

## Original Research Article

# Epidemiological profile of injuries in urban and urban slum areas of Rajkot city, India: a community based study

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## ABSTRACT

**Background:** Injuries and violence are among the most prominent public health problems in the world. Objective was to study the epidemiological profile of injuries in urban and urban slum areas of Rajkot city, India.

**Methods:** A community based study was conducted in Rajkot city with sample size of 540 households. Total 30 clusters (society) were selected from 805 notified societies including 20 clusters from urban areas and 10 clusters from urban slum areas of Rajkot city. From identified cluster, 18 households were selected to achieve targeted sample size 540. All injuries reported among all household members in the last 12 months were included in the study. A total of 2,367 persons of all ages were interviewed.

**Results:** The prevalence of injury was 14% among 2,367 study participants. Almost all injuries (99.1%) were unintentional in nature. The leading causes of injuries were falls (49.2%) and road traffic accidents (RTAs) (35.7%). Significant numbers of injuries were reported among males ( $p < 0.01$ ). The males reported RTAs (46.9%) and females reported falls (64.2%) as a common type of injury ( $p < 0.01$ ). Lower limb (70.1%) was the most commonly affected body part and road (38.4%) was the most common place of injury occurrence. Average money spent by injured person was Rs. 7,000. Only 11.3 % study participants had health insurance.

**Conclusions:** Injury prevention priorities should be focused on the leading causes such as falls and RTAs to develop specific preventive strategies.

**Keywords:** Prevalence, Accidents, Wounds and injuries, India

## INTRODUCTION

Injuries and violence are among the most prominent public health problems in the world.<sup>1</sup> It is estimated that around 9% of the global mortality and 12% of the global disease burden is due to injuries.<sup>2</sup> Developing countries carry the largest burden of injuries and approximately 90% of the deaths due to injuries occur in low and middle income countries.<sup>3</sup> India contributes 16.7% for injuries and accidents of the total disease burden.<sup>2</sup> Deaths due to injury are growing fast and doubling every sixth year in

India and injury would be the prime contributor in the total disease burden by 2020.<sup>4</sup> The high number of cases of injury fatalities among the developing countries can be attributed to unsafe environments, lack of effective prevention programs and poor access to quality health care.

Injury is defined as acute exposure to physical agents, such as mechanical force or energy, heat, electricity, chemicals and ionizing radiation, in amounts or at rates that cause bodily harm.<sup>1</sup> Injury may be classified as

unintentional (road traffic injuries, poisoning, drowning, falls, etc.), intentional (violence-related, including assault, homicide and suicide) and undermined intent.<sup>1</sup> Injury may result into death, life-long disabilities and long-term psychological health consequences.<sup>3</sup> Besides this, Injuries has also impact on financial burden in form of direct costs as a medical treatment or indirect costs as a result of loss of productivity.

In India, the severity and treatment costs for injury is higher than other diseases. Furthermore the financial burden on household due to injury is higher among non-insured persons.<sup>4</sup> Effective prevention of injuries is only possible when reliable detailed epidemiological information on magnitude and pattern of injury is available. Descriptive epidemiology of injuries remains limited in Gujarat including Rajkot city and available mainly from hospital based surveillance method. This method provides only a partial picture of magnitude of injuries. It doesn't provide information about all injuries, i.e. injuries that are not reached at hospital or treated at home.<sup>1</sup> So a community based study was conducted to know epidemiological profile of injuries in Rajkot city, Gujarat state, India.

## METHODS

The present study was conducted in urban and urban slum areas of Rajkot city, Gujarat state, India from January 2014 to December 2014 after obtaining ethical clearance from the institutional ethical committee. Rajkot is a major city of Gujarat state with population of 12, 86, 995 including slums.<sup>5</sup> There are total 23 wards and 805 notified societies (including slum area) in Rajkot municipal corporation (RMC).

Sample size and sampling technique was adopted from WHO guidelines for conducting community surveys on injuries and violence.<sup>1</sup> The calculated sample size was 495 households taking prevalence as 10% and for convenience 540 households were included in the study.<sup>2</sup> A notified society in RMC was considered as one cluster. Cluster sampling method was used to select 30 clusters (societies) from 805 notified societies of corporation. Out of selected 30 clusters, 20 were from urban and 10 from urban slum areas of corporation. From identified cluster, 18 households were selected to achieve targeted sample size 540.

