

## Original Research Article

# Road traffic accidents attending casualty in a tertiary care hospital : a 03 year study from South Western India

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## ABSTRACT

**Background:** Road Traffic Accident (RTA) is any vehicular accident occurring on the roadway i.e. originating on, terminating on, or involving a vehicle partially on the roadway. Road traffic accidents are a human tragedy which has an immeasurable impact on the families affected. The WHO estimates that over 1.2 million people pass away every year on the world's roads, and between 20 and 50 million fall victims to non-fatal injuries. The incidence of RTA remains poorly measured in India.

**Methods:** The present study is conducted at casualty department of a tertiary care hospital in South Western India among victims of road traffic accident. This cross sectional study was conducted to elucidate the role of various factors involved in road traffic accidents and to study demographic profile and injury pattern among RTA victims. All the reported RTA cases from 1st January 2016 to 31st December 2018 were included in the study.

**Results:** A total of 875 cases of RTA were studied. There were 83.77% (n=733) male and 16.23% (n=142) female accident victims. Most of the patients were aged between 21 and 30 years. Monsoons witnessed 46.63% (n=408) cases. Most cases occurred between 6 and 12pm (54.4%, n=476). Commonest injury was a simple injury (72.91%, n=638), dangerous injuries (27.09% percent, n=237) and dead was (7.43%, n=65). The highest number of accidents took place in the month of June (19.09%, n=167) and on Sundays (22.17%). Among the motorized vehicles, two-wheeler drivers were more (76.91%, n=673) involved in accidents. In this study 17.60% (n=154) were under influence of alcohol while driving.

**Conclusions:** This study shows there are multiple factors associated with road traffic accidents. Most of the factors responsible for RTA and its fatal consequences are preventable. India, as a signatory to the Brasilia declaration, intends to reduce road accidents and traffic fatalities by 50% by 2022. A comprehensive multipronged approach can mitigate most of them.

**Keywords:** Epidemiological factors, Injuries, Mode of travel, Road Traffic Accidents

## INTRODUCTION

Road Traffic Accident (RTA) is one of the varieties of transportation injuries (Road, Rail and Air).<sup>1</sup> Road traffic accidents are defined as a collision involving at least one vehicle in motion on a public or private road that results

in at least one person being injured or killed.<sup>2</sup> They not only involve high human suffering but also socioeconomic costs in terms of premature deaths, injuries, loss of productivity.<sup>3</sup> Nearly 1.3 million people die every year on the world's roads and 20 to 50 million people suffer non-fatal injuries, with many sustaining a disability as a result of their injury.<sup>4</sup> Road traffic injuries

are the leading cause of death among young people aged 15-29 years and cost countries 1-3% of the gross domestic product (GDP).<sup>4,5</sup>

According to the World Health Organization(WHO), road traffic injuries are the sixth leading cause deaths, disabilities and socio-economic losses in the young and middle-aged population.<sup>6</sup> The United Nations has declared 2011-2020 as a Decade of Action for Road Safety with a goal to save five million lives.<sup>7</sup> According to Ministry of Road Transport & Highways, during the calendar year 2016, the total number of road accidents is reported at 4,80,652 causing injuries to 4,94,624 persons and claiming 1,50,785 lives in the country. In other words, we can say that, on an average, 55 accidents and 17 deaths took place every hour in 2016.<sup>8</sup>As per an estimate given by Ministry of Road Transport & Highways, Government of India, about 54.1 percent of all persons killed in road accidents are in the 15 - 34 years age group during the year 2015.<sup>9</sup> Urgent action is needed to achieve the ambitious target for road safety reflected in the newly adopted 2030 Agenda for Sustainable Development, halving the global number of deaths and injuries from road traffic crashes by 2020.<sup>10</sup>

Underreporting of RTAs is a serious and global problem.<sup>11</sup> Details of traffic crashes are not available at the national level. Even as the official road traffic fatality data may be close to the actual number, the injury data are gross underestimates.<sup>12</sup> Strengthening and undertaking research on the public health burden and impact, understanding the risk factors, characteristics of trauma, and measuring the impact of interventions through well-designed public health and clinical research methods is the need of the hour.<sup>13</sup> This cross sectional study was conducted to elucidate the role of various factors involved in road traffic accidents and to study demographic profile and injury pattern among RTA victims.

## METHODS

The present study is a descriptive, cross-sectional study of Road Traffic Accident cases brought to the casualty of a tertiary healthcare centre of a metropolitan city in South-Western India. Duration of study January 2016 to December 2018.

