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A Descriptive Analysis on Reasons behind Road Traffic Accident in India

Jagrati Upadhyaya [a], Nikhil Singh [b], Ritika Singh [c], Vishvjeet Singh Panwar [d], Dr. Ashwani Panesar [e]

[a,b,c,d] Student, Department of Management, Lovely Professional University, Phagwara, Punjab

[e] Professor, Department of Management, Lovely Professional University, Phagwara, Punjab

ABSTRACT

The study aimed to research in area of road traffic accident into India to go through the factors responsible behind the accident as improving economy of India leading to more use of motorization which then also follows more accidents and injuries hence creating the most significant burden on health care system. We conducted some studies and gone through the published literature to estimate the major factors by examining the surveys of people and their perception about the accidents to understand for recognizing circumstance into road deaths & take appropriate actions. People use roads as a mode of transportation from one place to another. Roads provide a pivotal role in providing a lifeline for overall logistics, transportation and service industries.

Keywords: Traffic accident, interpretation, analysis

1. Introduction:

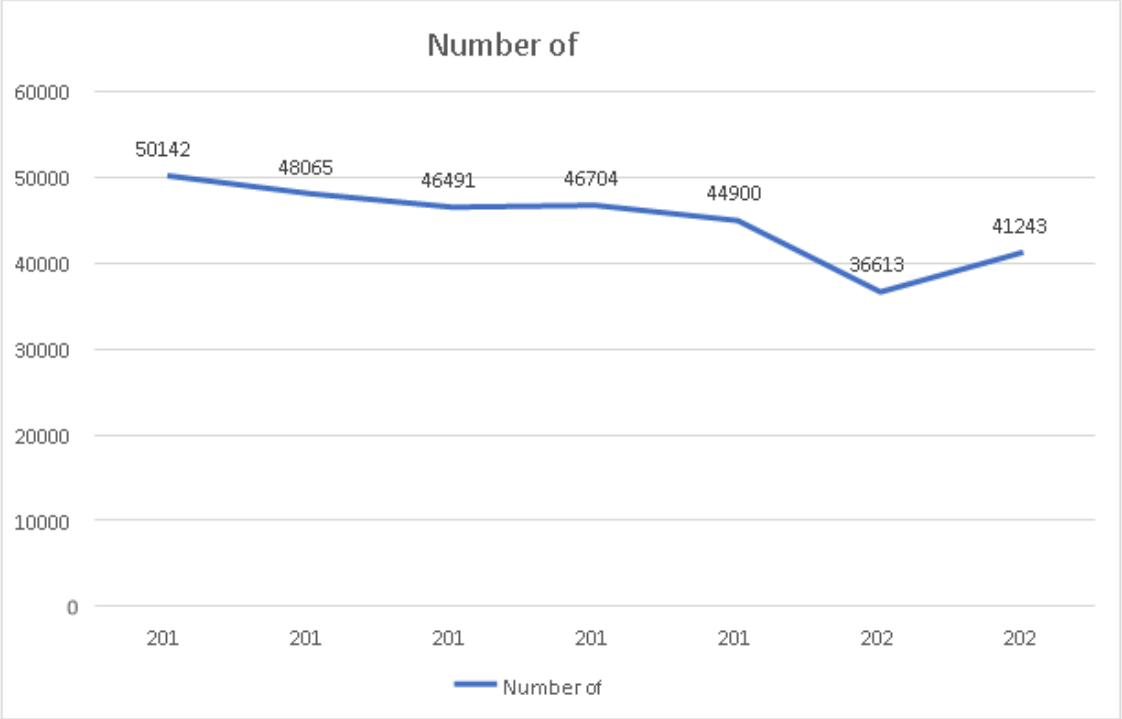
Concerns about global road safety have been prompted by data from ***World Health Organization*** showing that 1,3 million people around the globe lose their lives in traffic mishaps each year. While lower- & middle-income nations are roughly 60% of world's cars, they also account for 93% of all road fatalities. The issue of traffic safety is especially pressing in India, which has one of the world's largest road networks. Increasing development and record rates of car ownership attributable to fast economic growth have exacerbated the problem.

