

## Prevalence and Nature of Trauma and Injuries in Karachi National Trauma Registry of Pakistan “The Need of the Hour”

Muhammad Saeed Minhas, Muhammad Muzzammil, Jahanzeb Effendi, Syed Jahanzeb Anisuddin Bhatti

### ABSTRACT

**Objective:** To assess the prevalence, nature of trauma, reason(s) behind these trauma and first-aid care provided during transportation to hospital in Karachi Pakistan. Study also presents the framework of a national trauma registry and comparatively analyzes data between other registries.

**Method:** This cross sectional observational / descriptive study was conducted from July 2015 to Dec 2015. An informed verbal consent was taken and preformed questionnaire was filled. Patient brought dead and who did not give consent were excluded. Data was analyzed using SPSS 21 for statistical significance.

**Results:** The study conducted on 1500 patients includes 1030 males (68.7%) and 470 females (31.3%). Mean age was 45 SD 28.69. Maximum injuries occurred in age group of 11-20 year. By occupation most were found to be students & children 350(23.3%). Most traumas occurred on road 919(61.3%) and other occurred in home 349(22.7%). Road traffic accidents are found to be major cause of injuries 730(48.7%) and rest was due to other causes 630(42.0%). The vehicle involved in majority of cases was motorcycle 340(22.7%). In most of the cases emergency medical service 72148.0% was used for the transportation of the patients. During transportation (100%) of victims were not provided with first aid, breathing care/ bleeding care/iv fluids and splints/slabs. Severity at emergency room of patients was mainly moderate (52.7%) while severe condition was suffered by (32.0%) of patients and mild (14.7%).

**Conclusion:** This study concluded that the transport accidents are the major health problems especially in young population in Karachi. For better transportation of patients it is needed to upgrade facilities of ambulances and other emergency medical services. Emergency medical care facilities (including emergency trauma centers) establishment at district level, sub-divisional level are needed to provide good and quality care to trauma patients. Improvement in trauma care depends on the establishment of functioning trauma care systems, of which a trauma registry is a crucial component.

**Key Words:** Prevalence, trauma, road traffic accidents, first aid care, trauma registry.

### INTRODUCTION

Trauma can be outlined as an unpleasant experience, which may cause one to have mental, social or psychological problems usually for extended time. Medically, trauma can be outlined as a significant injury to individual's body [1] Traumatic injuries can inflict a significant burden on healthcare system worldwide.

Each year trauma accounts for forty one million accident emergency department visits and in

2014, 2.3 million traumas related hospital admissions are recorded across the United States [2]. Trauma injury in the United State accounts for about 30% of all life years lost, Cancer related deaths accounts for 16% and cardiopulmonary disease accounts for 12% in US. Death from cancer, cardiopulmonary disease and HIV combined is equal to deaths from impact of trauma because individual of all ages are affected by trauma [2]. 3<sup>rd</sup> leading cause of death is trauma as it occurs in all age groups and it is found that in young age mortality rate is exceptionally high [2].

Traumatic Injuries constitute a major health problem all over the world, including intentional or unintentional injuries. Every year over 5 million people are killed and many more cases of disability caused by traumatic injuries [3]. 1.2 million trauma related deaths

---

*Department of Orthopaedics, Jinnah Postgraduate Medical Center, Karachi Pakistan*  
Correspondence: Muhammad Saeed Minhas  
Email: orthominhas@gmail.com

and 50 million non-fatal injuries estimated by global nuisance per year [4].

Pakistan is a developing country where roadside accidents are leading cause of deaths every year. Death among individual belonging is more prevalent in lower socioeconomic category. Quantitative relation of trauma related deaths are higher among pedestrians and motorbikes. Studies have additionally shown that in Asia pedestrians and motor bikers have the highest rates of traumatic injuries [5,6]. Incidence of road traffic traumatic injuries was fifteen (including minor injuries) per thousand persons annually in Pakistan [7].

Roads in Pakistan carry wide range of users together with heavy vehicles like Lorries, trucks, cars, motorbikes and pedestrians without correct enforcement of traffic laws. Developing country like Pakistan important reason behind any disability, death and economic loss are Road traffic accidents (RTA) that is attributable by the multiplication and increasing range of roads and automobiles, several of that are old and not road-worthy. In this regard the phenomenal increase in use of motorbikes is extremely concerning particularly for commercial service. The bike riders injuries are usually severe must be considered as unprotected vehicle users because this transport is very unsafe [8].

