Original Article

Road Traffic Accidents

Prevalence/Trend of Bone Fractures in Road Traffic Accidents

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ABSTRACT

Objective: To study Prevalence/Trend of bone fractures in road traffic accidents.
Study Design: Observational Study
Place and Duration of Study: This study was conducted at the Department of Surgery, Idris Teaching Hospital Sialkot Medical College Sialkot from Jan 2009 to Jan 2019.
Materials and Methods: This Study was conducted on 1366 victim of road traffic accidents. The age, gender and bone involved was noted down. The informed consent was taken from each patient of road traffic accident. The findings were noted on the design Performa. The permission of ethical committee was also considered before start of the study and publishing in research journal.
Results: At the age of 5-15,there were 198(14.5%) were male and 19 (1.4%) female patients were found in road traffic accident in which different bones were found fractured .At the age of 16-25 there were 391 (28.6%) male and 74(5.4%) were female. At the age of 26-35 there were 248 (18.1%) male and 59(4.3%) were female. At the age of 36-45 there were 217(15.9%) male and 47(3.44%) female. At the age of 46-55 there were 66 (4.83%) and 16(1.17%) were female. At the age of 56-65 there were 11(0.80%) male and 03(0.22%) female. At the age of 65-70 there were 08(0.58%) male and 02(0.14%) female. Above 70 there were 06(0.44%) male and 01(0.07%) female. There were total 1145(83.8%) male and 221(16.2%) female. There was femur fracture in male patients at proximal 81(4.73%), shaft of femur 267(15.61%) , distal part of femur 31(1.81%) and in female patients proximal part 06(0.35%), Shaft of femur 42(2.46%), at distal part of femur 03(0.18%). There was Tibia/fibula fracture in male at proximal part 85(4.97%), shaft part 301(17.60%), distal part 72 (4.21%) and in female patients proximal part 06(0.35%) ,shaft part 56(3.27%) , distal part 05 (0.29%). There was humerus fracture in male patients at proximal part 18(1.05%), shaft 107 (6.25%), distal part 14(0.82%). In female patients 04(0.23%) ,shaft part 21 (1.23%), distal part 03(0.17%).
There was fracture of radius\ulna 246(14.38%) in male patients and 56(3.27%) in female patients. There was pelvis fracture 27(1.57%) in male patients and 12(0.70%) in female patients. There was clavicle fracture in 63(3.68%) male patients and 17(0.99%) female patients. Hand\feet bone fracture 134(7.83%) in male, 33(1.92%) in female.
Conclusion: It was concluded from the study that there were multiple bony fracture take place during road traffic accidents.
Key Words: Prevalence/Trend, bone fractures, road traffic accidents

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INTRODUCTION

Road traffic injures (RTIs) are responsible for a substantial proportion of deaths and injuries and are responsible for more years of life lost than most human diseases. Human behavior factors, vehicle factors, and road factors contribute to the causation of road traffic crushes[1].

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Although the numbers of lives lost in road crushes in high-income countries indicate a downward trend in recent decades, for most of the world's population, the burden of road-traffic injury in terms of societal and economic costs is rising substantially[2]. The distribution of road traffic deaths by road user group varies dramatically across epidemiological WHO sub regions and also varies across low-income, middle-income, and high-income countries. For example, 45% of road traffic fatalities in low-income countries are among pedestrians, whereas an estimated 29% in middle-income and 18% in high-income countries are among pedestrians[3]. Global efforts to reduce road traffic injuries may be facilitated. For example, motorcycle helmets were found to reduce the risk of head injury and from five well-conducted studies the risk reduction is estimated to be 72% (odds ratio (OR): 0.28, 95% confidence interval (CI): 0.23–0.35) although there was

some evidence that the effect of helmets on mortality is modified by speed[4].

