



RISK FACTORS AND ROAD TRAFFIC ACCIDENTS ON MUMBAI-PUNE EXPRESSWAY

S Ashok Kumar	Professor and Head of Department of Neurosurgery, MGM Medical College and Hospital, Kamothe, Navi Mumbai
Neeraj Patni*	Asst Prof Department of Neurosurgery, MGM Medical College and Hospital, Kamothe, Navi Mumbai *Corresponding author
Prashant J Wagh	Junior Resident, Department of Emergency Medicine, MGM Medical College and Hospital, Kamothe, Navi Mumbai
Dilraj Kadlas	Asst Prof Department of Neurosurgery, MGM Medical College and Hospital, Kamothe, Navi Mumbai

ABSTRACT **INTRODUCTION:** Road traffic injuries are the leading cause of death among people aged between 15 and 29 years. Road traffic crashes cost most countries 3% of their gross domestic product. Without sustained action, road traffic crashes are predicted to become the seventh leading cause of death by 2030.

METHODS: 170 patients who met with an accident on Mumbai-Pune Expressway and who presented to Emergency Department of MGM Medical College and Hospital were studied and analyzed.

RESULTS: In our study we noted that human factors (68%) contributed the most followed by vehicle (12%) and infrastructure (7%) among which over speeding (65.07%), alcohol (34.70%), fatigue/ sleep (34.22%), obstacle (21.70%) were the most common responsible factors for RTAs.

CONCLUSION: Maximum RTA's occurs in the productive age group. The need for drivers / road user's education, road maintenance and putting in place a well-organized rescue and pre-hospital care team is emphasized.

KEYWORDS : Road traffic accidents, Risk factors, Mumbai-Pune Expressway.

INTRODUCTION:

A Road Traffic Accident (RTA) can be defined as 'An event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed, where at least one moving vehicle is involved. Thus RTA is a collision between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles.'⁽¹⁾

"Two deaths in 1896 in Great Britain were due to motor vehicle accidents and one death was registered in the US in 1899 from vehicular accident. From these little beginnings, a terrible stream of death and injuries has followed"⁽²⁾

Every year the lives of more than 1.25 million people are cut short as a result of a road traffic crash. Road traffic injuries cause considerable economic losses to individuals, their families, and to nations as a whole. These losses arise from the cost of treatment as well as lost productivity for those killed or disabled by their injuries, and for family members who need to take time off work or school to care for the injured. Road traffic crashes cost most countries 3% of their gross domestic product.⁽³⁾ The WHO predicts that road traffic injuries will rise to become the seventh leading cause of death by the year 2030⁽⁴⁾

In India, the motor vehicle population is growing at a faster rate than the economic and population growth. The surge in motorization coupled with expansion of the road network has brought with it the challenge of addressing adverse factors such as the increase in road accidents.⁽¹⁾ According to the World Health Organization (WHO), road traffic injuries are the sixth leading cause of death in India with a greater share of hospitalization, deaths, disabilities and socioeconomic losses in the young and middle-aged population.⁽⁵⁾

Who is at risk?

Socioeconomic status

More than 90% of road traffic deaths occur in low- and middle-income countries. Even within high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes.

Age

People aged between 15 and 44 years account for 48% of global road traffic deaths.

Sex

From a young age, males are more likely to be involved in road traffic crashes than females. About three quarters (73%) of all road traffic deaths occur among young males under the age of 25 years who are almost 3 times as likely to be killed in a road traffic crash as young females.

Risk factors

The Safe System approach: accommodating human blunders

The basis of this approach are to ensure safe roads and roadsides, speed control, safe vehicles, and safety of road users, all of which must be addressed to eliminate fatal crashes and diminish fatal injuries.

1. Speeding

- An increase in average speed is directly proportional to both the probability of a crash occurring and to the severity of the consequences of the crash. For instance, an increase of 1 km/h in mean vehicle speed results in an increase of 4–5% in the frequency of fatal crashes.
- The chances of dying of a pedestrian is 60% if hit by a car at 80km/h, as compared to being hit at 50 km/h, which is less than 20%.

