



## Research Article

# Magnitude and characteristics of Road Traffic Accidents in Kashmir Valley

Authors

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## Abstract

*An alarming increase in morbidity and mortality owing to road traffic accidents over the past few decades is becoming a routine and matter of great concern globally. Road traffic crashes account for one fourth of the total deaths related to injury across the globe. In India it is the 6th leading cause of death with a greater share of hospitalizations, deaths, disabilities and socioeconomic losses in young and middle aged population.*

**Methods:** *This prospective cross sectional study was conducted with objectives to assess the magnitude and characteristics of road traffic accidents in Kashmir valley.*

**Results:** *Records reveal that valley had witnessed 2164 Road traffic accidents (RTAs) during 2011 in which 3439 victims were involved (3113 were injured and 326 got killed) with accident risk of 31.3 and fatality risk of 4.7, Fatality rate of 10 and severity index of 15.1. Most (87.9%), of the accident victims were less than 55 years of age, 81.7 % were males, 52.2% were literate, 21.3% were students. 50.6% of the victims were passengers, 24.8% pedestrians and 23.4% drivers. In 46.8% victims only one body part was injured. In 60.1% four wheeled vehicles were responsible for accidents followed by two wheeled vehicles in 10.5%. In 82.5% of RTA's the accident had taken place on straight road and majority (62.9%) of accidents were of longitudinal collision type.*

**Keywords:** *Road traffic accidents, Injury rate, Accident risk, Accident Severity and Fatality rate.*

## Introduction

Countries have and are passing through significant urbanization, industrialization and changes in the socio-economic values of societies. The process of rapid and unplanned urbanization has resulted in an unprecedented revolution in the growth of motor vehicles worldwide. An alarming increase in morbidity and mortality owing to road traffic accidents over the past few decades is becoming a routine and matter of great concern globally. Road

traffic crashes account for one fourth of the total deaths related to injury across the globe, killing 1.2 million people worldwide per annum. The figure is expected to increase to 2.3 million annually by 2020. Besides this, non-fatal road traffic mishaps injure another 20 million to 50 million people per annum globally (WHO, 2002). It is projected that road traffic injuries will move up to the third position by the year 2020 among leading causes of the global disease burden.<sup>(1,2)</sup>

Over 90% of the world's fatalities on the roads occur in low-income and middle-income countries, which have only 48% of the world's vehicles. <sup>(3)</sup>Without immediate action to improve road safety, it is estimated that road traffic deaths will increase by 80% in low and middle income countries by 2020. <sup>(4)</sup>

In India, according to WHO, Road Traffic Accident is the 6<sup>th</sup> leading cause of death with a greater share of hospitalizations, deaths, disabilities and socioeconomic losses in young and middle aged population. Incidentally, India holds the dubious distinction of registering the highest number of RTAs in the world. <sup>(5)</sup> Although it has only 1% of world's motor vehicles, but it accounts for 6% of the total global RTA deaths. According to National Crime Bureau Survey, at least 13 people die every hour in road accidents in the country. <sup>(6)</sup> According to Experts at the National Transportation Planning and Research Centre (NTPRC) the number of RTAs in India is three times higher than that prevailing in developed countries. The numbers of accidents for 1000 vehicles are as high as 35 while the figure ranges from 4 to 10 in developed countries. <sup>(5)</sup> Victims of Road Traffic Injuries are mostly men in the productive age group of 15-45 years and belong to the poorer section of society. <sup>(7)</sup> During 2011, a total of 497,686 road accidents were reported by all States/Union Territories (UTs) of India. Of these, about 24.4 per cent (121,618) were fatal accidents. The number of persons killed in road accidents were 142,485 i.e. an average of one fatality per 3.5 accidents. <sup>(8)</sup>WHO, in its international conference on RTA, noted the importance of adequate data on traffic injuries. Indeed, accurate estimates of the public health burden of RTA can establish the priority of this public health problem and will provide a rational basis for policy decision. The present study is therefore an attempt to study the magnitude and characteristic of Road Traffic Accidents in Kashmir Valley where the situation is no different from the rest of the world as far as the rising trend of RTAs is concerned.

### Objectives

- To assess the magnitude of road traffic accidents in Kashmir valley.
- To study the characteristics of these road traffic accidents.

