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Surveillance of Injury in a Tertiary Care Hospital of North India: A Hospital Based Study

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Authors' contributions

This work was carried out in collaboration between all authors. Author MKS and RB designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author NG managed the literature search and data analysis. Authors DS and SC proofread the manuscript and all authors approved the final manuscript.

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ABSTRACT

Introduction: Injury is a major, preventable public health problem in terms of morbidity, premature mortality or disability. This study aims to assess the epidemiology of injury in patients admitted to a tertiary care centre in northern India.

Materials and Methods: Observational, Descriptive, secondary data based study of injury patients admitted in surgical emergency department of Government Medical College Hospital Chandigarh from July 2009 to June 2010.

Results: Out of these total 7222 patients, 4129(57.2%) were of Road Traffic Accident (RTA) and 22.8% were of Assault. Male were at high risk of RTA. Although, overall males were at higher risk

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of assault but middle aged women were at higher risk than their counterparts. For 'fall' females were at high risk. Assault cases were more prevalent during summer, while RTA cases were more prevalent during winter season and fall during rainy season were reportedly more. Majority (33.0%) of RTA injury was in the age group of 20-39 years (most productive age) and in the age group of <10 years falls were most common (56.0% of all injury).

Keywords: Injury; Chandigarh; seasonal trend.

1. INTRODUCTION

Injury is a major, preventable public health problem in terms of morbidity, premature mortality or disability. Worldwide, the projections for 2020 show that 8.4 million deaths are expected annually. Trauma has its own natural history and it follows the same epidemic pattern as any other disease, that is, agent, host and environment interacting together to produce injury or damage. The mortality and economic losses imposed by morbidity which results from injuries are largely preventable. However, the development of effective injury prevention efforts depends on reliable and detailed information on the incidence and pattern of injury. Injury, as a research problem, has also been largely ignored in developing countries. An examination of 'years of potential life lost' indicated that injuries were the second most common cause of death after 5 years of age in India [1]. The epidemiology of injuries sustained due to trauma is poorly understood. There are few studies from developing countries discussing the epidemiology of trauma [2-5]. Injury is thus, a long-overlooked health problem that deserves study. This study aims to assess the epidemiology of injury in patients admitted to a tertiary care Centre in northern India with objective.

1. To find out the prevalence of different type of injury.
2. To assess socio demographic, epidemiological and seasonal distribution of different type of injury.

2. MATERIALS AND METHODS

2.1 Study Type

Observational Descriptive Study.

2.2 Study Duration

Study was conducted over the duration of one year from July 2009 to June 2010.

2.3 Study Sample

Injury patients admitted in surgical emergency department of Government Medical College Hospital, Chandigarh.

2.4 Data Collection

Secondary data was gathered from the registers maintained in the Surgical Emergency Department of during the study period.

2.5 Data Processing and Analysis

Data was collected and processed with the help of statistical software and later on get analyzed using the same with predictor variable as epidemiological pattern, seasonal trend, socio demographic distribution and outcome variable as different type of injury. Age wise, gender wise and seasonal prevalence of different type injury was calculated using total injuries as denominator for the calculation of same. Male female ratio of different injuries was also calculated. Proportion gender wise, injury wise illustrated using total of both columns and rows. Data was illustrated in terms of proportion and ratios using the tables.

2.6 Quality Control

All measures were taken to make sure proper quality control of study.

3. RESULTS AND DISCUSSION

The main challenge for public health in the coming century is to decrease the burden of injuries. Accelerated urbanization and industrialization, over the past three decades, has led to an alarming increase in the rates of accidental injuries, crime and violence in India [1].

