Research Article

Magnitude and characteristics of Road Traffic Accidents in Kashmir Valley

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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 loses 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 10and 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.¹,²

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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. (3) 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. (4)

In India, according to WHO, Road Traffic Accident is the 6th leading cause of death with a greater share of hospitalizations, deaths, disabilities and socioeconomic loses in young and middle aged population. Incidentally, India holds the dubious distinction of registering the highest number of RTAs in the world. (5) 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. (6) 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. (5) 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. (7) 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. (8) 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 cooperation 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 cooperation 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  | 1 0,15,503 | 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   | 1 2,50,173 | 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  | 1 0,15,503 | 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   | 1 2,50,173 | 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 1st January, 2011 to 31st 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 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. (%) | % |
|--------------------------|---------|---|
| 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 |
| Day of occurrence        | Monday 651 18.9 |
|                         | 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), 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 1st, 2011 to Dec 31st, 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. (9) (2004) who have reported accident severity index of 45 in year 2000. Dandona R et al. (10) (2008) reported an annual RTI mortality and disability as 38.2 and 35.1 per lakh populations respectively. Verma P K et al (11) from Delhi during 2002 report injury rate (IR) as 22.3/1000 population. Saadat S et al. (12) (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 (13) (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. (14) (2010) found that 70% of the RTI were constituted by the people aged 18–45 years. Sing S K et al. (9) (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. (15) who observed students (58.8%) and businessmen (35.9%) as the majority
of road traffic crash victims and Kaul V et al. (16) (2011) who report 80% of RTA victims as educated. Jha N et al. (17) (2004) show laborers as commonest affected class (27.6%) followed by students (24.1%). Verma P K et al. (11) (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, 1/4th (25%) were pedestrians and 23% were drivers, Deacon L et al. (18) (2011) report that 67.2% were car users, 13.3% were pedestrians, 7.0% were motorcyclists. Sharma D et al. (19) (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. (20)(2010) show that vehicular occupants were commonly affected (63.80%). Mishra B et al. (21) (2010) report 42.50% victims as passengers and 29.16% as pedestrians. Contrary to this, Ahmed M et al (22) 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. (13) (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. (20) (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. (23) (2010) observed maximum events (62.69%) had taken place during day time. Khajuria B et al. (24) found 54.22% RTAs had occurred during the day time and between 9 AM to 8 PM. On the other hand, Duric P. (25) (2009) reports that accidents had occurred mostly on Fridays and Saturdays and in early evening hours. Deacon L et al. (18) (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. (26) where collision with a vehicle caused 86.4% of all crashes. Ahmad M et al. (22)(2009) report hit pedestrian as the most common (39%), followed by head on collision (20%) and Sheikh MM et al. (27) (2009) also reports fatal hit pedestrian as the main collision type accident. In contrast Ganveer GB et al. (28) report side wayss collision (63.59%) as the commonest type of accident while as Jha N et al. (29)

In the present study more than half of traffic accidents victims (60.1%) had been hit by four wheeled vehicles while three-wheeler 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. (30) 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. (24) report that two wheelers were involved in 42% of RTAs. On the contrary Khare N et al. (31) report that commonest cause of RTA according to type of vehicle was motor cycle (Two wheelers) in 73% cases.

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