

Original Research Article

An autopsy study of road traffic accident cases at tertiary care center, Mandya, Karnataka

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Received: 02 November 2023

Revised: 02 December 2023

Accepted: 07 December 2023

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ABSTRACT

Background: Road traffic accidents represent a pervasive global crisis resulting in the loss of millions of lives and countless injuries annually. According to the world health organization (WHO), over 1.3 million people die in road traffic accident every year, and an additional 20-50 million are injured or disabled. Objective was to study the demographic patterns in these cases of RTA in and around AIMS B. G. Nagar, India.

Methods: It was a cross sectional study of all medico legal necropsies of road traffic accidents, Data was collected between January 2022 to June 2023 at the mortuary of the department of forensic medicine and toxicology, AIMS, B. G. Nagar, and Karnataka, India. Collected data was analysed.

Results: During the study period 117 (40.20%) were road traffic accidents, according to this study road traffic accidents were more 30 (25.64%) in old age groups and males 105 (89.74%) were majorly affected. Majority of the accidents 41 (35%) predominantly occurred during evening to midnight hours on highways 65 (55.55%), light vehicles (37.61%) were most frequently engaged in road traffic accident and the most common site of injury was head 98 (83.76%), and cause of death was due to intracranial hemorrhages (49.57%) and among the pattern of intracranial hemorrhage we observed high number of (32.47%) combination of subdural hemorrhages and sub-arachnoid hemorrhages.

Conclusions: Through this study we want to create awareness and deploy safety measures to prevent RTA.

Keywords: Demographic profile, Head injury, Road traffic accident

INTRODUCTION

Road traffic accidents represent a pervasive global crisis resulting in the loss of millions of lives and countless injuries annually. According to the world health organization (WHO), over 1.3 million people die in road traffic accident every year, and an additional 20-50 million are injured or disabled.¹ Worldwide, road traffic injuries are responsible for the highest injury mortality rates.² With the increasing number of vehicles on the road, it's crucial to prioritize safety to prevent road traffic accident. Not only can these accidents cause severe injuries or even fatalities, but the economy as a whole is impacted.^{1,2} During 2021, total of 4,03,116 cases of 'road

accidents' were reported which rendered 3,71,884 persons injured and 1,55,622 deaths.³ Hence, Ministry of Road Transport and Highways has been taking multiple initiatives including those related to vehicular and road engineering as well as educational measures for raising awareness in the field of road safety.⁴ With this background the present study was undertaken to ascertaining the socio-demographic profile of the victims, to assess the pattern of injuries leading to deaths from road traffic accidents, cause of death and risk factors responsible for road traffic accidents of victims by collecting information's from the mortuary of the department of forensic medicine and toxicology, AIMS, B. G. Nagar, Mandya, Karnataka.

METHODS

Study design

It was a retrospective, descriptive, cross sectional study.

Study area

The Adichunchanagiri Institute of Medical Sciences B. G. Nagara, located in Nagamangala Taluk, Mandya district, Karnataka state, is a tertiary care teaching hospital where the current study was carried out.

Study period

This study was conducted from 1st June 2023 to 31st October 2023.

Inclusion criteria

All the medico legal autopsies of road traffic accident cases conducted from January 2022 to June 2023.

Exclusion criteria

Cases other than road traffic accident and incomplete road traffic accident cases records.

Data collection

A pre-tested proforma was used. It was a cross sectional study which comprising all RTA necropsies conducted between January 2022 to June 2023 at the mortuary of the department of forensic medicine and toxicology, AIMS, B. G. Nagar, Mandya, Karnataka. The required information like age and sex distribution, time of accident occurrence, victim profiles, vehicles involved, fracture distribution, external injury distribution and patterns of cranio-cerebral trauma were studied from the post mortem reports. In order to accurately record the observations of this study, a comprehensive proforma was formulated.

Ethical approval

The study was approved by the institutional ethics committee of AIMS.

Sample size

Total number of 117 road traffic accident cases during the period of January 2022 to June 2023.

Statistical analysis

The data collected was entered into an excel spread sheet. Descriptive statistics such as mean, frequency and percentage were calculated using the program SPSS

version 22 software. The results of the analysis were then displayed as relevant Tables and Figures.

