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ACCIDENT ANALYSIS OF "PATIALA CITY" (2014 TO 2016)

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ABSTRACT

This study is to analyze the accidents, The Patiala city covered by six police station (Tripuri, Civil line, Urban Estate, Lahori gate, Bhakshiwala, Kotwali Patiala). The FIR recorded from above Police Station of Patiala city have been collected from year 2014 to 2016. The FIR report contains the data as Time of Accident, Hitting Vehicle, Hitten Vehicle, Deaths, Injuries, Location and Types of accidents. The FIR data was compiled and various parameters have been checked out to determine the criticality of Patiala city. Two Wheeler are mainly the victims in the Patiala City. Analyzing crash records from 2014 to 2016, a total of 139 crashes were recorded in 2014 from which 114 injured and 55 were killed, 137 crashes in 2015 from which 102 injured and 62 were killed, whereas in the year 2016 recorded a total of 133 crashes from which 97 injured and 50 were killed, thus, Total number of crashes from the year 2014 to 2016 are 409 from which 313 injured and 167 were killed in the Patiala City. It shows that crashes and injuries are reducing from 2014 to 2016 but fatalities increase from 2015 and reduce in 2016 with respect to 2014.

I INTRODUCTION

Road accidents are an outcome of the interplay of various factors, some of which are the length of road network, vehicle population, human population and adherence/enforcement of road safety regulations etc. Road accident causes injuries, fatalities, disabilities and hospitalization with severe socio economic costs across the country. Consequently, road safety has become an issue of concern both at national and international level. The United Nations has rightly proclaimed 2011-20 as the Decade of Action on Road Safety. India is also signatory to Brasilia Declaration and is committed to reduce the number of road accidents and fatalities by 50 per cent by 2020.

The accident rate is much higher in India as compared to the other countries such as USA , Canada, Europe As, there is a huge network of Highways in India but traffic density is also very much high. Indian Literacy percentage is 65% and hence people are less aware of the traffic rules and regulations. These factors have added in increase in road accidents and further increase in the loss of life and property.

1.1 Causes of accident

Vehicle

Road User

Road Condition

Environmental

II TYPE OF ACCIDENT

Minor accidents:- Accidents that cause minor injury/illness, requiring little or no treatment or property damage.

Serious accidents:- Accidents that cause lost time cases, visits to the local emergency room, accidents where victims are hospitalized.

Fatalities:- Accident that cause death

III IPC FOR ROAD ACCIDENT

Section 283

Danger or obstruction in public way or line of navigation.—Whoever, by doing any act, or by omitting to take order with any property in his possession or under his charge, causes danger, obstruction or injury to any person in any public way or public line of navigation, shall be punished with fine which may extend to two hundred rupees.

Section 279

Rash driving or riding on a public way.—Whoever drives any vehicle, or rides, on any public way in a manner so rash or negligent as to endanger human life, or to be likely to cause hurt or injury to any other person, shall be punished with imprisonment of either description for a term which may extend to six months, or with fine which may extend to one thousand rupees, or with both.

Section 337

Causing hurt by act endangering life or personal safety of others.—Whoever causes hurt to any person by doing any act so rashly or negligently as to endanger human life, or the personal safety of others, shall be punished with imprisonment of either description for a term which may extend to six months, or with fine which may extend to five hundred rupees, or with both.

Section 338

Causing grievous hurt by act endangering life or personal safety of others.—Whoever causes grievous hurt to any person by doing any act so rashly or negligently as to endanger human life, or the personal safety of others, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine which may extend to one thousand rupees, or with both.

Section 427

Mischief causing damage to the amount of fifty rupees.-Whoever commits mischief and thereby causes loss or damage to the amount of fifty rupees or upwards, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both.

Section 304A

Causing death by negligence.—Whoever causes the death of any person by doing any rash or negligent act not amounting to culpable homicide, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both.

IV LITERATURE REVIEW

1. Singh and Suman (2012) carried out research on accident analysis and Prediction models on national highways in India. They concluded that accident rate in terms of accidents per kilometer year increases with traffic volume. But accident rates in terms of number of accidents per million vehicle kilometer year decreases with increase in traffic volume.

2. Mustakin and Fujita (2011) published a paper investigating major factors contributing to highway accidents concentrating on the relationship between road condition, traffic flow, accident rates and their predicting using multiple non linear regression.

