

## Study of Prevalence and Risk Factors of Non-Fatal Road Traffic Accidents in Rural population of District Dehradun

Shubham Mohan Sharma<sup>1</sup>, Ruchi Juyal<sup>2</sup>, Lalit Kumar<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Community Medicine, Shree Guru Gobind Singh Tricentenary Medical College Hospital & Research Institute, India.

<sup>2</sup>Professor, Department of Community Medicine, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, India.

<sup>3</sup>Assistant Professor, Department of Community Medicine, Shree Guru Gobind Singh Tricentenary Medical College Hospital & Research Institute, India.

### \*Corresponding author

Dr. Shubham Mohan  
Sharma

### Article History

Received: 08.09.2017

Accepted: 16.09.2017

Published: 30.09.2017



**Abstract:** To study the prevalence and various environmental risk factors related to Road Traffic Accidental injuries in rural population of district Dehradun. A cross-sectional descriptive study was conducted in rural areas of district Dehradun. Multistage stratified random sampling method was used to reach the desired sample size. Overall 2000 individuals were interviewed using a structured pretested questionnaire. The data was entered in computer and analyzed by using SPSS software version 20. Maximum numbers of Road Traffic Accident (RTA) victims were in the age group of 20 – 29 years (31.0%). Males (74.3%) were involved significantly more as compared to females (25.7%). Most of the RTAs (54.7%) occurred during good light conditions and during clean and clear weather (94.7%). on crowded municipality roads (43.9%). Rural area had significantly more accidents (69.6%) as compared to urban area (30.8%). Maximum RTAs (76.5%) happened to occur on good roads.

**Keywords:** Prevalence, environmental factors, Road Traffic Accident

### INTRODUCTION

Accidental injuries are a neglected epidemic in developing countries, causing more than five million deaths every year. Unfortunately, accidents occur due to carelessness, recklessness and over confidence and not often due to ignorance. These injuries account for high economic and social costs for communities around the globe.

The costs involved are greater in low- and middle-income countries, where many public health systems have yet to prioritize injuries as a major health concern, despite the cost-effective methods available to prevent them [1].

Indirect estimates by the World Health Organization (WHO) suggest that unintentional injuries account for 3.9 million deaths worldwide, of which about 90% occur in low and middle income countries. The majorities of these deaths are attributable to Road Traffic injuries, falls, drowning, poisoning and burns. In 2004, WHO estimated about 0.8 million deaths in India were due to unintentional injuries [2].

Road Traffic Accidents (RTAs) can be studied in terms of agent (Vehicle), host (human) and environmental factors, which play an important role before, during and after a trauma event.

In India, not many systematic and scientific studies are available to highlight specific human, vehicle and environmental factors responsible for several types of injuries. Hence, the present epidemiological study was planned to address this research gap by focusing mainly on the prevalence and role of various risk factors including environmental factors in Road Traffic Accidents in a rural community setting. These findings are a part of a larger study carried out to know about the magnitude and pattern of injury in our area.

### MATERIALS AND METHODS

This community based cross sectional study was conducted in the rural areas of district Dehradun. Ethical clearance from the ethical committee of the institute was taken prior to conduction of survey. A sample of 1996 was worked out taking a prevalence of 30.6% [3] as a reference. It was rounded off to 2000.

All individuals who have sustained an accidental injury in the last one year that needed medical attention or stay in bed at least for one day; or required to stop regular work or activity for at least one day after injury were included in the study. Individuals with mental illness, physical or developmental disabilities were excluded from the study.

A pre-designed, semi structured (modified version of WHO questionnaire) was used to carry out the survey [4]. This included socio demographic details of the family, details pertaining to the Road Traffic Accident and other injuries and factors related to RTA. Data was collected by house to house survey in the chosen areas. Multistage stratified random sampling was used to select the household. After taking written consent from the head of the family, interview of the eligible subject was taken. For children, proxy interview of the mother/ guardian/ caretaker was undertaken. Collected Data was compiled and analyzed by using SPSS software version 20. Percentages and proportion were calculated for all the variables, while Chi square test was applied for association between two variables.

