An epidemiological study of road traffic accident cases admitted in a tertiary care centre of Uttar Pradesh

Verma P.[1*], Gupta S.[2], Singh G.[3]

[1*] Preeti Verma, Assistant Professor, Department of Orthopedics, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India.

[2] S C Gupta, Professor, Department of Community Medicine, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India.

[3] Gagan Singh, JR, Department of orthopedics, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India.

Introduction: Worldwide about 1.3 million people die each year as a result of road traffic accidents and are the leading cause of death among young people, aged 15–29 years. Nearly half (46%) of those dying on the world's roads are vulnerable road users (pedestrians, cyclists and motorcyclist.
Objectives: (1) To study the sociodemographic profile of road traffic accident (RTA) cases (2) To know the type of road users and the counterpart involved in the road traffic accidents.
Methodology: A hospital based cross-sectional study, conducted at Emergency Department& Hospital of S.N Medical College, Agra. By using systematic sampling technique, a total of 425 RTA cases were registered for the study. Cases or their attendant were interviewed based on a semi structured questionnaire. **Results**: Out of 425 RTA cases majority were Hindus (9o.6%), males (89.6%), from urban areas (72%), married (65.8%) and illiterate (62.8%). Maximum belonged to 16-30 years age group (40.0%) and laborers (42.3%) while mostly (82.8%) were from upper- lower social class. Of 425 cases, 37.6% were pedestrians and 33.2% were hit by motorized two wheeler.
Conclusion: Majority of the RTA cases are in the economically productive age group and are married, hence their hospitalization or disability places a huge economic burden on the family.

Keywords: Emergency Department, Road Traffic Accidents, Sociodemographic Profile, Type of Road Users, Tertiary Care Centre

Corresponding Author	How to Cite this Article	To Browse
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Introduction

Spectacular advances in health and health related sciences has brought down the morbidity and mortality due to communicable diseases and has resulted in longevity of people. At the same time, globalization has improved the socio-economic status resulting in more use of vehicles and the travel, further resulting in increased number of RTAs. Thus the entire spectrum of non communicable diseases and accidents has come to the forefront of health care delivery system.

According to WHO, deaths from road traffic accidents account for around 25% of all deaths from injury. The total number of road traffic deaths and injuries worldwide is forecast to rise by some 65% between 2000 and 2020. About 1.3 million people die each year as a result of road traffic accidents and are the leading cause of death among young people, aged 15–29 years.

Over 90% of the world's fatalities on the roads occur in low-income and middle-income countries, even though these countries have less than half of the world's vehicles. Nearly half (46%) of those dying on the world's roads are vulnerable road users (pedestrians, cyclists and motorcyclist. Without action, the road traffic accidents are predicted to result in the deaths of around 1.9 million people annually by 2020 [1].

'Road accidents' cases in India have marginally increased by 0.7% during 2013 as compared to 2012, while casualties decreased by 1.2%. A total of 4,75,625 traffic accidents cases were reported during the year 2013 comprising 4,43,001 RTA cases and these accidents accounted for 1,37,423 deaths due to RTA.

The analysis of road accident deaths by various mode of transport revealed that 34,187 persons (24.9%) were riding on two-wheelers, 24,081 (17.5%) were occupants of truck/lorry, 14,803 (10.8%) were travelling in car and 12,055 (8.8%) were killed while travelling in buses and most of the victims of accidents deaths were under age group of 15 to 44 years. 66 deaths per day were by truck/ lorry and 94 deaths were by two wheelers [2].

Aim and Objectives

01. To study the sociodemographic profile of RTA cases

02. To know the type of road users and the counterpart involved in the road traffic accidents

Material and Methods

The present study is a hospital based cross sectional study, conducted from April 2012 to March 2013 among cases admitted in Emergency Department or Hospital of SN Medical College, Agra due to road traffic accidents. The ethical clearance was given by ethical committee of S.N. Medical College, Agra. By using systematic sampling technique, a total of 425 RTA cases were registered for the study. The cases or their attendants after obtaining informed and written consent were interviewed by using a semi structured questionnaire. The Road traffic accidents cases were operationally defined as "injuries occurring on road involving two or more objects, one of which was any kind of moving object" [3].