3. Oppong & Asumadu (2012) did statistical analysis of road accidents fatality in Ghana using poisson regression. The results of the Poisson regression analysis showed that Saturday has the biggest expected number of people who are killed by road accidents when time (in years) was included in the model. It was realized that the number of people killed on Saturday by road accidents is e^0.238497 times more than the base level for every year.

4. Arndt (1994) developed accident models in Queensland, Australia, using multiple linear regression methods. Independent variables related to flow, 85th percentile speed, vehicle path radius and changes in 85th percentile speed (as a vehicle progresses through the roundabout). The 85th percentile speeds through a roundabout were calculated from the theoretical speeds, which were based on curve radii using a modified version of a method to calculate speeds for various curve radii on rural roads. The preferred model produced for all reported injury and fatal.

5. As proposed by Turner et al. (2006) a new model is currently being developed in New Zealand for rural roads that will consider all the key variables, including: traffic volume, access density, horizontal geometry, horizontal geometry consistency, seal width, shoulder environment, roadside hazards..Turner (2000) also developed some basic models for motorways (freeways), for the more frequent accident types, and total accidents, based on traffic flow only.

6. Singh and Dhattarwal (2004) analysed 2000-2001 data of road accidents of PGIMS, Rohtak. The study shown that 59% accidents occurred on Highways, 60% deaths were from VRU category, more than 70% from working age group, maximum accidents occurred in winter between 6-8 pm, heavy vehicles were responsible for 38.9% fatalities followed by cars and jeeps (30.4%), drivers were at fault in majority of cases (55.6%). Out of 104 motor cyclists only one was wearing helmet. None of the occupants of cars used protective seat belts. Out of the total deaths only 40% were within 1 hour of the accident, 98% deaths occurred within 2 weeks period.

V NEED AND OBJECTIVES OF STUDY

The objectives of the present study are listed below:

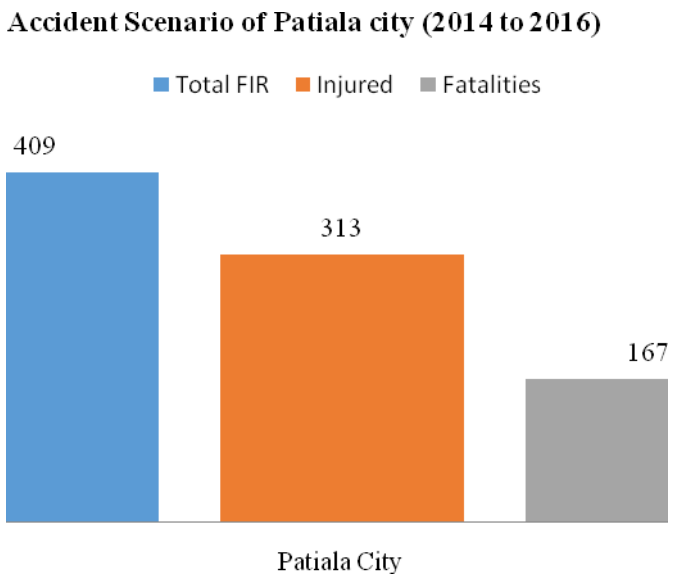
1. To study the daily, monthly and annual variation in accident rate in patiala city.
2. Identify the cause of the accident.
3. Find methods to prevent accident from recurring.
4. Identify the black spot in patiala city.
5. To study the effect of traffic volume on accident rate.
6. To study the variation in the traffic according to time in the day.

VI DATA COLLECTION AND ANALYSIS

With the prior permission of the concerned Senior Superintendent of Police (S.S.P) Patiala City, the accident data were collected from the six Police stations. These Police stations are Tripuri, Civil line, Urban Estate, Lahori gate, Bhakshiwala, Kotwali Patiala. The police stations have their own FIR records of several years. Accident, Fatality and Injury data were collected year wise from each police station records during year 2014 to 2016. The type of vehicles involved in accidents as recorded in the FIR was also noted down. The categories of vehicles include Tuck, Bus, Tractor, Jeep, Car, Auto Rickshaw, Motorcycle and Bicycle etc. Further, yearly-obtained data were sorted out month- wise and analyze the variation in accident in the different month of the year.