### Inclusion criteria

All the MLC cases in this hospital are handled by Forensic medicine Faculty and Residents. Road traffic accident for the purpose of study was defined as accident which took place on the road between two or more objects, one of which must be any kind of a moving vehicle. All the victims of RTA during the study period were included who fulfilled the inclusion criteria. All alleged RTA reporting to the hospital and consented were included.

### Exclusion criteria

All the victims brought dead or who died before being interviewed by Forensic medicine resident/faculty were excluded from the study.

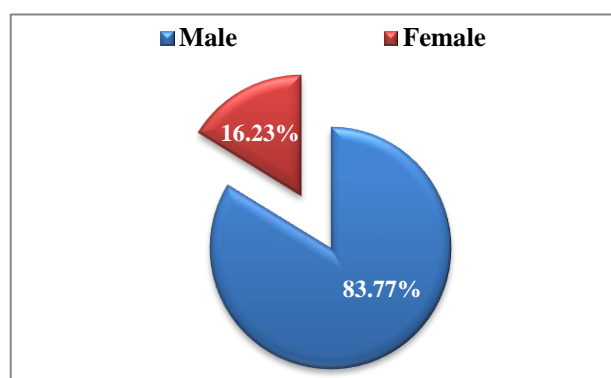
Informed consent was obtained from the victim or care provider in case victim was not able to give consent, prior to study participation. For medico legal and ethical reasons, the identification of the victims was not documented. Necessary permission was taken from the Institutional ethical committee prior to the study. There was a detailed proforma prepared to record the epidemiological data and details of injuries sustained etc. and the observations were thereafter statistically analyzed. Data was collected from MLC registers/record, OPD registers and case sheets (for admitted patients) and patient/guardian interview.

### Statistical analysis

Analysis of the data involved the use of chi-square tests and Poisson regression analysis in order to determine specific trends. Data analysis was performed by using SPSS 10 software. The results were studied using appropriate statistical methods. Microsoft word and excel were used for generating charts and graphs.

## RESULTS

The present descriptive, cross-sectional study was conducted to know the various epidemiological factors related to road traffic accident cases brought to a tertiary health care centre in South Western India. A total of 875 cases of RTAs were reported during the study period from 1 January 2016 to 31 December 2018. Among all victims who reported, 733(83.77%) were male and 142(16.23%) were female. The male: female ratio was 5.16:1 (Figure 1).



**Figure 1: Gender distribution of RTAS.**

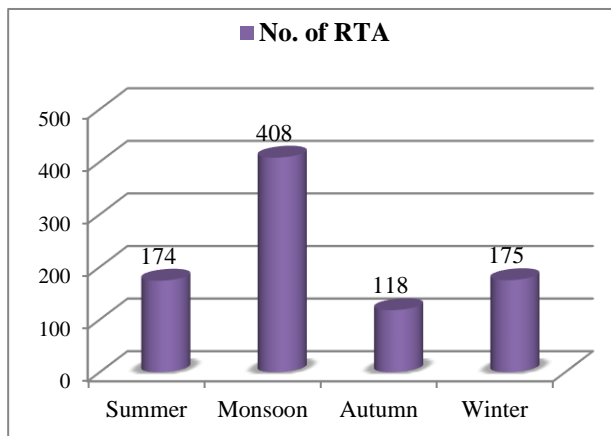
In this study, majority of the victims (23.89%, n=209) were between 21-30 years of age followed by 31-40 years (19.20%, n=168) and 41-50 years age group (16.69%, n=146) (Table 1).

Most of the RTA were in the Monsoon season 46.63% (n=408), followed by Winter (20 %, n=175), Summer (19.89%, n=174) and Autumn has seen 13.49%(n=118) number of RTA (Figure 2).

**Table 1: Distribution of RTAs based on Age group.**

Age (in Yrs)	No. of Cases	Percentage (%)
<10	22	2.51
11 TO 20	72	8.23
21 TO 30	209	23.89
31 TO 40	168	19.20
41 TO 50	146	16.69
51 TO 60	123	14.06
61 TO 70	82	9.37
> 71	53	6.06
	875	100.00

A higher proportion of accident cases was reported in the month of June (19.09%, n=167) followed by July (14.63%, n=128). Lowest was found in the month of March (2.97%, n=26) (Table 2).

