

Original Research Article

# Study of epidemiology of road traffic accidents

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	International Archives of Integrated Medicine, Vol. 5, Issue 4, April, 2018. Copy right © 2018, IAIM, All Rights Reserved. Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a>	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 19-03-2018	Accepted on: 28-03-2018
	Source of support: Nil	Conflict of interest: None declared.
<b>How to cite this article:</b> Mohit Goyal, Dhananjay Dobhal, Ashutosh Sayana, Salyl Dobhal, Aditya Goyal. Study of epidemiology of road traffic accidents. IAIM, 2018; 5(4): 23-28.		

## Abstract

**Background:** Road traffic accidents (RTAs) have emerged as an important public health issue which needs to be tackled by a multi-disciplinary approach. The trend in RTA injuries and death is becoming alarming in countries like India. The number of fatal and disabling road accident happening is increasing day by day and it is a real public health challenge for all the concerned agencies to prevent it. This article is intended to create awareness among the health professionals about the various modalities available to prevent road accidents and also to inculcate a sense of responsibility towards spreading the message of road safety.

**Materials and methods:** This was a prospective study of 230 patients between April 2016 to December 2017 reporting at General surgery, Orthopedics and Neurosurgery Department in Government Doon Medical College, Dehradun. Both indoor and OPD patients were included in this study. Data was gathered using a self-administered questionnaire with closed ended questions being addressed to the participants.

**Results:** Total of 230 accident victims was included in this study. Among them, 195 (85%) were males and 35 (15%) were female. Out of 230 respondents, 180 (78.26%) were involved in the accidents on normal working days, 30 (13.04%) of the accidents occurred during weekends and 4 (8.70%) on public holidays, Speeding 50 (21.74%) was one of the most significant personal factor associated with RTAs. Alcohol intoxication 35(15.22%), reckless driving 45 (19.57%) and tiredness of the driver 30 (13.04%) are the important personal factors associated with RTAs.

**Conclusion:** Most countries have a multidisciplinary approach to traffic planning and road design. It is done by psychologists, engineers, doctors, sociologists, vehicle experts, etc., in India; road traffic is still a civil engineering issue. Lessons can be learnt from the eminent guidelines and good practices for good behavior on the roads practiced in developed countries where safety, orderliness, and discipline are ingrained in the citizens, come what may. Mere celebration of the annual Road Safety Week during the first week of January does not serve any purpose. Drivers should learn to show consideration and respect to co-vehicle drivers and pedestrians so that our roads become safer.

## Key words

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Road traffic accident, Epidemiology, Dehradun.

## Introduction

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Road transport is the dominant mode of transport in India, both in terms of traffic share and in terms of contribution to the national economy. To meet the demand for road transport, the number of vehicles and the length of road network have increased over the years. A negative externality associated with expansion in road network, motorization and urbanization in the country is the increase in road accidents and road crash fatalities. Today, road traffic injuries are one of the leading causes of death, disabilities and hospitalization in the country imposing huge socio-economic costs [1].

According to the WHO statistics, 90% of the world's road traffic accident deaths occur in low and middle income countries, even though these countries have approximately half of the world's vehicles. If no action is taken to reduce RTAs, they are then predicted to rise to become the 7<sup>th</sup> leading cause of death by 2030, globally. Road traffic injuries have been neglected from the global health plans for many years though they are predictable and preventable. Road safety needs to be addressed holistically involving multiple sectors which include transport, police, health and education [2].

Road accidents in the country have decreased by around 4.1% during 2016, with the year seeing 4,80,652 road accidents as against 5,01,423 in 2015. However fatalities resulting from these accidents have risen by about 3.2% during the same period. Nearly 1,50,785 persons were killed in 2016 as against 1,46,133 in 2015 [3].

Report for first half of 2017 was encouraging – road accidents dropped by 3 % and fatalities dropped by 4.75 % between January to July 2017 [4].

Road traffic injuries cause considerable economic losses to individuals, their families and to nations as a whole. These losses arise from the cost of treatment as well as lost productivity for those killed or disabled by their injuries, and for family members who need to take time off work or school to care for the injured. Road traffic crashes cost about 3% of their gross domestic product for majority of the countries [5].