Statistics from the "***Road Accidents in India 2020 survey***" indicate that 1,31,714 people were killed and 3,48,279 were injured due to road accidents in India in 2020, totaling a tragic total of 3,66,138. Nonetheless, the general number of incidents has been decreasing since 2016, with the exception of a slight increase seen in 2018. This is due to the ongoing initiatives of this Ministry and several other pertinent groups and partners, who have been working on enhancing road safety. The total number of people hurt in road incidents has also gone down since 2016.

There were 18.46% fewer car crashes on average in 2020 than there were in 2019. Both deaths and accidents decreased by 12.84 percent and 22.84 percent in 2020, respectively. It's also possible that the prolonged closure enforced by the government during the pandemic led to the sharp drop in these measures. Furthermore, in 2020, there was a decline in both the total mortality toll and the amount of deadly road incidents.

Table 1: Type of Collision

Type of Collision			
Type	**2019**	**2020**	**2021**
Hit & run	69,621	52,448	57,415
With parked vehicle	13,317	11,096	11,611
Hit from back	89,923	73,039	87,368
Hit from side	57,987	48,010	60,221
Run off road	19,055	18,210	19,478
Fixed object	14,507	12,882	14,436
Vehicle overturn	23,314	19,211	19,303
Head on collision	87,452	73,743	76,304
Others	73,826	57,499	66,296
Total	**4,49,002**	**3,66,138**	**4,12,432**



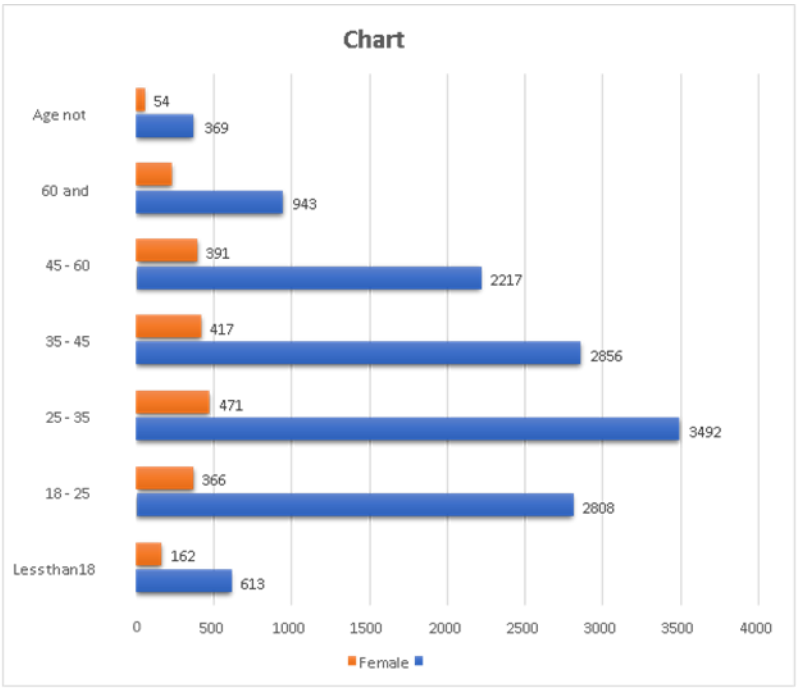
Based on the ***Ministry of Road Transport & Highways Research Wing's*** investigation. Except for a small 0.46 percent uptick in 2018, the number of traffic accidents has been declining since 2016. The number of traffic accidents declined by 18.46% on average from 4,49,002 in 2019 to 3,66,138 in 2020. The overall death toll decreased from 1,51,113 in 2019 to 1,31,714 in 2020, reflecting a YoY growth fall of 12.84 percent over the same period in 2018. Road accident-related injuries decreased overall by 22.84 percent from 4,51,361 in 2019 to 3,48,279 in 2020.