Exclusion Criteria

01. Cases / relatives who did not give written consent to participate in the study.

02. Cases who were admitted for a very short duration were also excluded from the study.

Sample Size

The sample size of the study group was calculated by using the formula given below-

(N) = $Z_{2a\%}pq/D_2$

Where-

= Standard Normal variate at level of significance = 1.96

P (Proportion) = 30 % (A study by G. Gururaj, 2008 revealed that 30% of admission of the emergency rooms are due to road traffic injuries which has been taken as the criteria) [4].

Q = 100 – p = 70

D (Decision error) = 15 % of proportion.

The sample size came out to be 398. Considering a dropout rate of 7%, the sample size was increased to 425.

Methodology

It was found out that in ED & Hospital of S.N. Medical College, Agra, the number of RTA cases admitted was approximately 1500 per annum. In order to achieve the desired sample size (n=425), three visits on alternate days of week were made and all the cases admitted on that day were registered for the study.

For first and third weeks of every month, the days selected were Monday, Wednesday and Friday while for second and fourth weeks of the month, the cases were interviewed on Tuesday, Thursday, Saturday and Sunday.

Data processing and statistical analysis: Statistical analysis was done using SPSS version 20.0.The data were summarized using percentages and frequency. Significant difference was determined by using chi-square test and standard error of difference between two proportions (Z test) and the difference was accepted significant at p value <0.05.

Result

Table 1 shows the distribution of RTA cases according to the different age and sex groups. It was found that majority cases were males (89.6%) and females were only 10.4%. Overall age distribution shows that maximum cases (40.0%) belonged to 16-30 years age group followed by 31-45 years age group (25.8%) and only 6.1% cases were of < 15 years age. This age wise variation was statistically significant (p<0.05). Among males distribution was similar to overall distribution, being maximum in 16-30years age group, followed by 31-45 years (42.3% & 27.6% respectively). Thus, in males majority (69.9%) cases occurred in 16-45 years age group which is the productive age. On the contrary in females, maximum RTA cases (34.1%) occurred in 45-60 years age group followed by 22.7% cases in <15 years age group. Statistically there is highly significant difference between sex variation in various age groups (chi square test) and among different age groups all the individual age groups (Z test) except above 60 yrs age (table 1).

Table-1: Age and sex wise distribution of RTA cases.

Age group*	Road traffic accident cases			Z value
	Male	Female	Total	
<15 yrs	16 (4.2)	10(22.7)	26(6.1)	2.89
16-30 yrs	161(42.3)	9(20.5)	170(40)	3.31
31-45 yrs	105(27.6)	5(11.4)	110(25.8)	3.07
46-60 yrs	63(16.5)	15(34.1)	78(18.3)	2.37
>60 yrs	36 (9.4)	5(11.4)	41(9.6)	0.4
Total	381(89.6)	44(10.4)	425 (100.0)	
χ2=37.592 ;d.f. =4; p<0.05		χ2=218.88 ;d.f. =2; p<0.05		

*Mean age= 35.6 yrs with SD of 15.66 yrs, mean age of male = 35.3 yrs, mean age of female =35.4yrs

Table on demographic profile of the RTA cases shows that majority cases were Hindu (90.5%), from urban areas (72%) and were married (65.9%). The males were more in Muslims (95%), rural areas (97.5%) and in married (91.1%) RTA cases, however this sex difference was found significant regarding place of residence only (table 2).

Table- 2: Demographic profile of RTA cases

Demographic profile	Road traffic accident cases		Total (N=425)
	Male (N=381)	Female (N=44)	
Religion			
Hindu	343(89.1)	42(10.9)	385(90.6)
Muslim	38(95)	2(5)	40(9.4)
χ2=1.363 ;d.f. =1; p>0.05			
Residence			
Urban	265(86.6)	41(13.4)	306(72)
Rural	116(97.5)	3(2.5)	119(28)
χ2=10.923 ;d.f. =1; p<0.05			
Marital status			
Married	255(91.1)	25(8.9)	280 (65.9)
Unmarried	111(88.1)	15(11.9)	126 (29.6)
Widow/Widower/Divorced/ Separated	15(78.9)	4(21.1)	19 (4.5)
χ2=3.283 ;d.f. =2; p>0.05			
Total	381	44	425

