

Accident Trend in India: Issues and Challenges

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Abstract

The main objective of this paper is to examine road accidents in India at metropolitan city, state and national level. The analysis exhibits that the proportion of road accidents deaths and injuries in India differs according to gender, age, time, and month. Age group 25-60 years is most vulnerable population group and also males face higher number of fatalities and injuries than females. Analysis of road accident trend at city and state level exhibits that there is large variation in fatality risk across cities and states. Fatality risk in 17 out of 36 states and union territories is higher than all India average. Moreover at international level, Russia is the only country having fatality risk more than India among all the 22 countries analysed under this paper. There is urgent requirement of rectifying the worsening situation in road deaths and injuries and to take suitable measures.

Introduction

Road transport is vital for development as it provides flexibility to people and goods. However, it also exposes people to the danger of road accidents, fatalities, and injuries. Exposure to adverse traffic environment is high in India because of high growth rate of urbanization and motorization in the country. Road accident injuries are one of the major causes of death in the country. As per data of 2016 (IMHE), road accident injuries is the 8th leading cause of death in India.

As per the MORTH report 2017, a total of 4, 64,910 road accidents happened this year throughout the country claiming 1, 47,913 deaths and causing injuries to 4, 70,975 persons. The data exhibits that an average of 1274 accidents and 405 deaths takes place everyday or 53 accidents and 17 fatalities occur every hour in the country. There is improvement in number of road accidents in year 2017 over 2016. Although this trend is continued from year 2015. The number of road accidents is lower by 3.3% in year 2017 compared to year 2016. Similarly the number of fatalities and injuries has been lower by 1.9% and 4.8% respectively. The state of Tamil Nadu is leading in the road accident data having highest number of road accidents in year 2017 but the number of fatalities in road accidents is highest in Uttar Pradesh.

The main objective of this study is to examine the road accidents in India at metropolitan city, state, and national level. The focus would be rectifying major road safety issues and suggesting countermeasures for addressing road safety problems. The primary source of data is MORTH report 2017 and Accident Deaths & Suicides in India, 1970 to 2017 published by National Crime Records Bureau.

Moreover, road accidents are comparatively higher in May-June and December-January which exhibits that weather influences the occurrence of road accidents. Accident rate is high during 9 AM – 9 PM but low during early hours of the day and midnight. The study is done considering the different sections including analyses done at national level, comparison of road accidents in top 15 states and UT's , road accidents in metropolitan cities and last conclusion is presented.

2. Analysis of road accident trend in India

2.1 Road accidental deaths and injuries

India is having a trend of having more number of road accidents every year till year 2015. However in year 2015, the number of road accidents were 5, 01,000 which is a very huge number but now every year it is reducing and in year 2017 it is 4,65,000 (Table 1). Similarly, number of fatalities have increases every year till 2016 but now it is also reduced in year 2017. Moreover, the fatality risk and vehicle density is increasing continuously since 1970. It can be inferred from the data that the road crashes have been increased nearly by four times and fatality has been increased by almost nine times since 1970. However, the fatality rate has been decreased to a very small value but traffic growth is also a major factor behind increasing accidents and fatalities.

Table 1: Road accident statistics of India (1970-2017)

Year	Number of Road Crashes(in thousands)	Number of fatalities(in thousands)	Number of Accidental injuries(in thousands)	Fatality Rate (no. of accident death per 10,000 vehicles)	Fatality Risk(no. of persons killed per 1,00,000 population)	Vehicle density (no. of vehicles per km of road)
1970	114	15	70	103.5	2.7	1.18
1980	153	24	109	53.09	3.6	3.03
1990	283	54	244	28.25	6.5	9.65
2000	391	79	399	16.15	7.8	14.73
2010	500	135	528	10.53	11.4	27.88
2015	501	146	500	6.96	11.7	38.38
2016	481	151	495	6.55	11.9	41.05
2017	465	148	471	-	11.5	-

When we analyse the accident data of some other countries of the world, it is obtained that India is having a huge value of fatality risk (11) as compared to other countries. Only Russia (16) is having higher value of fatality risk than India and USA (11) is also having same as that of India (see Table 2).

Table 2: Comparison of incidence of road related deaths and injury accidents in 2015

Country	Fatality Risk(killed per 1,00,000 population)	Injury Accidents per 1,00,000 population
Australia	5	286
China	4	14
France	5	85
Germany	4	374
India	11	38
Japan	4	422
USA	11	545
Russian Federation	16	128

2.2 Distribution of road accident fatalities and injuries based on category of road

From Table 3, it can be inferred that number of fatalities are increased in year 2017 on National Highways as compared to year 2016. Instead of having minimum length across the country, National Highways are contributing a huge number of road accidents and fatalities. It may be due to more traffic violation on these roads including over speeding, drunk driving etc.