RESULTS

During the study period, 291 medico-legal necropsies conducted at the mortuary of AIMS, B. G. Nagar, Mandya, Karnataka, the victim who died as a result of road traffic accident consist of 117 cases accounting for 40.20%.

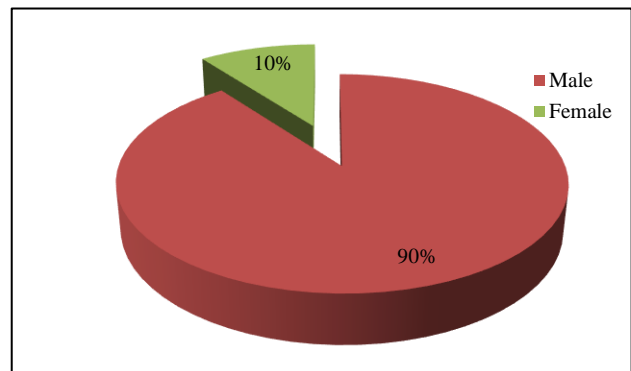


Figure 1: Sex distribution of RTA cases.

Out of 117 victims it was observed that 105 (89.74%) victims were male and 12(10.25) were females as shown in (Figure 1).

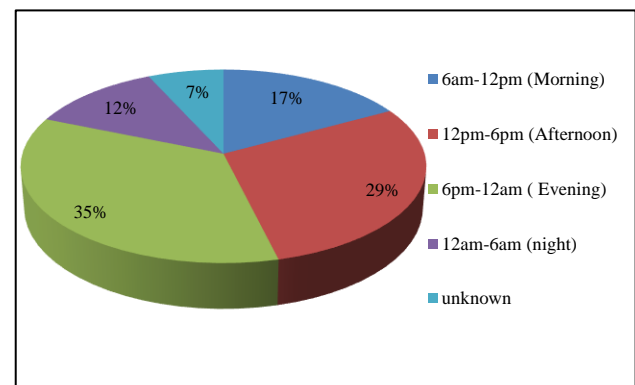


Figure 2: Time of occurrence of road traffic accidents.

In the present study, it was found that road traffic accidents predominantly occurred during the evening hours between 6 pm to 12 am, encompassing 35% of the total observed cases, followed by afternoon 29%, morning hours 17%, night 12% and unknown 7% (Figure 2).

In the present study the month of April (13.67%) and June (13.67%) registered the highest incidence of road traffic accidents, while January (10.25%) and March (10.25%) followed closely. The lowest number of cases, as illustrated in (Figure 3), was documented in November (3.57%).

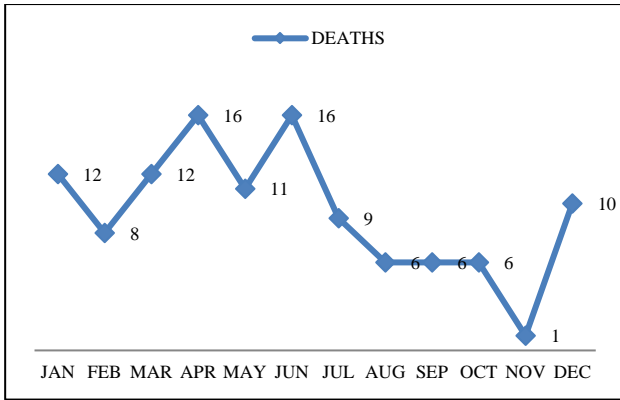


Figure 3: Month-wise distribution of RTA cases.

Table 1: Age and gender distribution of road traffic accidents.

Age group (in years)	No of cases	%
10-19	3	2.564
20-29	29	24.78
30-39	21	17.94
40-49	16	13.67
50-59	18	15.38
>60	30	25.64

Our study revealed that the highest number of RTA victims were in the age group of >60 years with 27 cases (25.64%). This was followed by the age group of 20-29 years with 29 cases (24.78%), 30-39 years with 21 cases, 50-59 years with 18 cases (15.38%), 40-49 years with 16 cases (13.67%), and 10-19 years with 3 cases (2.564%), as shown in (Table 1).