Table- 3: Biosocial characteristics of RTA cases

Socioeconomic status	Road traffic accident cases	
	Number (n)	Percent (%)
Educational Status		
Illiterate	266	62.6
Primary School	44	10.4
Middle School	39	9.2
High School	39	9.2
Intermediate	25	5.8
Graduate or Post-graduate / Professional	12	2.8
Occupation		
Unemployed	11	2.7
Students	24	5.6
Laborer	180	42.4
Housewife	38	8.9
Shoe maker/ bangle maker/electrician	39	9.2
Driver	90	21.2
Clerical/shop owner/farmer	33	7.7
Semi-professional /Professional	10	2.3
Socio-economic class*		
Upper(I)/ Upper Middle(II)	6	1.4
Lower Middle(III)	48	11.3
Upper Lower(IV)	352	82.8

Lower (V)	19	4.5
Total	425	100

*Modified Kuppuswami Scale-2012

Out of total 425 RTA cases, 62.6% were illiterate, whereas only 8.6% were educated above high school and around 10% each were educated up to primary and middle classes respectively. It is also clear seen from the table that maximum (42.3%) were laborers by occupation followed by 30.4% as skilled workers (driver/ artesian/electrician). 8.9% were housewives and2.7% were unemployed. According to modified Kuppuswami scale (2012), it was seen that majority (82.8%) of the cases belonged to upper- lower social class while another 11.2% belonged to lower- middle. Very few (1.4%) belonged to social class I &II (table 3).

Table 4 & 5 shows the distribution of RTA cases as type of road users and as per their age and sex. It was found that two wheelers users were most common cases followed by pedestrians (38.4%&37.6% respectively) , while users of non motorized vehicles were least common suffers (7.3%).When type of road users were studied according to age group, it was observed that in all age group except 16-30 yrs, pedestrians were most commonly involved. In <15 yrs age group, 69.3% pedestrians were injured, followed by two wheelers (19.2%). Among 16-30 yrs age group, two wheeler users were involved in 52.4% instances, while pedestrians were involved in 27.1% instances. In 31-45 yrs and 46-60 yrs age groups, a similar trend was observed , pedestrians(42.8% &37.2% respectively) being most commonly involved followed by two wheelers(35.4% &32.1% respectively). Among > 60 yrs most commonly involved road users were also pedestrians (48.8%) followed by NMV (26.8%). Statistically there is significant association between type of road users and the age group (table 4).

Table-4: Distribution of RTA cases according to type of road users and age

Road Users	Age Group (yrs)					Total
	<15	16-30	31-45	46-60	>60	
Pedestrians	18(69.3)	46(27.1)	47(42.8)	29(37.2)	20(48.8)	160(37.6)
Two wheelers	5(19.2)	89(52.4)	39(35.4)	25(32.1)	5(12.2)	163(38.4)
LMV/HMV	1(3.9)	28(16.4)	22(20.0)	15(19.2)	5(12.2)	71(16.7)
Non motorized*	2(7.6)	7(4.1)	2(1.8)	9(11.5)	11(26.8)	31(7.3)
Total	26 (100.0)	170 (100.0)	110 (100.0)	78 (100.0)	41 (100.0)	425 (100.0)
χ2=67.937; d.f. =12; p<0.05						

*Non motorized (pedal cyclist, tricycle occupant/ rider)

Table-5: Distribution of RTA cases according to type of road users and sex

Type of road users	Road traffic accident cases			Z value
	Male	Female	Total	
Pedestrians	133(34.9)	27(61.4)	160(37.6)	3.428
Two wheelers	152(39.9)	11(25.0)	163(38.3)	2.131
LMV/HMV	65(17.1)	6(13.6)	71(16.7)	0.636
Non motorized*	31(8.1)	0(0.0)	31(7.3)	5.827
Total	381(100.0)	44(100.0)	425(100.0)	
χ2=13.472; d.f. =3; p<0.05				

The table 5 depicts that among males most commonly involved type of road users were two wheelers (39.9%) followed by pedestrians (34.9%). On the contrary among females, most commonly involved were pedestrians (61.4%) followed by two wheelers (25.0%). Statistically there is significant difference between type of road users among male & female sex. On going in more details of type of road users , figure -1 depicts that maximum (37.6%) accident cases were pedestrians, 19.6% were two wheeler drivers, 18.6% were two wheeler pillions while 9.6% were three wheeler driver or occupants. Pedal cyclists involved in the accident were 7.5% and 4.5% were car/ van drivers or occupants. Only 1.2% was tricycle occupant/rider. It was found that motorized two wheeler (33.2%) was the most common object followed by LMV& HMV (22.8% & 15.3% respectively). In 17.9% cases non motorized vehicle was the hitting objects (table 5).