Table 2: Types of accident and its data

Driver fault	55.60%
Alchohol & Drugs	5.3%/6.4%
Overloading	19.60%
Overcrowding	22.80%
Cyclists	1.20%
Pedestrian	2.20%
Vehicle Condition	1.80%
Road Condition	0.80%

Total of 4,12,432 accidents have been reported in nation in 2021; 1,28,825 (31.2%) of those occurred on motorways and other national highways, 96,382 (23.4%) on state highways, and 1, 87,225 (45.4%) on other roads.

50,953 (35.8%) of the 1,42,163 fatal accidents reported in 2021 occurred on national highways, compared to 34,946 on state highways and 56,264 on other roads.



STATE WISE DISTRIBUTION OF NUMBER OF ROAD ACCIDENT DURING 2017 TO 2021

Table 3- shows the accident in different states of India from 2017 to 2021 source- Ministry of road transport & highways research wing's

S. No.	States/UTs	2017	2018	2019	2020	2021
1	Andhra Pradesh	25,727	24,475	21,992	19,509	21,556
2	Arunachal Pradesh	241	277	237	134	283
3	Assam	7,170	8,248	8,350	6,595	7,411
4	Bihar	8,855	9,600	10,007	8,639	9,553
5	Chhattisgarh	13,563	13,864	13,899	11,656	12,375
6	Goa	3,917	3,709	3,440	2,375	2,849
7	Gujarat	19,081	18,769	17,046	13,398	15,186
8	Haryana	11,258	11,238	10,944	9,431	9,933
9	Himachal Pradesh	3,114	3,110	2,873	2,239	2,404
10	Jharkhand	5,198	5,394	5,217	4,405	4,728
11	Karnataka	42,542	41,707	40,658	34,178	34,647
12	Kerala	38,470	40,181	41,111	27,877	33,296
13	Madhya Pradesh	53,399	51,397	50,669	45,266	48,877
14	Maharashtra	35,853	35,717	32,925	24,971	29,477
15	Manipur	578	601	672	432	366
16	Meghalaya	675	399	482	214	245
17	Mizoram	68	53	62	53	69
18	Nagaland	531	430	358	500	746
19	Odisha	10,855	11,262	11,064	9,817	10,983
20	Punjab	6,273	6,428	6,348	5,203	5,871
21	Rajasthan	22,112	21,743	23,480	19,114	20,951
22	Sikkim	196	180	162	138	155
23	Tamil Nadu	65,562	63,920	57,228	45,484	55,682
	Telangana	22,484	22,230	21,570	19,172	21,315
25	Tripura	503	552	655	466	479
26	Uttarakhand	1,603	1,468	1,352	1,041	1,405
27	Uttar Pradesh	38,783	42,568	42,572	34,243	37,729
28	West Bengal	11,631	12,705	10,158	9,180	11,937
29	A & N Islands	189	254	230	141	115

30	Chandigarh	342	316	305	159	208
31	D & N Haveli	67	80	68	100	140
32	Daman & Diu	79	76	69	-	-
33	Delhi	6,673	6,515	5,610	4,178	4,720
34	J & K	5,624	5,978	5,796	4,860	5,452
35	Ladakh	0	NA	NA	NA	236
36	Lakshadweep	1	3	1	1	4
37	Puducherry	1,693	1,597	1,392	969	1,049
	Total (All India)	**4,64,910**	**4,67,044**	**4,49,002**	**3,66,138**	**4,12,432**

2. Literature review:

M. Bin Islam et al. studied the various aspects as on what basis the road accidents occurred in India till 2021, whereby accident characteristics, accident forecasting and better roadway and vehicle design were the variables under consideration. Accidents have become bone of contention as it lead to severe injuries which can make a victim disable for the rest of his/her entire life and can create to social crises in the society at large, so to prevent this government started investing most of their budget in the roadways which is the most important way of the transportation.

The main thing is many people don't learn from the road accidents or the mistakes on road. Apart from the knowing and aware of signals or the general rules they many people don't learn which leads to severe accident and injury. The risk factors which is considered for this are meteorological information, location, gender, and weather conditions are the risk variables taken into account in this study. likelihood of pedestrians being engaged in traffic accidents rises by 10.6 times for pedestrians on urban roads and by 2.7 times for vulnerable road users. The results revealed that most road accidents are caused due to vehicle drivers, and other causes, such as pedestrians and vehicle failure, lead to fatal accidents and to prevent it has been induced that all the roads and drivers should get the proper knowledge, road blocks should be marked properly and signals should also be properly set which can reduce the accident in the place where there is more injuries. Basically the risk of the accident or crash are more likely due to the perceived difficulty in comprehending, assessing and responding to hazards.