In present study Out of total 7885 patients reported, in 633 patients, either address or age/sex was not recorded by the concerned authorities because of some reasons thus final analysis was restricted to 7222 patients. Out of these 5722 were males and 1500 were females giving sex-ratio of 3.8. Caren Dsouza et al. [1] in their study, found that annual incidence of trauma admissions in hospital was 15.96%. Most of the injuries were seen in 21-40 years age group (39.67%). Similar findings were noted in a study which was done by Swarnkar M and co associates in a hospital in central India [6]. This age group is the most productive age group, and trauma and its morbidity result in a huge economic setback for the country. Males far outnumbered females, with a ratio of 2.3:1. Similarly, a male predominance was seen in other studies which were done in India [6-8] which could have occurred due to the fact that in India, males are still the main working community and are hence more exposed to work related stress and workplace injuries. In our study out of these total 7222 patients, 4129(57.2%) were of Road Traffic Accident (RTA) and 22.8% were of Assault. The percentage Burn injury was merely 4.6% (Table 1). Caren Dsouza et al. [1] found in their study that the incidence of limb injuries was more (66.92%), which was in contrast to head injuries, they being the most common injuries seen in other parts of the country.

Injury rates were found to be more or less uniform in all age groups. Hence all individuals in different age groups were at equal risk of injury, though type of injury may be different. Middle aged females were comparatively at high risk of burn. Male were at high risk of RTA. Although, overall males were at higher risk of assault but middle aged women were at higher risk than their counterparts. For 'fall' females were at high risk. Age also came out to be significant correlate for fall cases. Elderly females were at high risk. Females were more prone to burn and fall while males were more prone to RTA and assault on overall basis (Tables 2 and 3). RTAs accounted

for the second common mode of trauma seen following fall in a study [1] which was in contrast to those seen in other studies, where RTAs were the most common mode of injury [6-8]. An unprecedented increase in the number of vehicles has outpaced the development of adequate roads and highways. India has 1% of the motor vehicles in the world, but it bears the burden of 6% of the global vehicular accidents [9].

According to the World Health Organization (WHO), road traffic injuries are the sixth leading cause of death in India, with a greater share of hospitalization, deaths, disabilities and socio-economic losses in the young and middle- aged populations [7].

Caren Dsouza et al. [1] found 191 cases of road traffic accidents, out of which 76 cases were pedestrian injuries. In data from Delhi, India, pedestrian injuries accounted for 41% of the injuries [10]. Assault cases were more prevalent during summer, while RTA cases were more prevalent during winter season and fall during rainy season were reportedly more. Majority (33.0%) of RTA injury was in the age group of 20-39 years (most productive age) and in the age group of <10 years falls were most common (56.0% of all injury). Sex wise analysis demonstrated that in the age group of 0-20 years injuries were more common (21.9%) in females as compared to its low proportion of 18.5% in males and in the age group of 20-39 years reverse was true (Table 4).

In a developing country like India, which is already wriggling under the enormous burden of infectious and tropical diseases and the regular outbreaks of epidemics, we should make all efforts to reduce this burden and not add to it. The industrial growth and might of our country was never so envied as it is today and with this, lot of social and structural changes are evident around us. All of this has led to lifestyle modifications and social ethics, as a result of which there has been this surge in trauma related hospital admissions across the country [1].

Hospital based study on the basis of secondary retrospective data were few of limitations of study though it provides scope to researchers to further explore on this public health issue of injury using more pertinent and generalizable study design.

Table 1. Types of injury by age at GMCH Chandigarh for the year 2009 – 2010

Type of injury	>10 (%)	10 -19 (%)	20-29 (%)	30-39 (%)	40-49 (%)	50-59 (%)	60 + (%)	Over all (%)	Out of tricity (Chandigarh) (%)
RTA	174(4.2)(35.1)	491(11.9)(54.7)	1361(33.0)(58.5)	808(19.6)(56.9)	632(15.3)(59.5)	393(9.5)(68.3)	274(6.6)(61.7)	4129(57.2)	936(22.7)
Assault	13(0.8)(2.6)	205(14.0)(22.8)	578(39.4)(24.8)	339(23.9)(23.9)	207(14.1)(19.5)	79(5.4)(13.7)	47(3.2)(10.6)	1468(20.3)	315(21.4)
Fall	278(21.8)(56.0)	172(13.5)(19.2)	239(18.7)(10.3)	181(14.2)(12.7)	193(15.1)(18.2)	95(7.4)(16.5)	119(9.3)(26.8)	1277(17.7)	222(17.4)
Burn	31(9.4)(6.3)	30(9.0)(3.3)	133(40.3)(5.7)	91(27.6)(6.4)	29(8.8)(2.7)	12(3.6)(2.0)	4(1.2)(0.9)	330(4.6)	79(23.9)
Others	0	0	15(83.3)(0.6)	2(11.1)(0.1)	1(5.6)(0.1)	0	0	18(0.2)	03(16.7)
Total	496(6.9)(100)	898(12.4)(100)	2326(32.2)(100)	1421(19.7)(100)	1062(14.7)(100)	575(8.0)(100)	444(6.1)(100)	7222(100)	1555(21.5)