### Materials and Methods

This prospective study was conducted at district police headquarters of Kashmir valley. In order to get the magnitude of RTAs occurring in the valley during the study period, information was obtained using a predesigned questionnaire. In this regard, Inspector General of Police, Kashmir Zone was first briefed about the project and necessary co-operation was sought from him by way of an official written communication from the Head of the Department. Necessary instructions were then passed in writing by the IG of Police, Kashmir Zone to the District Police Headquarters of all the districts of Kashmir Valley to extend their co-operation in this regard. Following this, each District Headquarter was personally visited to develop a liaison with the concerned officials there. The predesigned questionnaire was handed over to the concerned official for recording the relevant information of every RTA registered by them during the study period of 1 year. Subsequently each District Headquarter was visited once in two months for collection of data pertaining to the RTAs that occurred during previous two months. The data thus obtained from all the districts was compiled to get the overall magnitude of RTAs that occurred in the Kashmir Valley during the study period. The data thus collected was tabulated and subjected to statistical analysis.

### Results

Present descriptive study on the magnitude and characteristics of road traffic accidents in Kashmir valley revealed the following findings.

**Table 1:** District wise distribution of Road Traffic Accidents (RTAs)

District	Total Population		Total RTAs		Injured		Deaths	
	N	%	N	%	n	%	N	%
Kupwara	8,75,564	12.9	159	7.3	278	8.9	20	6.1
Baramulla	10,15,503	14.7	341	15.8	624	20.1	41	12.6
Bandipora	3,85,099	05.6	89	4.1	137	4.4	22	6.7
Ganderbal	2,97,003	04.3	90	4.2	149	4.8	19	5.8
Srinagar	12,50,173	18.1	492	22.7	511	16.4	75	23.0
Budgam	7,55,331	10.9	162	7.5	213	6.8	17	5.2
Pulwama	5,70,060	08.3	264	12.2	374	12.0	37	11.3
Shopian	2,65,960	03.9	76	3.5	74	2.4	5	1.5
Kulgam	4,23,181	06.1	207	9.6	312	10.0	30	9.2
Anantnag	10,69,749	15.5	284	13.1	441	14.2	60	18.4
Total	69,07,623	100.00	2164	100.00	3113	100.00	326	100.00

Table 1 presents the distribution of RTAs by various districts in Kashmir Valley during January 1st, 2011 to December 31st, 2011. Total of 2164 Road Traffic Accidents occurred in Kashmir Valley during 2011 in which 3113 persons got injured and 326 were killed. Out of these

accidents majority i.e. 22.7% have occurred in district Srinagar (22.7%) while as maximum people were injured in district Baramulla (20.1%). Most of the deaths due to RTAs have occurred in district Srinagar 23%

**Table 2:** Risk, Severity and Fatality rate of road traffic accidents (RTAs) in Kashmir Valley during 2011

District	Total Population	Total RTAs	Injured	Killed	Accident risk*	Injury rate**	Fatality risk***	Accident severity****	Vehicles registered	Fatality rate*****
Kupwara	8,75,564	159	278	20	18.2	31.8	2.3	12.6	7252	27.6
Baramulla	10,15,503	341	624	41	33.6	61.4	4.0	12.0	32930	12.5
Bandipora	3,85,099	89	137	22	23.1	35.6	5.7	24.7	1386	158.7
Ganderbal	2,97,003	90	149	19	30.3	50.2	6.4	21.1	1649	115.2
Srinagar	12,50,173	492	511	75	39.4	40.9	6.0	15.2	192127	3.9
Budgam	7,55,331	162	213	17	21.4	28.2	2.3	10.5	26694	6.4
Pulwama	5,70,060	264	374	37	46.3	65.6	6.5	14.0	25393	14.6
Shopian	2,65,960	76	74	5	28.6	27.8	1.9	6.6	2665	18.8
Kulgam	4,23,181	207	312	30	48.9	73.7	7.1	14.5	3053	98.3
Anantnag	10,69,749	284	441	60	26.5	41.2	5.6	21.1	34280	17.5
Total	6907623	2164	3113	326	31.3	45.1	4.7	15.1	327429	10