Information was sought from all individuals residing in the identified households after obtaining verbal consent. The head of family or any senior family member present was interviewed. For the purpose of this study, injury was defined as any injury serious enough to warrant medical treatment or to alter "normal" activity for one or more days.<sup>1</sup> Injuries that occurred within a period of past 12 months were included in the study. The questionnaire was divided into two parts. The first part was about socio-demographic details and to identify household member who had an injury in the last one year. The

second part, administered to injured persons, which was developed based on WHO guidelines for surveys on injuries and violence.<sup>1</sup> Detailed information about each injury event (i.e. type, place, time, site and outcome of injury etc.) was collected in the second part. The data was analyzed by using Epi Info 7 (version 3.5.3) software.<sup>6</sup>

## RESULTS

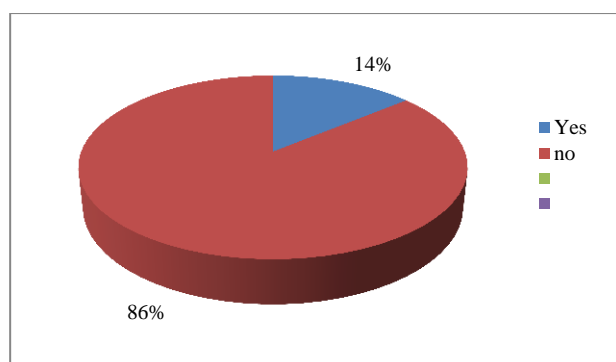
A total of 2,367 persons from 540 households were interviewed in the present study. Majority of study participants were from 25-54 years of age group (46.3%) (Table 1). Sex wise distribution of study participants were almost equal (52.5% were males and 47.5% were females). Literacy status of study participants was higher, only 9.5% participants were illiterate. Almost two third participants (68.9%) were belonging to nuclear families. Only 11.3 % participants had health insurance. Out of total 2,367 study participants, 14% prevalence of injury was reported in present study (Figure 1).

**Table 1: Socio demographic profile of study participants in Rajkot city, India (n=2367).**

Variables	Frequency	(%)
<b>Age group (in years)</b>		
0-14	578	24.4
15-24	392	16.6
25-54	1095	46.3
55-64	169	7.1
≥65	133	5.6
<b>Sex</b>		
Male	1243	52.5
Female	1124	47.5
<b>Education status</b>		
Illiterate	224	9.5
Primary	627	26.5
Secondary	476	20.1
Higher secondary	291	12.3
Graduate	415	17.5
Post graduate	79	3.3
Not applicable*	255	10.8
<b>Type of family</b>		
Nuclear	372	68.9
Joint	48	8.9
Three generation	120	22.2

\*Children <6 years of age.

The most common type of injury was falls (49.2%) followed by RTAs (35.7%) (Table 2). Significant numbers of injuries were reported among males ( $p<0.01$ ). The most common type of injury among males was RTAs (46.9%) while among females the most common type of injury was falls (64.2%). The difference was statistically significant. Among all injuries, the most common affected body part was lower limb (70.1%) (Figure 2).



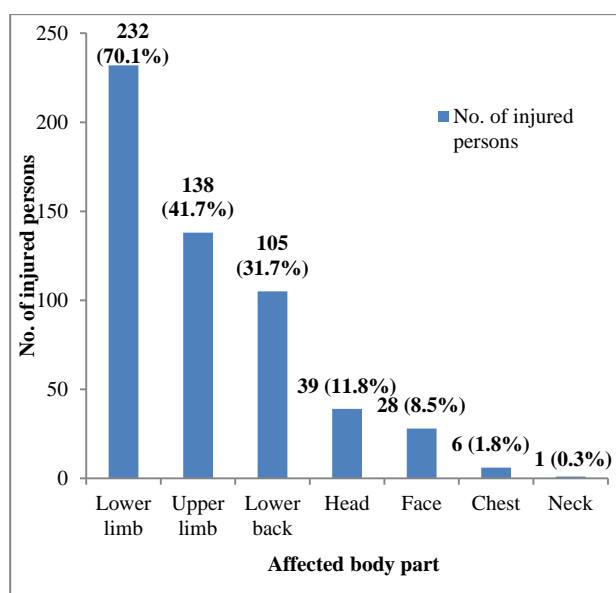
**Figure 1: Prevalence of injury.**

**Table 2: Association between type of injury and gender (n=331).**

Type of injury	Male No. (%)	Female No. (%)	Total No. (%)	P value
RTAs	91 (46.9)	27 (19.7)	118 (35.7)	0.01#
Falls	75 (38.7)	88 (64.2)	163 (49.2)	0.00##
Burns	1 (0.5)	13 (9.5)	14 (4.2)	
Machine injury	16 (8.3)	0 (0)	16 (4.8)	
Other injuries*	11 (5.6)	9 (5.9)	20 (6.0)	
<b>Total</b>	<b>194 (58.6)</b>	<b>137 (41.4)</b>	<b>331 (100)</b>	

\*Poisoning, drowning, dog bite and electric injury etc.

#sex wise distribution of injury, ##sex wise distribution of type of injury.



**Figure 2: Distribution of injuries according to affected body part.**

Table 3 illustrates that almost all injuries (99.1%) were unintentional in nature. The most common place of injury was on road (38.4%) followed by at home (36%). Almost half of injuries (47.4%) were occurred in evening time.

Majority of injured persons (62.2%) had taken home remedy as the first choice of treatment while 56.5% consulted local physician and 49.9% visited emergency room as the first choice of treatment. Of all injured persons, 40.5% injured persons were hospitalized and 35.6% persons were permanently disabled. On average, injuries led to 7 days of stay at hospital. Average money spent by injured person was Rs. 7,000 (Table 4).

