

An epidemiological study of injury among urban population

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Abstract

Background: Injuries are a focus of public health practice because they pose a serious health threat, occur frequently and are preventable. Injuries affect people of all ages and range from minor cuts and bruises to major catastrophes that take thousands of lives.

Objectives: This paper aims to find out the prevalence of injuries and to study the various epidemiological factors related to the injuries in Dharan.

Materials and methods: A sample of 1398 households was taken as study sample. A systematic random sampling technique was used to select the 10% households from each 19 wards. A pre-tested questionnaire was used to collect demographic information and information related to injuries to the persons suffered from injuries.

Result: The prevalence of minor injury in Dharan was 3.5% per month. The injury was common in the age group, 40-49 years (4.6%) and majority of injured persons were farmers (6.9%). Home was the common place (55.6%) for the minor injury. Cut/stab (32.8%) was the most common types of minor injury. The prevalence of major injury was 0.7% per year and occurred more among 50-59 years age group (1.7%). The commonest place for major injury was at road (53.1%) and service holders were at more risk (1.4%). Falls from the height (46.9%) were the most common types of major injury.

Conclusion: The injuries related to lifestyle profession and road traffic accidents (RTA) is the commonest burden revealed in the study sample. Promotion of safety and education for protection at work and safe driving can prevent the major socio-economic loss to the family and community at large.

Key word: Minor injury, Major injury, RTA, Epidemiological factors.

Injury had long been considered as an “accident” and has been taken as a medico-legal and a criminal perspective but not taken as a public health problem. Once a person comes in health institution for treatment of an injury, only then it is considered a health problem¹. Injuries are a focus of public health practice because they pose a serious health threat, occur frequently and are preventable². Modernisation created hostile environment for accidental injuries everywhere, which toll large number of morbidity and mortality among young people and children. Information available are merely record based, which is just tip of the iceberg. Problem of the accidental injury can be recognised only through community based epidemiological studies in different regions.

This study was conducted in Dharan municipality, a town of the Eastern region of Nepal, which provides the magnitude of the problem in Dharan. This paper aims to find out the prevalence of injuries and to study the various epidemiological factors related to the injuries

in a rapidly urbanising town, Dharan, which includes minor and major injuries.

Material and methods

This study is a cross-sectional study conducted from July 2004 to June 2005 in Dharan municipality. Dharan is a town situated at the foot of the mighty Himalayas in the Eastern region of Nepal. This town is one of the most important industrial, economic and educational centres in the region and a gate-way to the hills and mountains of the Eastern Nepal. The population of Dharan Municipality was 95332 with 13853 households, according to the census 2002; it is divided in to 19 wards. It has mixed ethnicity comprising of Rai, Newar, Limbu, Brahmin, Chhetri, Tamang, Magar, Gurung and others³. In this study 10% of the households

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of Dharan i.e. 1388 households was taken as a sample size. A systematic random sampling technique was used to select 10% households from each 19 wards. Hence, the number of household from each ward ranged from 20 to 190 based on the total number of households in a particular ward. A detailed questionnaire was used to collect demographic information of all members of each households and information related to injuries to the persons suffered from injuries including treatment obtained, cost of treatment (direct/indirect cost) and length of disability. A separate questionnaire with in depth interview and probe was done to collect any information related to a fatal injury within one year among family members. Preliminary analysis indicated that a long recall period underestimated annual injury rates, with the effect being greater for injuries resulting in <30 disability days while the rates for injuries resulting in 30 or more disability days were quite stable⁵. We therefore categorised severity of injury as 'minor' if resulting in less than 30 days of lost of activity and 'major' if resulting in 30 or more days of lost activity.

A master chart was prepared and the collected data was entered in Microsoft Excel. Coding of the variables was done. SPSS version 11.5 was used for analysis and percentage, proportions and prevalence rates were calculated. Chi-square test was applied to test for proportions wherever applicable.

Results

Out of total number of 13853 households having a total population of 95332 in Dharan municipality, 1388 households having 7063 persons (i.e. 10% of the households of Dharan) were interviewed during the study period.