Developed countries around the world have successfully deployed trauma systems and data predicts a 13% decrease in deaths as a result of road traffic accidents in these countries. On the contrary, an 80% increase in deaths is predicted in the lower and middle-income countries. The success in building a comprehensive trauma care system hinges upon the development of a national trauma registry [12].

System of timely information assortment that aids in the analysis of trauma care for injured patients after meeting specific criteria for inclusion is trauma registry. It also includes, additionally to hospital based trauma information also include patient information additionally include patient data from different health care providers as well as pre hospital care and rehabilitation if utilized. It additionally provides a mechanism for overall system analysis and patient care. Trauma registry is a manual or computerized database that consists of extensive demographic, injury information, and trauma outcome. Registries include all trauma patient data from the incident scene to hospital discharge.

Impacts of trauma registry on trauma care are:

- What is really hurting people? : Identifies injury cause
- Provides “counts:” Spike in injury type
- Identifies Intentional vs. unintentional: accidental: suicide, or homicide
- Identifies cases for research, quality assurance
- Data drives legislation: like seatbelt laws, Motorcycle helmet
- Design, evaluate injury prevention programs
- Trauma care practice: Evidence based
- Injury severity scores/financial issues (state trauma fund)
- Complications concurrent review: preventable/non-preventable
- Case distribution: like Facial fractures
- Facility improvements: More operating rooms, ED CAT scanner
- Blood usage

Rapidly expanding interest in injury scoring and trauma registries is due to developments in microcomputer technology and user-friendly software. The trauma registry, particularly when it is population based, is an epidemiologic research empowering tool, planning of trauma systems, and development of prevention programs, outcome evaluation and research [9].

The Chicago’s Cook County Hospital established the primary computerized trauma information system in 1969 [10]. Since then various hospitals, regions, states, and countries have developed trauma registries [11]. With in the USA trauma registries are well established and comparatively common and are used to modify legislation system effectiveness [12].

In Pakistan, the Road Traffic Injury Research and Prevention Center (RTIRP) is that the initial road traffic injury surveillance system that was established across 5 public and private hospitals within the city of Karachi. The surveillance program collects, analyses and disseminates information to stakeholders relevant field [13].

Since this registry contains road traffic injuries limited data, we propose the establishment of a computerized registry that encompasses all cases of trauma that present to the hospital. We present a framework of the registry data collected and analyzed over a short period of time at one accident and emergency center in Karachi and compare our results with data from other trauma registries.

## METHODS

A cross-sectional descriptive study, conducted from July 2015 to December 2015. An informed verbal consent was taken from patient or attendant and preformed questionnaire was filled. A designed questionnaire was used and data was collected, consisted of general epidemiologic data of trauma patients, place and time of injury, cause and severity of injury. The form contains of 2 major parts: part one was designed to measure socio-demographic information for example age, gender, place of injury, time of injury and reason behind injury. Part two was concerning the details of causes of injury, first aid care and kind of injury (diagnosis). Patients who were brought dead and who did not give consent were excluded. Data was analyzed on the SPSS 21 for statistical significance.

## RESULTS

The study was conducted on 1500 patients, of which 1030 were males (68.7%) and 470 were females (31.3%). Mean age was 45 SD 28.69. Maximum injuries occurred in age group of 11-20 year (Table-I). Most injuries occurred during the daytime 161 (10.7%) By occupation, most victims were found to be students\children 350(23.3%), skilled laborers 341(22.7%) and others 420(28.0%) (Table-I). Most cases of trauma occurred on the road 919(61.3%) while the other largest occurrence was at home 349(22.7%). Majority of the people belonged to the city of Karachi (92.7%) and were travelling at time of injury (54.7%). The major cause of injury was found to be transport accidents (48.7%) (Table-II) and rest were due to other causes (42.0%)(Table-III). In road users, pedestrians were (19.3%), drivers/riders (18.7%) and passengers were (10.7%). Majority of the victims did not use seat belt (44.7%) or helmet (91.8).

The vehicle involved in the majority of cases was the motorcycle (22.7%), bus (8.7%), car (10.0%), three wheeler (8.0%) and truck (6.0%). In most of the cases,

emergency medical service (48.0%) and private vehicles (32.0%) were used for the transportation of the patients to the hospital.

Specific cause of injuries found to be firearm (8.0%) and explosions (0.7%). Type of violence contained war/conflict (3.3%), others (2.0%), unknown (2.0%) and interpersonal conflicts (1.3%). Other than the transport injuries, the causes of injuries were fall from level (17.3%) and fall from height (15.3%).