## Reasons for accidents

**Speeding:** An increase in average speed is directly related both to the likelihood of a crash occurring and to the severity of the consequences of the crash. For example, an increase of 1 km/hr in mean vehicle speed results in an increase of 3% in the incidence of crashes resulting in injury and an increase of 4-5% in the incidence of fatal crashes. An adult pedestrian's risk of dying is less than 20% if struck by a car at 50 km/hr and almost 60% if hit at 80 km/hr.

Driving under the influence of alcohol and other psychoactive substances or drug increases the risk of a crash that results in death or serious injuries. In the case of drink-driving, the risk of a road traffic crash starts at low levels of blood alcohol concentration (BAC) and increases significantly when the driver's BAC is  $\geq 0.04\text{g/dl}$ . In the case of drug-driving, the risk of incurring a road traffic crash is increased to

differing degrees depending on the psychoactive drug used. For example, the risk of fatal crash occurring among those who have used amphetamines is about 5 times the risk of someone who hasn't.

Non-use of motorcycle helmets, seat belts and child restraints: Wearing a motorcycle helmet correctly can reduce the risk of death by almost 40% and the risk of severe injury by over 70%. Wearing a seat belt reduces the risk of a fatality among front-seat passengers by 40-50% and of rear-seat passengers by between 25-75%. If correctly installed and used, child restraints reduce deaths among infants by approximately 70% and deaths among small children by between 54% and 80% [6].

### Materials and methods

This was a prospective study of 230 patients suffering from RTAs between April 2016 to December 2017 reported at General Surgery, Orthopedics and Neurosurgery Department in Government Doon Medical College, Dehradun. Both indoor and OPD patients were included in

this study. Patients referred from remote areas to medical college were also part of this study.

The critically ill and those who were unwilling to participate in this study were excluded. Data was gathered using a self-administered questionnaire with closed ended questions being addressed to the participants. We informed the participants about the research, the risk and benefits of participating in the study and their rights. Confidentiality was also assured to participants by us.

### Results

Study was done under 3 criteria - Demographic data, Information of the accident and personal & environmental factors associated with the road traffic accident. The age range of the 230 respondents ranged between 11 and 60 years. 120 (52.17%) were married and 110 (47.83%) were unmarried. 175 (76.09%) resided in urban area while 55 (23.91%) stayed in rural area. Demographic characteristics of the respondents are summarized in **Table - 1**.

**Table - 1:** Demographic data (N = 230).

Variable	Response	Frequency	Percentage
Age	11-25 years	90	39.13
	26-35 years	75	32.60
	36-45 years	20	8.70
	46 years onwards	45	19.56
Gender	Male	195	84.78
	Female	35	15.22
Employment status	Employed	170	73.91
	Unemployed	60	26.09
Place of residence	Rural	55	23.91
	Urban	175	76.09

Information about the accident - Out of 230 respondents, 180 (78.26%) were involved in the accidents on normal working days, 30 (13.04%) of the accidents occurred during weekends and 4 (8.70%) on public holidays. Information is gathered on basis of day of occurrence, time of occurrence, place of occurrence, category of road user, type of vehicle used and number of deaths

occurred due to road traffic accident. Data collected are summarized in **Table - 2**.

Personal and Environmental factors associated with road traffic accident - In our study, Speeding 50 (21.74%) was one of the most significant personal factor associated with RTAs. Alcohol intoxication 35(15.22%), reckless

driving 45 (19.57%) and tiredness of the driver 30 (13.04%) are the important personal factors associated with RTAs. Among the Environmental factors, data was collected under

the category of bad weather, poor road condition, traffic congestion and animals on road. All personal and environmental factors data is summarized in **Table - 3**.