Sr. No	Police Station	Year	Total Fir	Injured	Fatalities
1	**Tripuri**	2014	44	31	21
2		2015	43	30	20
3		2016	34	21	13
		Total	**121**	**82**	**54**
4	**Civil Line**	2014	30	20	11
5		2015	25	20	9
6		2016	29	26	10
		Total	**84**	**66**	**30**
7	**Urban Estate**	2014	18	17	6
8		2015	27	16	12
9		2016	28	21	8
		Total	**73**	**54**	**26**
10	**Lahori Gate**	2014	17	18	5
11		2015	12	7	6
12		2016	18	10	7
		Total	**47**	**35**	**18**

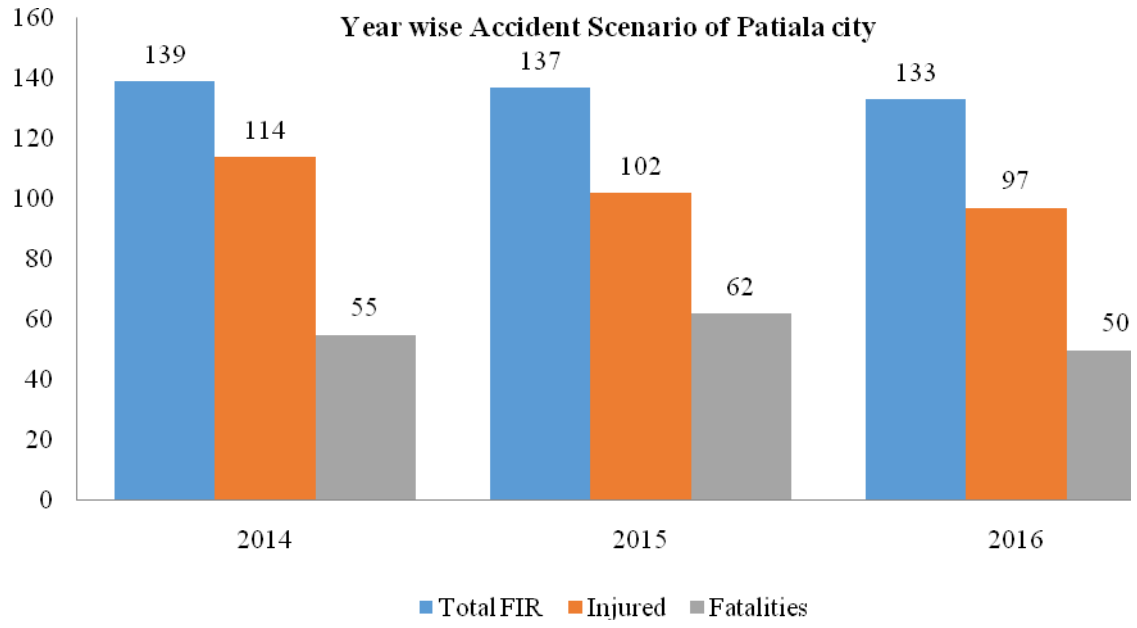
13	**Bhakshiwala**	2014	21	19	9
14		2015	15	19	6
15		2016	8	9	4
		Total	**44**	**47**	**19**
16	**Kotwali Patiala**	2014	9	9	3
17		2015	15	10	9
18		2016	16	10	8
		Total	**40**	**29**	**20**
		Total	**409**	**313**	**167**



Analyzing crash records from 2014 to 2016, a total of 139 crashes were recorded in 2014 from which 114 injured and 55 were killed, 137 crashes in 2015 from which 102 injured and 62 were killed, whereas in the year 2016 recorded a total of 133 crashes from which 97 injured and 50 were killed