According to public health et al. it was assumed that the death ratios was very high in urban and as well as rural areas where there are many accidents in the areas which are not even been counted or underestimated, there are some few patterns which are observed that the traffic flow was having a non-linear relationship with accident rates and somewhere it is suggested that there is a linear relationship with accident rates.

According to R.R. Dinu et al. random Parameter Models for Accident Prediction on Two-Lane Undivided Highways in India was presented bin 2011. The models are calibrated and validated using three years' worth of crash data from approximately 200 kilometres of highway segments. Based on the data, it seems that the model coefficients for things like traffic volume, the share of vehicles, motorcycles, and trucks in circulation, the number of driveways in an area, and the average radius of both horizontal and vertical curves are distributed randomly. They wrapped things off by talking about the limits of the current study and the modelling results.

According to Rakesh Mehar et al. in order to formulate a road safety improvement programme in India have highlighted the gaps in the current state of the art and presented some foundational concepts. The study provides the framework for creating an accident reporting system, ranking safety hazardous areas, identifying safety improvement strategies, and prioritising safety actions. It is hoped that this research will pave the way for a more methodical strategy to be developed for increasing road safety in India.

3. Research Methodology:

We have surveyed the primary data with the means of google form where there are total 69 data in a row which contains the Gender, vehicle owners either they are 2 wheeler or 4 wheeler, factors of accident or the reasons behind and all the data has been surveyed from the college students and as well as the truck drivers accidental people who met accidents.

We have used the method of finding the frequencies by mean, mode and median through the software which is SPSS.

Analysis and Interpretation:

Below are the tables which shows the frequencies of the different factors and types which influenced more in the accident.

Table 4 derived from the SPSS

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	42	60.9	60.9	60.9
	female	26	37.7	37.7	98.6
	Gender	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The total data derived is 69 where 42 is male and 26 is female with 60.9% and 37.7% respectively showed the results

It is clear that male are more in this study who drives vehicle where the difference between both of them are around 40%
As per the Graph 2 and this study it is clear that major accidents are being happened in India are by the males only.
Table 5 derived from the SPSS

Vehicles

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 wheeler	23	33.3	33.3	33.3
	4 wheeler	3	4.3	4.3	37.7
	Both	42	60.9	60.9	98.6
	A	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

This table shows the owners of 2 wheeler and 4 wheeler vehicle and the people who own both the types of vehicle where 60.9 percent of people has both the types of vehicles and is the maximum number of numbers where 23 people own only 2 wheeler and 3 people only own 4 wheelers.

Table 6 Data derived from the SPSS

Met accident

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	42	60.9	60.9	60.9
	no	26	37.7	37.7	98.6
	B	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

In this data out of the total 42 people met an accident while 26 people never met an accident which comprises more than 60% people faced the accident and 37.7 people never met.

Table 7 data derived from the SPSS

Weather

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	10	14.5	14.5	14.5
	Agree	23	33.3	33.3	47.8
	Neutral	15	21.7	21.7	69.6
	Disagree	11	15.9	15.9	85.5
	strongly disagree	9	13.0	13.0	98.6
	C	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The studied result has shown that the weather contributed the accident is 14.5 strongly agreed by people, 33.3% agreed, neutral by 21.7%, disagree by 15.9% and strongly disagreed by 13% where some people faced accident due to the weather conditions.

Table 8 the data has been derived from the SPSS

On the phone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	8	11.6	11.6	11.6
	no	55	79.7	79.7	91.3
	may be	5	7.2	7.2	98.6
	D	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The study done by the above data is showing that there are also some people who thinks that being on the phone and driving can be the reason behind the accident which is only 11.6 percent whereas 79.7% opinion are not agreeing with this and there are also some people who thinks that may be the accident happened because of being on the phone.

