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Original Research Article

An epidemiological study of injuries in an urban slum community in the metropolitan city of Mumbai

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ABSTRACT

Background: In India, injuries account for an estimated 15% of total deaths and 15% of disability adjusted life years (DALYs) with resulting economic losses of 3% of gross domestic product (GDP) for the country. Learning about injuries is the first step to reduce the risks of injuries in the community. The objectives of the study were to describe the nature of injuries and their relationship to select epidemiological variables and also to assess the type of health facility accessed and the cost incurred therein.
Methods: A descriptive cross-sectional study was carried out from May 2016 to October 2017. A recall period of three months for minor injuries & one year for major injuries or deaths due to injury was used. Data was collected by using semi-structured, pre-designed, pre-tested and open-ended questionnaires.
Results: In this study, 70.7% subjects were male and 29.3% were female. There were 216 injuries either affecting work or for which treatment was availed, out of which 170 did not have knowledge about first-aid. 44.4% of study subjects belonged to 25- 44 years and 35.6% injured were daily wage-earners. 37.96% of injuries were caused by road traffic accident and 19.9% found to have suffered from cut injuries and there were 5 deaths. 48.3% study subject took treatment in the government hospital because of the affordable cost.
Conclusions: This study can help the integrated disease surveillance program to plan data collection on injuries occurring in the community in order to get a comprehensive picture of total morbidity.

Keywords: Injuries, Healthcare facility, Mechanism and nature

INTRODUCTION

In India, injuries account for an estimated 15% of total deaths and 15% of disability adjusted life years (DALYs). Consequently, an estimated 1.5 million people die as a result of injuries and 15-20 million are hospitalized with resulting economic losses of 3% of gross domestic product (GDP) for the country.[1] Every year, injuries contribute to a significant number of deaths, hospitalizations (for short and long periods), emergency care, disabilities (physical, social and psychological), amputations, disfigurement, pain, suffering and agony. Many children become orphans, women become destitute and the elderly grieve in isolation. In addition, injuries also result in disruption of several activities leading to loss of work, income, education and other social activities, causing long term suffering among survivors and families.[2]

Many injuries are linked to social, environmental, cultural and biological issues in causation which are recognized as man-made and behavior linked disorders. Even common people don't consider injuries as preventable events. As most of them are accidental and happen all of a sudden, the impact of injuries on the human life is greater. The major challenges faced today

by injuries are prevention, acute and long-term care, and rehabilitation. The study of injuries with respect to these factors is essential to decide the preventive strategies.[2]

Recent progress in industrialization and use of vehicles, increased number of people living in crowded and unsafe settlements, coupled with inaccessible and unaffordable emergency health services also contribute to the higher health burden of injury in the developing regions of the world.[3] In India, very few community-based studies have been conducted on injuries. While the mortality data on injuries could be available with less effort, the data on non-fatal injuries is very difficult to obtain. Learning about injuries is the first step to reduce the risks of injuries in the community. Hence, need was felt to conduct a study to assess the multi-factorial nature of the injuries.

Objectives

- To estimate the incidence of unintentional injury in a urban community
- To describe the nature of injuries and their relationship to select epidemiological variables
- To assess the type of health facility accessed and the cost incurred.

METHODS

A descriptive cross-sectional study was conducted in Babrekar nagar which is field practice area of Department of Community Medicine of Lokmanya Tilak Municipal Medical College and General Hospital, Sion, Mumbai during the period from May 2016 to October 2017. The study population was persons having any type of injury in household of surveyed population in field practice area of Department of Community Medicine. A recall period of three months for minor injuries and one year for major injuries or deaths due to injury was used. The total population of selected area is approximately 4500. There are total 726 houses (family size approximately 6), which are distributed in 8 lanes. The annual incidence of injury was found to be from 7 to 14 per 100 in various studies. By using the formula, $4PQ/L^2$; where P=annual incidence of injuries, Q=100-P and L=allowable error (20% of P). The population to be covered from the above calculation of any randomly selected area should be 1270 i.e. approximately 211 houses. They were numbered according to micro-planning of intensive pulse polio immunization. The houses were selected by systematic random sampling. By calculating the sampling interval, every third house was selected. Data thus collected by using semi-structured, pre-designed, pre-tested and open-ended questionnaires, data was analyzed with the help of Microsoft excel and SPSS Software version-21.

RESULTS

It was seen from Table 1 that 159 (70.7%) subjects were male and 66 (29.3%) were female and there were 216 injuries either affecting work or for which treatment was availed, corresponding to an annual incidence of 19.4 per 100 populations (n=1270). Majority (44.4%) of study subjects belongs to 25-44 years age group followed by those in the 5-14 (18.2%) years of age group. Amongst the surveyed population, the leading type 82 (37.96%) of injury were caused by road traffic accident followed by injury caused due to fall i.e. 32 (14.81%) and burns 14 (6.48%). All the patients of dog bite and electrocution (not displayed in table) were treated on OPD (out patients department) basis.

Table 1: Distribution of study subjects according to mechanism of injury and age.