Table 3: Road accidents, fatalities and injuries by road category-2016 and 2017

Road Category	2016			2017		
	Number of accidents	Persons killed	Persons injured	Number of accidents	Persons killed	Persons injured
National Highways	142359	52075	146286	141466	53181	142622
State Highways	121655	42067	127470	116158	39812	119582
Other Roads	216638	56643	220868	207286	54920	208771
Total	480652	150785	494624	464910	147913	470975

Figure 1 illustrates that national highway is contributing 29.6% of road accidents in year 2016 and 30.4% of road accidents in year 2017. Although, national highways accommodates about 40% of total road traffic of the country. The percentage shares indicates high accident and fatalities rates and also high accident severity on the NH and SH.

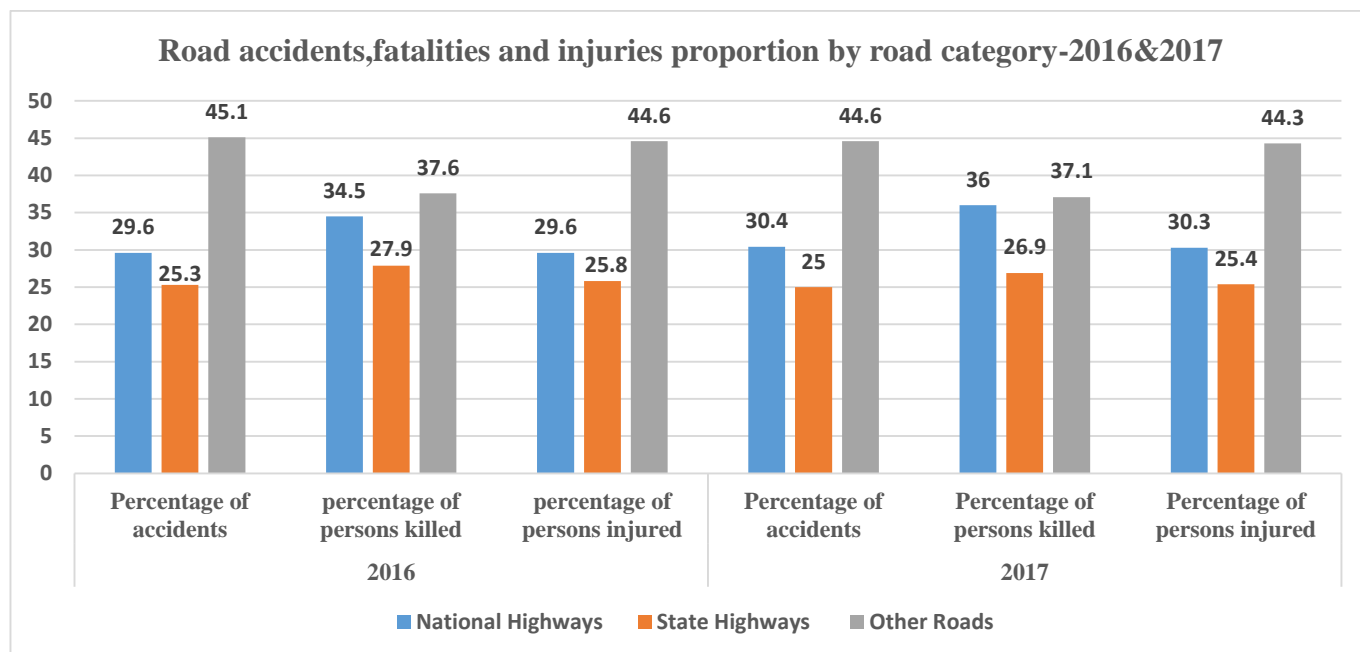


Figure 1: Percentage of road accidents, fatalities and injuries by road category

2.3 Age and gender wise distribution of road deaths and injuries

Table 4 presents fatality distribution by age. This table clearly exhibits that the working age group, 25-60 years is most prone to road accident in India. Age group 25-35 years comprises maximum proportion in number of fatalities. It is inferred that fatalities have been increased in almost every age group of working age group.

Table 4: Age wise distribution of fatal road accident victims during 2016 and 2017

Age Group	Number of fatalities (2016)	Percentage share (2016)	Number of fatalities (2017)	Percentage share (2017)
Less than 18	10622	7	9408	6.4
18-25	31775	21.1	34244	23.2
25-35	38076	25.3	39549	26.7
35-45	33558	22.3	32788	22.2
45-60	22174	14.7	22462	15.2
Above 60	8814	5.8	9384	6.3
Age not known	5766	3.8	79	0.1
Total	150785	100	147913	100

Table 5 shows the gender wise distribution of fatal road accidents in year 2016 and 2017. This table depicts that the males accounts for 85% of all fatal accidents. And number of fatalities in males is increased in taking time period and in females is reduced.