All (100% ) of victims were not provided with first aid during transportation to the hospital, with no breathing care, no bleeding care, no intravenous fluids and no splints/slabs or cervical collar application. Severity at emergency room of patients was mainly moderate (52.7%) while severe condition was suffered by (32.0%) of patients and mild (14.7%). Majority of patients suffered with femur fracture (10.0%). Others suffered from ankle, arm, dislocation of elbow joint, fracture of radius and ulna (1.3%), while head injury was prevalent among (6.0%) of people.

**Table-I:** Patient Demographics

<b>No. of patients</b>	1500
<b>Average age (yrs)</b>	47 SD 60.81
<b>Gender: Male</b>	1030 (68.7%)
<b>Gender: Female</b>	470 females (31.3%)
<b>Occupation:</b>	Professional 51(3.3%)
	clerical staff 59 (4.0%)
	skilled labourer 339 (22.7%)
	unskilled labourer 71(4.7%)
	Agriculture 70 (4.7%)
	student/child 348 (23.3%)
	forces/police 38 (2.7%)
	Fisheries 11 (0.7%)
	Unemployed 70 (4.7%)
	Other 422 (28.0%)
	Unknown 21 (1.3%)
	Total 1500 (100.0%)

**Table-II:** Causes of injury

	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Transport accidents</b>	731	48.7	48.7	48.7
<b>Violence</b>	129	8.7	8.7	57.3
<b>Self inflicted injuries</b>	10	.7	.7	58.0
<b>Other accidents</b>	631	42.0	42.0	100.0
<b>Total</b>	1500	100.0	100.0	

**Table-III:** Other accident/unintentional injury

	Frequency	Percent	Valid Percent	Cumulative Percent
fall from level	261	17.3	41.3	41.3
fall from height	229	15.3	36.5	77.8
sharp object	10	.7	1.6	79.4
blunt object	30	2.0	4.8	84.1
firearm/explosion	49	3.3	7.9	92.1
drowning	11	.7	1.6	93.7
animal bite/attack	10	.7	1.6	95.2
other	32	2.0	4.8	100.0

## DISCUSSION

Major leading cause of death is trauma among all age individuals. It is a typical reason behind mortality and morbidity in Karachi. What is more concerning is the increasing number of trauma and its socioeconomic repercussions. Quality information on different causative factors of injury is required. The efficient addressing and discussion of the age groups affected by trauma is important to understand and develop prevention programs and strategies that can reduce the morbidity and mortality.

Young population between 15-24 years is fourfold more probably to die from a road traffic accident than from alcohol, drugs or different substance of poisoning. Deaths under 25 years of age due to RTA are more common than deaths due to hanging, shooting, stabbing, alcohol, drug abuse, a sharp/blunt object or intentional self-harm. This age group mostly includes adult, unmarried males [14]. In developing countries around 90% of deaths of Pedestrians, passengers and cyclists combined are because of road traffic accidents most of that occurring in urban areas. 55-70% of deaths belong to urban pedestrians [15]. In our study, the largest group affected was between the ages 11 and 20 years and more than two-thirds of the victims were men, which are similar from injury data of Kampala, Uganda, where the highest number of victims belonged to the ages 16 and 25 as there is significance difference in population and injuries difference among these study populations [12]. Our data reveals that the single largest causes of injuries are road traffic accidents (48.7%), which are similar to figures from the study in Kampala (50%) [12]. The RTIRP puts the annual incidence of RTI at 184.3 per 100, 000 populations and mortality figures from RTA at 5.7 per 100,000 populations. This study also reports 73% of the victims between the ages 15 and 44 [16].

In our study, the motorcycle was reported to be the most common vehicle involved in injuries. The data is consistent with surveillance data from Karachi, which puts the two-wheeler as the most common road user to be injured [16].

Although Pakistan, like many other developing nations, lacks a structured pre-hospital emergency care system, most of our victims were brought in to the hospital via emergency medical services. These ambulances, which are mostly run by charitable organizations, are actually patient transport vehicles with untrained personnel and unequipped vehicles. As expected, all victims in our study were brought to the emergency with without being given resuscitation or basic lifesaving maneuvers. Another study on an improvised explosive device bombing on a police bus in Karachi in 2011 discusses the unusually high rate of mortality from the event. The authors ascribe the high number of deaths to the lack of on-site and pre-hospital trauma care given to the victims [17].