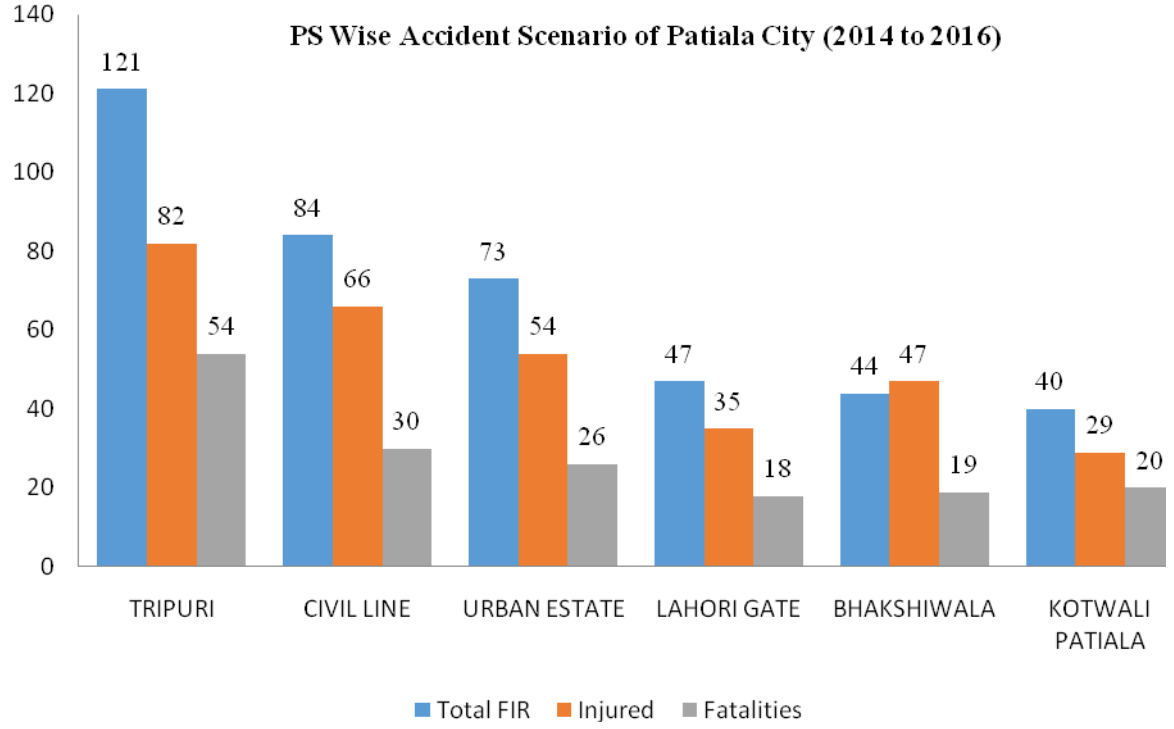
YEAR	TOTAL FIR	INJURED	FATALITIES
2014	139	114	55
2015	137	102	62
2016	133	97	50
Total	**409**	**313**	**167**

The following diagram shows that crashes and injuries are reducing from 2014 to 2016 but fatalities increase from 2015 and reduce in 2016 with respect to 2014.



It show that police station Tripuri area record more crashes, injuries and fatalities all of them, and police station kotwali patiala have least crashes and injuries but fatalities are little bit higher then Lahori gate and Bhakshiwaka Police station

POLICE STATION	TOTAL FIR	INJURED	FATALITIES
TRIPURI	121	82	54
CIVIL LINE	84	66	30
URBAN ESTATE	73	54	26
LAHORI GATE	47	35	18
BHAKSHIWALA	44	47	19
KOTWALI PATIALA	40	29	20
Total	**409**	**313**	**167**

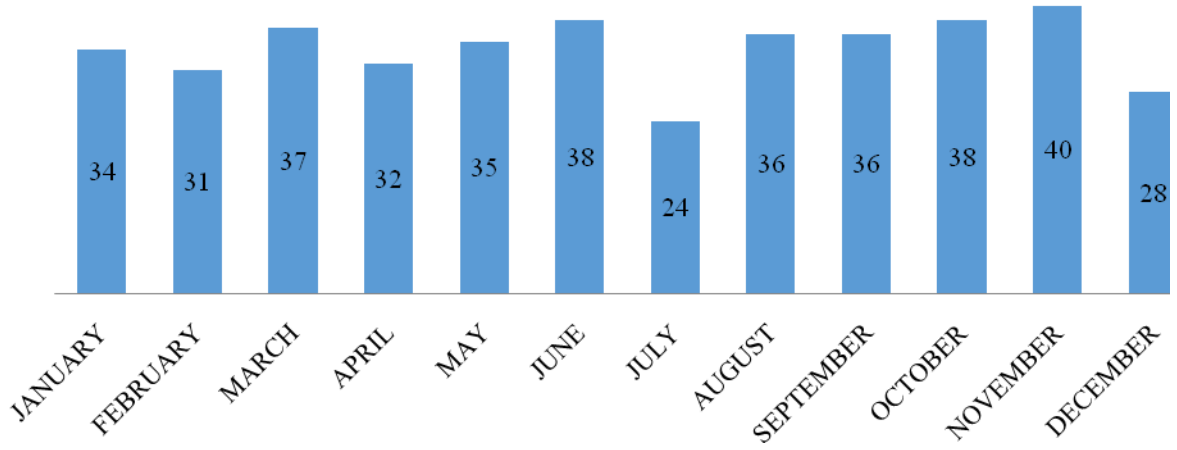


In the Patiala city mostly accident occur in the month of November which is 40 but least accident occur in month of july which is 24 according to the last three year FIR data (2014 to 2016)