\*Accident risk: Number of accidents/lakh population

\*\*Injury rate: Persons injured/lakh population

\*\*\* Fatality risk: Number of deaths/lakh population

\*\*\*\*Accident severity: Road accident deaths per 100 accidents

\*\*\*\*\* Fatality rate: number of deaths /10,000 vehicles

The Table 2 shows the magnitude of severity of road traffic accidents in Kashmir Valley from 1<sup>st</sup> January, 2011 to 31<sup>st</sup> December, 2011. Overall accident risk of RTAs was 31.3/100,000 population, with rate of injury as 45.1 persons per lakh population and mortality as 4.7 persons per

lakh population. RTA accident rate of 48.9 per lakh population has been reported from district Kulgam, 46.3 from district Pulwama and 39.4 from district Srinagar followed by districts Baramulla (33.6), Ganderbal (30.3), Shopian (28.6), Anantnag (26.5), Bandipora (23.1),

Budgam (21.4) and Kupwara (18.2) in decreasing order. Injury rate was reported highest in district Kulgam (73.7) followed by Pulwama (65.6), Baramulla (61.4) and Ganderbal (50.2). Similarly fatality risk was also highest (7.1) in district Kulgam followed by Pulwama (6.5), Ganderbal (6.4) and Bandipora (5.7). The overall severity index remained as 15.1. The severity index was highest in district Bandipora (24.7) followed by Ganderbal and Anantnag (21.1 each), Srinagar (15.2), Kulgam (14.5) and Budgam (10.5). Lowest severity index was observed in district Shopian (6.6). Likewise fatality rate was highest for Bandipora (158.7) followed by Ganderbal (115.2) and Kulgam (98.3) districts.

**Table 3:** Sociodemographic characteristics of RTA victims

Characteristics		No. (3439)	% (100)
Age (Yrs)	<15	229	6.7
	15-25	822	23.9
	25-35	693	20.2
	35-45	861	25.0
	45-55	417	12.1
	55-65	214	6.2
	≥65	90	2.6
	Not-known	113	3.3
Gender	Males	2810	81.7
	Females	629	18.3
Educational status	Literate	1795	52.2
	Illiterate	936	27.2
	Not known	708	20.6
Occupation	Labourer	304	8.8
	Student	731	21.3
	Farmer	435	12.6
	Businessman	391	11.4
	Service	240	7.0
	Others	1338	38.9

Table 3 shows that most of the victims of RTAs were below 55 years of age i.e. 87.9%(3022), 25% were in the age group of 35-45years, the most productive age group. Out of 3439 victims, majority 81.7%(2810) were males and 18.3% (629) were females. More than half of the victims 52.2%(1795) were literate. However literacy status of 20.6%(708) could not be ascertained from Police records. 21.3% (731) victims were students, 12.6%(435) farmers and 11.4%(391)

were businessmen. 8.8%(304) constituted labour class and 7%(240) were in service (private or government). However occupation of 38.9% (1338) victims could not be traced from police records.

**Table 4:** General characteristics of RTA.

Characteristics		No. (3439)	% (100)
Site of Accident	Straight road	2837	82.5
	T-Junction	234	6.8
	Not known	241	7.0
	4-Way intersect	127	3.7
Type of accident	Longitudinal-Collision type (Head on)	2163	62.9
	Run off road collisions (Skid off)	234	6.8
	Rear -end collisions	103	3.0
	Side collisions	299	8.7
	Rollovers (Turning turtle)	478	13.9
	Fall from moving vehicle	162	4.7
Type of Road User	Passenger	1741	50.6
	Pedestrian	853	24.8
	Driver	805	23.4
	Not known	40	1.2
Number of body parts injured	1	1608	46.8
	2	694	20.2
	3	131	3.8
	4	26	0.8
	Not known	980	28.4
	Day of occurrence	Monday	651
Tuesday		493	14.3
Wednesday		474	13.8
Thursday		491	14.3
Friday		433	12.6
Saturday		503	14.6
Sunday		394	11.5
Time of occurrence	12 midnight-6am	38	1.1
	6am-12 noon	1504	43.7
	12 noon-6pm	1520	44.2
	6pm-12 midnight	377	11.0
Type of vehicle	Four wheeler	2067	60.1
	Three wheeler	109	3.2
	Two wheeler	360	10.5
	Others	903	26.2

Table 4 shows that half of the victims 50.6% (1741) were passengers, 24.8%(853) pedestrians and 23.4%(805) drivers. Status of 1.2% (40) victims was not known. In 46.8%(1608) victims only one body part was injured, in 20.2%(694) two parts, in 3.8%(131) three parts and in 0.8%(26) four parts were involved. However, in

28.4%(980) number of body parts injured could not be ascertained.