There is a dearth of information on injury patterns that could be used to prioritize injury prevention measures. For example, hospital discharge data from eight European countries, including 10,341 pedestrians sustaining 19,424 injuries, have been used and fractures (51.1%, 95% CI: 50.3–51.8) and internal injuries (21.3%, 95% CI: 20.7–21.9) are the most frequently found in the data[5]. From the viewpoint of preventive medicine, a comprehensive survey of nationwide traumatic epidemiology, especially related to traffic accidents, should be necessary for Taiwan's health authority to redistribute medical resources to the major injuries. The present study, based on the Taiwan's national admission data, is aimed to (1) investigate the occurrence of injuries associated with traffic accidents, (2) find the major distributions of injury patterns, and (3) evaluate the risk factors of the main injury. [6]

MATERIALS AND METHODS

This study was conducted at the Department of Surgery, Idris Teaching Hospital Sialkot Medical College Sialkot from Jan 2009 to Jan 2019.

This Study was conducted on 1366 victim of road traffic accidents. The age, gender and bone involved was noted down. The informed consent was taken from each patient of road traffic accident. The findings were noted on the design Performa. The permission of ethical committee was also considered before start of the study and publishing in research journal.

RESULTS

At the age of 5-15,there were 198(14.5%) were male and 19 (1.4%) female patients were found in road traffic accident in which different bones were found fractured .At the age of 16-25 there were 391 (28.6%) male and 74(5.4%) were female. At the age of 26-35 there were 248 (18.1%) male and 59(4.3%) were female. At the age of 36-45 there were 217(15.9%) male and 47(3.44%) female. At the age of 46-55 there were 66 (4.83%) and 16(1.17%) were female. At the age of 56-65 there were 11(0.80%) male and 03(0.22%) female. At the age of 65-70 there were 08(0.58%) male and 02(0.14%) female. Above 70 there were 06(0.44%) male and 01(0.07%) female. There were total 1145(83.8%) male and 221(16.2%) female.

There was femur fracture in male patients at proximal 81(4.73%), shaft of femur 267(15.61%), distal part of femur 31(1.81%) and in female patients proximal part 06(0.35%), Shaft of femur 42(2.46%), at distal part of femur 03(0.18%). There was Tibia/fibula fracture in male at proximal part 85(4.97%), shaft part 301(17.60%), distal part 72 (4.21%) and in female patients proximal part 06(0.35%) ,shaft part 56(3.27%), distal part 05 (0.29%). There was humerus fracture in male patients at proximal part 18(1.05%), shaft 107 (6.25%), distal part 14(0.82%). In female patients 04(0.23%) ,shaft part 21 (1.23%), distal part 03(0.17%). There was fracture of radius\ulna 246(14.38%) in male patients and 56(3.27%) in female patients. There was pelvis fracture 27(1.57%) in male patients and 12(0.70%) in female patients. There was clavicle fracture in 63(3.68%) male patients and 17(0.99%) female patients. Hand\feet bone fracture 134(7.83%) in male, 33(1.92%) in female.

Table No. 1: Detail of patients with age and gender

Sr. No.	Age	Male	Female
1	5-15	198 (14.5%)	19(1.4%)
2	16-25	391 (28.6%)	74 (5.4%)
3	26-35	248 (18.1%)	59 (4.3%)
4	36-45	217 (15.9%)	47 (3.44%)
5	46-55	66 (4.83%)	16 (1.17%)
6	56-65	11 (0.80%)	03 (0.22%)
7	65-70	08 (0.58%)	02 (0.14%)
8	Above 70	06 (0.44%)	01 (0.07%)
Total		1145 (83.8%)	221(16.2%)

Total number of patients=1366

Table No, 2: Bones involved in road traffic accidents

Sr. No.	Bone fractured	Male		Female
1	Femur	Proximal	81(4.73%)	06(0.35%)
		Shaft	267(15.61%)	42(2.46%)
		Distal	31(1.81%)	03(0.18%)
2	Tibia/ Fibula	Proximal	85(4.97%)	06(0.35%)
		Shaft	301(17.60%)	56(3.27%)
		Distal	72(4.21%)	05(0.29%)
3	Humerus	Proximal	18(1.05%)	04(0.23%)
		Shaft	107(6.25%)	21(1.23%)
		Distal	14(0.82%)	03(0.17%)
4	Radius/ Ulna	246(14.38%)		56(3.27%)
5	Pelvis	27(1.57%)		12(0.70%)
6	Clavicle	63(3.68%)		17(0.99%)
7	Hand/ Feet bone	134(7.83%)		33(1.92%)
Total		1446(84.56%)		264 (15.43%)

