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An Analysis of Road Traffic Injuries in India from 2013 to 2016: A Review Article

Elango S[1], Ramya AB[2], Renita A[2], Ramana M[2], Revathy S[2] and Rajajeyakumar M[3*]

[1]*Department of Community Medicine, MGR Medical University, India*

[2]*Department of Community Medicine, MGR Medical University, India*

[3]*Department of Physiology, Chennai Medical College Hospital and Research Centre, MGR Medical University, India*

[*]**Corresponding author:** Dr. Rajajeyakumar M, Department of Physiology, Chennai Medical College, Hospital and Research Centre (SRM Group) Irungalur, Trichy, Tamil Nadu-621105, India, Tel: +919751382650; E-mail: rajakumar60@gmail.com

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Abstract

Background: Accidents are killing more people in India than terrorism or natural disasters. Risk factors can be grouped as human and environmental causes. Better road safety plans for execution since morbidity mortality disability and economic impact of road traffic accidents.

Aims and Objectives: To analyze the available data on RTA and find out the epidemiological factors, morbidity and mortality pattern from 2013-2016 and to assess the possibility of achievement of Brasilia declaration in India by 2020.

Materials and Methods: A retrospective study was done from the time period 2013 to 2016. Among the 50 studies, 23 articles were included for this study after meeting this inclusion criteria.

Results and Discussions: From the data, Number of person killed in RTA has increased by 3.2% from 2013-16, Economically productive age group is the most vulnerable group (3.5% increase from 2014-16) of which more than 2/3rd are males are subjected to RTA, which indirectly reflect on families and countries economical standards, 13 states has accounted for 86% of total road accidents in the country, Tamilnadu holds the record for highest in 2013-16.

Conclusion: With the data that has been compiled from the year 2013-16, distribution of road accident with respect to age, gender, month, time, geography, epidemiological factors, morbidity and mortality pattern due to RTAs in India has been charted out, and analysis has been if we can achieve the goal of Brasilia Declaration.

Keywords: Brasilia declaration; Mortality; Morbidity; Road traffic injuries; Road safety

Introduction

Accidents are killing more people in India than terrorism or natural disasters and yet we never talk about them Mr. Nitin Gadkari, surface transport minister [1]. Following first (Road traffic accidents) RTA everybody said, this should never happen again. But a century later in 2016, the total number of RTAs has been noted as 4,80,652 accidents with mortality of 1,50,785 lives in the country. This shows that, on an average, 1317 RTAs and 413 deaths taking place on Indian roads every day; or 55 accidents and 17 deaths every hour [2].

According to some professionals, due to underreporting, the original figure in terms of both injuries and fatalities should be greater than what is actually reported [3-5]. Without urgent action, this catastrophe will advance as a major threat to the country. According to the publication, the most productive age group 18-45 accounted for a share of 68.6% of all road traffic accident deaths in India which will reflect on economy of the nation [6].

India spends about 1200 crores, towards RTA, eliminating the financial burden of accident survivors with permanent impairment [7]. It is approximated that 3% GDP goes to RTA in India [8]. Unlike the first world countries, in terms of road usage India has a heterogeneous traffic of slow and fast-moving vehicles, pedestrians and animals sharing the same roads [9].

Risk factors can be grouped as human and environmental causes. Human vulnerability are young men (15-29 years), consumption of alcohol while driving, tiredness, not obeying traffic rules, not using helmets and safety belts, health conditions (sudden illness, MI, vision problems), mental factors (risk taking, impulsiveness), defective judgment, rash driving, poor perceptions, family problems, and distractions (using mobile phones). Environmental factors may be related to roads (defective and narrow roads, poor lighting, and lack of familiarity) and vehicles (over speeding, poor maintenance of vehicles, large number of vehicles, poor driving standards and overcrowding of buses) [9,10]. Risky road situations have been generated due to the growing number of automobiles along with population growth, which leads to jamming problems in the nation for which road infrastructures are usually not prepared to manage the heavy flow of traffic Delay in providing required medical services is one of the causes of mortality due to RTAs [11].

In spite of speaking about risk factors and methods of prevention of RTA for more than two decades, no of accidents and relative mortality shows an increasing trend that demands strict enforcement of laws, to ensure discipline on roads, better road safety plans for execution since morbidity mortality disability and economic impact of road traffic accidents is a great concern not only to family but also the nation as a whole.