YEAR	2014	2015	2016	ALL
MONTH	NO. OF ACCIDENT	NO. OF ACCIDENT	NO. OF ACCIDENT	TOTAL
JANUARY	12	15	7	34
FEBRUARY	9	10	12	31
MARCH	13	13	11	37
APRIL	11	6	15	32
MAY	11	9	15	35
JUNE	16	6	16	38
JULY	5	10	9	24
AUGUST	16	13	7	36
SEPTEMBER	8	17	11	36
OCTOBER	12	14	12	38
NOVEMBER	16	17	7	40

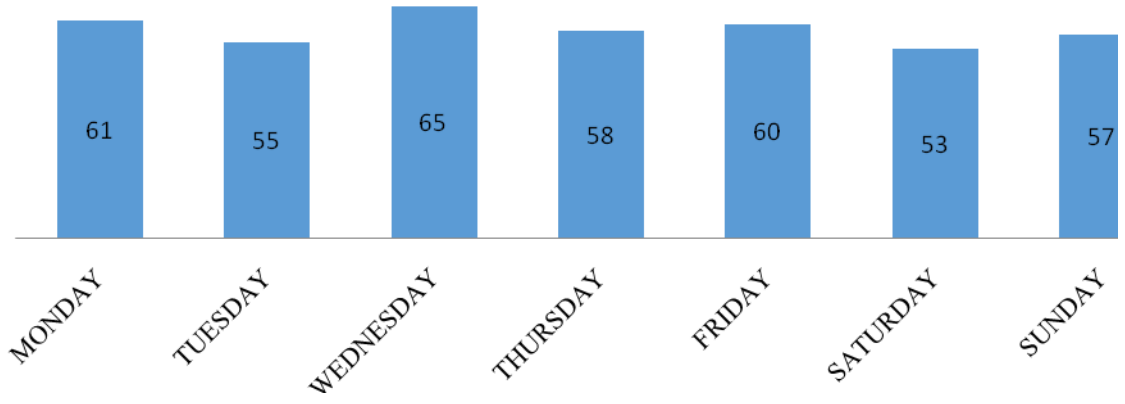
DECEMBER	10	7	11	28
Total	**139**	**137**	**133**	**409**

Month Wise Accident Variation of Patiala City (2014 to 2016)



According to last three year data (2014 to 2016) day wise variation has little different from one to other but 65 numbers of accident occur on Wednesday which is higher than all other days of the week.

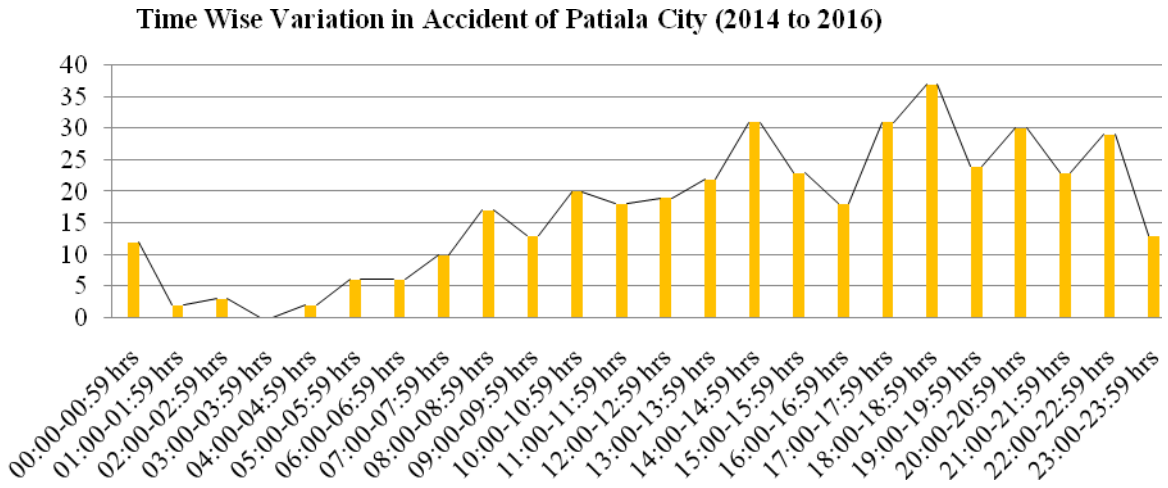
Day Wise Variation in Accident of Patiala City (2014 to 2016)