Total bone fractured=1710

DISCUSSION

An international evaluation of the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010), identifying all available data on causes of death for 187 countries from 1980 to 2010, showed that the fraction of global deaths due to injuries was marginally higher in 2010 (9.6%) compared with two decades earlier (8.8%). This was driven by a 46% rise in worldwide deaths due to road traffic accidents and a

rise in deaths from falls[7,8]. Because of this significant burden, the primary purpose of this study was to explore the incidences of injuries associated with traffic accidents and their modifiable risk factors to promote the advance of health and injury-prevention policies in Taiwan.

In this present study, annual road traffic injury incidences rate in recent ten years was from 9.17% to 11.54%; the highest was in 2011. These high incidences were similar to those reported in the Vorko-Jović (2006) study, which focused on urban road traffic accidents in Croatia[9]. Another similar result was also found in an America study[10], which also reported the gender difference that males are much more likely to get injury in a road traffic crash than females, especially among adults and the elderly. Our study was consistent with previous studies. Table 1 demonstrates that males are much more likely to be killed in a road traffic injury than females.

Head and spine injuries were most common among front and rear vehicle occupants and drivers[11]. Among motorcycle riders admitted to the hospital, the most common head injuries are concussions, followed by brain injuries or hemorrhage, facial fractures, and skull fractures. In Taiwan, 18% of the inpatients who suffered from head injuries were estimated in the present study. Around 7.6% to 75.1% of motorcycle riders got head injuries without helmets; oppositely, the incidence of head injuries in motorcycle riders who wear helmets is 3.4% to 40.6%[12]. These highly differences of injury incidence between helmeted or nonhelmeted riders were similar to those reported in a meta-analysis study. Motorcycle helmets were estimated to reduce 72% risk of any kinds of head injury (odds ratio (OR): 0.28, 95% confidence interval (CI): 0.23–0.35)[4]. That is another issue worthy to be investigated in Taiwan.

Head injuries are the leading cause of death in motorcycle accidents, even in helmeted riders. For instance, in the US, 53% of motorcycle deaths were a result of head injuries[12]. Incidence of head injuries caused by a rotational acceleration has been pointed out in the literature, but they underestimate the number of pedestrian fatal victims in eight European countries and in San Francisco study[5,13]. A previous study in the United Arab Emirates reported that road traffic victims are predominantly male (89%), pedestrians (88%). In UAE study, the Trauma Registry of Al Ain city was collected over 3 years, and showed that there were 1070 patients, mainly from non-Arabic speaking expatriates, low-income countries. Overall mortality was 4%; pedestrians accounted for 61% of deaths. Head injury was the major factor affecting hospitalization and mortality[11].

In the USA, 5,838 admissions of an academic Level I trauma center registered over 10 years were reviewed and showed that there were 1,136 patients (19.4%) 14 years old or less, 3,741 (64.1%) who were 15 to 55 years old, 420 (7.2%) 56 to 65 years old, and 541 (9.3%) older than 65 years. Overall mortality was 7.7% and ranged from 3.2% in the age group of 14 years or less to 25.1% in patients over 65 years[14]. In the USA, another National Trauma Databank study during a 5-year period including 12,429 admissions revealed that there were 4,095 patients (32.9%) ≤14 years, 3,806 (30.7%) 15 to 35 years old, 3,413 (27.5%) 36 to 55 years old, 688 (5.5%) 56 to 65 years old, and 427 (3.4%) >65 years old, The overall mortality was 3.7% and ranged from 2.4% in the age stratum of ≤14 years to 12.2% in the stratum of >65 years[15]. In the present study, the traffic incidents-related mortality rate among those admitted populations was noted as a significant gender difference in Taiwan (in average, 0.18% for the female and 0.50% for the male).