Aim

- To analyze the available data on RTA and find out the epidemiological factors, morbidity and mortality pattern from 2013-2016, India.
- To assess the possibility of achievement of Brasilia declaration in India by 2020.

Materials and Methods

A retrospective study was done from the time period 2013 to 2016. Among the 50 studies, 23 articles were included for this study after meeting this inclusion criteria. Bhuyan et al. have investigated from the descriptive data gathered from Assam Medical College Hospital and from the police reports (1998,1999) resulted that maximum accidents affect younger males, most of the accidents involve single vehicle only and 50% of the casualties were non-driving travelers. Accident rate was more in dusk and in winter season contributing more injuries commonly involving Head and neck, Upper Limb and Lower limb and conclude that RTA is a major public health problem in Assam and needs more scientific study [12,13].

Ruikar et al. conducted a retrospective study using reports published annually by the Ministry of Road Transport and Highways and National Crimes Records Bureau, Government of India, and described national statistical trends and normalized indicators of road accidents, morbidity and mortalities. They found that India contributed only 0.7% articles on road traffic injuries and had less than 1 article on road traffic injuries per 1,000 road traffic-related deaths. And recommended that effective policies on injury prevention and safety must be based on local evidence and research [14].

Kohli et al. have studied about the poor knowledge about traffic rules and risk taking behavior among younger population and found that road traffic injuries alone is the number one cause of disease among adolescents. While planning traffic safety initiatives, policy makers need to recognize children's vulnerabilities as well as their inexperience, physiological needs and enthusiasm for life [15].

Kakkar et al. conducted a descriptive study done using information from different sources like District Hospital, Private hospitals, Traffic Police record. Total accidents during study period were 87 with 9 deaths. Most vulnerable age group was 25-34 years, males. Most common cause were over speeding (47.1%), drunken driving (32.1%), rash driving (20.7%). Deaths and injury were mainly due to rash driving (68%) or drunken driving (32%). Other major causes were pedestrians and animals sharing roadways, disregard of traffic rules, among all the above causes, over speeding of vehicle cause maximum mortality [16].

Mohan et al. have performed a descriptive study using the information from First Information Reports (FIRs), daily time series of RTI counts were created and temporal characteristics were analyzed with respect to the vehicle, type of roads also on which time of the day for the interval between January 2005 and May 2007. The results were, of the reported 3262 RTIs, of which 52% has occurred on the National Highway (NH). On National highway, the overall accident rate was reported to be 8.8/1 lakh automobiles/day with more pedestrian involvement. RTA were higher on weekends. 13% of all RTIs were associated with fatalities. Hotspots are major junctions, and the rates vary over different stretches of the NH. In India, FIRs form a valuable source of RTI information that can be used by administrators to devise effective strategies for RTI prevention [17].

Parsekar et al. have investigated papers related to RTAs from various databases such as PubMed, Google scholar, government websites to get an overview in India for the last 15 years. They found that the burden of RTA was found to be considerably high globally as well as in India. RTA causes a number of effects which can be physical, psychological, economic and social. The burden of RTA is on the rise which makes it necessary to take a multi-sectorial approach in its prevention and control [18]. Annadurai et al. conducted a retrospective study using the reports from Ministry of Road Transport and Highways, WHO website; there are laws and policy regulating RTA, but it has been found that the enforcement of regulations is weak and hence strong political commitment, multiple strategies that required Education, Engineering (Roads and vehicle), Enforcement, Emergency care and Enactment [19].

Chandrasekharan et al. conducted a prospective observational study in India over a period of one year which included consecutive patients admitted after RTA. Among 773 patients, there were 197 deaths. The majority were aged 15-40 years (67%), males (87.84%), during night (58.2%). City roads (38.9%) saw more accidents but highway accidents were more fatal. Mortality was associated with crossing the road on foot, Pillion riders, Front-seat occupants in four-wheelers, Lack of safety gears, Delays in transfers of patients. Disobeying law, weak legislation and enforcement, poor personal safety, and driving under poor conditions are some of the leading causes of RTAs [20].

Mir et al. conducted a prospective study from October to September 2014 in the largest hospital of Kashmir, A total of 886 cases were studied. Male: Female ratio was about 4:1. 21-30 year age-group was common. Most of the victims (54.74%) presented during summer season. Two wheelers (43.45%) were more common. Only 9.71% of the victims presented to the hospital within 1 hour of the accident. It was done to emphasize the importance of behavioral change in population regarding road safety rules rather than just improving the road condition [21].