Table 5: Gender wise age profile of fatal road accident victims in 2016 and 2017

Age Group	Male		Female	
	2016	2017	2016	2017
Less than 18	8347	7443	2275	1965
18-25	27417	30148	4358	4096
25-35	32609	34728	5467	4821
35-45	28564	28538	4994	4250
45-60	18592	19235	3582	3227
Above 60	6964	7696	1850	1688
Age not known	4960	45	806	34
Total	127453	127833	23332	20081

2.4 Month and time wise distribution of road accidents

The data on Figure 2 shows that the number of accidents and fatalities are maximum in the month of May and minimum in the month of September. The month wise distribution shows that both road accidents and fatalities are low during July to September and rises again on October and November.

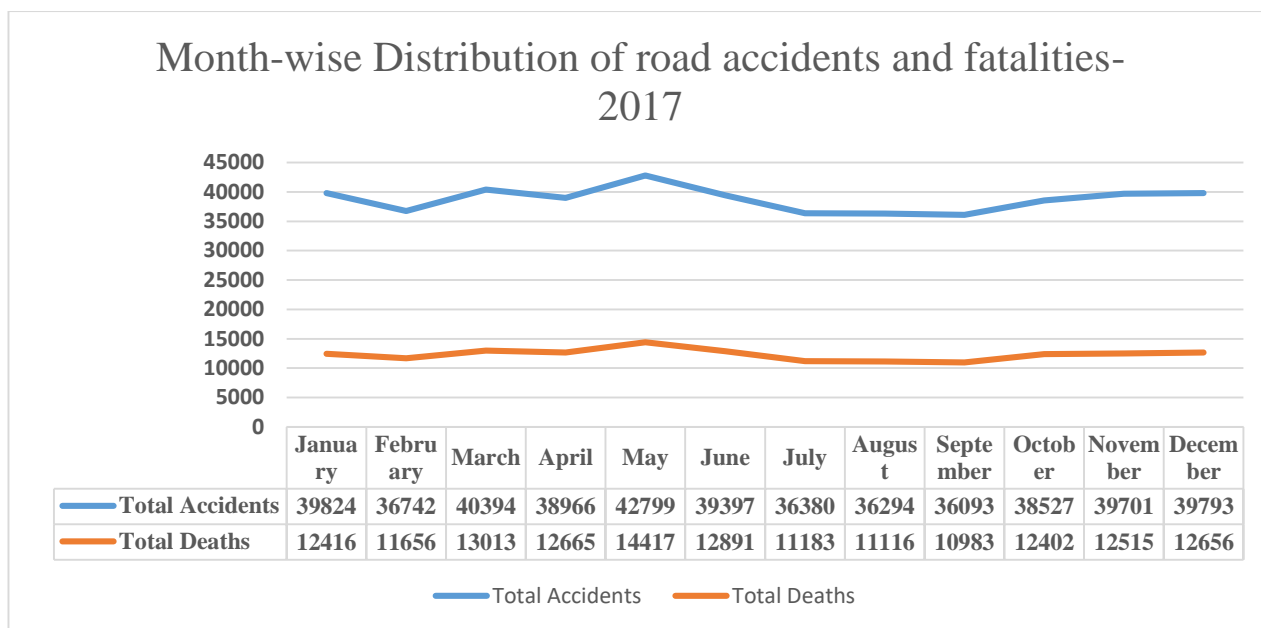


Figure 2: Month wise distribution of road accidents and fatalities in year 2017

Figure 3 presents the time wise distribution of road accidents in India. The figure finds that the time slot 6PM-9PM is having maximum number of road accidents contributing for 18.4% of total accidents in the country. The pattern of road accidents is nearly same for year 2016 and 2017.