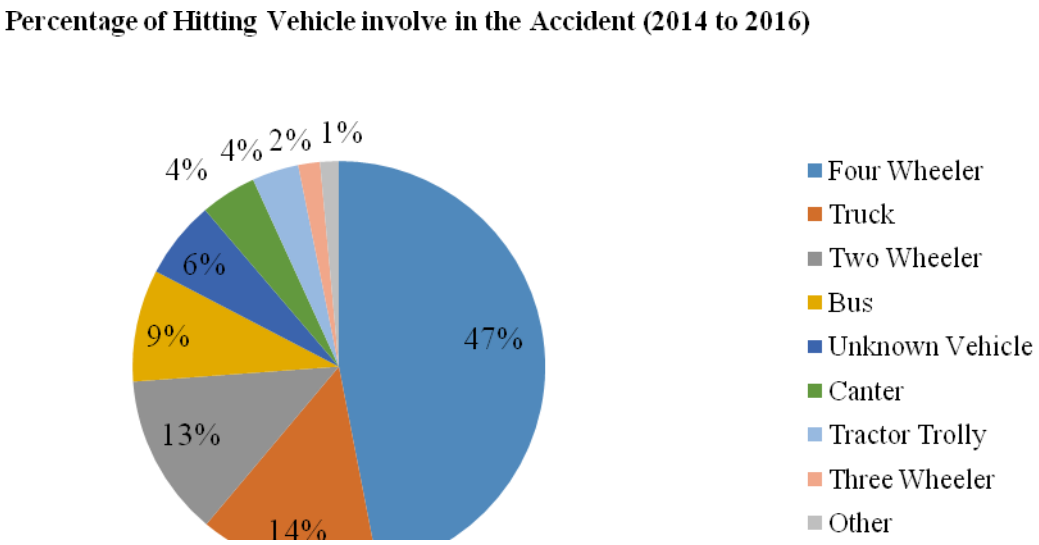
Variation of crashes in different hour of the day was analyzed, it show that most of the accident took place during 18:00 hrs-18:59 hrs and ZERO accident during 03:00 hrs-03:59 hrs in the Patiala city

TIME RANGE	NO. OF ACCIDENT
00:00-00:59 hrs	12

01:00-01:59 hrs	2
02:00-02:59 hrs	3
03:00-03:59 hrs	0
04:00-04:59 hrs	2
05:00-05:59 hrs	6
06:00-06:59 hrs	6
07:00-07:59 hrs	10
08:00-08:59 hrs	17
09:00-09:59 hrs	13
10:00-10:59 hrs	20
11:00-11:59 hrs	18
12:00-12:59 hrs	19
13:00-13:59 hrs	22
14:00-14:59 hrs	31
15:00-15:59 hrs	23
16:00-16:59 hrs	18
17:00-17:59 hrs	31
18:00-18:59 hrs	37
19:00-19:59 hrs	24
20:00-20:59 hrs	30
21:00-21:59 hrs	23
22:00-22:59 hrs	29
23:00-23:59 hrs	13
Total Accident	**409**