Injury type	Age (in years)					Total
	5-14	15-19	20-24	25-44	45-59	
	N (%)	N (%)	N (%)	N (%)	N (%)	
Road traffic	08 (9.6)	08 (9.6)	11 (13.3)	45 (54.2)	10 (12.1)	82
Fall	09 (28.1)	00	04 (12.5)	19 (59.4)	00	32
Fall of object	00	04 (33.3)	00	08 (66.7)	00	12
Burn	00	10 (55.6)	00	04 (22.2)	00	14
Dog-bite	04 (50.0)	00	00	04 (50.0)	00	08
Electrocution	04 (100)	00	00	00	00	04
Other	16 (23.5)	08 (11.8)	19 (27.9)	20 (29.4)	01 (1.5)	64
Total	41 (18.2)	30 (13.3)	34 (15.1)	100 (44.4)	11 (4.9)	216

X^2=12.396; d.f.=3; p=0.015 (statistically significant).

It was seen from Table 2 that 19.9% study subjects found to have suffered from cut injuries followed by fracture 18.9%. The percentage of study subjects suffering from laceration and abrasion were 15.3% and 13.8% respectively; whereas the percentage of concealed injury, contusion and penetrating injury respectively was 6%, 9.7% and 7.9%. About 8.3% suffered from burn injury and 3.6% study subjects had other type of injury like blunt trauma.

It was observed from Table 3 that the association between the Abbreviated Injury Scale (AIS) score and hospitalization status was found to be significant. Most of the injuries 113 (72.9%) were minor injuries followed by moderate injuries 42 (27.1%), while 5 (7.5%) injuries were un-survivable injuries.

Table 2: Distribution of study subjects according to nature of injury.

Nature of injury	Frequency	Percentage (%)
Abrasion	30	13.8
Cut	43	19.9
Concealed	13	6.0
Contusion	21	9.7
Fracture	41	18.9
Laceration	33	15.3
Penetrating	17	7.9
Burn	18	8.3
Total	216	100.0

Table 3: Distribution of study subjects according to severity of injury, abbreviated injury scale score and hospitalization status.

Severity of injury	Abbreviated injury scale score	Hospitalized		z value p value
		Yes (%)	No (%)	
Minor	1	00	113 (72.9)	
Moderate	2	04 (6.0)	42 (27.1)	
Serious	3	17 (25.4)	00	Z=12.595
Severe	4	41 (61.1)	00	P=0.0001
Un-Survivable	6	05 (7.5)	00	
Total	-	67 (100)	165 (100)	

Table 4: Distribution of study subjects according to type of health care facility used and its reasons.

Health care facility	Reasons for using No. (%)				Total
	Preference	Proximity	Treatment cost	Other	
Govt. hospital	06 (10.3)	04 (6.9)	28 (48.3)	20 (34.5)	58
Govt. dispensary	12 (40.0)	18 (60)	00	00	30
Private clinic	57 (58.2)	29 (29.6)	00	12 (12.2)	98
Private hospital	24 (80.0)	05 (16.7)	00	01 (3.3)	30
Total	99 (44.6)	56 (22.2)	28 (15.3)	33 (14.9)	216

X^2=27.39; d.f.=3; p=0.0001 (statistically significant).

Table 5: Occupation status of study subjects.

Occupation	Frequency	Percentage (%)
Government	16	7.5
Private	41	18.9
Daily worker	77	35.6
Unemployed	04	1.8
Student	47	21.7
Housewife	25	11.6
Retired	05	2.3
Total	216	100

Table 6: Distribution of study subjects according to cost of treatment and money borrowed.

Cost of treatment (In Rs.)	Money borrowed		Total
	Yes	No	
0-500	24 (32.4)	122 (83.5)	146
500-1000	08 (10.8)	00	08
1000-10000	38 (51,4)	07 (4.7)	45
>10000	04 (5.4)	13 (8.8)	17
Total	74	142	216

X^2=90.68; d.f.=3; p=0.0001 (statistically significant).

Table 7: Distribution of study subjects according to education status and first aid knowledge.

Education status	Knowledge of first-aid N (%)			Total
	Yes	No	Don't know	
Illiterate	00	24 (100.0)	00	24
Primary	00	84 (95.4)	04 (4.6)	88
Secondary	04 (15.4)	18 (69.2)	04 (15.4)	26
Higher secondary	14 (25.9)	40 (74.1)	00	54
Graduate	20 (8.3)	04 (16.7)	00	24
Total	38	170	8	216

X^2=52.789; d.f.=1; p=0.0001 (statistically significant).

It was seen from Table 4 that 48.3% study subject who took treatment in the government hospital because of the affordable treatment cost. 60.0% study subject who took treatment in the government dispensary because of the proximity of the health care facility. 58.2% and 80.0% study subject preferred to take treatment in the private clinic and the private hospital respectively. The association between the health care facility used and the reason is found to be statistically significant.

It was seen from Table 5 that 35.6% study subjects were daily workers, while 21.7% were students. The study subjects working in private and government were found to be 18.9% and 7.5% respectively. About 11.6% were housewife while 2.3% were retired. About 1.8% study subjects were unemployed.