**RESULTS**

The study population comprised of all individuals who had sustained a traffic accidental injury in the last twelve months preceding the survey that needed medical attention or stay in bed for at least one

day; or to stop regular work or activity for at least one day after the injury.

Out of all injuries occurring in the surveyed population in last twelve months, RTA accounted for 27.1% of the cases (Figure – 1). Maximum number of RTA victims (Table - 1) were in the age group of 20 – 29 years (31.0%) followed by 30 – 39 years age group (21.1%). It was observed that overall males (74.3%) were involved significantly more in RTAs as compared to females (25.7%) (Table-2).

Majority of RTA victims were from middle class (45.0%) followed upper middle class (33.9%) and least cases were reported from lower class (1.2%). RTA injuries were maximally found in the laborer/farmer group (24.0%), followed by students (21.1%). Drivers were the most affected RTA victims (71.1%) followed by passengers (26.5%). Only 2.4% of the pedestrians in our study were victims of RTA (Table – 3).

Most of the RTAs (63.5%) occurred during evening hours (4 – 10pm) followed by day time i.e.10am – 4pm (18.8%) (Fig-3). Most of the RTA cases occurred when day light was adequate (54.7%) and weather was Good (94.7%) (Table-4). It was also observed (Table – 5) that maximum RTAs occurred on highways (34.1%) followed by on municipality roads (38.2%). Maximum RTAs (76.5%) happened to occur on good roads, while only 3.5% occurred on bad roads.

**Table -1: Age wise distribution of RTA victims**

Variable	Total No. of RTA (170)	
	N	%
< 10 yrs.	29	17.0
10 – 19 yrs.	21	12.3
20 – 29 yrs.	53	31.0
30 – 39 yrs.	36	21.1
40 – 49 yrs.	17	9.9
50 – 59 yrs.	10	6.4
≥ 60 yrs.	4	2.3
<b>Chi square</b>	$\chi^2 - 130.1, df - 3, p \leq 0.0001$	

**Table – 2: Sex wise distribution of RTA victims**

Variable	Total No. of RTA (170)	
	N	%
Male	126	74.3
Female	44	25.7
<b>Chi square</b>	$\chi^2 - 77.19, df - 1, p \leq 0.0001$	

**Table -3: Some other Host factors in RTA injuries**

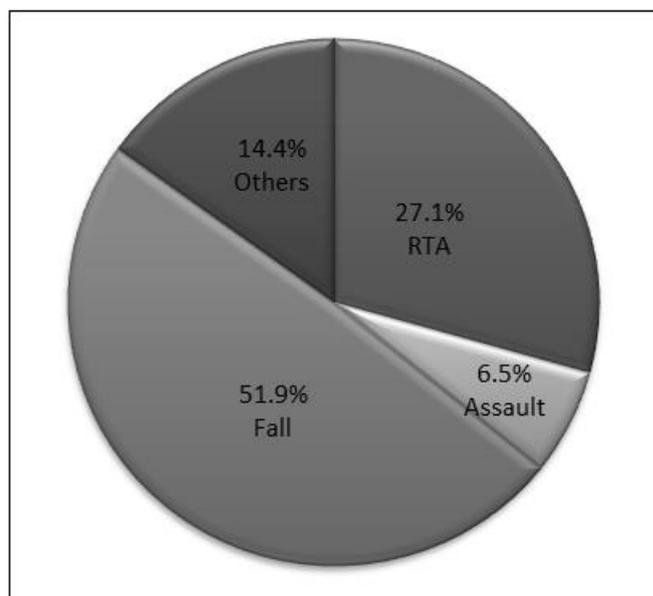
Variables	Rural(170)	
	N	%
<b>Socioeconomic status</b>		
Upper class	4	2.3
Upper Middle	57	33.9
Middle class	77	45.0
Lower Middle class	30	17.5
Lower class	2	1.2
<b>Chi square</b>	$\chi^2 - 122.9, df - 1, p \leq 0.0001$	
<b>Occupation</b>		
Unskilled labour	20	11.7
Skilled labour	15	8.8
Farmer	6	3.5
Shopkeeper/Businessman	24	14.6
Professional	18	10.5
Unemployed/Retired	24	14.0
Government/Private service	15	8.8
House hold work	11	6.4
Student	36	21.1
<b>Chi square</b>	$\chi^2 - 89.05, df - 1, p \leq 0.0001$	
<b>Activity at the time of accident</b>		
Driving	121	71.1
Passenger	45	26.5
Pedestrian	4	2.4
<b>Chi square</b>	$\chi^2 - 59.31, df - 1, p \leq 0.0001$	