The highest number of road traffic accident is seen among the Hindus with 108 (92.30%) of the cases, followed by the Muslims with 5 cases (4.273%) and 4 (3.418%) unknown cases (Table 2). Light vehicles were most frequently engaged in road traffic accidents, accounting for 44 incidents (37.61%), and the majority of the casualties were not wearing helmets. Heavy vehicles come in second place with 23 instances (11.97%), followed by self-fall from vehicles with 22 cases (18.80%), motorbike with 14 cases (11.97%), and unknown vehicles with 14 cases (11.97%) as shown in Table 2. Motorcycle riders had the highest rate of fatalities among all categories of road users, accounting for 70 instances (59.82%), followed by pedestrians with 30 cases (25.64%), Pillion riders with 16 cases (13.67%), and an unknown victim’s rate of (0.854%).

The majority of road traffic accidents took place on highways, with 65 cases (55.55%), followed by roads with 52 cases (44.45%). Out of 117 road traffic accident cases, 73 victims succumbed in the hospital accounting for (62.39%), spot death with 41 cases (35.04%). And only in 1 case the victim died on the way to hospital accounting for (2.564%) as shown in (Table 2).

Table 2: Profile of road traffic accidents.

Distribution of religion	No. of cases	%
Hindu	108	92.307
Christian	0	0
Muslim	5	4.273
Unknown	4	3.418
Total	117	100
Type of road users		
Pedestrians	30	25.64
Motorcycle rider	70	59.82
Pillion rider	16	13.67
Unknown	1	0.85
Total	117	100
Site\place of accident		
Highways	65	55.55
Roads	52	44.45
Unknown	0	0
Total	117	100
Place of death		
Hospital	73	62.39
Spot	41	35.04
On the way to hospital	3	2.564
Total	117	100
Type of vehicle involved		
Motorcycle	14	11.97
Heavy vehicle	23	19.66
Light vehicle	44	37.61
Self-fall from 2 wheeler	22	18.80
Unknown vehicles	14	12
Total	117	100

Table 3: Type of body parts involved and distribution of fracture.

Body parts involved	No. of cases	%
Head injury	98	83.76
Chest (thorax) injury	11	9.401
Pelvis injury	2	1.709
Abdomen injury	4	3.418
Lower limb injury	8	6.837
Upper limb injury	4	3.418
Multiple injuries	4	3.418
Distribution of fracture		
Skull	43	36.75
Spine	1	0.854
Thorax	45	38.46
Pelvis	4	3.418
Lower limb	25	21.36
Upper limb	16	13.67

As stated in Table 3, head injury was seen in 98 instances (83.76%), followed by chest (thorax) with 11 cases (9.401%), lower limb with 8 cases (6.837%), abdomen (3.418%), upper limb (3.418%), multiple injury (3.418%), and pelvis (1.709%). The most common

fracture observed in this study was thorax fracture with 45 cases (38.46%), followed by skull fracture with 43 cases (36.75%), lower limb fracture (21.36%), upper limb fracture (13.67), pelvis (3.418%), and Spine (0.854%) as shown in Table 3.

In the present study external injury like abrasion contusion laceration was majorly observed in lower limb with 57 cases (48.71%), followed by head, neck and face with 56 cases i.e., (47.86%), upper limb (47.86%), abdomen and pelvis (19.65%) Table 4.

Table 4: Distribution of external injuries.

Part of the body	Abrasion	Contusion	Laceration	Total
Head, neck and face	24 (20.51)	10 (8.54)	22 (18.80)	56 (47.86)
Upper limb	40 (34.18)	13 (11.11)	3 (2.564)	56 (47.86)
Abdomen and pelvis	14 (11.96)	7 (5.982)	2 (1.709)	23 (19.65)
Lower limb	41 (35.04)	5 (4.273)	11 (9.401)	57 (48.71)

In the present study, the commonest intracranial hemorrhages present in victims are combinations of subdural hemorrhages and sub-arachnoid hemorrhages, with 38 cases accounting for 32.47% of the cases. Followed by subdural hemorrhages alone (26.49%) and subarachnoid hemorrhages alone (4.273%), and combination of extradural hemorrhage + subdural hemorrhage accounted for 2.564%, and combination of extradural + subdural + subarachnoid hemorrhage, subdural + subarachnoid + petechial hemorrhages accounted for 1.709%, and combination of subdural + subarachnoid + Intraparenchymal hemorrhages with 0.854% (Table 5).