The prevalence of minor injuries was highest (4.6%) among 40-49 years age group, followed by 4.5% among 0-9 years. But the prevalence of major injuries was the highest (1.7%) among 50-59 years of age group, followed by 30-39 years and 20-29 years age groups, 1.0% and 0.7% respectively. The difference in the prevalence of both injuries according to the age-group is statistically not significant. The prevalence of injury among the males is significantly higher in comparison with females for minor injuries ($p < 0.0001$) and major injuries ($p < 0.005$) (Table 2).

Minor injuries accounted more (4.0%) in those with intermediate and above education. The least prevalence was among illiterates (3.0%). Among major injuries, highest (1.0%) prevalence was found among primary school education, followed by secondary school education (0.7%).

Table 2 shows that the prevalence of minor injury was also highest (6.9%) among agriculture and farming by occupation. Likewise the prevalence of major injuries was more among those who were in agriculture field.

Maximum number (19.2%) of minor injuries occurred on Saturday, follows by Sunday and Monday, 17.2% and 14.4% respectively. Major injuries occurred maximum (24.5%) on Sunday (Fig. 1). Similarly 22.4%, 16.3%, 14.3% and 10.2% of the major injuries occurred on Saturday, Friday, Thursday and Monday respectively.

Data indicates that minor injuries occurred most frequently at 3pm to 5:59 pm (26%) and followed by 21.6% at 9:00 am to 11:59 am. Very less number (1.2%) of minor injuries occurred during 1:00 am to 5:59 am. Maximum percentage (30.6%) of major injuries had occurred at 3:00 pm to 5:59 pm, followed by 6:01 pm to 1:00 am 20.4%. Only (6.2%) of major injuries occurred during 6:00 am to 8:59 am.

In terms of minor injuries, most of them (55.6%) occurred at home, followed by road and recreation area (including sports): 21.6% and 20.0% respectively. Most of the major injury (53.1%) occurred at road, followed by home (42.9%) and recreation area (including sports) (4.1%).

Fall and transport injuries were the most common causative mechanism for major injuries whereas cut/stab was also additional causes to the causative mechanism for minor injuries (Table 3).

Table 1 shows that out of the total surveyed population of 7063, prevalence of minor injuries were 3.5% during the preceding recall of one month and major injuries were 0.7% during preceding recall of one year. Four deaths due to injuries were also reported during the preceding one-year.

Table 1: Prevalence of injuries in the study population (n=7063)

Types of injuries	Number	Prevalence, % (95% CI)
Minor injury	250	3.5 (3.1 to 4.0)
Major injury	49	0.7 (0.5 to 0.9)

Table 2: Prevalence of different types of injuries according to the various demographic variables

Variables	Prevalence (%)			
	Minor Injury	significance	Major Injury	significance
Age group (Year)				
0-9	4.5	$\chi^2=7.06$, d.f.=6, p=0.32, NS	0.6	$\chi^2=14.8$, d.f.=6, p=0.21, NS
10-19	3.0		0.6	
20-29	3.3		0.7	
30-39	3.2		1.0	
40-49	4.6		0.1	
50-59	3.3		1.7	
≥60	3.3		0.4	
Gender				
Male	4.5	$\chi^2=19.41$, d.f.=1, p< 0.0001, S	1.1	$\chi^2=9.75$, d.f.=1, p< 0.005, S
Female	2.6		0.4	
Education*				
Illiterate	3.0	$\chi^2=0.947$, d.f.=1, p= 0.33, NS	0.5	$\chi^2=0.372$, d.f.=1, p=0.54, NS
Literate	3.5		0.7	
Primary	3.5		1.0	
Secondary	3.3		0.7	
Intermediate and above	4.0		0.6	
Occupation* *				
Student	3.5	$\chi^2=15.79$, d.f.=8, p= 0.06, NS	0.6	NA
Housewife	2.9		0.4	
Business	4.0		0.6	
Unemployed	5.0		0.8	
Service	3.6		1.4	
Agriculture/Farming	6.9		1.1	
Retired	3.4		1.3	
Labour	1.3		1.3	
Others	1.9		0.9	