More RTAs had occurred on Mondays 18.9%(651) followed by Saturday 14.6%(503), Tuesday and Thursday 14.3% each and 13.8% (474) on Wednesday. Less number of accidents occurred on Sunday 11.5%(394) and Friday 12.6% (433). Majority of the accidents 44.2% (1520) have occurred between 12noon to 6pm followed by 43.7%(1504) between 6am to 12noon, 11%(377) between 6pm to 12midnight. Least number of accidents i.e. 1.1%(38) occurred between 12midnight to 6am.

In more than half of the total RTA victims i.e. 60.1%(2067) four wheeled vehicles were responsible for accidents followed by two wheeled vehicles in 10.5%(360), three wheeled vehicles in 3.2%(109) and others in 26.3%(903) victims.

In 82.5% of RTA's the accident had taken place on straight road, in 6.8% at T-junction, in 3.7% at 4-way intersection and in 7% the site of accident was not known. With regard to type of accident, majority (62.9%) of accident were of longitudinal collision type followed by roll-over type (13.9%), side on collision (8.7%), skid off (6.8%) and rear end collision (3%).

### Discussion

During our study from Jan 1<sup>st</sup>, 2011 to Dec 31<sup>st</sup>, 2011 in Kashmir Valley a total of 2164 RTAs were reported in which 3113 people were injured and 326 were killed. Out of these, Srinagar district has witnessed maximum accidents 22.7% (492), which could be attributed to the fact that it is the summer capital of the state, densely populated with more registered vehicles and a popular tourist destination, thus maximum traffic remains in and around Srinagar roads. Moreover encroachment of foot paths by shopkeepers, vendors etc compels the pedestrians to walk on the main roads thus making them susceptible to accidents. The figures revealed by the police records could be an underestimate of the actual magnitude of RTAs in the valley. The reason for this could be that some

victims try to avoid registering of RTAs with the police to avoid legal formalities, or some are hit and run cases which escape police records.

The magnitude of RTAs in the present study turns out to be 31.3/100,000 population, with rate of injury as 45.1 persons per lakh population and mortality as 4.7 persons per lakh population. The overall severity index has remained as 15.1. This is quite low as compared to studies conducted by Sing S K et al.<sup>(9)</sup> (2004) who have reported accident severity index of 45 in year 2000. Dandona R et al.<sup>(10)</sup> (2008) reported an annual RTI mortality and disability as 38.2 and 35.1 per lakh populations respectively. Verma P K et al.<sup>(11)</sup> from Delhi during 2002 report injury rate (IR) as 22.3/1000 population. Saadat S et al.<sup>(12)</sup> (2011) in Iran have reported an annual incidence of all traffic injuries for 1000 population as 13.1.

The study revealed that most of the RTA victims (88%) were below 50 years of age and were males (81.7%). Preponderance of male and young people could be explained on the basis that they are active bread winners of the family at least in this part of the globe and venture out in search of livelihood outside their homes and females mostly remain at home. Most of the studies throughout the globe support these findings e.g. Mondal P et al.<sup>(13)</sup> (2011) from India in a five year study (2005 to 2009) reports average percentage share for the age groups up to 14yrs, 15–29 yrs, 30–44 yrs, 45–59 yrs and above 60 yrs as 6.35, 29.84, 35.05, 20.97 and 7.79 respectively He further reports that victims died from age group of 5-44 yrs, which is the most productive age group of a nation. Mashreky SR et al.<sup>(14)</sup> (2010) found that 70% of the RTI were constituted by the people aged 18-45 years. Sing S K et al.<sup>(9)</sup> (2004) report that adults working in the age group 18 to 60 years accounted for more than 80% of all casualties.