**Table-4: Environmental factors in RTAs**

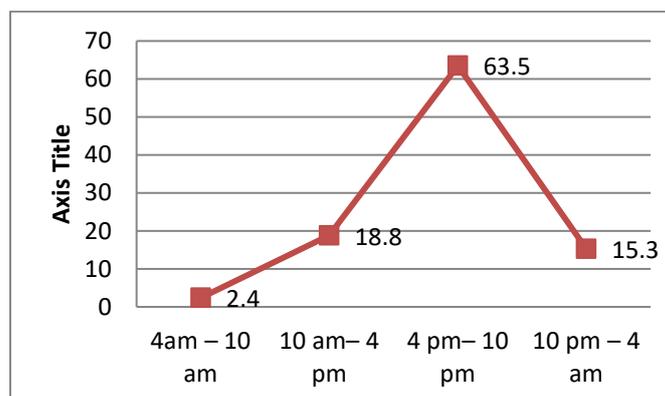
Variables	Total No. of RTA (170)	
	N	%
<b>Light conditions</b>		
Good	93	54.7
Dim light	46	27.1
Dark	31	18.2
<b>Chi square</b>	$\chi^2 - 3.012, df - 1, p \leq 0.0001$	
<b>Weather conditions</b>		
Clean/Clear	161	94.7
Rainy	9	5.3
Foggy	0	0.0
<b>Chi square</b>	$\chi^2 - 271.812, df - 1, p \leq 0.0001$	

**Table – 5: Road related factors in RTAs**

Variables	Total No. of RTA (170)	
	N	%
<b>Type of road</b>		
Highway	58	34.1
Rural/Brick road	47	27.7
Municipality road	65	38.2
<b>Chi square</b>	$\chi^2 - 18.824, df - 1, p \leq 0.0001$	
<b>Road conditions</b>		
Good	130	76.5
Bad	6	3.5
Average	34	20.0
<b>Chi square</b>	$\chi^2 - 95.254, df - 1, p \leq 0.0001$	



**Fig-1: Distribution of various types of injuries.**



**Fig-2: Time distribution of Road Traffic Accidents**

## DISCUSSION

In our study, maximum number of RTA victims were in the age group of 20 – 29 years (31.0%) followed by 30 – 39 years age group (21.1%). Similar results were also observed by Mahajan N and Jha N [5,6]. In contrast, Dixit et al from Srinagar Garhwal, Uttarakhand reported that 50% of drivers involved in RTAs were less than 40 years of age and 15.8% of drivers were less than 20 years of age [7].

There was male preponderance in our study as males (74.3%) were significantly more involved in RTAs as compared to females (25.7%). Similar results were also observed by Patil S and Jha N [8,6].

In the present study it was seen that RTA injuries were maximally found in the laborer/farmer group (24.0%), followed by students (21.1%). The reason may be that laborers and farmers have to go to their work places/fields daily by several modes of transport and so are more prone to accidents. Among

students, the reason which may be cited is that in rural areas also, young students are mostly bikers & have risk taking behavior & hence more prone to RTA. Similar findings were reported by Kumar R and Singh P in their clinico epidemiological study of Road traffic accidents in hilly area of Kumaon region in which they observed that most of the trauma victims were farmers/laborers followed by tourist [9].

In our study drivers were found to be the most affected RTA victims (71.1%) followed by passengers (26.5%). Only 2.4% of the pedestrians in our study were victims of RTA. In contrast, Marvin Het al reported that pedestrians (68000), motorcyclists (36000) and other vulnerable road users (20000) constituted 68% of RTI deaths (124000) nationally [10].