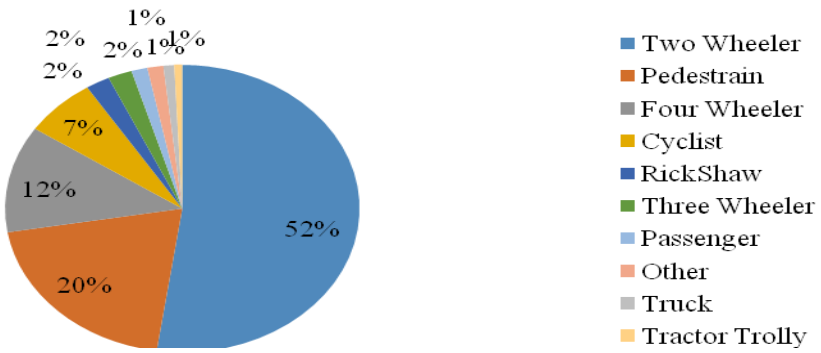
From the FIR data sheet the hitting vehicle wise data is being arranged and analyzed. The pie chart for hitting vehicle wise analysis is shown below. The Four Wheeler contributing 47%, Truck 14%, Two Wheeler 13%, Bus 9%, Unknown Vehicles 6%, Canter and Tractor Trolley 4% each, Three Wheeler 2% and other 1%.From the pie-chart, it is observed that four-wheelers are the most common cause of accident in the Patiala city and further due to heavy vehicles like Truck. The reason behind that may be due to speeding & rough driving or drunken driving.



From the FIR data sheet the hitting vehicle wise data is being arranged and analyzed. The pie chart for hitten vehicle wise analysis is shown below. Motorcycle (M/C) or Scooter or Scooty

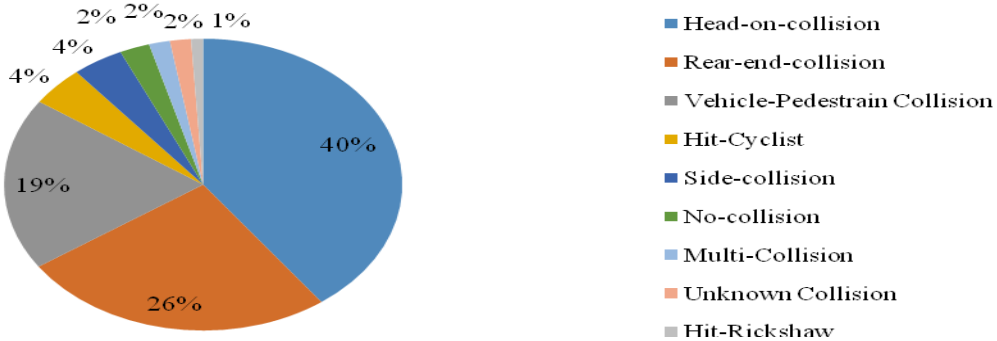
contributes 52% , the pedestrians contributes 20% and Car/Jeep contribute 12%. The cycle contributing 7%, Auto-Rickshaw, Rickshaw and passenger contributing 2% each, Truck, tractor trolly and other contribute 1% each. There is a loss to public property too.

Percentage of Hitten Vehicle involve in the Accident (2014 to 2016)



From the FIR data sheet the cause wise analysis data is being arranged and analyzed. The pie chart for cause wise/type of collision wise analysis is shown below. From the chart it was Observed that the highest accidents are due to Head-on-collision i.e. 40% , Rear-end-collision which is 26% and Vehicle-Pedestrian collision contribute 19%. Side-Collision and hit cyclist contribute 4% each. No- collision and Multi-Collision contribute 2% each.

Type of Collision involve in accident



VII CONCLUSIONS

On the analysis of above data certain trends were observed and the following conclusions can be drawn from the same:

1. The maximum number of accidents observed during the months of November, October, June and March. The reason for the same can be over speeding, fog and smog conditions.
2. As per the time of the day, maximum accidents took place during 18:00 hrs-18:59 hrs and ZERO accident during 03:00 hrs-03:59 hrs in the Patiala city

3. As per data recorded, the type of hitting vehicle concludes that car/jeep and trucks cause maximum number of accidents. This is because of the heavy volume of traffic in the city. Heavy vehicles are also difficult to maneuver and stop because many times they are overloaded.

4. As per data recorded, the type of vehicle hitten concludes that two-wheelers and pedestrians cause maximum number of accidents. This is because of people mostly prefers light motor vehicles for travel from one place to another. There is also a lack of awareness among the people regarding the traffic safety rules & regulations.

5. On the analysis of primary causes of accidents/type of collision, we find that head-on Collision, Rear-end collision and vehicle-pedestrian collision are the main causes of accidents. Because in the Patiala city many intersections are just after the end of the flyover, so that it responsible for Rear-end collision and also lack of traffic signs.

6. Safety for pedestrians is not provided. This is also one of the major causes of accidents.

7. Improper road design and lack of proper road signs at t-junctions and sharp curves also causes accidents.

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