In comparison, registry data in Uganda reports that patients usually delivered to the hospital by friends, relatives, witnesses or the police [18].

In Pakistan pre-hospital trauma care by emergency medical services is a vital area where health care expenditure should be directed based on our data. Establishing a national trauma registry in Pakistan will provide direction for future healthcare policies. In Karachi homicide, suicide and unintentional injuries account for nearly sixty percent of all deaths among persons aged 1–34 years. A little proportion of individuals additionally suffers from injuries as a result of firearms, burns and explosions [19].

Published statistics on global injury report that eighty fifth of all road traffic deaths in world principally occur in low and middle financial gain countries and therefore the upsurge within the range of vehicles per individual can lead to an anticipated eightieth increase in injury mortality rates between 2000 and 2020 [20].

Prevention and mitigation strategies that focus on implementation of laws requiring helmets and seat-belt use have resulted in a decrease in injuries and deaths in developed countries. We observed a dismal number of motorcycle victims who were wearing a helmet at the time of their accidents. Previous studies have reported 4.6% [21] and 7%<sup>16</sup>victims wearing helmets. The registry data will provide irrefutable evidence that will be essential in convincing law makers to strictly mend and implement safety laws while the population should be warned by campaigns on print and electronic media as well as conducting focus groups, awareness sessions and free helmet distribution events by traffic wardens.

Trauma registries are databases that document acute care delivered to patients hospitalized with injuries. They're designed to provide data that may be used to improve trauma care potency and quality [22]. A trauma registry could be a comprehensive, accurate, and timely information source that permits for continuous monitoring of the method of injury care [23]. Trauma registries in most developing countries either don't exist at all (particularly in Pakistan) or wherever they exist are usually rudimentary, poorly developed and incomplete. Information on the trauma epidemiology from developing countries, most of them are one time surveys, retrospective clinical studies, mortuary information or population surveys [24,25]. For vital positive impact in developing countries, a well-designed trauma registry is fascinating for analysis, planning, and implementation for trauma care. Many factors exist in several developing countries, nowadays time that hamper the establishment of efficient and reliable trauma registry.

Many trauma patients in developing countries either don't obtain formal hospital treatment or don't survive to succeed in a hospital and don't seem to be captured by hospital based registries. These are sure drawbacks of a trauma registry that limit its worth as a tool for public health surveillance [26]. Implementing a trauma registry by cost implications must be carefully considered under conditions of limited healthcare budgets. The advantages should be weighed against the costs in terms of infrastructure and manpower.

To counter this enormous burden of injury, a national trauma system is essential for Pakistan. The primary step in developing an injury prevention program is to get reliable information to establish the prevalence of injury. Future healthcare policy and expenditure requires direction from data from trauma

registries. Developing countries Hospitals and governments ought to be inspired to establish trauma registries using proven cost-efficient methods as demonstrated by many developing countries.

## CONCLUSION

This study concluded that the transport accidents are the major health problems especially in young population in Karachi. For better transportation of patients there is need to upgrade facilities of ambulances and other emergency medical services. Emergency medical care facilities (including emergency trauma centers) establishment at district level, sub-divisional level are needed to provide good and quality care to trauma patients. Improvement in trauma care depends on the establishment of functioning trauma care systems, of which a trauma registry is a crucial component.

## REFERENCES

1. "Trauma." Merriam-Webster.com, Merriam-Webster. (online) (cited on 10 jan 2016). Available from URL: <http://www.merriam-webster.com/dictionary/trauma>.
2. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) (online). (cited on 10 jan 2016). Available from URL: <https://www.cdc.gov/injury/wisqars/index.html>.
3. Y Holder, M Peden, E Krug, J Lund, G Gururaj, O Kobusingye. Injury surveillance guidelines. Geneva, World Health Organization, 2001. (online) (cited on 10 jan 2016). Available from URL: <http://apps.who.int/iris/bitstream/10665/42451/1/9241591331>.
4. World Health Organization. Global status reports on road safety: Time for action 2010. (Online). (Cited 2012 Feb 28). Available from URL: [http://whqlibdoc.who.int/publications/2009/9789241563840\\_eng](http://whqlibdoc.who.int/publications/2009/9789241563840_eng).
5. Suriyanwongpaisal P, Kanchanasut S. Road traffic injuries in Thailand: trends, selected underlying determinants and status of intervention. *Inj Control Saf Promot*. 2003 Mar-Jun;10(1-2):95-104.
6. Yang BM, Kim J. Road traffic accidents and policy interventions in Korea. *Inj Control Saf Promot*. 2003 Mar-Jun;10(1-2):89-94.
7. Ghaffar A, Hyder AA, Masud TI. The burden of road traffic injuries in developing countries: the