RTAs maximally (63.5%) occurred during evening hours (4 – 10pm) followed by during 10am – 4pm (18.8%). Similar results were also observed by Dixit S and Verma P [7, 11]. In contrast, Kandpal *et al.*

in their study from Dehradun Uttara hand, observed that majority of accidents (76.8%) occurred during day time i.e. from morning to evening with a peak (31.1%) in afternoon [12]. Day light was reported to be adequate in most of the RTA cases (54.7%) and weather was good (94.7%). It might be due to the fact that this part of Uttarakhand, fog usually occurs in winter evenings and clears by late morning and people avoid travelling during night and early morning hours. The days in winters are usually sunny unlike plain areas. In rural area no RTA was reported under foggy conditions. Similar results were also observed by Joshi *et al.* [13].

Maximum RTAs (76.5%) were reported to occur on good roads, while only 3.5% occurred on bad roads. This shows that despite of good road conditions, RTAs are bound to happen because of human factors such as not following the traffic rules properly, rash driving, overloading and other such conditions. Similar results were also observed by Dixit S [7].

### CONCLUSIONS AND RECOMMENDATIONS

From the above study it can be concluded that the prevalence of RTA injuries are fairly high in rural population of district Dehradun. Its increasing prevalence in rural community and in the younger age group is a pointer to the fact that the burden of RTAs is going to rise in near future.

Greater attention should be paid towards the prevention of RTA in India. Computerized Trauma Registry, health insurance coverage of population for efficient and timely management of injured persons, devising better road and traffic management networks as well as educating the public in general for road safety measures including use of personal safety gears as well as following traffic rules etc. are some of the few recommendations advised for prevention and better management of RTA injuries.

### REFERENCES

1. Gosselin RA, Spiegel DA, Coughlin R, Zirkle LG. Injuries: the neglected burden in developing countries. *Bulletin of the World Health Organization*. 2009 Apr;87(4):246-a.
2. World Health Organization: The Global Burden of Disease: 2004 update. Geneva: World Health Organization; 2008.
3. Kalaiselvana G, Dongre AR, Mahalakshmy T. Epidemiology of injury in rural Pondicherry, India. *Journal of injury and violence research*. 2011 Jul;3(2):62.
4. Shankar G, Naik VA, Powar R. Epidemiological study of burn injuries admitted in two hospitals of North Karnataka. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*. 2010 Oct;35(4):509.

5. Mahajan N, Aggarwal M, Raina S, Verma LR, Mazta SR, Gupta BP. Pattern of non-fatal injuries in road traffic crashes in a hilly area: A study from Shimla, North India. *International journal of critical illness and injury science*. 2013 Jul;3(3):190.
6. Jha N, Srinivasa DK, Roy G, Jagdish S. Injury pattern among road traffic accident cases: A study from South India. *Indian J Community Med*. 2003 Apr 1;28(2):84-90.
7. Dixit S, Tyagi PK, Singh AK, Gupta SK, Malik N. Clinico-epidemiological profile of road traffic incidents admitted at a tertiary care hospital in garhwal-uttarakhand. *JEMDS*. 2012;1(3):83-90.
8. Patil SS, Kakade RV, Durgawale PM, Kakade SV. Pattern of road traffic injuries: A study from western Maharashtra. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*. 2008 Jan;33(1):56.
9. Kumar R, Singh P. Orthopedic trauma in hilly area of Kumaon region: A clinico epidemiological study.
10. Hsiao M, Malhotra A, Thakur JS, Sheth JK, Nathens AB, Dhingra N, Jha P, Million Death Study Collaborators. Road traffic injury mortality and its mechanisms in India: nationally representative mortality survey of 1.1 million homes. *BMJ open*. 2013 Aug 1;3(8):e002621.
11. Verma PK, Tiwari KN. Epidemiology of road traffic injuries in Delhi: Result of a survey. *In Regional Health Forum 2004 (Vol. 8, No. 1, pp. 6-14)*.
12. Kandpal SD, Vyas S, Semwal J. Epidemiological profile of Road Traffic Accidents reporting at a Tertiary Care Hospital in Garhwal Region of Uttarakhand. *Indian Journal of Community Health*. 2015 Jun 30;27(2):235-40.
13. Joshi AK, Joshi C, Singh M, Singh V. Road traffic accidents in hilly regions of northern India: What has to be done?. *World journal of emergency medicine*. 2014;5(2):112-5.