It was seen from Table 6 that 32.4% study subjects who borrowed money for treatment of injury, the cost of treatment of injury was less than Rs. 500/-. In 10.8% study subjects who borrowed money for treatment of injury, the cost of treatment of injury was between Rs. 500-1000. In 51.4% study subjects who borrowed money for treatment of injury, the cost of treatment of injury was between Rs.1000-10000. The association between the total income of family of study subject and money borrowed for treatment of injury was found to be statistically significant.

It was seen from Table 7 that all illiterate were not having knowledge of First-Aid. 95.4% study subjects whom educational status is up to primary level were not having knowledge of first aid. 15.4% study subjects whom educational status is up to secondary level were having knowledge of first aid. 25.9% study subjects whom educational status is up to higher secondary level were having knowledge of first aid. 83% study subjects whom educational status is up to graduate level were having knowledge of first aid. The association between the educational status and the first aid knowledge was found to be statistically significant.

DISCUSSION

This is an epidemiological study of factors responsible for morbidity, disability and mortality among study subjects due to injuries in an urban slum of a Metropolitan city (n=1270). In the study sample, there were 216 injuries either affecting work or for which treatment was availed, corresponding to an annual incidence of 19.4 per 100 population. About 8 study subjects were found to have died due to injury corresponding to an annual rate of 7 per 1000 population. Amongst the surveyed population, the leading type 82 (37.96%) of injury were caused by road traffic accident followed by injury caused due to fall i.e. 32 (14.81%) and burns 14 (6.48%). Whereas the study done by Sharma M et al in 2013 found that the three-leading mechanism of injury were Fall 44 (33.8%) followed by road traffic accident 40 (28.2%) and stuck or hit by person or object 16 (11.3%).[4] Other study done by Konda et al showed that majority of the participants (77.8%) fell in indoor settings and 22.2% fell outdoor settings. In the house, most of the fall incidents injuries occurred in living room (23.8%) followed by the bathroom and kitchen (19%), and bedroom and on the stairs (9.6%).[5]

Majority (44.4%) of study subjects belongs to 25-44 years age group followed by 18.2% in the 5-14 years of age group. Whereas in a study conducted in Delhi by Verma and Tewari found that the number of injuries was the highest 48% among the 5-25 years age group followed by 28% in the 25-45 age group.[6]

In the present study, dog-bite injury was common among the children between 5-14 years, whereas study done by Parmeswaran et al revealed that injuries caused by dog-bite were 29 (25%) in the same age group.[7] About 19.9% study subjects found to have suffered from cut injuries followed by fracture 18.9%. The percentage of study subjects suffering from laceration and abrasion were 15.3% and 13.8% respectively; whereas the percentage of concealed injury, contusion and penetrating injury was 6%, 9.7% and 7.9% respectively. About 8.3% suffered from burn injury. 3.6% study subjects had other type of injury like blunt trauma. Whereas, in a study conducted by Patil et al found that majority of injuries caused by fractures were 190 (54.3%).[8]

About 48.3% study subject who took treatment in the government hospital because of the affordable treatment cost and 60% study subject who took treatment in the government dispensary because of the proximity of the

health care facility. About 58.2% and 80% study subject preferred to take treatment in the private clinic and the private hospital respectively. Whereas a study done by Lamawansa and Piyathilake, about 42 (49.4%) took treatment at the government facility and 20 (23.5%) took treatment in private institution.[9]

In the present study, 88 (40.7%) were educated till primary level followed by higher secondary school 54 (25%), secondary school 26 (12%). Whereas a study done by Jha et al found that 107 (21.4%) had education upto 5th class. Ninety-five (19.3%) were educated upto 8th class, while 82 (16.6%) were illiterates. Victims with a higher education (matriculation and above) were fewer in proportion.[10]

About 35.6% study subjects were daily worker, while 21.7% were students. The study subjects working in private and government were found to be 18.9% and 7.5% respectively. About 11.6% were housewife while 2.3% were retired. Only 1.8% study subjects were unemployed. Whereas a study done by Jha et al found laborers (29.9%) to be highest in number among the injured. Persons who were employed in service were the next largest group with 157 (21.6%) injured and 115 (15.8%) students were involved in accidents.[10]

In present study, the ratio of deaths: serious injuries: minor injuries were 1:12:23 however, a recent working committee report for the planning commission after examining available national data estimated the ratio of deaths: serious injuries: minor injuries as 1:15:70.[11] Many injuries are linked to social, environmental, cultural and biological issues in causation which are recognized as man-made and behavior linked disorders. Even common people don't consider injuries as preventable events.

CONCLUSION

This study can help the Integrated Disease Surveillance Program to plan data collection on injuries occurring in the community to get a comprehensive picture. The cross-sectional nature of this study limits the causal interpretation of risk factors and types of injuries. It is necessary to undertake longitudinal follow up in that area. Despite the above mentioned limitations, this study allows useful conclusions to be drawn, which may be useful for developing preventive programs.

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