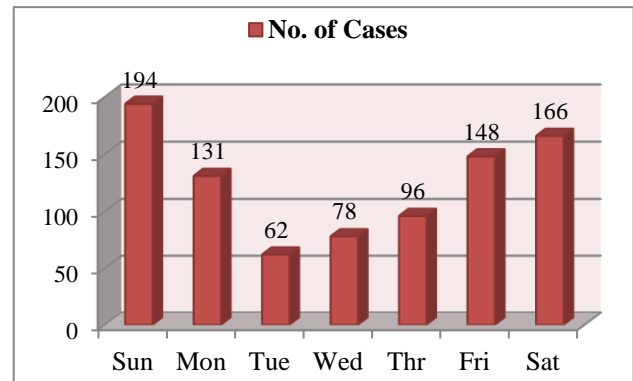


**Figure 2: Season wise distribution of RTAs.**

**Table 2: Month wise distribution of RTAs.**

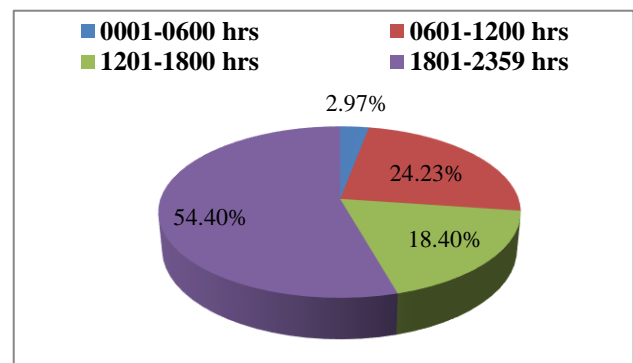
Month	No. of Cases	Percentage (%)
January	71	8.11
February	63	7.20
March	26	2.97
April	52	5.94
May	96	10.97
June	167	19.09
July	128	14.63
August	113	12.91
September	36	4.11
October	54	6.17
November	28	3.20
December	41	4.69
	875	100.00

Highest proportion of accident cases was reported on Sunday (22.17%, n=194) followed by Saturday (18.97%, n=166) and Friday (16.91%, n=148). Thus in the weekends (from Friday to Sunday), the proportion of accidents was found to be as high as 58.05% (n=508) (Figure 3).

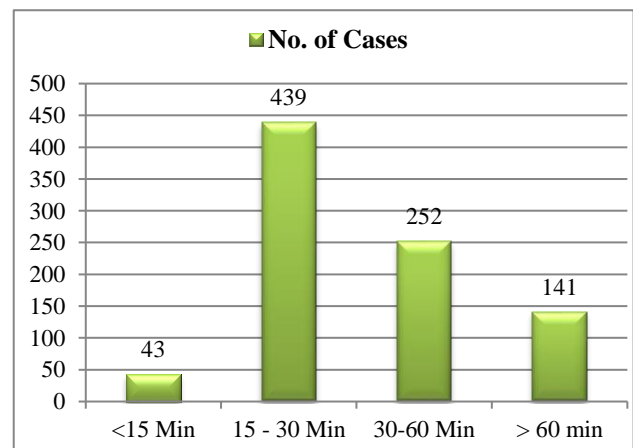


**Figure 3: Day wise distribution of RTAs.**

Most of the accidents took place in the evening (6 PM to 12 AM) i.e. 54.40% (n=476) followed by morning hours (24.23%, n=212), afternoon (18.40%, n=161) and night (2.97%, n=26) (Figure 4).



**Figure 4: Time period wise distribution of RTAs in a day.**



**Figure 5: Time taken to Reach Hospital post RTA.**

In the present study 76.91% (n=673) of victims were using two wheelers, 5.60% (n=49) of cases were using four wheelers and 17.49% (n=153) were pedestrians. Among 673 victims involved in accident while on two wheelers, 528 were riding the vehicle and among 49 people involved in four wheeler accident 28 were driving the vehicle. 13.97% (n=94) of victims reported usage of helmet while driving two wheelers and only 26.53% (n=13) of victims used seat belt while driving four wheelers.

Hospital care was provided to 4.91% (n=43) of the victims within the Platinum hour (<15 min). Nearly 50.17% (n=439) of the victims reached hospital within the Golden hour (Figure 5).

In our study the most common precipitating factors for occurrence of accidents was over speed (42.97%, n=376), followed by 239 (27.31%) who were using mobile phone while driving and 154 (17.60%) who were under influence of alcohol (Table. 3).

**Table 3: Aggravating factors of RTA.**

Factor	No. of Cases	Percentage (%)
Over Speed	376	42.97
Alcohol	154	17.60
Skid	106	12.11
Mobile Phone	239	27.31
	875	100.00

In our 72.91%(n=638) of cases had injuries of extremities followed by 64.34%(n=563) of cases who had injuries on head and neck and 97.26%(n=851) of cases had multiple injuries (Table. 4).