Table 2. Age and sex wise distribution of different types of injury

Age (Yrs)	Sex	RTA (%)	Assault (%)	Fall (%)	Burn (%)	Others (%)	Total (%)
10	Male	107 (31.7)(3.2)	8 (2.4)(0.7)	204 (60.4)(21.4)	19 (5.6)(10.2)	0	338 (100)(5.9)
	Female	67(42.4)(8.5)	5(3.2)(2.0)	74 (46.8)(23.0)	12 (7.6)(8.4)	0	158 (100)(10.5)
	Total	174(35.1)(4.2)	13(2.6)(0.8)	278(56.0)(21.8)	31(6.3)(9.4)	0	496(100)(6.9)
10-19	Male	398(54.7)(11.9)	186(25.6)(15.2)	129(17.7)(13.5)	14(1.9)(7.5)	0	727(100)(12.7)
	Female	93(54.4)(54.4)	19(11.1)(7.7)	43(25.1)(13.4)	16(9.4)(11.2)	0	171(100)(11.4)
	Total	491(54.7)(11.9)	205(22.8)(14.0)	172(19.2)(13.5)	30(3.3)(9.0)	0	898(100)(12.4)
20-29	Male	1158(59.5)(34.7)	508(26.1)(41.6)	193(9.9)(20.2)	71(3.7)(38.0)	15(0.8)(83.3)	1945(100)(34.0)
	Female	203(53.3)(25.7)	70(18.4)(28.5)	46(12.1)(14.3)	62(16.3)(43.4)	0	381(100)(25.4)
	Total	1361(58.5)(33.0)	578(24.8)(39.4)	239(10.3)(18.7)	133(5.7)(40.3)	15(0.6)(83.3)	2326(100)(32.2)
30-39	Male	664(58.9)(19.9)	267(23.7)(21.8)	138(12.2)(14.5)	57(5.1)(30.5)	2(0.2)(11.1)	1128(100)(19.7)
	Female	144(49.1)(18.3)	72(24.6)(29.3)	43(14.7)(13.4)	34(11.6)(23.8)	0	293(100)(19.5)
	Total	808(56.9)(19.6)	339(23.9)(23.1)	181(12.7)(14.2)	91(6.4)(27.6)	2(0.1)(11.1)	1421(100)(19.7)
40-49	Male	504(59.9)(15.1)	162(19.2)(13.3)	159(18.9)(16.6)	16(1.9)(8.6)	1(0.1)(5.6)	842(100)(14.7)
	Female	128(58.2)(16.2)	45(20.5)(18.3)	34(15.5)(10.6)	13(5.9)(9.1)	0	220(100)(14.7)
	Total	632(59.5)(15.3)	207(19.5)(14.1)	193(18.2)(15.1)	29(2.7)(8.8)	1(0.1)(5.6)	1062(100)(14.6)

Table 2 continued.....

50-59	Male	313(71.3)(9.4)	61(13.9)(5.0)	57(13.0)(6.0)	8(1.8)(4.3)	0	439(100)(7.7)
	Female	76(55.9)(9.6)	18(13.2)(7.3)	38(27.9)(11.8)	4(2.9)(2.8)	0	136(100)(9.1)
	Total	393(68.3)(9.5)	79(13.7)(5.4)	95(16.5)(7.4)	12(2.0)(3.6)	0	575(100)(8.0)
60 +	Male	196(64.7)(5.9)	30(9.9)(2.5)	75(24.8)(7.9)	2(0.7)(1.1)	0	303(100)(5.5)
	Female	78(55.3)(9.0)	17(12.1)(6.9)	44(31.2)(13.7)	2(1.4)(1.4)	0	141(100)(9.4)
	Total	274(61.7)(6.6)	47(10.6)(3.2)	119(26.8)(9.3)	4(0.9)(1.2)	0	444(100)(6.1)
All Ages	Male	3340(58.4)(100)	1222(21.4)(100)	955(16.7)(100)	187(3.3)(100)	18(0.3)(100)	5722(100)(100)
	Female	789(52.6)(100)	246(16.4)	322(21.5)	143(9.5)	0	1500(100)
	Total	4129(57.2)(100)	1468(21.3)(100)	1277(17.7)(100)	330(4.6)(100)	18(0.2)(100)	7222(100)(100)