Arjuna et al. have performed a retrospective cross-sectional study using data from hospital registers in PICU. Children admitted after RTA of 1 to 18 years age are the study population. Study period was from 2014 to 2016. This study shows that RTA prevalence is more in 15-18 year age (31%), males (79.5%), children were from rural area (73%), Children travelling in 2 wheelers (74.9%). Conclusions: To bring the mortality rate down, children especially with rural background should be made aware about the importance of strict compliance to traffic rules and regulation.

Singh et al. have investigated a cross-sectional study keeping hospital register as a baseline data and found out under recording of police records in RTA. The population under study was the total number of accidents in Chandigarh 2011 and that had reported to 3 major GH and result shows that 537 cases were recorded in hospital and 375 cases were in police records. Out of 15% cases that were matched, 64% completely matched and 36% partially matched cases. Hence, a standardized reporting format of all RTIs sis required in both

the police and hospitals. It is advised mandatorily for all hospitals to report all accidents to nearby police station to ensure completeness.

Statistical analysis

The data will be entered in Microsoft Excel. Appropriate statistical analysis was carried out by using Statistical Package for Social Science (SPSS). Descriptive statistical analysis was used to analyze the data. The descriptive data were presented as frequencies and proportions. All the statistical analysis were carried out at 5% level of significance and p value ≤ 0.05 was considered as significant.

Results

Table 1 depicts increase in number of person killed per 100 RTA was around 28 in 2013-2014 which was increased to 31.4 in 2016 (3.2% increase) whereas no of accidents decreased from 5,01,423 (2015) to 4,80,652 (2016). From Table 2 the sex wise distribution of road accidental deaths in India 2014, 2016, 2017 males accounted for more than 80% of total fatalities which is higher than the fatalities faced by females. This may be due to the outdoor work environment of males; drunken driving and over speeding are common among males. This data also infer the confinement of females at home even at 21st century.

Parameter	2013	2014	2015	2016
Number of road accidents	4,90,383	4,89,400	5,01,423	4,80,652
Number of deaths in RTA	1,38,258	1,39,671	1,46,133	1,50,785
Number of injured in RTA	5,09,667	4,93,474	5,00,279	4,94,624
Number of person killed per 100 RTA	28.2	28.5	29.1	31.4

Table 1: Number of road accident and its consequences from 2013-16.

In Table 3 Age profile of road accident victims for the calendar year 2016 reveals that productive age group of 18-45 accounted for a share of 68.6% (1,03,409 persons) in the total road accident fatalities which has been increased 3.5% from 2014.

Gender	Male	Female
2014	1,21,132(86.7%)	20,377(14.5%)
2015	1,20,626(82.5%)	25,507(17.45%)
2016	1,27,453(84.5%)	23,332(15.4%)

Table 2: Gender distribution.

In Table 4, 13 states has accounted for 86% of total road accidents in the country, which has been listed above. In comparison to all states Tamil Nadu holds the record for highest number of accidents of 71,431 (14.86%) in the year of 2016, it has topped the scenario previous years also which requires a special concern, Madhya Pradesh has been ranked 2nd which has been accounted for 53,97 (11.22%) accidents. Maharashtra has shown a decline from 12.72% to 8.29%

In Table 5 2014, national highways constitutes 28.2% accidents which has been increased to 29.6% in 2016, whereas in state highways there were no big difference from 2014 to 2016 which accounted for 25.2%-25.3%.

Highways are not the biggest killers, whereas streets and other main roads constitute major number of road accidents which constitutes around 45.1% in 2016. In Table 6 Motorized vehicles accounted for 94.4% of fatal accidents and 95.5% of the total road accidents during the calendar year 2016. Two-wheeler constitutes major proportion in deaths due to road traffic accidents, which has shown increase from 28.6% (39,353) in 2013 to 34.8% (52,473) in 2016.

Age group	RTA Death 2014	RTA Death 2015	RTA Death 2016
Upto 17 years	16,901(12.1%)	12,589(8.6%)	10,622(7.0%)
18-44 years	91,040(65.18%)	98,470(67.38%)	1,03,409(68.6%)
45 and above	33,585(24.04%)	31,164(21.32%)	22,174(14.7%)

Table 3: Age wise comparison of death related to RTA.

