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## REVIEW ARTICLE

# ROAD TRAFFIC ACCIDENTS SO EASY TO OCCUR, SO DIFFICULT TO PREVENT: A REVIEW

**Pradip Kharya, *Arti Gupta and Hariom Solanki**

M. B. B. S., All Institute of Medical Sciences, New Delhi

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**ABSTRACT**

Rapid and unplanned urbanization has led to an enormous increase in the number of motor vehicles world-wide. World Health Organization estimated that across the world road traffic accidents kill 1.3 million people and injure another 50 million people every yearly. In India more than a lakh of people lost their lives due to road traffic accidents in the year 2009. The most common causes for road traffic accidents are over speeding, non usage of safety measures, driving under the influence of alcohol, distracted driving especially mobile phone distraction, poor road design, Poor visibility, over confidence, ignorance, tendency to overtake from wrong side and lack of adequate infrastructure. Improvement in quality and availability of injury related indicators providing useful data on the effects of crashes is needed for efficient planning. A number of factors affecting the occurrence of road traffic accidents need to be considered within the system approach. Principal preventable factors need to be acted on include better road design and traffic management, improving maintenance of vehicles, enforcement of speed limits, use of seat belts and helmets and strictly dealing with offenders of traffic laws including severe punishment for driving under influence of alcohol or drugs.



## INTRODUCTION

Globally rapid and unplanned urbanization has led to an enormous increase in the number of motor vehicles. Broadly the development and modernization of public transport systems have not kept pace with the urbanization. As a result use of personal vehicles and intermediate public transport, mainly three wheelers are growing. World-wide the alarming increase in morbidity and mortality due to road traffic accidents is a matter of great concern.

Road traffic accident fatality rates are higher in developing countries like India compared to developed world[1]. Delayed response time following an accident and inadequate medical care leads to higher mortality and morbidity in victims of road traffic accidents[2,3]. It is believed that burden of road traffic accidents are increasing as the increase in number of motor vehicles has outpaced the development of infrastructure namely widening of roads and utilization/of safety measures. In many countries motor vehicle accidents rank first of all fatal accidents. Road traffic accidents are major but neglected public health challenge needing effective and sustainable prevention.

## METHODOLOGY

We searched the following electronic databases: PUBMED, BMJ, LANCET and Google Scholar for studies related to road traffic accidents. All databases were searched form inception. In addition, we checked reference lists of reviews and retrieved articles for additional studies. From the searches we reviewed the title and abstract of each paper and retrieved potentially relevant references.

**Current status**

World Health Organization estimated that across the world road traffic accidents kill 1.3 million people and injure another 50 million people every yearly[1]. It has been projected that the number of fatalities in road traffic accidents will reach 1.9 million globally by 2020[4]. Every hour 40 individuals under age of 25 years die in road accidents. Road traffic accidents are second most common cause of mortality in the age group 5 to 29 year[5]. The number of estimated deaths in Asia due to road traffic accidents is about 700,000 every year, more than half of the global deaths in road traffic accidents. However the number of vehicles in Asia is only 43% of the rest of the world.

In India 126,896 people lost their lives and another 466,649 were injured in road traffic accidents of which 421,628 were registered in the year 2009. The corresponding number of registered cases in year 2008 was 415,855. This amounts to 1.4% increase in the number of road traffic accidents in 2009 over 2008. Road traffic accident took 14 lives every hour in India in 2009. In the year 2009 maximum road accidents reported were from Maharashtra (14.8%) followed by Tamilnadu (12.5), Madhya Pradesh (9.7%), Karnataka (9.3%) and Andhra Pradesh (9.0%). These states contributed to 55.3% of total accidents in India. The number of people dying in road accidents was highest for Andhra Pradesh accounting for 11.8% of such deaths, followed by Uttar Pradesh (11.6%), Tamilnadu (10.9%), Maharashtra (9.1%), Karnataka (6.9%).Together these states contributed to 50.3% of total such deaths in India. Maximum people injured in road traffic accident belonged to Tamilnadu with 13.7% of total injuries. The actual figures may be substantially higher given considerable under reporting of such incidences in India. The severity of accidents was highest for Punjab with 66 people dying in every 100 accidents[6].