- 1st National Injury Survey of Pakistan. Public Health. 2004 Apr;118(3):211-7.
8. Chalya P, Mabula JB, Ngayomela IH, Kanumba ES, Chandika AB, Giiti G. et al. Motorcycle injuries as an emerging public health problem in Mwanza City, north-western Tanzania. *Tanzan J Health Res* 2010, Oct;12:214-221.
  9. Vestrup JA. Update on trauma care in Canada. 6. Update on trauma registries and trauma scoring. *Can J Surg*. 1990 Dec;33(6):461-3.
  10. Boyd DR, Rappaport DM, Marbarger JP, Baker RJ, Nyhus LM. Computerized trauma registry: a new method for categorizing physical injuries. *Aerosp Med*. 1971 Jun;42:607-615.
  11. Shapiro MJ, Cole KE, Jr, Keegan M, Prasad CN, Thompson RJ. National survey of state trauma registries – 1992. *Journal of Trauma-Injury Infection & Critical Care*: July 1993 - Volume 35 - Issue 1 - ppg 170.
  12. Nwomeh BC, Lowell W, Kable R, Haley K, Ameh EA. History and development of trauma registry: lessons from developed to developing countries. *World Journal of Emergency Surgery*. 2006 Oct; 1:32. Doi: 10.1186/1749-7922-1-32.
  13. Junaid Abdul Razzak, Muhammad Shahzad Shamim, Amber Mehmood, Syed Ameer Hussain, Mir Shabbar Ali, Rashid Jooma. A successful model of road traffic injury surveillance in a developing country: process and lessons learnt. *BMC Public Health* 2012 May; 12:357. doi: 10.1186/1471-2458-12-357.
  14. Nantulya, V. M, Reich MR. Equity dimensions of road traffic injuries in low and middle-income countries: Injury Control and Safety Promotion. 2003 Mar-Jun;10(1-2):13-20.
  15. Nantulya VM, Muli-Musiime F. Kenya. Uncovering the social determinants of road traffic accidents. In: Evans T, Whitehead M, Diderichsen F, Bhuiya A, Wirth M, editors. *Challenging inequities: from ethics to action*. Oxford: Oxford University Press; 2001.
  16. Shamim S, Razzak JA, Jooma R, Khan U. Initial results of Pakistan's first road traffic injury surveillance project. *Int J Inj Contr Saf Promot* 2011 Sep; 18: 213-7.
  17. Minhas MS, Khan KM, Effendi J, Bhatti A, Jamali S. Improvised explosive device bombing police bus: Pattern of injuries, patho-physiology and early management. *J Pak Med Assoc*, 2014 Dec: 64 (12 Suppl 2 ): S49-S53.
  18. Kobusingye OC, Lett RR. Hospital-based trauma registries in Uganda. *J Trauma* 2000 Mar;48:498-502.
  19. Anderson RN. Deaths: leading causes for 1999. *Natl Vital Stat Rep* 2001 Oct 12;49(11):1-87
  20. Murray C, Lopez A: *The Global Burden of Disease*. Volume 1. Cambridge, MA: Harvard University Press; 1996
  21. Kumar R, Muzzammil M, Minhas MS. Frequency of motor bike injuries, helmet vs non helmet wearing in Karachi Pakistan. *Trauma International* Oct-Dec 2015;1(2):12-16.
  22. Moore L, Clark DE. The value of trauma registries. *Injury*. 2008. Jun;39(6):686-95.
  23. Rutledge R. The goals, development, and use of trauma registries and trauma data sources in decision making in injury. *SurgClin North Am*. 1995;75:305-326.
  24. Mock C, Acheampong F, Adjei S, Koepsell TD. The effect of recall on estimation of incidence rates for injury in Ghana. *Int J Epidemiol*. 1999 Aug; 28(4):750-5
  25. London J, Mock C, Abantanga FA, Quansah RE, Boateng KABull. Using mortuary statistics in the development of an injury surveillance system in Ghana. *World Health Organ*. 2002; 80(5):357-64.
  26. Pollock DA, McClain PW. Trauma registries. Current status and future prospects. *JAMA*. 1989 Oct 27; 262(16):2280-3.