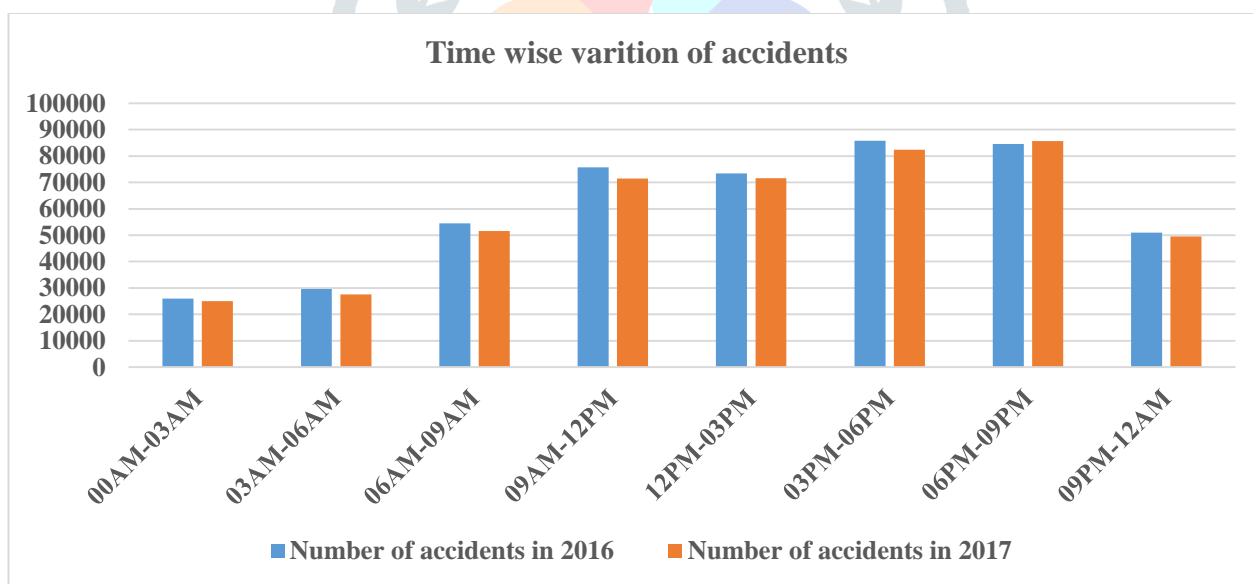


Figure 3: Time wise variation of number of accidents

2.5 Causes of road accidents

It is clear from Figure 4 that over speeding contributes maximum in terms of road accidents. Infect, over speeding and wrong side driving accounted for 76.7% of total accidents. Violation of other rules, red light jump etc. accounts for just 6.2% road accidents. Violation of any traffic rule may include human error or driver’s fault. But in the case of over speeding, human error is not only responsible but there may be a possible fault in road design also. And traffic violations like drunken driving, red light jumping could be perhaps, attributed by traffic rules enforcement.

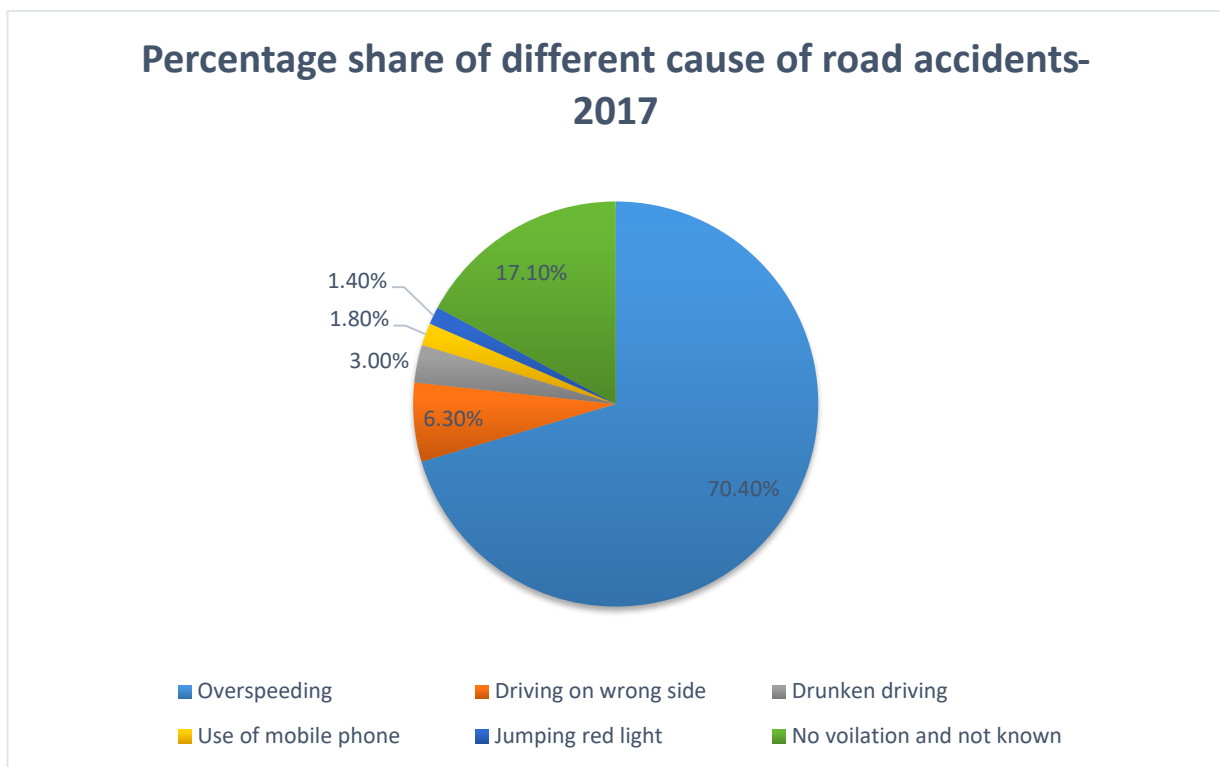


Figure 4: Percentage share of causes of road accidents-2017

3. Analysis of road accident at state level

This study has analysed data of top 15 states in terms of total accidents in year 2016 and 2017 which is shown in Figure 5. The figure depicts that, the state Tamil Nadu is having maximum of number of road accidents during both the years. And the data of considered states, Bihar is having minimum number of road accidents. Haryana is ranked 13th in terms of total number of road accidents. It is also clear from figure that in almost every state the number of road accidents has decreased in year 2017 compared to year 2016. Tamil Nadu and Madhya Pradesh together accounts for 25.6% of road accidents of the country. The Figure 6 shows the ASI values for 15 states of the country. It is inferred from the figure that Bihar is having the maximum value of ASI, followed by Uttar Pradesh. And Kerala is having the minimum value of accident severity index among all the 15 states.