**Table 4: Distribution of Parts of Body injured in RTA.**

Part of Body	No. of Cases	Percentage (%)
Only External	851	97.26
Head & Neck	563	64.34
Face	202	23.09
Chest	395	45.14
Abdomen	71	8.11
Extremities	638	72.91

## DISCUSSION

A total of 875 road traffic accident victims were studied who attended the department of casualty in a tertiary care hospital of South western India.

Out of a total of 875 cases reported to the hospitals of the study, 733(83.77%) were male and 142(16.23%) were female, giving a male: female ratio of 5.16:1. Similar findings were seen in a studies done by Misra et al and Pathak et al where majority of the study participants were males.<sup>14,15</sup> The findings from our study are in agreement with other studies where majority of the RTA victims were

males.<sup>16-22</sup> A majority of male involvement is as per expectation since males are more exposed to road traffic accidents because they venture out of houses more than females for the purpose of livelihood and other work purposes.

The most common age group involved in RTA in our study was 21 to 30 years i.e., 23.89%. Similar findings were observed in a study done by Aditya et al in Vadodara and Khan SP, Hussain AR in Tirupati who found that most common age group affected was 21-30 years (34.91% & 34.20% respectively).<sup>23,24</sup> This is because the youths are the one often having been involved risk taking behaviour and increased usage of vehicle for college, work and other purposes. This is indicating the loss of tender; active and productive age people are the one affected by RTA related injuries in turn adding to higher economic loss to the country.

Most of the RTA happened in the monsoon season (46.63%, n=408) that is in the month of June (19.09%, n=167) followed by July (14.63%, n=128). This increase in trend may be due rainy season, impaired road visibility and making road slippery resulting in loss of good control over vehicle resulting in RTA. Our study corresponds with Kiren et al in Mangalore.<sup>25</sup> However, this observation is in contrast many studies as Ahmad I study in Varansai shows RTA are more in the month of January (40%), another study from South India also reported most cases (13.9%) in January, Prabhakar A et al study in East Sikkim reported most cases in October (14.15%), Singh R et al study in Ghaziabad shows more incidence in winter season.<sup>26-29</sup> This variability is due to change in movement of vehicle in that region in respect variation weather conditions, visibility and traditions of locality like festivals. At the national level, most deaths are reported in the months of May (8.8%), April (8.74%), and January (8.72%).<sup>30</sup>

In this study highest number of RTAs were reported on Sunday (22.17%, n=194) followed by Saturday and Friday. Thus weekends form majority i.e., more than 50% of total RTA in these three years study. Similar findings were seen in the in Khan SP, Hussain AR study done in Tirupati, Ahmad I in UP and a study from South India.<sup>24,26,27</sup> However this was in contrast to a study conducted at Delhi<sup>31</sup> which reported that highest RTAs occurred on Mondays and Wednesdays and in study of East Sikkim with more RTA in Mid-week (Wednesday-Thursday; n=165, 35.33%) with least in weekend (Saturday-Sunday; n=105, 22.48%).<sup>28</sup>

Most of the accidents took place in the evening (6 PM to 12 AM) i.e. 54.40% (n=476) followed by morning hours (24.23%, n=212), afternoon (18.40%, n=161) and night (2.97%, n=26) considering these are the busy hours for those going back from School, office other workplaces and venturing out youth. The findings our study correlates with many studies however contrast was found in study by Kakkar R et al and Shah et al al, in which

majority of accidents occurred in the morning (6 AM to 12 PM).<sup>1,15,24,25,32,33</sup>

In this study majority of the victims 50.17% (n=439) were able to reach the hospital within the Golden hour by many ways. The results of this study is similar to study done by Pathak SM et al.<sup>15</sup> However, in study conducted by Kiran R et al, in Mangalore revealed that most of the cases took 1 to 2 hours to reach the hospital.<sup>25</sup>

In the present study 76.91% (n=673) cases of RTA was with two wheelers, near similar to study done in UP, however higher compared to other studies.<sup>24,26-28</sup> This is may be due to highest number of two wheeler usage among commuters.