Table 5: Distribution of pattern of intracranial hemorrhages.

Pattern of intracranial hemorrhages	No. of cases	%
Extradural hemorrhage alone	2	1.709
Subdural hemorrhage alone	31	26.49
Subarachnoid hemorrhage alone	5	4.273
Extradural + subdural + subarachnoid hemorrhage	2	1.709
Extradural hemorrhage + subdural	3	2.564
Extradural + subarachnoid hemorrhage	0	0
Subdural + subarachnoid hemorrhages	38	32.478
Subdural + subarachnoid + petechial hemorrhages	2	1.709
Subdural + subarachnoid + intraparenchymal hemorrhages	1	0.854

In the present study, majority of the cases died due to intracranial hemorrhages accounting for 49.57% of the cases, followed by cranio-cerebral injuries (25.64%) and hemorrhage and shock due to multiple injuries (16.23%), and hemorrhage and shock due to trauma to abdomen (3.418%), coronary insufficiency, hemorrhage and shock due to trauma to chest and sepsis accounted for only 0.854% of the cases (Table 6).

Table 6: Distribution of cause of death.

Pattern of cause of death	No. of cases	%
Cranio-cerebral injury	30	25.64
Hemorrhage and shock due to multiple injuries	19	16.23
Intracranial hemorrhages	58	49.57
Coronary insufficiency	1	0.854
Hemorrhage and shock due to trauma to abdomen	4	3.418
Hemorrhage and shock due to trauma to chest	1	0.854
Sepsis	1	0.854
Respiratory failure	3	2.564
Total	117	100

DISCUSSION

During the study period from January 2022 to June 2023, 291 necropsies were conducted in the department of forensic science and toxicology at AIMS B. G. Nagar. Out of 291 cases, 117 (40.20%) were road traffic accidents, and the majority of victims who died in RTA were male, with 105 cases (89.74%) and 12 (10.25%) being female. Similarly, a male predominance was seen in other studies which were done in India.⁵⁻¹⁶ The predominance of men may be a result of our Indian social structure, which prioritizes men taking care of the home and going to work, as well as men's tendency for irresponsible, careless driving or riding and violating traffic laws.

Our study reveals that the highest number of RTA victims were in the age group of >60 years (25.64%), the old people are more likely affected in RTA, similar finding were observed in the studies done by Marak et al.⁸ The reason for this might be due to the fact that Aging causes physical abilities to decrease, including eyesight and hearing, this may lead to not fast enough to cross the roads which may increase the chance of a road collision.

In a present study it was found that road traffic accidents predominantly occurred during evening to midnight hours between 6 pm to 12 pm similar results were found in a study conducted by Farooqui et al, Dsouza et al, Marak et al, Swarnkar et al, Neeluri et al, Raja et al,¹⁵ Sonawane et al.^{5,7-9,11,15,16} Poor road lighting, a lack of retroreflective signs, insufficient lane markings, and driver conduct, including drunk driving, inattentive

driving, and excessive speeding, are some of the causes that contribute to this high rate of evening to midnight fatalities.

In the present study the month of April (13.67%) and June (13.67%) i.e., the summer season registered the highest incidence of road traffic accidents. These results concur with other research findings, Swarnkar et al, but in the study done by Marak et al, more road traffic accident was seen in the month of October.^{8,9}

The highest number of road traffic accident was seen among the Hindus with 92.30% of the cases, Similar conclusions were made in a study conducted by Marak et al, Neeluri et al, Raja et al.^{8,11,15} Hinduism is the most common religion in the Mandya district, followed by Islam and Christianity. This may be the cause of the overwhelming number of Hindu victims.