Figure 7 and Figure 8 shows percentage share of states/UT's in reduction of road accidents and road fatalities respectively. It can be inferred from Figure 7 that Tamil Nadu is at 1st place in reducing the number of accidents i.e. by 37.3% which is followed by Maharashtra i.e. 25.6%. And also in terms of fatalities reduction, Tamil Nadu is still leading here which is shown in Figure 8. The figure shows that Rajasthan and Uttarakhand are at last place contributing 0.7%. So more concern should be given to road design, sight distance, and road safety feature instalment to reduce the number of accidents and fatalities to a low number.

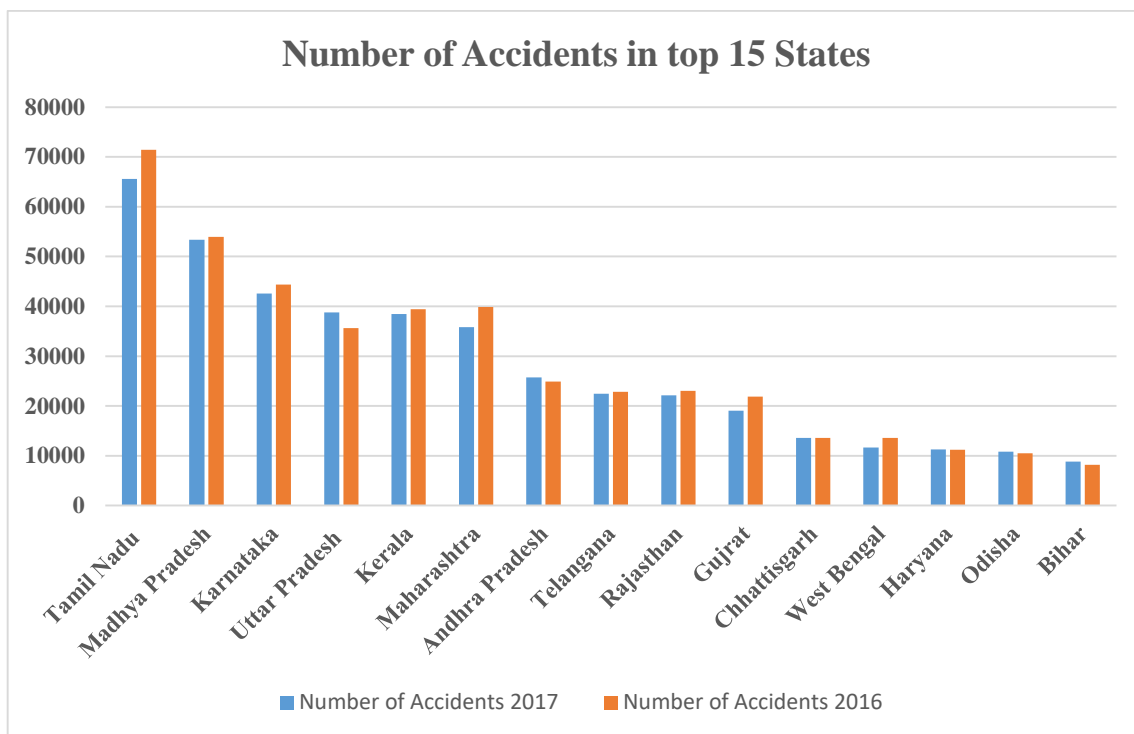


Figure 5: Number of accidents in top 15 states

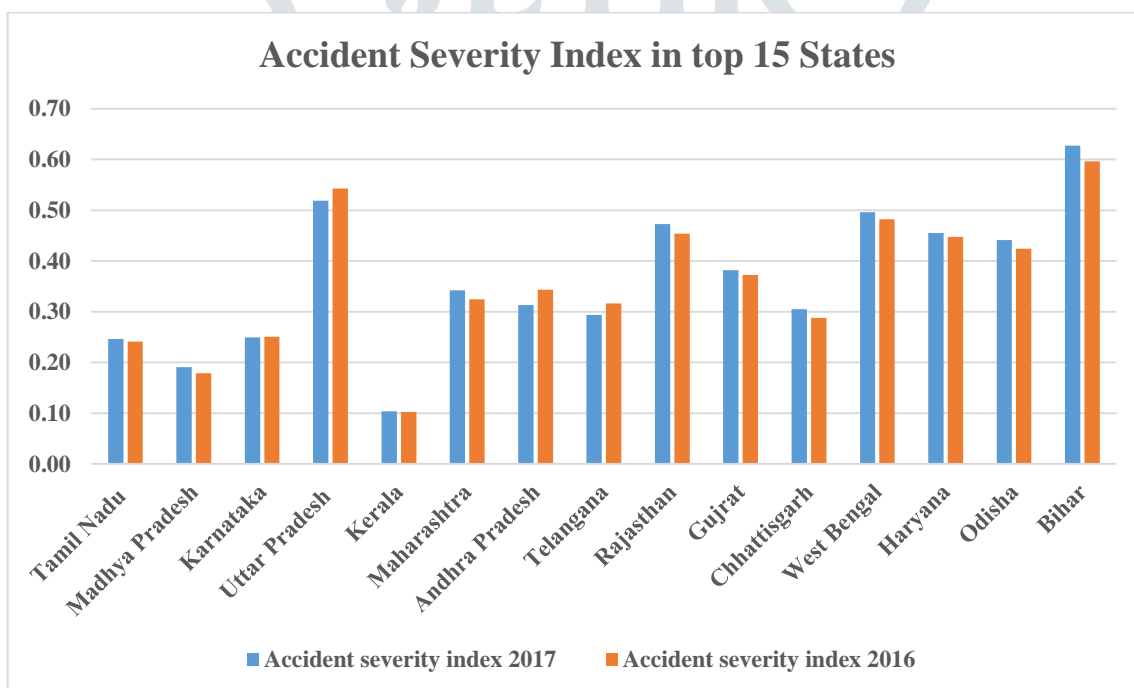


Figure 6: Accident Severity Index (ASI) of 15 states of the country

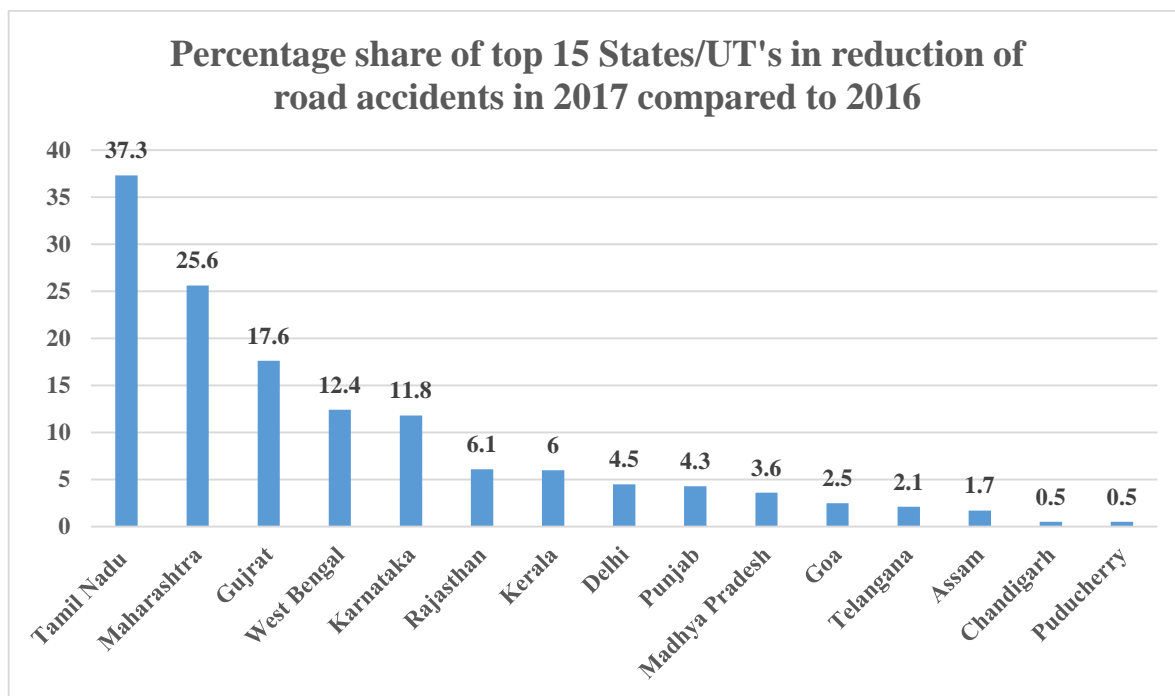


Figure 7: Percentage share of top 15 States/UT's in reduction of road accidents in 2017 compared to 2016