In this study safety precautions like helmet while driving two wheeler was reported by only 94(13.97%) victims and only 13(26.53%) of victims using seat belt while driving four wheelers. This result in the study city is less compared to study conducted at Kammam by Neeluri R et al in 2018, 26.19% wore helmet while driving two wheelers and more compared to study conducted at Hyderabad in 2016 by Baburao et al in which 3% of victims used car seat belts and 8% of victims wore helmets.<sup>32,34</sup> In spite of an existing legislation on compulsory use of helmets and seat belts, very few of the two wheeler and four wheeler users complied with the legislation. Thus, there is a need to focus on safety education and strict enforcement of the existing legislations as an immediate measure.

Over speed, alcohol and mobile phone are proven factors which compromise road safety at any time. In our study the 42.97%, (n=376) cases reported RTA were associated with over speeding of the vehicle, this is less compared to study conducted by Neeluri R et al, at Khammam in which over speeding was the main factor in 61.42% cases.<sup>32</sup> Now days almost everyone is addicted to usage of mobile phone even while walking and road and driving hence, the possibility of meeting with collision are more. There is no relevant Indian data found on this problem, but studies conducted in Australia have shown that using mainly the talking on mobile phone increases the reaction time by over 40% in drivers.<sup>35</sup> In our study 27.31% (n=239) victim admitted that they were using mobile phones while driving or walking. This is less compared to study done in Khammam which documented only 11.07% cases were using mobile phones.<sup>32</sup> In this study 154(17.60%) cases and were under influence of alcohol. This is in higher proportion when compared to study done by Kiran et al in Mangalore who found that 13% were under influence of alcohol during the accident.<sup>25</sup> Our findings were low compared to study done at Hyderabad by Baburao et al, who reported that 62% had consumed alcohol while driving.<sup>34</sup> However, data on alcohol use by the victim at time of crash are not available with the NCRB and Ministry of Road Transport and Highway.<sup>36</sup>

Injury are found in all most all cases of RTAs however severity of injury and part involved varies with speed, mode and type of impact. In the present study 72.91% (n=638) of cases had injuries of extremities followed by 64.34% (n=563) of cases who had injuries on head and neck and 97.26% (n=851) of cases had multiple injuries. The findings from our study are in agreement with other studies where the most common site for injury was lower limb.<sup>32,37,38</sup> However, contrary to the study conducted by Kiran R et al in Mangalore who observed that most common site of injury was abdomen (49%).<sup>25</sup> and head injury (52%) in study conducted at Varanasi by Ahmad I.<sup>26</sup>

## CONCLUSION

Road transport is essential for development as it provides mobility to people and goods. However, it also exposes people to the risk of road accidents, injuries and fatalities. Exposure to adverse traffic environment is high in India because of the unprecedented rate of motorization and growing urbanization fueled by high rate of economic growth. Sustained economic growth and increased per capita income have led to rapid growth of motorized vehicles in India. As a result, incidents of road accidents, traffic injuries and fatalities have remained unacceptably high in the India. Today, road traffic injuries are one of the leading causes of death, disabilities and hospitalization in the country. There is an urgent need for promoting awareness, establishing road safety information data base, encouraging safer road infrastructure including application of intelligent transport and enforcement of safety laws. Motor Vehicle (Amendment) Bill 2017 has made provision for stricter penalties for various traffic rules, violations with the objective of strengthening enforcement and ensuring greater compliance.

## Recommendations

- The multi-pronged strategy to address the issue of road safety based on 4 'E's viz. Education, Engineering (both of roads and vehicles), Enforcement and Emergency Care should be adopted in letter and spirit.
- Road safety should be made an integral part of road design at planning stage and Road Safety Audit should be taken up regularly.
- High priority should be accorded to identification and rectification of black spots/ accident prone spots.
- A model Institute of Driving Training and Research (IDTR) should be set up in all States/ UTs.
- Road safety awareness campaign through the electronic and print media should be promoted and Road safety education should focus on school children and college going students.
- Enforcement of traffic rules and motor vehicle rules are extremely important components of road safety and accident mitigation measures which are under the purview of State Policy and Transport Departments.

- The provision of rescue operation and administration of first aid at the site of an accident and the transport of the victim from accident site to nearby hospital will ensure speedy and effective trauma care and management.
- To protect the Good Samaritans from harassment on the actions being taken by them to save the life of the road accident victims, the Ministry of Road Transport & Highways have issued guidelines vide Notification dated 12th May 2015 to be followed by hospitals, police and all other authorities for the protection of Good Samaritan. It should be popularized through awareness campaigns so that citizens don't hesitate in helping accident victims.

Limitations of the Study being a hospital based study it is not representative of the exact burden of road traffic accidents. Also, Problem of recall bias was there since it depended on interview of the victims of RTA.

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