

## Prevalence of Road Traffic Injuries and Associated Risk Factors: A Community Based Cross Sectional Study

Madhu Priya<sup>1</sup>, Sandeep Yadav<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Community Medicine, NSMCH, Bihta, Patna, Bihar, India

<sup>2</sup>Assistant Professor, Department of General Surgery, NSMCH, Bihta, Patna, Bihar, India

Received: 13-06-2023 Revised: 21-07-2023 / Accepted: 28-08-2023

Corresponding Author: Dr. Sandeep Yadav

Conflict of interest: Nil

### Abstract

**Aim:** The aim of the present study was to estimate the prevalence of road traffic injuries (RTIs) and associated risk factors among residents of Bihta, Patna.

**Material & Methods:** This was a cross-sectional study conducted among 500 study subjects selected from urban and rural field practice area of the Department of Community Medicine, NSMCH, Bihta, Patna. Data was collected by personal interview using a pre-designed, pre-tested structured questionnaire. Result is presented in percentages and association was tested using logistic regression analysis.

**Results:** In the present study, the overall prevalence of RTI was found to be 4%. The prevalence of RTI was higher amongst males compared to females. RTI was also significantly higher among participants in the age group of 18-30 years and among people who were unemployed. In the final multi-variate analysis, people belonging to age group of 18-30 years and >50 years, unemployed, married and having graduation degree were found to be significantly associated with RTIs.

**Conclusion:** Our present study found a high prevalence of RTIs with risk factors like young age group, male gender, alcohol consumption and driving in rural areas. A constant increase in the number of motor vehicles, rampant encroachment of roads, unscientific construction of subways and under passes at highways, extremely high speed driving at the highways, ignorance regarding wearing helmets among riders of two wheelers, nasty tendency of violating traffic rules, anarchic traffic systems and population explosion have greatly contributed to rapid increase in road traffic accidents and thus RTI injury cases. Hence, preventing the occurrence of such injuries can greatly reduce fatalities.

**Keywords:** Road safety, Road traffic accidents, Road traffic injuries

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Road traffic accidents are defined as a collision involving at least one vehicle in motion on a public or private road that results in at least one person being injured or killed. [1] A road traffic injury (RTI) is any injury caused due to crashes originating, terminating or involving a vehicle partially or fully on a public highway. [2] It can result in fatal or a non-fatal injury that occurs as a result of a collision or incident involving at least one vehicle in motion in a private or a public road that results in one or more person being injured or killed. [3]

It has been predicted that by 2020 global death rates from road traffic accidents will rise by 67% due to the effect of rapid population growth, industrialisation and an increase in road vehicles. The World Health Organisation predicts that road traffic injuries would become the sixth commonest

cause of death by the year 2020 and the fifth by 2030. [1]

Rapid urbanization and industrialization have produced a massive increase in the number of motor vehicles on the road worldwide resulting in an increase in morbidity and deaths from traffic accidents, particularly in developing nations like India. Road traffic collisions are a prominent cause of death among teenagers. Children, pedestrians, cyclists, and older people are among the most vulnerable to road traffic accidents. [4] Globally, road traffic accidents (RTA) are common public health problem and established as the eighth leading cause of death which have similar impact as other communicable and non-communicable diseases. [5] GBD 2019 found that road traffic injuries (RTIs) were the first cause of death due to injury compared to other causes. [6] The global status report on road safety also showed that road traffic accidents (RTA)

cause more than 1.3 million deaths annually. [1,7] Road accidents are common in India and stand first in the number of road traffic accidents (11%) around the World.

Deaths due to injury that occur outside the hospital environment will not be covered by such systems; they also fail to capture those injuries that do not receive hospital attention (either because the injury was not severe enough to warrant medical treatment or because help was sought elsewhere). [8] Road traffic injuries also place a huge burden on the health sector in terms of pre-hospital and acute care and rehabilitation. [9] Hence the present study was conducted to determine the various risk factors influencing the road traffic accident cases admitted in a tertiary care hospital of Bihar region

### Material & Methods

The study was a community based cross-sectional analytical study carried out in the field practice area of the Department of Community Medicine, NSMCH, Bihta, Patna, Bihar, India. The study was carried out over a period of 1 year. A total of 500 Participants were selected by convenience sampling method. People who refused to participate in the study or whose questionnaires were incompletely filled were excluded from the study.

### Inclusion Criteria

- Persons of all ages, residing in the place of study for at least 6 months were included in the study.

### Exclusion Criteria

- Residents of hostels, jail, and community halls in the place of study as well as visitors or guests residing for less than 6 months were excluded.