Discussion

The present study was conducted to know the sociodemographic profile of RTA cases. According to WHO report on "Global status report on road safety 2013 it was found that road traffic accidents are the leading cause of death among young people aged 15-29 yrs and about 46% those dying are " vulnerable road users"[1]. In the present study it was found that 89.6% of the cases were males. Similarly Jha Nilambar et.al & Kumar Srinivasa P.V. et.al also found that males were predominantly involved [5,6]. It was also found that maximum cases were in the age group of 16-30 years (40.0%), followed by 31-45 yrs (25.8%). Similar trend was also observed by Mishra B et al [7] & Khare et.al [8] who reported that the maximum cases were in the age group of 15–30 years (38.3% &50% respectively) followed by 31-45yrs age group.

Patil S S et al [9] also observed that the maximum (29.4%) cases were between 20- 29 years of age. Among males 16-30 years age group (42.3%) was the most commonly affected, while among females the most common age group was 46-60 years (34.1%). Gudadinn M. R [10] found that the maximum (30.9%) of cases were in the age group of 20-30 yrs both in males and females as compared to our study. Sharma Deepak et.al [11] found that in males the most common age group involved was 21-30 years (31.8%) whereas in case of females the highest number of cases was seen in the age group of 31- 40 years (21.9%). This sex difference may obviously be due to the fact that males tend to travel more for work related and other purposes as compared to females. Majority (72.0%) were urban dwellers, while 28.0% were from rural areas. However Mishra B et al [7] and Viren Kaul et.al [12] found that majority of the cases in their studies were from rural areas as compared to urban areas. This variation might be due to the location and catchment area of the hospital as the present study has been conducted in a tertiary level hospital located in the heart of the city. In the present study, 65.8% were married. Similarly Singh Abhishek et.al [13] & Singh R K et.al [14] found that most of the cases who suffered from accidents were married. The apparent occurrence of road accidents more among married may be due to the other determining factors for RTA like age rather than marital status.

In the present study most (62.6%) of the cases were illiterate, while 28.8% cases had education up to high school level. This finding is in corroboration with the findings of Singh RK et.al [14] who also reported that maximum of the cases were illiterate but the proportion is lower (24.5%) than the present study followed by 16.3% were educated up to primary and middle education each. In contrast to the present study, Kumar Srinivasan P.V. et.al [6] found that 39.3% were graduates, followed by 31.1% with intermediate education. Unskilled laborers (42.4%) formed the largest group in the present study while another 21.2% cases were drivers. Similar occupation profile was noted by Bayan Pankaj et.al [15] & Singh Abhishek et.al [13] in their study. Because in the present study most of the cases were illiterate and laborers majority of the cases (82.8%) belonged to upper- lower class. Only 1.4% belonged to upper/ upper middle classes. These findings are consistent with the findings of Urfi et.al [16] where maximum cases were from upper lower class.

However, upper middle class (63.9%) was noted as the largest group by Kumar Srinivasa P.V. et.al [6].

In the present study, 45.1% of the cases were pedestrians or pedal cyclists, while 38.2% of the victims were two wheeler drivers/ pillion. A similar trend was documented by Kiran E. Ravi et.al [17] who found that majority (60.2%) of the cases were pedestrians, followed by two wheelers (23.6%) . Patil Supriya Satish et.al [9] & Khare Neeraj et.al [8] mentioned that two wheeler occupants constituted the maximum number of RTA cases (49.7% & 73% respectively), followed by pedestrians (13.4% & 10% respectively). The difference might be due to the fact that the roads lack a separate section or footpath for pedal cyclists or pedestrians, respectively. Thus there are a substantial proportion of RTA victims who were injured while walking or riding pedal cycles. Maximum (33.2%) cases were hit by two wheelers, followed by those who were hit by LMV (22.8%). A little less than 20% of the cases were not hit by any motorized vehicle. Similarly Patil S.S et.al [9] & Kumar Verma Pramod et.al [18] found that maximums (31.9%) were hit by two-wheelers (31.9% & 24.5% respectively), followed by LMV (29.8% &15% respectively). But on the contrary Chanchlani Roshan et.al [19] found that 71.4% of victims were hit by four wheelers.

Conclusion

Majority of the RTA cases are in the economically productive age group and are married, hence their hospitalization or disability places a huge economic burden on the family.

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