**Table - 2:** Information about the accident (N=230).

Variable	Responses	Frequency	Percentage
Day of occurrence	Normal working day	180	78.26
	Weekends	30	13.04
	Public holidays	20	8.70
Time of occurrence	Morning	55	23.91
	Afternoon	85	36.96
	Night	90	39.13
Place of occurrence	City road	125	54.35
	Rural road	50	21.74
	Highways	55	23.91
Category of road user	Pedestrian	60	26.09
	Driver	85	36.96
	Passenger	70	30.43
	Cyclist	15	6.52
Type of vehicle used	None (Pedestrian and Passenger)	130	56.52
	Motorcycle	85	36.96
	Personal car	10	4.35
	Bus	5	2.17
Number of deaths	None	225	97.83
	Less than 5	5	2.17
	More than 5	Nil	Nil

**Table - 3:** Personal and Environmental factors associated with RTAs (N = 230).

Category of factors	Factors	Responses	Frequency	Percentage
Personal factors	Speeding	Yes	50	21.74
		No	180	78.26
	Alcohol intoxication	Yes	35	15.22
		No	195	84.78
	Reckless driving	Yes	45	19.57
		No	185	80.43
Tiredness of the driver	Yes	30	13.04	
	No	200	86.96	
Environmental factors	Bad weather	Yes	35	15.22
		No	195	84.78
	Poor road condition	Yes	55	23.91
		No	175	76.09
	Traffic congestion	Yes	45	19.57
		No	185	80.43
	Animals on road	Yes	10	4.35
		No	220	95.65

## **Discussion**

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In our study it was found that age group most prone for accident is 18-25 years with male predominance 84.8% males: 15.2% females. Road traffic accident was more on city road as compared to rural road and highways. Maximum injuries were reported in vicinity of school, cinema, factory and bus stand i.e. overcrowded places but most of them were simple injuries however injuries near village highways were of serious type. Though it can also be said that road safety is a multifactorial public health issue as many factors are involved in road traffic injuries like human Factors (over speeding, overtaking, not wearing helmet, driving under the influence of alcohol, sudden road crossing without observation) or vehicle Factors (Poor visibility, loss of balance, brake failure, problem with head and back lights, overloaded vehicles) or environmental factors (Absence of reliable and efficient public transport, poor street lighting conditions, obstacle on existing roads, poorly designed roads, absence of traffic signals or poorly maintained traffic system). On the basis of results obtained major causes of road traffic accidents were identified viz., pedestrians and animals sharing roadways with fast and slow moving vehicles, Increased driving speed of vehicles, widespread disregard of traffic rules, unusual behavior of men and animals and among all the above causes increase speed driving of vehicle cause maximum mortality and morbidity.

The Government has approved a National Road safety Policy. This policy outlines various policy measures such as promoting awareness, establishing road safety information data base, encouraging safer road infrastructure including application of intelligent transport, enforcement of safety laws etc. The Government has constituted the National Road Safety Council as the apex body to take policy decisions in matters of road safety. The ministry has formulated a multi-pronged strategy to address the issue of road safety based on 4 'E's viz. Education, Engineering (both of road and vehicles), Enforcement and Emergency care [6].

## **Conclusion**

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India's Motor Vehicles Act lagging far behind the needs of a fast-motorizing society is painfully evident from its road safety record. It should take a "zero tolerance" policy toward the most common transgressions - dangerous and reckless driving; disregard for traffic rules; jumping red lights; driving under the influence of liquor; failing to use seatbelts; and driving without a helmet - to bring about a visible change [3]. But strict implementation of traffic rules and stringent punishments alone will not solve the persisting crisis. Change in the mind set of riders and drivers and road users realizing their responsibilities alone will bring about a change.

Most countries have a multidisciplinary approach to traffic planning and road design. It is done by psychologists, engineers, doctors, sociologists, vehicle experts, etc., in India; road traffic is still a civil engineering issue [4]. Lessons can be learnt from the eminent guidelines and good practices for good behavior on the roads practiced in developed countries where safety, orderliness, and discipline are ingrained in the citizens, come what may [5]. Mere celebration of the annual Road Safety Week during the first week of January does not serve any purpose. Drivers should learn to show consideration and respect to co-vehicle drivers and pedestrians so that our roads become safer. But it looks a long way to go.

## **Acknowledgement**

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The authors have collected the year 2016 data from the booklet published by the Government of India, Ministry of Road transport and Highways, Transport research wing New Delhi and are very thankful to them. Authors would also like to give special acknowledgement and thanks to all students and doctors involved in collection of data.

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