A cross-sectional study in India showed that fractures were the commonest injury among the victims of nonfatal road traffic accidents, and majority of the victims were in the age group of 18–37 years[16]. A road trauma analysis based on Data of the Trauma Registry in the United Arab Emirates showed that injuries of the extremities and head were frequent among pedestrians, motorcyclists, and bicyclists; the mean hospitalization was 9.7 days and overall mortality was 4%[11].

In China, the data of 2213 in patients with traffic trauma showed that fracture of extremities (53.3%) occurred most often, craniocerebral trauma (19.4%) next, then followed in turn by thoracoabdominal visceral injury (6.56%), spine fracture (5.37%), fracture of ribs (4.88%), and pelvic fracture (4.18%)[17]. In Africa, a retrospective analysis of nonfatal road traffic crash victims still showed that the commonest injuries were fractures (69.0%) with the tibia/fibula being the most fractured bones (30.3%). Age group of 15–44 years was the most affected (81.9%)[18]. In the present, fractures of upper limb, lower limb, and spine and trunk account for about 30% of the inpatients caused by traffic incidents in Taiwan.

The USA National Trauma Databank study of 12,429 admissions showed that bicycle-related injuries involving motor vehicles are associated with a high incidence of head injuries and extremity fractures. Age plays a critical role in the severity and anatomic distribution of injuries sustained, with a stepwise increase in mortality with increasing age[15]. In Pakistan, of the 132,504 victims of road traffic crashes (RTCs), there were 67% males and 65% aged 16–35 years, and minor injuries (65%) and fractures (25%) were the most reported[19]. Another hospital-based study of 450 cases admitted due to traffic accidents in India revealed that the commonest type of injury was fracture (49.33%) and the most common site of fracture was lower limb (48.2%), and several risk factors such as age, sex, type of vehicle, use of alcohol, absence of driving license, nonuse of helmets, and casual attitude are associated

with increased occurrence of road traffic accidents[20]. In the present study, gender, age, and socioeconomic level were significant risk factors of the most orthopedic fractures among traffic incidents-related inpatients in Taiwan. Otherwise, different hospital level receiving these orthopedic fractured cases was another cluster factor found in the present study.

The study of national estimates of motor vehicle crash-(MVC-) related hospitalization and associated use of health care resources among patients of 20 years old and younger in 3438 hospitals in 36 USA states revealed that mean (SD) hospital charges and lengths of stay (LOS) were $33,440 ($55,113) and 4.8 (7.7) days, respectively. Older age, being male, urban hospital location, mortality during hospitalization, higher injury severity, and longer LOS were significantly associated with higher total charges[21]. Another study based on the Iranian National Trauma Registry Database (INTRD), including data from 14 general hospitals in eight major cities in Iran, enrolled 8,356 patients with road traffic injuries (RTIs) admitted to the hospitals and showed that the mean hospital charges for the patients were US$128 ± US$210 and the mean LOS for the patients was 6.8 ± 8.0 days. Older age, being a bicycle rider, higher injury severity, and longer LOS were associated with higher hospital charges[22]. Compared to the two above studies, the direct medical cost and LOS for the traffic incidents-related hospitalization in Taiwan would be reasonable and accessible to the people. Furthermore, our study demonstrates that integrating all road users and pedestrian patients with hospital discharge data provides better estimates of the incidence of injury and more comprehensive information about injury type than other local hospital-based ED reports.

CONCLUSION

It was concluded from the study that there were multiple bony fracture take place during road traffic accidents.

Author's Contribution:

Concept & Design of Study:	Muhammad Asif Saeed
Drafting:	Imran Idrees Butt, Maqsood Ahmed Khan
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Revisiting Critically:	Muhammad Asif Saeed, Imran Idrees Butt
Final Approval of version:	Muhammad Asif Saeed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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