### Data Collection Method

Data collection was done by personal interview using a pre designed pre tested questionnaire. The questionnaire was developed in English and also translated in the local language. Pilot testing of the questionnaire was done and modifications were made as necessary. The purpose of the study was explained to the respondents in their local language. Information of socio demographic details was recorded from head of the household or knowledgeable adult person available at the time of visit in all the families that were visited. If there was a history of RTI in any such household, further information was collected from the victim. In case the victim has expired/unavailable, the history was taken from head of the household or next to kin (proxy). For non-fatal injuries, history about last 3 months of any RTI was taken.<sup>10</sup> For fatal injuries, recall up to last 12 months was taken.<sup>10</sup>

### Statistical Analysis

The data was entered in MS EXCEL 2019 and analyzed using SPSS statistics 16.0. Quantitative variables were expressed in mean standard deviation and qualitative variables were expressed in proportions. The differences between proportions were analyzed using Chi-Square test. A probability value of less than 0.05 is considered to be statistically significant.

### Results

**Table 1: Overall RTI prevalence among the study participants**

Prevalence of RTI	Frequency	Percentage
Yes	20	4
No	480	96
Total	500	100

In the present study, the overall prevalence of RTI was found to be 4%.

**Table 2: Prevalence and association of RTI with respect to different factors**

Variables	RTI		U-OR* (95% CI)	P Value	
	Yes	No			
	0-17	1	106	2.13 (0.35-12.91)	0.314
<b>Age group (years)</b>	18-30	12	114	12.02 (2.77-52.05)	<0.001
	31-50	5	100	10.38 (2.26-47.54)	<0.001
	>50	2	160	Ref	0.412
<b>Gender</b>	Male	15	250	4.1(1.75-9.37)	0.0012
	Female	5	230	Ref	-
<b>SES</b>	Class I	10	255	Ref	-
	Class II	5	125	1.2 (0.58-0.27)	0.535
	Class III	4	80	2.4 (0.98-5.93)	0.055
	Class IV	1	19	1.2 ((0.15-9.94)	0.832
	Class V	0	1	0.00 (0.00)	0.931
<b>Locality</b>	Rural	16	320	Ref	-
	Urban	4	160	0.88 (0.40-1.91)	0.7535

	Cultivator	5	65	Ref	-
	Businessman	4	80	0.59 (0.19-1.77)	0.316
	Unemployed	5	25	3.2 (1.20-8.94)	0.023
<b>Occupation</b>	Student	2	150	0.11 (0.03-0.39)	0.001
	Daily wage earner	2	35	1.0 (0.28-3.53)	1.00
	Service holder	1	50	0.059 (0.13-0.01-1.08)	0.055
	Home maker	1	75	0.007 (0.24-0.024)	0.007
<b>Marital status</b>	Married	15	280	4.1 (1.68-9.96)	0.0017
	Unmarried	5	200	Ref	-
	Illiterate	1	4	ref	-
	Primary school	7	126	0.48 (0.05-4.4)	0.535
	Middle school	4	80	0.21 (0.02-2.2)	0.184
<b>Education</b>	High school	3	110	0.18 (0.01-1.79)	0.165
	Higher secondary	3	120	0.16 (0.01-1.55)	0.120
	Graduate	1	35	0.05 (0.003-0.92)	0.048
	Post graduate	1	5	0.71 (0.03-14.3)	0.832

A total of 500 participants, from both rural and urban areas, participated in the study and the prevalence of RTI was higher amongst males compared to females. RTI was also significantly higher among participants in the age group of 18-30 years and among people who were unemployed.

**Table 3: Factors associated with RTI-multiple logistic regression analysis**

Variables		Adjusted Odds Ratio	95% Confidence interval		P value
			Lower	Upper	
<b>Age</b>	0-17	Reference	-	-	-
	18-30	17.43	1.985	137.663	0.007
	31-50	3.707	0.423	32.431	0.242
	>50	0.025	0.002	0.237	0.002
<b>Gender</b>	Female	Reference	-	-	-
	Male	3.832	0.987	14.805	0.058
<b>SES</b>	Class I	Reference	-	-	-
	Class II	1.356	0.468	4.001	0.555
	Class III	3.412	0.877	13.287	0.072
	Class IV	0.490	0.014	16.396	0.690
<b>Occupation</b>	Cultivator	Reference	-	-	-
	Businessman	1.676	0.337	8.319	0.515
	Unemployed	16.078	2.217	116.642	0.007
	Student	0.634	0.064	6.137	0.684
	Daily wage earner	1.432	0.188	10.892	0.733
	Service holder	0.386	0.032	4.67	0.452
	Home maker	0.24	0.034	1.968	0.184
<b>Marital status</b>	Unmarried	Reference	-	-	-
	Married	7.525	1.41	40.159	0.016
<b>Education</b>	Illiterate	Reference	-	-	-
	Primary school	0.732	0.02	26.037	0.870
	Middle school	0.082	0.002	3.641	0.190
	High school	0.078	0.002	3.285	0.18
	Higher secondary	0.052	0.001	2.277	0.128
	Graduate	0.007	0	0.377	0.017
	Post graduate	0	0	.	0.931

In the final multi-variate analysis, people belonging to age group of 18-30 years and >50 years, unemployed, married and having graduation degree were found to be significantly associated with RTIs.