Table 9, the data has been derived from the SPSS

Animal crash

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	11	15.9	15.9	15.9
	Agree	20	29.0	29.0	44.9
	Neutral	13	18.8	18.8	63.8
	Disagree	13	18.8	18.8	82.6
	strongly disagree	11	15.9	15.9	98.6
	E	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The study has shown that there are 15.9% people of the total strongly agrees that the accident happened due to the animal crash while they are crossing the road and there are 29% of people agrees in this and 18.8% people are of neutral thinking then 18.8% people disagrees and there are also people who strongly disagrees in this which are 15.9%.

Table 10, the study has been derived from the SPSS

Crossing road

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	11	15.9	15.9	15.9
	Agree	22	31.9	31.9	47.8
	Neutral	6	8.7	8.7	56.5
	Disagree	14	20.3	20.3	76.8
	strongly disagree	15	21.7	21.7	98.6
	F	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

This study shows that the accident which happens in real life is because the pedestrian who crosses the road without any signals and abruptly where 15.9% and 31.9% people strongly agree and agrees respectively out of the 100% which is 69.

Table 11, the study has been derived from the SPSS

Safety rules

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	18	26.1	26.1	26.1
	Agree	24	34.8	34.8	60.9
	Neutral	11	15.9	15.9	76.8
	Disagree	10	14.5	14.5	91.3
	strongly disagree	5	7.2	7.2	98.6
	G	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

In this study there are some things which are cleared that shows the people are meting an accident because of the safety rules and signals not followed and the people who strongly agrees on that is 26.1% and 34.8% agrees with this and only 7.2% people strongly disagrees with this reason behind the accident.

In this there are many things like indicators, turnings, over speeding, traffic rules and etc which are not being followed.

Table 12, the study has been derived from the SPSS

Over speeding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	11	15.9	15.9	15.9
	Agree	10	14.5	14.5	30.4
	Neutral	13	18.8	18.8	49.3
	Disagree	16	23.2	23.2	72.5
	strongly disagree	18	26.1	26.1	98.6
	H	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The study shown above clears the fact that there are very less accidents happen because of the over speeding where 26.1% people disagrees with this and people who strongly agrees are 15.9% that means it states that people are thinking that not every7 accident happened because of the over speeding.

Table 13, the study has been derived from the SPSS.

Wrong side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	4.3	4.3	4.3
	Agree	3	4.3	4.3	8.7
	Neutral	13	18.8	18.8	27.5
	Disagree	28	40.6	40.6	68.1
	strongly disagree	21	30.4	30.4	98.6
	I	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The study shows that this can also be the reason behind the accident like the people who drives in the wrong side of the road which can lead to the accident on the road in India there are only 4.3% people who strongly agrees in this and also 4.3% people who agrees and strongly disagree people are 30.4% and 40.6% people who disagrees with this reason.

Table 14, the Study has been derives from the SPSS

Break traffic signal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	4	5.8	5.8	5.8
	Agree	7	10.1	10.1	15.9
	Neutral	10	14.5	14.5	30.4
	Disagree	30	43.5	43.5	73.9
	strongly disagree	17	24.6	24.6	98.6
	J	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

Here the study states that there are very less people who thinks that breaking the signals can be the reasons behind the accident where only 5.8% people has the opinion with this and the people disagrees are 43.5% and who strongly disagrees are 24.6%.

It is clear that yes some people thinks of this reason because while breaking the signals another vehicles coming from the different direction can collide hard which can be leading to the severe injuries.

Table 15, the study has been derived from the SPSS

Vehicles breakdown

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	8	11.6	11.6	11.6
	Agree	13	18.8	18.8	30.4
	Neutral	10	14.5	14.5	44.9
	Disagree	19	27.5	27.5	72.5
	strongly disagree	18	26.1	26.1	98.6
	K	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The study states that the breakdown of the vehicles in India leads to accident because of the break failure, engine malfunction, and many other kind of abrupt failure in the vehicles lead to accident, here 11.6% people strongly agrees and 18.8% people just agrees with this whereas 26.1% and 27.5% people strongly disagrees and disagrees respectively and 14.5% people thinks neutral about this.