2. Driving under the influence of psychoactive substances

- There is a substantial gain in the risk of a crash, if a person is driving under the influence of any psychoactive substance.
- The risk of a road traffic crash starts at low levels of blood alcohol concentration (BAC) and increases significantly when the driver's BAC is ≥ 0.04 g/dl, in cases of Drink-Driving.

3. Nonuse of motorcycle helmets and seat-belts

- Almost 40% risk of death & about 70 % risk of severe injury can be lowered just by wearing a motorcycle helmet correctly.
- By just wearing a seat-belt, the risk of a fatality among front-seat passengers is reduced by 40–50% and of rear-seat passengers by 25–75%.

4. Distracted driving

Impaired driving is caused due to various types of distractions and mainly the distraction caused by mobile phones is a growing concern for road safety.

- Drivers using mobile phones are nearly 4 times more expected to

be involved in a crash than drivers not using a mobile phone. Using a phone while driving slows reaction times notably braking reaction time, but also reaction to traffic signals, and makes it tough to keep in the correct lane, and to keep the correct following distances.

5. Unsafe road infrastructure

The safety of road users basically depends on the design of roads which have a considerable impact.

Ideally, roads should be designed keeping in mind the safety of all road users which should include making sure that there are adequate facilities for pedestrians, cyclists, and motorcyclists. Methods such as footpaths, cycling lanes, safe crossing points, and other traffic calming measures can be critical to lowering the risk of injury among these road users.

6. Unsafe vehicles

The likelihood of serious injury can be reduced due to safe vehicles. There are a number of UN regulations on vehicle safety that, if applied to countries manufacturing and production standards, would potentially save many lives. These include requiring vehicle manufacturers to meet front and side impact regulations, to include electronic stability control (to prevent over-steering) and to ensure airbags and seat-belts are fitted in all vehicles. Without these basic standards the risk of traffic injuries – both to those in the vehicle and those out of it – is considerably increased.

7. Inadequate post-crash care

More is the delay severe the injuries become. Post-crash care of injuries are extremely time-sensitive and delays of minutes can make the difference between Life and Death.

8. Inadequate law enforcement of traffic laws

To bring expected reduction in road traffic fatalities and injuries related to specific behaviors, the traffic laws on drink-driving, seat-belt wearing, speed limits, and helmets, must be strongly imposed. If not enforced then it is likely that they will not be complied with and therefore will have very little chance of influencing behavior.

Effective enforcement includes establishing, regularly updating, and enforcing laws at the National, Municipal, and local levels that address the above mentioned risk factors. It also includes the definition of appropriate penalties.

AIMS AND OBJECTIVES:

To analyze risk factors associated with road traffic accidents.

MATERIALS AND METHODS

Study subjects:

Inclusion criteria: All cases of road traffic accidents that occurred on Mumbai Pune Expressway and Mumbai-Sion Highway who presented to Emergency Department of MGM Medical College Navi Mumbai.

Exclusion criteria: Brought dead cases.

Study period: 1st January, 2016- 30th November 2017.

Sample size: All cases of road traffic from 1st January, 2016 to 30th November 2017.

Study instrument: A semi-structured and pre-tested questionnaire was used.

Study analysis: Appropriate statistical measurements like ratios, percentages, proportions were used.

RESULTS AND DISCUSSION:

Sex:

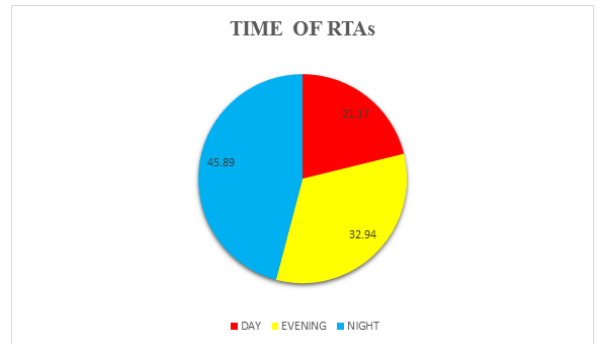
Out of 170 RTA cases, 108 were males (63.5%) and 62 (36.5%) were females.

Age:

In our study, maximum cases occurred in fourth (26.47%) decade followed by third (21.76%) decade.

Time of accident:

JP research studies revealed that, maximum accidents occurred in the night. In 2015 it was 55% and it was 67% in 2016 while in our study it was 45.89%.