Table 3. Male female ratio wise distribution of different types of injury

Type of injury	>10 ratio	10 -19 ratio	20-29 ratio	30-39 ratio	40-49 ratio	50-59 ratio	60 + ratio	All ratio
RTA	1.6	4.3	5.7	4.6	3.9	4.1	2.5	4.2
Assault	1.6	9.8	7.3	3.7	3.6	3.4	1.8	5.0
Fall	2.8	3.0	4.2	3.2	4.7	1.5	1.7	3.0
Burn	1.6	0.9	1.1	1.7	1.2	2.0	1.0	1.3
Others	0	0	15.0	2.0	1.0	0	0	18.0
Total	2.1	4.3	5.1	3.8	3.8	3.2	2.1	3.8

Table 4. Sex and season wise distribution of different injury types

Type season	Gender	Rainy (%)	Winter (%)	Summer (%)	Total (%)
R T A	Male	1027(30.8) (54.9)	1151(34.5) (60.3)	1160(34.8) (59.7)	3338(100) (58.3)
	Female	257(32.6) (49.9)	267(33.8) (54.8)	265(33.6) (53.2)	789(100) (16.4)
	Total	1284(31.1) (53.9)	1418(34.3) (59.2)	1425(30.5) (58.4)	41297(100) (57.2)
Assault	Male	440(36.0) (23.5)	328(26.8) (17.2)	454(37.2) (23.4)	1222(100) (21.4)
	Female	81(32.9) (15.7)	78(31.7) (16.0)	87(35.4) (17.5)	246(100) (16.4)
	Total	521(35.5) (21.8)	406(27.7) (16.9)	541(36.9) (22.2)	1468(100) (20.3)
Fall	Male	351(36.8) (18.8)	353(37.0) (17.2)	251(26.3) (12.9)	955(100) (16.7)
	Female	127(38.4) (24.7)	111(34.5) (22.8)	84(26.1) (16.9)	322(100) (21.5)
	Total	478(37.4) (20.0)	464(36.3) (19.4)	335(26.2) (13.7)	1277(100) (17.7)
Burn	Male	50(26.7) (2.7)	69(36.9) (3.6)	68(36.4) (3.5)	187(100) (3.3)
	Female	50(35.0) (9.7)	31(21.7) (6.4)	62(43.4) (12.4)	143(100) (9.5)
	Total	100(30.3) (4.2)	100(30.3) (4.2)	130(39.4) (5.3)	330(100) (4.6)
Others	Male	0	8(44.4) (0.4)	10(55.6) (0.5)	18(100) (0.3)
	Female	0	0	0	0
	Total	0	8(40.4) (0.3)	10(55.6) (0.4)	18(100) (0.2)
All injury	Male	1870(32.7) (100)	1909(33.4) (100)	1943(34.0) (100)	5722(100) (100)
	Female	515(34.3) (100)	487(32.5) (100)	498(33.2) (100)	1500(4100) (100)
	Total	2385(33.0) (100)	2396(33.2) (100)	2441(33.8) (100)	7222(100) (100)

4. CONCLUSION

Finding of this study can be concluded that injuries are bit more common in males than females. Road traffic accidents, falls and assaults are most commonly occurring and

prevalent type of injury among both sexes with seasonal variation. To end up, we can make an effective policy on the basis of findings of this study and by exploring and doing other studies on same domain so that we can effectively deal with rampantly rising public health malady.

CONSENT

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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