States	2013 n(%)	2014 n(%)	2015 n(%)	2016 n(%)
Tamilnadu	66,238(13.6)	67,250(13.74)	69,059(13.77)	71,431(14.86)
Maharastra	63,019(13)	44,382(9.0)	63,805(12.72)	39,878(8.29)
MP	51,810(10.7)	39,698(8.1)	54,947(10.9)	53,972(11.22)
Karnataka	44,020(9)	43,694(8.92)	44,011(8.7)	44,403(9.33)
Kerala	35,215(7.2)	36,282(7.41)	39,014(7.78)	39,420(8.2)
UP	30,615(6.3)	26,064(5.32)	32,385(6.45)	35,612(7.4)
AP	43,482(8.9)	23,154(4.73)	24,258(4.83)	24,888(5.17)
Rajasthan	23,592(4.8)	24,639(5.03)	24,072(4.80)	23066(4.7)
Gujarat	25,391(5.2)	22,152(4.52)	23,183(4.62)	21,859(4.54)
Telangana	-	20,078(4.10)	21,252(4.23)	22,811(4.74)
Chattisgarh	13,657(2.8)	13,821(2.82)	14,446(2.88)	13,580(2.82)
Westbengal	12,414(2.6)	12,875(2.63)	13,208(2.63)	13,580(2.82)
Haryana	10,482(2.2)	10,676(2.18)	11,174(2.22)	11,234(2.33)
Others	68,648(13.59)	1,04,635(21.3)	66,609(13.28)	64,918(13.50)

Table 4: State wise comparison of accidents per annum.

Table 7 Minor injured accidents shows a stable situation with slight variations and it declined from 1,92,634 in 2015 to 1,87,642 in 2016. Non-injured accidents declined by from (57,395)11.4% in 2015 to 7.5% (36,091) in 2016. Matter of concern is that grievously injured accidents have gone up from 25.2% (1,22,589) in 2013 to 28.3% (1,36,071) in 2016.

The share of fatal accidents and grievously injured accidents were 28.3% and 25.1% of total number of road accidents during 2016 against 26.3% and 23.9% respectively during 2015. From the Table 8 comparison it has been concluded that most of the road traffic accidents occur in uncontrolled areas which has been accounted for 74.8% (56,865) in 2013 and 74% (40,010) in 2016 against 26%-27% in traffic controlled areas.

In Table 9 The holder of regular license has accounted for 79.01% (3,96,381) in 2015 and 84% (4,05,079) in 2016 and persons without

license has contributed 11.89% (59,435) accidents in 2015 and 8.7% (41,405) in 2016.

Type of road	2014	2015	2016
National highways	1,38,010(28.2%)	1,42,268(28.4%)	1,42,272(29.6%)
State highways	1,23,328(25.2%)	1,20,518(24%)	1,21,605(25.3%)
Others	2,28,060(48.6%)	2,38,637(47.6%)	2,16,774(45.1%)

Table 5: Accidents based on different types of roads.

Vehicle	2013	2015	2016
Two wheeler	39,353(28.6%)	36,803(25.2%)	52,473(34.8%)
Auto-rickshaw	7,245(5.3%)	6,155(4.2%)	7087(4.7%)
Car,jeep,taxi	23,710(17.2%)	28,610(19.6%)	26,991(17.9%)
Buses	10,147(7.4%)	12,133(8.3%)	9,952(6.6%)
Truck,tempo	17,666(12.8%)	37,458(25.6%)	16,888(11.2%)
Other motorized vehicle	17,004(12.4%)	16,167(11.7%)	15,983(10.6%)
Other non-motorized vehicle	22,445(16.3%)	8,807(6%)	21,411(14.2%)

Table 6: RTA deaths based on vehicle.

In Table 10 Road accidents are multi-causal and an accident is the result of a combination of factors such as human error, road defects, engineering defects of the vehicle, non-availability of pedestrian facility, cyclist facility, circumstantial factors such as weather condition, visibility etc. The factors responsible for road accident should, ideally, be established objectively from the circumstance under which it has occurred rather than on a subjective judgment.

Fault of driver results in 80.3% (1,21,126) of accidents which shows an increase in trend from (1,00,595) 78% in 2013. Drivers fault includes over speeding (61% deaths), over taking (7.8% deaths), intake of alcohol and other drugs (5.1% deaths) and others (26.1%) act of talking over cell phones, driver fatigue, distractions and etc. In Table 11 spite of low traffic in rural areas, due to poor road facilities, poor knowledge about road safety and stray animals more number of accident occur in rural areas than urban till this year.