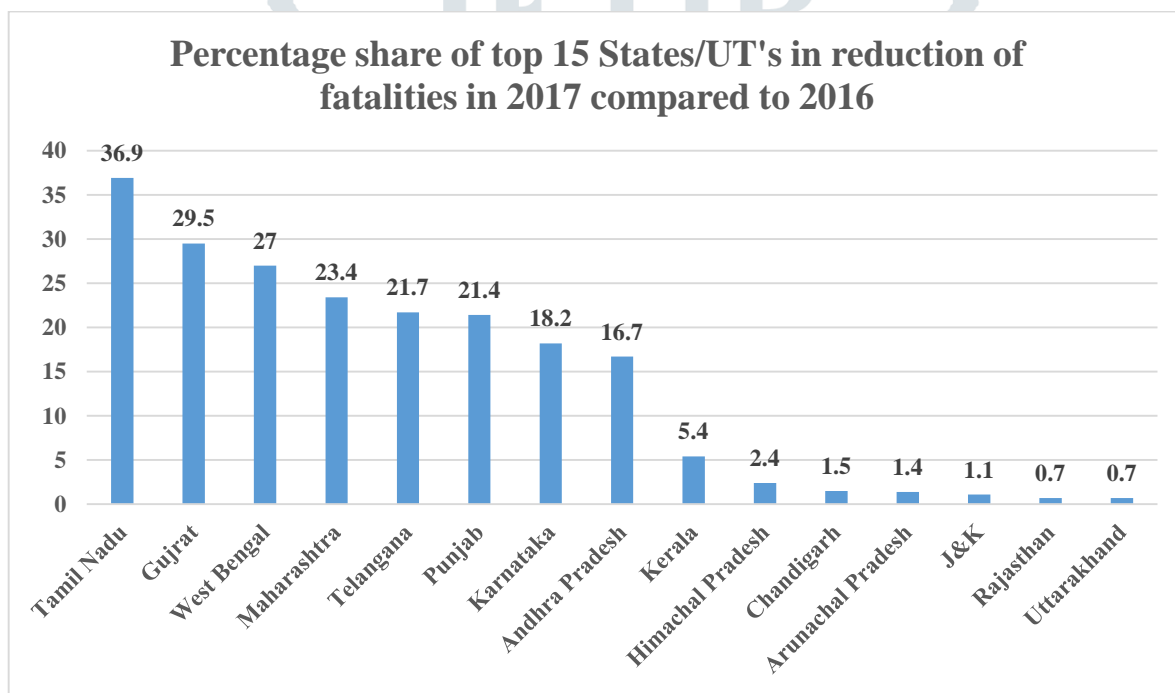


Figure 8: Percentage share of top 15 States/UT's in reduction of fatalities in 2017 compared to 2016

4. Analysis of road accident trend at city level

This study includes analysis of total accidents, fatal accidents, and injury accidents in 11 one million plus cities for year 2017 shown in Figure 9. It is clear from the figure that Chennai is having maximum number of road accidents followed by Delhi. But if examine in terms of fatalities, Delhi is leading Chennai and contributing maximum number of fatalities. And Amritsar is at the last place in number of total accidents, fatal accidents, and injury accidents.

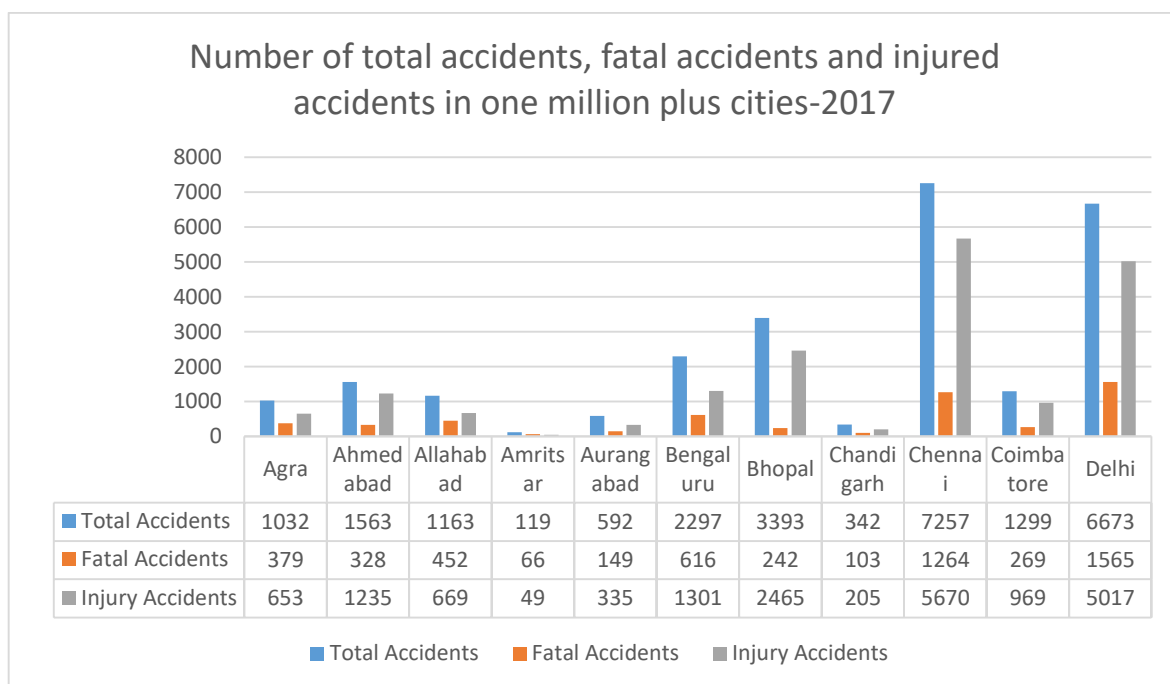


Figure 9: Number of total accidents, fatal accidents and injured accidents in one million plus cities-2017