### Discussion

Road traffic accidents (RTAs) is an emerging public health issue and hence a big financial burden to a lot to individuals, families, communities and nations as a whole. [10] A road traffic accident occurs when at least one moving vehicle collides with another on a public or private road, resulting in at least one person being hurt or killed. [11] Rapid urbanization and industrialization have produced a massive increase in the number of motor vehicles on the road worldwide resulting in an increase in morbidity and deaths from traffic accidents, particularly in developing nations like India. Road traffic collisions are a prominent cause of death among teenagers. Children, pedestrians, cyclists, and older people are among the most vulnerable to road traffic accidents. [12]

In the present study, the overall prevalence of RTI was found to be 4%. A total of 500 participants, from both rural and urban areas, participated in the study and the prevalence of RTI was higher amongst males compared to females. The study conducted by Ganveer et al [13] found a male:female ratio of 6:1 which can be attributed to the fact that proportion of males as compared to females is more and in our society. Also as males are the bread earners for the family and are therefore involved usually in outdoor activities thus exposing themselves to accidents. Sharma et al [14] also observed a similar higher male:female ratio. RTI was also significantly higher among participants in the age group of 18-30 years and among people who were unemployed. This might be due to the fact that unemployment may lead to increased levels of stress which in turn might cause decreased concentration while driving thus leading to increased incidence of RTIs. On the contrary, in studies from Delhi, students were commonly involved in accidents followed by labourers. [15] Similar types of results were seen in studies conducted by Agarwal et al. and Jeepra P. [16,17]

In the final multi-variate analysis, people belonging to age group of 18-30 years and >50 years, unemployed, married and having graduation degree were found to be significantly associated with RTIs. Road traffic injury is now the leading cause of death for children and young adults aged 5–29 years and the eighth leading cause of death for all age groups surpassing HIV/AIDS, Tuberculosis, and diarrheal diseases. Pedestrians, cyclists, and motorcyclists, as well as those living in low- and middle-income countries, bear a disproportionate share of the burden of road traffic injuries and deaths which is

exacerbated by increasing motorized transportation. [18]

### Conclusion

Our present study found a high prevalence of RTIs with risk factors like young age group, male gender, alcohol consumption and driving in rural areas. A constant increase in the number of motor vehicles, rampant encroachment of roads, unscientific construction of subways and under passes at highways, extremely high speed driving at the highways, ignorance regarding wearing helmets among riders of two wheelers, nasty tendency of violating traffic rules, anarchic traffic systems and population explosion have greatly contributed to rapid increase in road traffic accidents and thus RTI injury cases. Hence, preventing the occurrence of such injuries can greatly reduce fatalities.

### References

1. WHO. World Health Organisation; Geneva: 2004. World Report on Road Traffic Injury Prevention: Summary; pp. 1–52.
2. World Health Organization. International statistical classification of diseases and related health problems, 2015.
3. World Health Organization. Road traffic injuries, 2022.
4. Anantharaman VV, Muthunarayanan L. Epidemiology of Road Traffic Accidents (RTA) reported at a tertiary care hospital in Chennai. *NJRCM*. 2015;4(1):101-105.
5. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, Abraham J, Adair T, Aggarwal R, Ahn SY, AlMazroa MA. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet*. 2012 Dec 15; 380(9859):2095-128.
6. Vos T, Lim SS, Abbafati C, Abbas KM, Abbasi M, Abbasifard M, Abbasi-Kangevari M, Abbastabar H, Abd-Allah F, Abdelalim A, Abdollahi M. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*. 2020 Oct 17;396(10258):1204-22.
7. World Health Organization (WHO). Road traffic injuries [Internet].
8. World Health Organization. (2004).
9. Gururaj G. Road traffic injury prevention in India. *National Institute of Mental Health & Neuro Sciences*; 2006.
10. Ministry of Road Transport and highway Transport Research Wing. Road accidents in India-2019, 2020.
11. Biswas S, Naiya S, Ghosal A, Basu G, Dasgupta R, Roy S. An epidemiological study on road

- traffic accidents in urban West Bengal. *J Evol Med Dent Sci*.2015;4(60):10533–38.
12. Anantharaman VV, Muthunarayanan L. Epidemiology of Road Traffic Accidents (RTA) reported at a tertiary care hospital in Chennai. *NJRCM*. 2015;4(1):101-105.
  13. Ganveer GB, Tiwari RR. Injury pattern among nonfatal road traffic accident cases: a cross-sectional study in Central India. *Indian J Med Sci*. 2005;59(1):9–12.
  14. Sharma D, Singh US, Mukherjee S. A study on road traffic accidents in Anand-Gujarat. 2011; 2(2):4.
  15. Ghosh PK. Epidemiological study of the victims of vehicular accidents in Delhi. *J Indian Med Assoc*. 1992;90(12):309-12.
  16. Aggarwal A, Kaur S, Dhillon M. Sociodemographic profile of road traffic accident victims admitted at emergency surgical OPD of a tertiary care hospital. *J Postgrad Med Educ Res*. 2012;46(1):15-8.
  17. Jeepara P, Pirasath S. Road traffic accidents in Eastern Sri Lanka: An analysis of admissions and outcome. *Sri Lanka J Surg*. 2011;29(2).
  18. Global status report on road safety 2018 [Internet].