In Table 12 clearly states that there is substantial variation in road accidents in different times of the day. Most of the accidents occur between 15:00 to 21:00 hrs (3:00-9:00 PM) maybe due to more traffic in the peak hours, inadequate lighting, driver fatigue etc. Accidents are low during late night and early hours of day.

In Table 13 although monthly variations in Road traffic accidents are not substantial, Road traffic accidents were highest in May 8.8% (43,064) in 2013, 9.2% (46,247) in 2015, 9% (43,368) in 2016. In 2016, following May, March has 2nd highest accidents 8.9% (42,843) followed by April 8.7% (42,010) since temperature is fairly high in these months; it may have had its impact on road accidents.

High temperature has both physiological and psychological effect on drivers. Months like Jan-41,749(8.6%), Feb-40,765(8.4%), Dec-39,432(8.2%) have shown more accidents than other months, this is because certain part of the country particularly North India faces poor visibility on the roads in these months due to foggy weather conditions.

Year	Fatal	Grievously Injured	Minor injured	Non-injured	Total accidents
2013	1,22,589(25.19%)	1,16,089(23.86%)	1,89,982(39.03%)	57,816(11.88%)	4,86,476
2014	1,25,828(25.71%)	1,15,454(23.59%)	1,92,310(39.29%)	55,808(11.40%)	4,89,400
2015	1,31,726(26.27%)	1,19,668(23.86%)	1,92,634(38.40%)	57,395(11.44%)	5,01,523
2016	1,36,071(28.30%)	1,20,848(25.14%)	1,87,642(39.03%)	36,091(7.5%)	4,80,652

Table 7: Classification according to Injuries.

Category	2013	2015	2016
Traffic light	6,139(8%)	7,648(11.9%)	4,322(8%)
Signal	-	-	-
Police control	4,741(6.2%)	4,058(6.5%)	31,076(5.7%)
Stop sign	3,451(4.5%)	3,464(5.4%)	3,609(6.7%)
Fashing signal/blinkers	4,740(6.2%)	5,129(8%)	3,012(5.6%)
Uncontrolled	56,865(74.88%)	44,059(68%)	40,010(74%)

Table 8: Accidents classified according to type of traffic control.

In Table 14 Vehicles less than 5 years are responsible for most of the accidents 1,94,198 (40.3%) in 2016, 37.4% killed followed by vehicles aged between 5-10 years accounted for 1,57,370(32.7%) accidents, (32.9%) 49,536 deaths.

In Table 15 Delhi, Chennai, Bangalore, Mumbai are the four cities in India with more number of accidents. Chennai has the highest record of accidents in 2016.

Category	2015	2016
Regular license	3,96,381(79.01%)	4,05,079(84.6%)
Learners license	59,435(11.89%)	41,405(8.7%)
No licence	45,191(9%)	32,088(6.7%)

Table 9: Types of license and road accidents.

Causes	2013	2015	2016
Fault of driver	1,00,595(78%)	1,12,982(77.4%)	1,21,126(80.3%)
Fault of cyclist	1,384(1%)	2,250(1.5%)	1,508(0.8%)
Fault of pedestrian	2,690(1.8%)	3,091(2.0%)	3,755(2.0%)
Defect in condition of vehicle	4,127(2.8%)	2,823(1.9%)	3,529(1.9%)
Defect in road condition	2,733(1.9%)	2,983(2.0%)	2,578(1.4%)
Other causes*	22,217(15.1%)	17,923(11.9%)	26,045(15.9%)

Table 10: Number of deaths due to various causes of road accidents.

Location	2013	2015	2016
Urban	52,603(38.2%)	56,978(39%)	57,840(38.4%)
Rural	84,969(61.8%)	89,155(61%)	92,945(61.6%)
Total	1,37,572	1,46,133	1,50,785

Table 11: RTA deaths classified according to different types of location.