**Table 3: Distribution of injury according to its type, place and time of occurrence, and outcome (n=331).**

Variables	Frequency	%
<b>Type of injury</b>		
Intentional	3	0.9
Unintentional	328	99.1
<b>Place of occurrence of injury</b>		
Work site	28	8.5
On road	127	38.4
Home	119	36.0
Other place*	57	17.2
<b>Time of injury</b>		
Morning	80	24.2
Afternoon	63	19.0
Evening	157	47.4
Night	31	9.4
<b>Outcome of injury</b>		
Hospitalized	134	40.5
Permanently disabled	118	35.6
Death at crash site	4	1.2
Not hospitalized	75	22.7

\*School, sea, street, water park, hospital.

**Table 4: Injury cases distribution as per money spent on medical treatment (n=321).**

Money spend on medical treatment in Rs.	Frequency (n)	(%)	Average money spent in Rs.
<5000	185	57.6	7000
5000-10000	43	13.4	
10000-50000	90	28.0	
>50000	3	0.9	

## DISCUSSION

The present study was conducted in urban areas of Rajkot city involving 2367 study participants during the year 2014. The study reported 14% prevalence of injury in one year. Globally different studies reported prevalence of injury ranges from 2.5-30.4% in various studies including India.<sup>7-12</sup> The wide range of prevalence may be attributed to many factors such as place, time, type of survey, selection of study participants and recall period. Almost all injuries (99%) were unintentional in nature in present study, which can be prevented by care and protective measures. Unfortunately, a misconception in the society is that the injuries are due to fate and are unavoidable.<sup>13</sup>

This finding was consistent with studies from other parts of India.<sup>8,9</sup>

Two leading causes of injuries were falls (49.2%) and RTAs (35.7%) in Rajkot city. Similar findings were observed in other urban area of India.<sup>14</sup> In contrast, studies conducted in rural areas of India and Sri Lanka were reported animal bites, falls and RTAs as leading causes of injury.<sup>8,9,15</sup> The pattern of injuries may vary in urban and rural areas due to differences in occupation, culture and lifestyle of person. Males (58.6%) were more prone to injuries than females (41.4%) in this study. Various studies across India reported similar findings.<sup>8,9,16</sup>

The leading cause of injury among females was falls while in males was RTAs. Studies from other countries also reported that RTAs were more common in males.<sup>17,18</sup> Risk to injuries due to RTAs remains high in males because in Indian society males being the earning members of family are subjected to work related stress and more exposure to outside environment as compared to females.<sup>19</sup> Hence there is need to carry out further research to explore pattern and causes of falls and RTAs, so that more appropriate preventive measures can be developed.

Road (38.4%) and home (36%) were identified as the most common places for injury occurrence in present study. Consistent with our findings, road and home were also identified by various studies in India as well as in other countries as common places of injuries.<sup>8,12,14,15,18-20</sup> Probable reason for more injuries on the road in an urban area is due to traffic and other risk factors especially in developing countries, such as no segregation of pedestrian from wheeled traffic, poor enforcement of traffic safety regulations, defective layout of cross roads and speed breakers.

Almost half of the injuries (47.4%) were reported during evening time. Similar trend was found in Gujarat state and Rajkot city as per National Crime Records Bureau (NCRB) 2015 compare to other parts of India, where it was more common during day time.<sup>21</sup> This may be due to the fact that at evening time heavy traffic, overcrowding and darkness are relatively more. Lower limb was the most affected body part (70%) in injured persons in this study similar to other studies conducted in other areas.<sup>11,13,22</sup>

Majority of injured persons (62.2%) had taken home remedy as the first choice of treatment while study conducted in neighboring country Sri Lanka showed that majority of injured person had taken allopathic treatment as a first choice of treatment.<sup>13,15</sup> However study conducted in rural area of India explored that some harmful home remedies were used for treatment of injuries as the first choice of treatment.<sup>9</sup>

More than one third of injured persons (35.6%) were permanently disabled. The proportion of disabilities in present study was high as compared to study conducted in Sudan, but in contrast to other studies which reported lower proportion of disabilities in India.<sup>9,19,22</sup> Duration of hospital stay may affect the economic status of injured person as well as the family member. In present study, more than one third (40.5%) injured persons were hospitalized. Average money spent on medical treatment by injured person was Rs 7000. Loss of wages for injured person and the caregiver would impose an indirect effect on the economic condition of the family.<sup>22</sup>

Health insurance coverage was very low among study participants (11.3%). This finding was almost similar to our country's health insurance coverage, as only 17% of population had access to insurance policies in 2014.<sup>23</sup> The insurance companies so far have paid very little attention to medical insurance because of low profitability as well as lack of demand.<sup>4</sup> So there is a need to improve awareness and knowledge about health insurance and efforts should be targeted to cover more number of persons by health insurance.

## CONCLUSION

Most common type of injuries were falls and RTAs. Males reported with RTAs and females with falls. Lower limb was most commonly affected body part. Increasing health insurance coverage and developing injury prevention strategies may help to reduce injuries.

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