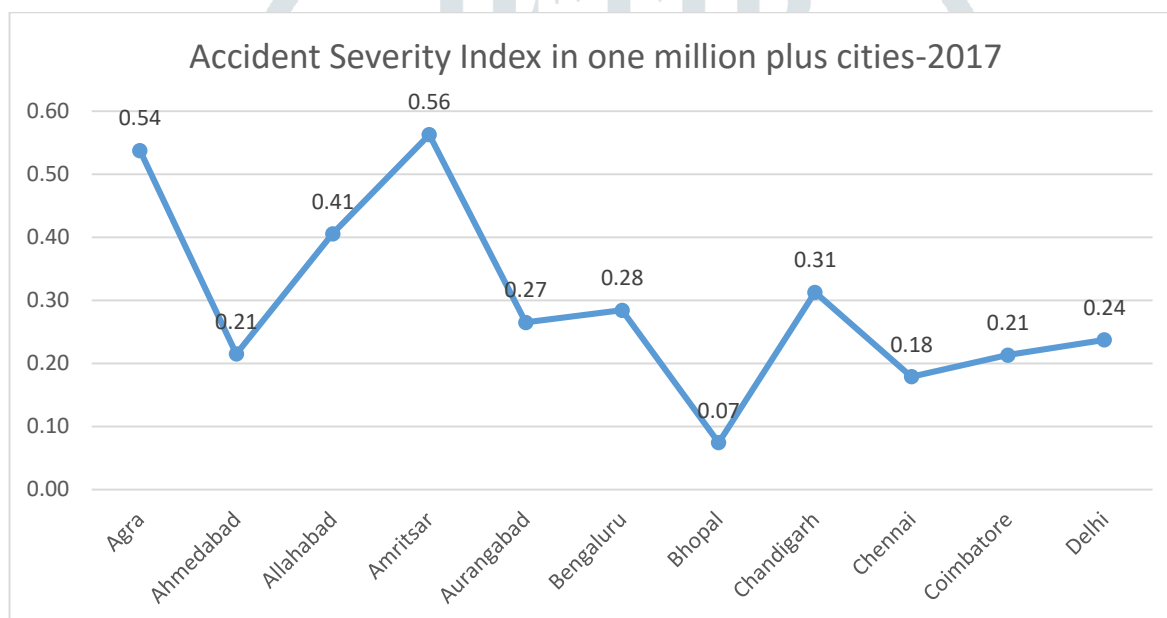


Figure 10: Accident Severity Index in one million plus cities-2017

The Figure 10 shows value of Accident Severity Index (ASI) for one million plus cities in year 2017. The figure depicts that, Amritsar is having the maximum value of ASI followed by Agra. The value of ASI is minimum in Bhopal which means accident occurring are not resulting in more fatalities. And the value of ASI can be improved by providing proper road safety facilities on the locations having higher value of ASI.

Conclusion

The analysis represents the distribution of road accident, fatalities and injuries in India according to time, month, gender, and age. The final results concluded from the analysis are:

- The age group 25-35 is highly prone to number of accidents, fatalities, and injury followed by age group 35-45.
- On the basis of gender, the analysis shows that males accounts for about 85% of fatal road accidents.
- The month wise analysis showed that, in month of May highest number of road accidents and fatalities occurred and in September, least number of accidents and fatalities took place.
- The time wise analysis exhibits that time slot of 6PM-9PM is having maximum number of road accidents contributing for 18.4% of total road accidents.

- Based on the causes of road accidents, over speeding contributes maximum in terms of road accidents. However, over speeding and wrong side driving accounted for 76.7% of total accidents.
- Analysis of road accidents at state level shows that Tamil Nadu has highest number of road accidents in year 2017
- Accident severity index of Bihar is maximum among the states considered for analysis.
- In the terms of reduction of road accidents and fatalities from year 2016 to 2017, Tamil Nadu is at 1st position.

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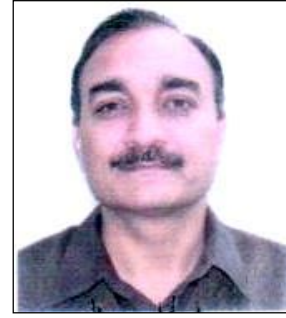
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