Time(Hrs)	2013	2014	2015	2016
06:00-09:00	54,585(11.3%)	52,279(11.9%)	55,518(11.1%)	54,522(11.3%)
09:00-12:00	76,851(15.8%)	69,042(15.3%)	81,964(6.3%)	75,771(15.7%)
12:00-15:00	74,894(15.4%)	68,918(15.2%)	79,616(15.9%)	73,380(15.3%)
15:00-18:00	83,258(17.1%)	77,830(17.2%)	86,819(17.5%)	85,834(17.8%)
18:00-21:00	82,149(16.9%)	76,334(16.9%)	86,836(17.3%)	84,555(17.6%)
21:00-24:00	51,,749(18.6%)	47,873(10.3%)	51,425(10.3%)	50,970(10.6%)
00:00-03:00	29,823(6.1%)	26,068(5.7%)	27,954(5.6%)	25,976(5.4%)
03:00-06:00	33,167(6.8%)	32,554(7.2%)	30,291(6%)	29,644(6.2%)

Table 12: Classified based on time of occurrence.

Month	2013	2015	2016
January	39,185(8.0%)	42,661(8.5%)	41,749(8.6%)
February	36,137(7.4%)	40,661(8.1%)	40,765(8.4%)
March	38,543(7.9%)	42,842(8.5%)	42,843(8.9%)
April	37,782(7.7%)	42,432(8.4%)	42,010(8.7%)
May	43,064(8.8%)	46,247(9.2%)	43,368(9.0%)
June	37,249(7.6%)	42,065(8.3%)	39,489(8.2%)
July	33,847(6.9%)	39,694(7.9%)	37,881(7.8%)
August	33,698(6.9%)	39,126(7.8%)	37,729(7.8%)
September	34,565(7.1%)	39,761(7.9%)	36,929(7.6%)
October	35,103(7.2%)	42,089(8.3%)	39,952(8.3%)

November	36,297(7.4%)	41,018(8.1%)	38,505(8%)
December	37,531(7.7%)	42,827(8.5%)	39,432(8.2%)

Table 13: RTA month wise distribution.

Age	2015	2015	2016	2016
	Accidents	Killed	Accidents	Killed
<5 yrs	235770(47.4%)	64720(44.5%)	194198(40.3%)	56329(37.4%)
5-10 yrs	171146(41.5%)	62327(43%)	157370(32.7%)	49536(32.9%)
>10 yrs	185458(11.1%)	18175(12.5%)	119507(24.8%)	40848(27.17%)
Age not known	-	-	10598(2.2%)	3921(2.6%)

Table 14: Accidents based on age of vehicle.

Cities	2014	2015	2016
Delhi	7191	8085	7375
Chennai	9465	7328	7486
Bangalore	5005	8434	5323
Mumbai	2219	23,468	3379

Table 15: Cities with more number of accidents.

Discussion

In light of the World Health organization, global status report on Road safety 2015 Road Traffic Accident continues being a major public health problem, leading cause injury and mortality with more than 50 million injuries and 1.5 million death, with more than 90% casualty in developing countries, Nearly 2200 delegates gathered at 2nd Global high level conference on Road safety conducted on 18-19 Nov 2015 in Brasilia, Brazil adopted the "BRASILIA DECLARATION ON ROAD SAFETY through which they agreed ways to halve Road Traffic Deaths by the end of this decade "A key milestone within the new sustainable development goal.

With the data that has been compiled from the year 2013-16, distribution of road accident with respect to age, gender, month, time, geography, epidemiological factors, morbidity and mortality pattern due to RTAs in India has been charted out, and analysis has been if we can achieve the goal of Brasilia Declaration.

From the data, Number of person killed in RTA has increased by 3.2% from 2013-16, Economically productive age group is the most vulnerable group (3.5% increase from 2014-16) of which more than 2/3rd are males are subjected to RTA, which indirectly reflect on families and countries economical standards, 13 states has accounted for 86% of total road accidents in the country, Tamilnadu holds the record for highest in 2013-16, Madhya Pradesh has been ranked second in 2016. Maharashtra has shown a decline from 2013-16. More than Highways, streets and other main roads constitute major number of road accidents which constitutes around 45.1% in 2016.

Motorized vehicles accounted for about 95% of fatalities and road accidents. Two-wheeler constitutes major proportion in deaths increase of 6.2% 2013 to 2016. Grievously injured accidents have gone up from 25.2% in 2013 to 28.3% in 2016 which requires more post-crash care and rehabilitation centers.

It has also been shown that Most of the road traffic accidents occur in uncontrolled areas 74.8% (2013) and (74%) in 2016 that emphasize the importance of traffic regulations and the license holder has accounted for 79.01% (2015) and 84% (2016) this implies requirement of proper evaluation on testing of driving skill before the issue of license.