Table 16, the study derived from the SPSS

Drowsy driving

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	6	8.7	8.7	8.7
	Agree	3	4.3	4.3	13.0
	Neutral	13	18.8	18.8	31.9
	Disagree	27	39.1	39.1	71.0
	strongly disagree	19	27.5	27.5	98.6
	L	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

This is the fact that comprises the road accidents in the long run because some drivers or riders drive the vehicle without being in full concentration, people feels sleepy and still they drive the vehicles that leads to an accident, this study states that only 8.7% people out of total has the opinion and strongly agrees that the accident happened because of this reason and 27.5% people strongly disagree with this fact and the remaining are in the between that means many people are against this fact as per their opinion.

Table 17, the study has been derived from the SPSS

Potholes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	8	11.6	11.6	11.6
	Agree	14	20.3	20.3	31.9
	Neutral	12	17.4	17.4	49.3
	Disagree	14	20.3	20.3	69.6
	strongly disagree	20	29.0	29.0	98.6
	M	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

This study shows the frequencies of the accident that had happened because of the Potholes on the road either in the rural or urban areas where 11.6% people strongly agrees this, 20.3% people agrees, 17.4% people are neutral about this fact, 20.3% people are disagreeing this fact and mostly which 29% people strongly disagrees with this fact.

Table 18, this study has been derived from the SPSS

Safety gears

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	7	10.1	10.1	10.1
	Agree	6	8.7	8.7	18.8
	Neutral	16	23.2	23.2	42.0
	Disagree	19	27.5	27.5	69.6

	strongly disagree	20	29.0	29.0	98.6
	N	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The very important aspect while driving any kind of vehicle is the safety gears which should be wore by the drivers or riders to prevent any kind of the accidents, here the most numbers are with the people who are strongly disagreeing with the fact that accidents and injuries happened because of not wearing the safety gears and only 10.1% people are strongly agreeing with the fact that this can be the reason behind.

Table 19, the study has been derived from the SPSS

Tyre condition

		Frequency	Percent	Valid Percent	Cumulative Percent
	strongly agree	7	10.1	10.1	10.1
	Agree	6	8.7	8.7	18.8
	Neutral	13	18.8	18.8	37.7
Valid	Disagree	18	26.1	26.1	63.8
	strongly disagree	24	34.8	34.8	98.6
	O	1	1.4	1.4	100.0
	Total	69	100.0	100.0	

The most important part for the vehicles is the tyre which balances the whole body which should be in the adequate condition so to prevent any kind of accident or injuries.

4. Conclusion:

According to the study, all the interpretation and analysis, the majority of the accident happened are due to the weather condition, animal crossing crashes, not following safety rules, potholes, fog and drunk and drive and then followed by most minority reasons influenced to accidents are over speeding, vehicles breakdown abruptly, tree blockages, poor maintenance of vehicle then after the accidents which were happened due to the reasons which are least responsible are as follows:- being on the phone and driving, wrong side, break traffic signals, drowsy driving, safety gears and tyre condition.

If the drivers and riders are taking their responsibility of not getting into an accident then driving very consciously, considering the weather condition before driving, following the safety rules, using fog lamps, proper maintenance of vehicle, not over speeding and not getting into drink and drive can be the better way to prevent the accidentlso there are some government measures which should be taken by government to prevent the accident by improving the road quality, placing road blockages, improving signal quality can decrease the road accident exponentially.

5. Suggestions:

Drive in the prescribed speed limits on the various road.

Always put on helmets, seat belts and other safety equipments before driving a bicycle/motor cycle/or any vehicles.

Do not drink and drive

Never use mobile phones or ear phones while driving.

Know the traffic signs signals,lights and traffic safety rules before you hit the road.

Do not drive for long hours in a stretch. Have a proper breaks after every 2 hours of continuos driving.

Park well away and turn on hazards lights.

Tyres- Damaged or worn out car tyres can be detrimental to your safety and even increase fuel consumption.

Keep a safe distance from vehicles away.

Never assume to know what the intentions of other drivers.

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