* Children aged <6 years (n=327) not applicable for education

** Children aged <10 years (n= 601) not applicable for occupation

NS: not significant /S: significant

NA: not applicable (less number of frequency in many cells)

Table 3: Distribution of injuries according to the causative mechanism

Mechanism	Type of injury			
	Minor		Major	
	No.	%	No	%
Cut/stab	82	32.8	2	4.1
Fall	81	32.4	23	46.9
Transport injuries	25	10.0	20	40.8
Burn/scald	23	9.2	3	6.1
Bite (animal/insects)	11	4.4	0	0
Assault	11	4.4	1	2.1
Struck by objects	6	2.4	0	0
Other	11	4.4	0	0
Total	250	100.0	49	100.0

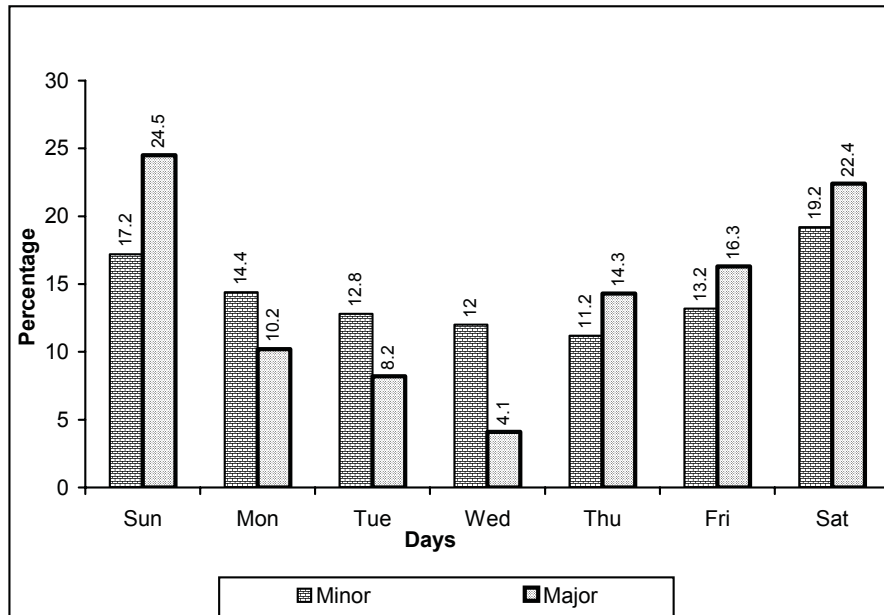


Fig 1: Distribution of injuries according to the day of occurrence

Discussion

The present study revealed that prevalence rate of minor injury was 3.5% per month and for major injuries 0.7% per year. A study from Ghana⁴ showed that the incidence rate of minor injuries among the urban community was 1.3% and that of major injury was 1.7%. Another study done in urban area of Tanzania⁵ showed that the incidence rate of minor injury was 1.7% and major injury 0.83%. Compared to these studies, the prevalence of minor injuries was more in our context whereas the prevalence of major injuries was less. Also, in a study conducted in rural area of eastern Nepal, showed that the prevalence of minor injury was 2.9% per month and major injury was 0.04% per year⁶. The prevalence of injury was higher in our study as compare to study done in rural area of Nepal. This could be due to rapid urbanisation and unplanned urban growth of Dharan which has led to incompatible land uses with high levels of pedestrian vehicle conflict and also increasing motorization, crowded living conditions and lack of recreation space. Similar trends was observed in some the studies^{6,7}.

The age specific prevalence of both injury was highest among 0-9 years age group (5.1%), followed by 50-59 years age group (5.0%) and 40-49 years age group 4.7%. In Kumasi Ghana also found maximum incidence in 0-9 year's age group⁸. A hospital-based study in eastern Nepal⁹ showed that 0-40 year was the most commonly injured group. Similarly, a study done by Oliver BA found that most prone group for accident was

5-25 years¹⁰. In Tanzania, maximum participants were among 15-44 years age group⁵. This shows that the age may be an important risk factor for many injuries but its influence varies among specific injury groups. Injuries are quite common in age group between 0-9 years in this study because of the range and extent of their activities which exposed them to such episodes.