Our study reveals a literacy status of 52% among victims and a preponderance of students (21.3%) followed by farmers (12.6%) and business class (11.4%). These findings are supported by studies by Chalya PL et al.<sup>(15)</sup> who observed students (58.8%) and businessmen (35.9%) as the majority

of road traffic crash victims and Kaul V et al.<sup>(16)</sup> (2011) who report 80% of RTA victims as educated. Jha N et al.<sup>(17)</sup> (2004) show laborers as commonest affected class (27.6%) followed by students (24.1%). Verma P K et al.<sup>(11)</sup> (2004) in a study in Delhi found the business group had a higher incidence (IR=44) followed by the service group (40.1) and the labour group (IR=28.9).

Present study revealed that half of the victims (50.6%) were passengers, 1/4<sup>th</sup> (25%) were pedestrians and 23% were drivers, Deacon L et al.<sup>(18)</sup> (2011) report that 67.2% were car users, 13.3% were pedestrians, 7.0% were motorcyclists. Sharma D et al.<sup>(19)</sup> (2011) report that 55.79 % of the RTA victims were drivers and riders followed by the occupants and passengers (30.26%). Patel DJ et al.<sup>(20)</sup> (2010) show that vehicular occupants were commonly affected (63.80%). Mishra B et al.<sup>(21)</sup> (2010) report 42.50% victims as passengers and 29.16% as pedestrians. Contrary to this, Ahmed M et al.<sup>(22)</sup> report that highest number of victims were pedestrians (68%).

19% of our accident victims were injured on Mondays while on rest of the days not much difference was observed. Monday being the first working day of week when everyone is rushing for reaching early to their destination with probability of increase in accidents. Majority (88%) of victims were injured during day time between 6am to 6pm. The reason could be that during and after turmoil in the state the traffic on roads remains negligible during night hours due to security reasons and people try to complete their work during day time only. These findings have been supported by various studies like Mondal P et al.<sup>(13)</sup> (2011) who reports 16.3% accidents occurring during 3 p.m. to 6 p.m, 15.2% during 9 a.m. to 12 noon and least 6.9% during 12 am to 3 am in the night. Patel DJ et al.<sup>(20)</sup> (2010) show that most of the accidents occurred in the afternoon hours (12:01-18:00 hrs) 43.80% and least number of cases 10.47% during 00:01-06:00 hrs. Patel M et al.<sup>(23)</sup> (2010) observed maximum events (62.69%) had taken place during day time. Khajuria B et al.<sup>(24)</sup> found 54.22% RTAs had

occurred during the day time and between 9 AM to 8 PM. On the other hand, Duric P.<sup>(25)</sup> (2009) reports that accidents had occurred mostly on Fridays and Saturdays and in early evening hours. Deacon L et al.<sup>(18)</sup> (2011) showed that accidents had mostly occurred on Fridays, and between 3.00 pm to 3.59 pm.

Head on collision (63%) remains the commonest type of accident in the present study followed by rollover in 13.9% and side collision in 8.7%. Almost similar findings were also reported by Dandona R et al.<sup>(26)</sup> where collision with a vehicle caused 86.4% of all crashes. Ahmad M et al.<sup>(22)</sup> (2009) report hit pedestrian as the most common (39%), followed by head on collision (20%) and Sheikh MM et al.<sup>(27)</sup> (2009) also reports fatal hit pedestrian as the main collision type accident. In contrast Ganveer GB et al.<sup>(28)</sup> report side wayss collision (63.59%) as the commonest type of accident while as Jha N et al.<sup>(29)</sup>

In the present study more than half of traffic accidents victims (60.1%) had been hit by four wheeled vehicles while three-wheelers were responsible for only 3.2% accidents. The same could be explained on the basis of valleys climatic conditions which favour the use of four wheelers and exponential growth of vehicle population during past decade due to easy financing / loan facilities offered by banks. Some studies in support of ours findings include Sing Y.N et al.<sup>(30)</sup> who report that four wheeled vehicles (car, jeep, van etc) were mostly (35.73%) involved followed by other types of vehicles. Khajuria B et al.<sup>(24)</sup> report that two wheelers were involved in 42% of RTAs. On the contrary Khare N et al.<sup>(31)</sup> report that commonest cause of RTA according to type of vehicle was motor cycle (Two wheelers) in 73% cases.

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