GRAPH NO 1: Depicts time of RTAs.

In our study 45.89% of the cases met with an accident in the night while 32.94% and 21.17% accidents occurred during evening and day respectively.

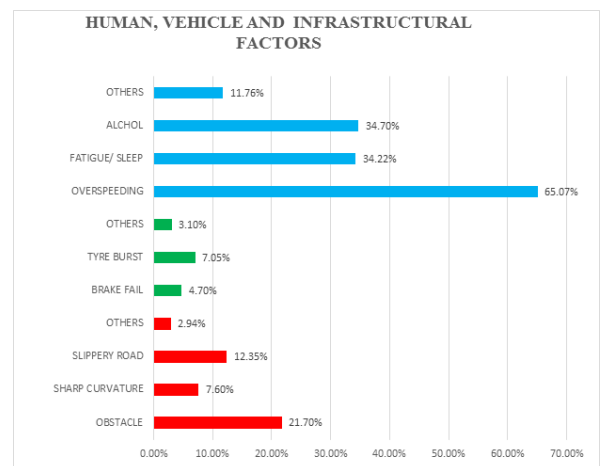
Vehicles involved:

According to JP research studies, cars and trucks were the most commonly involved vehicles contributing to almost 33% and 54% of accidents in 2015, while it was 41% and 40% in 2016 respectively. In our study the incidence of cars and trucks involved in accidents were 37.22% and 16.05% respectively. We also noted the incidence of two wheeler (33.57%) accidents that occurred in the city, on Sion-Panvel highway which is the continuation of the Mumbai-Pune Expressway.

Human factors:

In our study, we noted that there was a significant increase in the contribution of over speeding of vehicles (65.07%) towards the accidents as compared to 30% and 40% in 2015 and 2016 respectively as noted by JP research studies.

Alcohol (34.70%) and Fatigability/sleep (34.22%) were the second and third most common contributing factors for RTAs in our study as compared to JP research studies, where the incidence of alcohol (1%) was very low in 2015 and fatigability was 29% and 27% in 2015 and 2016 respectively.



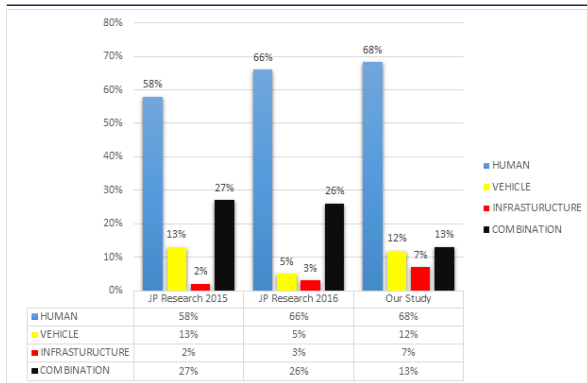
GRAPH NO 2: Depicts various risk factors of RTAs.

Vehicle as a factor:

It was found that, the vehicle contributed (5-10%) in the form of tyre burst and brake fail in our study as well as in JP research studies.

Infrastructure:

Factors like obstacles, sharp curvatures, slippery roads etc. have contributed to a maximum number of RTAs with regards to infrastructure. In our study, obstacles (21.7%) contributed the most, followed by slippery roads (12.35%) and sharp curvatures (7.64%).



Graph No 3: Comparison of our study with JP research studies in terms of human, vehicle and infrastructure.

In our study, human factor contributed most (68%) for RTAs, followed by vehicle (12%) and infrastructure (7%) which was comparable to JP research studies.

CONCLUSION:

Maximum RTA's occurs in the productive age group. Over speeding, alcohol, fatigability, obstacles, etc. are responsible for maximum number of RTAs. Maximum no. of RTAs occur during night and evening hours. As compared to vehicle and infrastructure factors, human factors are responsible for maximum cases of RTAs and has shown increasing trend in last few years. Most of the factors responsible for RTA and its fatal consequences are preventable. The focus should be on minimizing the number of RTAs in the form of strict implementation of safety guidelines for drivers of vehicles laid down by appropriate authorities especially for over speeding and alcohol consumption. In addition, various measures to evacuate RTA victims from accident sites to hospitals and establishment of adequate multiple trauma centers will go in a long way for better outcome of RTA victims.

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