More young people die in road traffic accidents, an overwhelming number of which are male[7]. In the study conducted by Bhattacharjee J et al people of younger age group were more often victim of road traffic accident with greater involvement of men[8]. Highest deaths and injuries were among the pedestrians, motorcycle occupants and bicyclists compared with other categories of road users[7].

***Corresponding author:*** guptaarti2003@gmail.com

Another study by Jha N et al also showed that the highest number of victims was between 20 to 29 years of age followed by 30 to 39 year of age, with average age of victims 31.5 years of age. [9]

**Contributing factors**

The most common causes for road traffic accidents and resultant deaths are: Over speeding, Non usage of helmets/seatbelt, driving under the influence of alcohol and distracted driving especially mobile phone distraction[10]. Poor road design, Poor visibility, over confidence, Ignorance, tendency to overtake from wrong side and other infrastructure related factors also contribute to these accidents. Accidents due to over speeding by drivers amounted to as high as 57.5% of the accidents and resulted in 5.9% of total deaths in RTA. The per cent share of total accidents and deaths due to intake alcohol or drugs was 7.1% and 10.3%. The accidents caused by defects in the motor vehicles accounted only for 1.8% accidents and 2.5% of total deaths. Pedestrians and cyclists were less often at fault leading to 2.2% and 12% of the total accidents respectively[11]. Another important cause of increasing number of accidents is enormous increase in the number of vehicles on the road. With economy growing at the rate of 8% annually, middle class is expanding in India. People have money to fulfil their desire for luxuries such as personal vehicles. In Delhi alone total number of registered motor vehicles in 2008-09 was 6,011,731 compared to 4,809,010 in 2005- 06[12].

Like other developing countries the environment and mix of vehicles in the traffic stream is very different in India when compared with developed nations making roads here more accident prone. Major differences being enormous number of motor cycles, scooters; large number of buses often overloaded; defective roads, poor street lighting, defective lay out of cross roads and speed breakers; large number of pedestrians sharing the roadway with fast moving and slow moving vehicles practically without any segregation of pedestrians from wheeled vehicles; large number of old poorly maintained vehicles; low driving standards in general with disregard of traffic rules and unusual behaviour of men. Animals also share road with unpredictable behaviour leading to accidents in many cases[13].Roads in India belong to different categories like National highways, district roads, rural roads, elevated roads, bypass roads and are also used for mobility and transportation, which remain the principal activity. Other activities for which roads are used or damaged include laying of municipal drains, telephone cables, water supply pipes, electric cables, playing games, flying kites and holding public meetings and demonstrations. Roads also provide shelter to homeless people on their footpaths if there is any. Many illegal dwellings are often made by encroachment on the roads. Children living in such places are at very high risk of becoming a victim of road traffic accident.

**Way forward**

In Road traffic accident risk of injury and mortality is determined by many factors: the first is exposure i.e. the amount of movement or travel within the system for a given density; second is the underlying probability of injury given a crash; and the last element is outcome of the injury. The risk can be explained by human error, kinetic energy, safety measures in the vehicle, tolerance of the human body and swiftness and adequacy of the post-crash care[14, 15].