Accident is the result of a combination of factors such as human error, road defects, engineering defects of the vehicle, non-availability of pedestrian facility, cyclist facility, circumstantial factors such as weather condition, visibility but fault of driver results in 80% of accidents includes over speeding, overtaking, intake of alcohol and other drugs and others-act of talking over cell phones, driver fatigue, distractions and etc. Vehicles less than 5 years are responsible for most of the accidents. On the contrary to expectation rural areas account for more accidents than urban may be due to poor road facilities, poor knowledge about road safety and stray animals, Most of the accidents occur between 15:00 to 21:00 hrs (3:00-9:00 PM) maybe due to more traffic in the peak hours, inadequate lighting, driver fatigue etc. Accidents are low during late night and early hours of day.

Road traffic accidents are higher in May, March, April Since temperature is fairly high in these months, it may have had its impact on road accidents. High temperature has both physiological and psychological effect on drivers Months like January, February, December have also shown more accidents because, in certain part of the country particularly North India faces poor visibility on the roads in these months due to foggy weather condition. Delhi, Chennai, Bangalore, Mumbai are the four cities in India with more number of accidents. Chennai has the highest record of accidents in 2016. This can be explained as these are highly crowded areas with intense traffic.

Limitations

- The major problem in India is due to mixed nature of road traffic: Pedestrians, bicycle, motor cycle rickshaw, taxi, truck, buses sharing the same road space with varying width and speed.

- Low levels of enforcement of law is often noted in Indian sub-continent, simply legislating is rarely effective

Recommendations

To strengthen road safety management and improve legislation and its enforcement:

- Appropriate, effective and evidence-based legislation based on the risk factors identified and its effective enforcement is required to reduce road traffic accidents. Key risk factors like over speeding, drunken driving, Non-use of seat belts and helmets, the use of narcotic, psychotropic drugs and psychoactive substances can be controlled by comprehensive legislation.
- Encourage States to designate funded lead agencies and related coordination mechanisms at national or sub-national level and to strengthen the collaboration between governments, including parliamentary bodies, civil society, academia, private sector commitments to accelerate the implementation of the Global Plan for the Decade of Action for Road Safety 2011-2020.
- To improve and standardize the quality of data collection on the occurrence of road traffic crashes, including information from different sources(including health care facilities and police stations)that can help in enacting effective laws.
- Encourage States to introduce new technologies in traffic management and intelligent transport systems to mitigate road traffic crash risk and maximize response efficiency; Encourage States to develop and implement comprehensive legislation and policies on motorcycles, including training, driver licensing, and vehicle registration.

To promote safer roads and sustainable mode of transportation

- Promote environmentally sound, safe, accessible and affordable quality modes of transport, particularly public and non-motorized transport; urban planning (the resilience of cities).
- To implement policies to protect and promote pedestrian safety and cycling mobility, such as pedestrian walkways and bicycle lanes and/or tracks, adequate lighting, speed cameras, road signs and road marking.
- Establish and enforce safer road infrastructure, adequate safe speed limits, road signs, speed cameras, and other speed restricting mechanisms.

To develop and improve the use of safer vehicles

- To ensure that all new motor vehicles, meet applicable minimum regulations for occupant and other road users protection, with seat belts, air bags and active safety systems such as anti-lock braking system (ABS) and electronic stability control (ESC) fitted as standard(acc to United Nations vehicle safety regulations).
- Road safety, quality, and vehicle disposal for both individual and public transportation, with respect to second hand vehicles to be adequately addressed.

To increase awareness and build capacity of road users

- Increase awareness of road safety risk factors, protection and prevention, to stimulate responsible behavior of all road users with a view to creating a peaceful road and social environment.

To improve post-crash response and rehabilitation services

- Timely access to health care, strengthen emergency health services rehabilitation services, through the implementation of appropriate legislation is mandatory to reduce mortality, morbidity and hence the social impact on society.

Conclusion

Many countries from the developed world have shown marked reduction in road traffic accidents, injuries and fatalities by adopting an integrated multi-sectorial approach to road safety. India is committed to reduce the number of road traffic accidents and its death by half in 2020 in Brasilia declaration but from the above analysis it is shown that despite multiple conferences, legislations, awareness campaigns, etc. The burden of road traffic fatalities and injuries shows a growing trend consecutively due to various reasons mentioned above. Current efforts to reduce the problems of road safety are minimal in comparison to what should be done. Without political will and commitment at central, state and local government levels and proper enforcement of legislation and law India's hope on Brasilia declaration will be a utopian dream.

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