In the present study, males were injured more (minor 4.5% and major 1.1%) than the females, which is supported by many studies done in Ontario of Canada¹¹, in Pakistan¹², in Valencia of Spain¹⁰, in Eastern Nepal¹³ and in Haryana India¹⁴. The reason may be due to their involvement in outdoor activities and females leading less active life and mostly remain indoors.

The result also showed that prevalence was more among those who had studied up to or above intermediate (minor 4.0%, and major 0.6%), than those of other level of education except for major injuries which was more among primary school education. Similar finding was found in other studies^{5, 15}. It was observed that more people with lower levels of education were involved in injuries. However, this relationship between education and injury may not be causal.

Injury rate according to occupation was seen highest among the agricultural workers / farmers for minor injury 6.9%, but major injury was found more among the service holders (1.4%). This may be because

farmers were more involved in fieldwork and in close contact with sharp equipments and tools than in other occupations, which may increase the risk of having an injury. It has been reported that more accidents were seen among low socio-economic group of people. However in another study¹⁶ major injury was found highest among students (2.5%) followed by labourers 2.0%, but in our study it was 0.6% and 1.3% respectively.

The highest number of minor and major injuries had occurred on Saturday and Sunday. Similar finding have also been observed by other studies^{8,6}. Saturday is a public holiday in Nepal. The reason may be that people leave homes for recreation and other various purposes on Saturday and hence become more exposed to minor injuries. Similarly more people got major injury during 1st day of the week; reason may be due to the heavy traffic rush.

In the present study, the peak time for minor injury was 3:00 pm to 5:59 pm (26.0%), followed by 9:00 am to 11:59 am (21.6%) and 6:01 pm to 1:00 am (17.2%). Similar finding have been observed by the study of Rajbhandari⁶. Morning hours are the busiest as commuters go to the schools, offices, factories and business places and were more prone to injuries. Similarly maximum numbers of major injuries occurred at 3:00 pm to 5:59 pm (30.6%) (Fig 2) followed by 6:01 pm to 1:00 am (20.4%). Similar finding was found in a study of Haque M et al.¹⁷. These hours were the busiest times as peoples are found returning from the various places after finishing their works and roads are also busy. During this time children usually go to play and hence they were more exposed to different types of injuries. Only (6.2%) of people got major injuries at 6:00 am to 8:59 am, it may be because at that time people are at home and roads are also not so busy, hence less chances of injuries at that time.

This highest numbers of minor injuries seemed to be occurring at home (55.6%), followed by road (21.6%) and recreation areas (including sports) 20.0%. But most of the major injury occurred at road (53.1%) and at home 42.9%. The study from the eastern Nepal⁶, found the most common place for injuries were field/farm (28.9%), equal percentage (20.8%) for road and play ground and 13.1% at home. This is expected because in rural area most of the people are involved in agricultural work; hence they were more prone to be injured in the field. Also in the present study the most of the major injury occurred at road. This may be because of high levels of pedestrian vehicle conflict and also increasing use of vehicles in Dharan.

Our study also shows that the leading causative mechanism of minor injuries was cut /stab and fall.

Likewise most of the major injuries (46.9%) were due to fall followed by transport related injuries 40.8%. Similar findings have also been observed by Mock CN et al.⁴. Fall was the single largest contributor, followed by transport related injury. In a previous hospital based study¹⁸, it was reported transport related admission for children (40%), followed by falls (27%). However, transport related injuries accounted for over half (54.0%) of injury related mortality in that study, showing that although falls are a significant contributor to non-fatal injuries, transport injury is the most important contributor for fatal injuries.

Conclusion

The prevalence rate of minor injury was 3.5% per month and for major injuries 0.7% per year.

Injury rate was seen highest among the agricultural workers / farmers for minor injury but major injury was found more among the service holders. The highest number of minor and major injuries had occurred on Saturday and Sunday. The leading causative mechanism of minor injuries was cut /stab and fall. The injuries related to lifestyle profession and RTA is the commonest burden revealed in the study sample. Promotion of safety at work and education for protection at work and safe driving can prevent the major socio-economic loss to the family and community at large.

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