Reporting is needed to be strengthened. There is under reporting of road traffic accidents in India due to lack of formal reporting agreements and sharing of information between police, hospitals and other agencies; individuals not feeling the need to report to police unless the injury is serious; complaint not being officially registered even when injured person reaches a police station; agreement between individuals involved in a crash and under reporting by private sector. Other reasons for under reporting include late hospital deaths due to complications of road traffic injuries are not recorded as death due to road traffic injuries; death certificates are not filled in a standardized manner in hospitals across the country; lack of uniform reporting of road traffic injuries to police all over India, limited manpower and facilities with police and cultural practices of immediate burial or cremation which discourages families to involve police[16].Road traffic injuries more often affect the earning or productive people in younger age groups.[8,9]

Accidents just do not happen; multiple factors interact to multiply the risk in certain situations resulting in accidents. Given the burden; negative individual and social effects and that the risk factors are mostly preventable, they call for urgent attention to prevent accidents. Road safety in part depends on how societies choose to manage transport systems, land use and urban development in relation to their overall health and safety objectives and how they are balanced with economic, social and environmental considerations. Although knowledge about effective preventive measures exists, progress in road safety is hampered by ineffective implementation. A well-defined road safety policy, a central coordinating agency, allocation of adequate resources, better implementation of tested and effective interventions and dependable information systems are urgently required. Measures to prevent road traffic accidents and mortality include: Safety education to drivers regarding the risk factors, traffic rules and safety precaution; training of drivers in proper maintenance of vehicles and in providing first aid; avoiding driving after taking alcohol or drugs as these impair judgement, driving ability and increase risk and consequences of accidents. Use of safety measures like seat belts which reduce the number of fatal and non-fatal injuries. Seat belts are must for the passengers of four wheelers for their safety; helmets reduce the risk of head injuries and prevent death. Doors should be securely locked while in motion especially if the children are also there in the vehicle. Children should not be seated on front seats as airbag injury risk is more in children in case of accidents. Elimination or modification of causative and contributing factors like better design and quality of roads, adherence to speed limits, marking danger points, adequate street lighting, provision of functional traffic signals on cross roads, proper maintenance of vehicles. Legislative measures include driving tests, checking medical fitness before giving licences and there after periodic medical assessment of drivers, strict enforcement of speed limits, compulsory use if seat belts and helmets, roadside checking drivers for driving under the influence of alcohol, regular inspection of vehicles. Medical care including planning, organization and management of trauma and emergency care services so that it forms a continuum from the trauma site, during transportation to the hospital care. Rehabilitation of injured persons should also be a part of these efforts and it includes medical, social and occupational rehabilitation so that a victim of accident does not become dependent on others.

Important role can be played by public health in prevention of road traffic accidents. Data collection and analysis can be undertaken to study epidemiology of accidents. Factors involved and contributing to accidents can be better understood and identified. New preventive measure or approaches can be suggested based on such research. It can demonstrate the health and economic impact of road traffic accidents. Implementation of interventions, their monitoring, and evaluation of these interventions in terms of impact on reducing the number of accidents, thereby suggesting further modifications can also be undertaken in public health domain. Role of public health in rehabilitation of victims of road traffic accident is also important.

**Conclusion**

Road traffic accidents are ubiquitous, predictable and preventable. Despite growing burden of road traffic accidents road safety has received little attention. Reasons include lack of general awareness as well as specific information on the magnitude of problem, its health, social and economic consequences and also on the interventions that can prevent crashes or reduce the severity. There is no systemic data available in India on transportation pattern. Therefore studies are required to find these patterns. Improvement in quality and availability of injury related indicators providing useful data on the effects of

crashes is needed. There is need for correlating data from hospitals or other health care facilities with the data collected through other relevant sources for reliability purpose. Apart from humanitarian aspects of reducing road crash deaths and injuries, a strong case can be made for urgent need to intervene on economic grounds alone. Greater participation from health and other sectors based on an integrated, intersectoral and coordinated approach is essential. A number of factors affecting the probability of road traffic accidents need to be considered within the system approach. Principal preventable factors need to be acted on include better road design and traffic management, improving maintenance of vehicles, enforcement of speed limits, use of seat belts and helmets and strictly dealing with offenders of traffic laws including severe punishment for driving under influence of alcohol or drugs. However despite availability of many proven preventive measures for averting accidents and saving lives and limbs in case of accident, little can be achieved without political will and commitment and cooperation of people in communities.

**Conflict of interest:** None

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