Light vehicles (car, auto) were most frequently engaged in road traffic accidents (37.61%) followed by heavy vehicle (19.66%) i.e., four wheelers are the most commonly involved vehicles similar findings were observed in the study done by Sonawane et al, Swarnkar et al.^{9,16} Motorcycle riders had the highest rate of fatalities among all categories of road users, accounting for 70 instances (59.82%), This finding was similar to study done by Swarnkar et al, Neeluri et al, Narayan et al, Sonawane et al, and our findings are in contrast to the finding of Farooqui et al, Mishra et al, Marak et al, and Garg et al, where they observed pedestrians being the commonest victims.^{5,6,8,9,11,12,14,16}

The majority of road traffic accidents took place on highways, with 65 cases (55.55%). These results support earlier research findings of Marak et al.⁸ According to the results of the current study, high-speed limits may be to blame for the increased number of accidents on NH 75, or the Bangalore-Mangalore Highway. The higher speed restrictions on national highways can make accidents more likely because they give drivers less time to react and cause more force when they collide. And on weekends, this highway sees a lot of traffic from individuals traveling to Bangalore from other cities to work or attend school there. This may be the cause of the majority of accidents on the highway.

In the present study, out of 117 road traffic accident cases, 73 victims succumbed in the hospital (62.39%) and spot death with 41 cases (35.04%). These findings are consistent with the findings of other researcher Marak et al.⁸ Our findings are in contrast to the findings of Farooqui et al, Sonawane et al, where they reported the largest number of victims died at the site of accidents.^{5,16}

In the present study external injury like abrasion contusion laceration was majorly observed in lower limb followed by head, neck & face, similar findings were observed in the research done by Sonawane et al.¹⁶ In the study conducted by Farooqui et al, head, neck and face,

followed by upper extremity and lower extremity were commonly affected.⁵

According to the current study, the head is the most commonly involved body part in road traffic accidents, followed by the chest (thorax). Similar findings were observed in the research done by Farooqui et al and Prakash et al.^{8,13} In the study conducted by Dsouza et al, limbs followed by the head were commonly affected, and in the study conducted by Marak et al, the head followed by the thorax and abdomen were affected.^{7,8} Our findings were contrary to the study conducted by Neeluri et al.¹¹ Due to the lack of helmet use by two-wheeler riders and the lack of seat belt use by light motor vehicle riders, there was a high frequency of head injuries.

In the present study, majority of the cases died due to intracranial hemorrhages accounting for 49.57% of the cases, followed by cranio-cerebral injuries (25.64%), the commonest intracranial hemorrhages present in victims are combinations of subdural hemorrhages and sub-arachnoid hemorrhages, with 38 cases accounting for 32.47% of the cases, Followed by subdural hemorrhages alone (26.49%). Sonawane et al, reported similar findings, but in the study conducted by Marak et al, Narayan et al, majority of the cases died due to cranio-cerebral injuries followed by intracranial hemorrhages.^{8,12,16}

There are few limitations of the study. The sample size was small as it was a retrospective study.

CONCLUSION

This study showed that road traffic accidents were more in old age groups and males are majorly affected, Majority of the accidents predominantly occurred during evening to midnight hours on highways. Light vehicles were most frequently engaged in road traffic accident and the most common site of injury was head. And cause of death is due to intracranial hemorrhages and among the pattern of intracranial hemorrhage we observed high number of combinations of subdural hemorrhages and sub-arachnoid hemorrhages.

Helmet use by two-wheeler riders and the seat belt use by light motor vehicle riders for both pillion rider and riders irrespective of age and sex, are two practices that aid in reducing traffic accidents. This lessens the likelihood of serious head injuries and significantly lowers the incidence of fatalities in traffic accidents. Other methods include creating safe pedestrian crossings and walkways, enhancing zebra crossings, upgrading night-time street lighting, and urging motorists to be patient and give senior people extra time to cross busy main highways. Additionally, observing traffic laws and regulations will significantly reduce the road traffic accidents involving vehicles. A computerized trauma register must be created immediately to highlight danger this would be extremely helpful in policy making and health management in India.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Rakshitha BM, Chinmayi Y, Kumar V, Kumar U. An autopsy study of road traffic accident cases at tertiary care center, Mandya, Karnataka. *Int J Res Med Sci* 2024;12:153-8.