinct entity. A new classification system

has been proposed based on five gunshot injury parameters which include energy, vital structures, involved, wound characteristics, fracture and degree of contamination. In our study, the commonest sites shot were extremities, followed by abdomen and chest and then head and neck which is according to literature¹⁶. Firearm injuries to extremities is seldom life threatening but has significant morbidity¹⁷.

Among all gunshot wounded patients, 29 were shot in chest, 30 were shot in abdomen 28 were shot in extremities, 9 were shot in head and neck. Out of 3/9 who were shot in head were dead on arrival and one died after resuscitation in trauma section?

15 out of hundred were females, 85 out 100 were males, 15 were under 18 years of age, and 6 out of hundred was pediatrics group. 65 out of 100 were between 18 years of age to 45. 11 out of hundred were dead on arrival. 15 out of 100 were suicides and 61 were homicides 4 were the victims of Ariel firing 2 were shot accidental. Most common reason were the domestic issues that is 42 out of 100 amongst them 15 out 100 were suicides 6 out 100 property issues 4 were reluctant for revealing any issue. Most commonly used weapon was pistol used for both homicides and suicides 4 rifles were used in homicides and one m4 used two shotguns were used for homicide among.

Among all those 100 cases reporting to A AND E dept. of LRH, 31 cases were referred cases from different peripheral outskirts/areas with average time of reaching ED was 2 hours after being shot and they were not critical who need intervention for life threatening emergencies as their life-threatening condition were dealt where they reported after being shot/wounded. 69 patients were from different areas of Peshawar, who were either very critical or with class III shock or dead-on arrival.

Extremity: Several factors such as wound ballistics, tissue destruction, and anatomical relationships determine the extent of injury after firearms¹⁸. In our study 28 out of 100 victims were shot in extremities, lower limb remains the most commonly affected part usually associated with soft tissue trauma or open fractures, a complete limb survey followed by wash and limb series Xray done after taking orthopedic team on board extensive soft tissue injury open fracture were dealt in casualty OT jointly by plastics and vascular team, minor injuries managed in minor OT followed by discharge from accident and emergency with follow-up in OPD

Abdomen: In the abdominal firearm injuries, Fast scan (focused abdominal sonography for trauma) remain the triaging and diagnostic tool but never the sole reason for exploration. [19]. Victims who were shot in abdomen were either stable or unstable with evisceration, those who were stable after portable abdominal Xray and FAST scan patients were admitted by general surgical team for exploration of abdomen, those who were unstable and with class III and class IV shock or those who had overt peritonitis or evisceration were shifted directly to OT after resuscitation and taking general surgical team/ urological team on call.

Chest: In this survey 29 out of 100 were shot in chest, patients who were shot in chest were either stable on unstable, who those were stable, maintained oxygen

saturation and maintaining blood pressure portable chest X-ray obtained to exclude haemo/ pneumothorax and cardiothoracic team taken on board prior to intubation, for those who were shocked desaturating chest intubation and resuscitation done followed by x-rays general surgical team in case of positive fast scan and below nipple shot and cardiothoracic team liaison

Head and neck: The most common injury was sustained in head, and chest. Gunshot wound to chest carry high mortality rate. Aarabi et al showed 76% of patients with civilian gunshot wounds carry die at the scene, 61% are dead on arrival²⁰. Victims who were shot in head were all dead-on arrival, patients who were shot in neck with entry and exit wound both in neck with at risk or involved airway, vascular and soft tissue injury in neck were dealt by ENT team followed by admission. Those patients with entry wound in neck exit in any area of chest were jointly managed by ENT and Cardiothoracic teams after resuscitation and airway protection in trauma room.

Recent data from American college of surgeons (ACS) showed that firearm injuries have highest case fatality rates-e 15.3% for (GSW)²¹.

Firearm injuries are very common in our setup due to legal or legal possession, lack of awareness public awareness and misuse is a contributing factor, limiting ownership can prevent firearm injuries, this paper only provides a snapshot of patient actual number is much higher than what is assessed through this study.

Figure 1: Key summary of recommendation

CONCLUSION

Firearm injuries are an important public health problem globally. In our set up the nature of problem is even more grievous and less highlighted, contributing to premature death disabilities. Understanding the nature of problem is only way to prevent firearm violence.

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