

# WHO PROJECT ON FEASIBILITY STUDY FOR INJURY SURVEILLANCE BY JIPMER

STICKER NO.  
SE/07/119686

PRINCIPLE INVESTIGATOR :  
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STUDY SITE  
JIPMER Hospital, Pondicherry, INDIA

OBJECTIVE :  
To study the feasibility of injury surveillance and to identify a model for sustained data collection, analysis and reporting.

## METHODOLOGY

### 1) Point of data collection

The data required for completing the designed proforma was primarily sourced from the medicolegal records maintained in the hospital. These are mandatorily filled for all accident and medicolegal cases in the Emergency Department of the Hospital. In addition information was also sourced from records of the Medical Records Division regarding patient status ( In-Patient or Out-Patient)

### 2) Who collected the data

Data Entry operators ( two personnel ) under the supervision of a member of the faculty of surgery entered the data into a database modeled on the proforma.

### 3) Current status of medical record keeping

There is an ongoing programme of computerizing medical records. However due to a large backlog of records to be computerized, this is not yet up to date. The medicolegal records are stored in a separate section of the MRD in paper format. These records are promptly computerized . However the information entered is at best sketchy.

### 4) ICD coding

ICD coding of records is done along with their computerizing. The last three years of cases are yet to be coded.

### 5) Time taken for retrieval

The idea to source information from medicolegal records was to enable quick retrieval of records. These records are stored separately in the MRD and retrieving them only required a mechanism to be evolved between the MRD and the Project Office to maintain a continuous supply of records to be entered into the database

### 6) Usefulness of the format

The format was finalized after discussions among the experts involved. The format was largely relevant

7) Information in the case sheet appropriate for the format

This being a retrospective study, there was a shortage of a large amount of data pertaining to the exact details of an accident / incident. To mention a few, use of helmets, seat belts, number of referrals, objects used for assault, types of vehicles involved and so on.

8) Time for filling the format

The initial period of entry where the information in the Medico Legal Records were transferred into the database took three and a half months. It took us an additional month to acquire additional information from the MRD and enter the same. This period was simultaneously utilized for data analysis.

9) Data entry process

We employed two graduates for data entry. They were trained over a period of 1 week to understand the proforma and the source (medical records). In addition one faculty from the department was constantly available and supervising their work. The error rate during the entry period was around 5%. Corrections were made on a day to day basis.

We felt that entry could have been faster and more reliable if

- i) Medical personnel (Doctors / Nurses) were involved in the entry process.
- ii) Database design could be more sophisticated and disallow logical inconsistencies to creep in.

10) Time for data entry

Four and a half months, including the time taken for analysis.

11) Staff requirement for various steps

1. Data Entry Operators :
  - a. Mr S Mourthy
  - b. Mr R. Ravichander
2. Design, validation and analysis of Database
  - a. Dr Nanda Kishore M., Asst Prof in Surgery, JIPMER

12) Hospital

JIPMER, Pondicherry

13) Period of Data Collection : January 2005 to December 2006

14) Number of injury records identified : 8612

15) Number of records coded onto proforma : 8612

## TYPE OF INJURY

All injuries were broadly divided into two groups. The first was injuries sustained in a road traffic accident while all other injuries were clubbed together into the second group. Overall RTA contributed to 31% of all injuries.

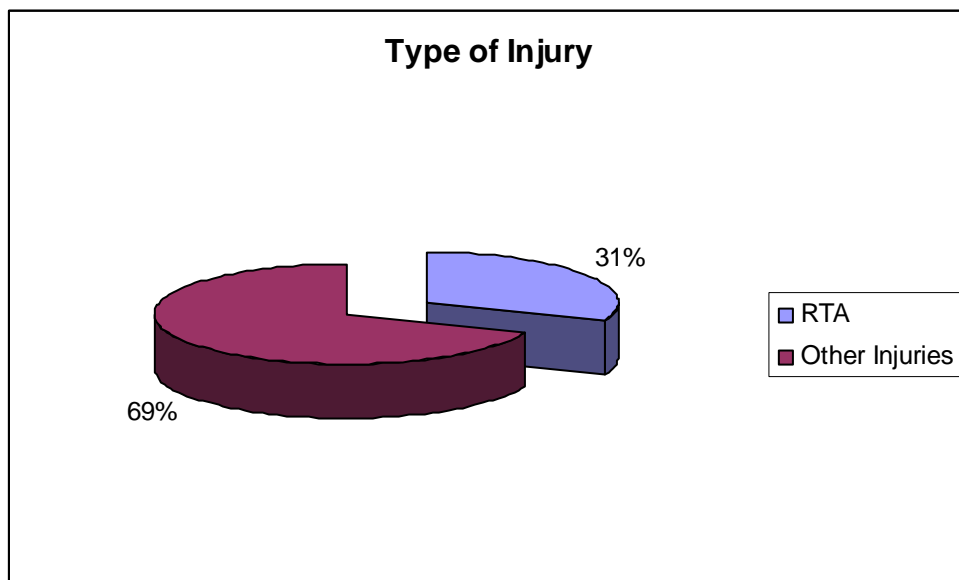
### Type of Injury

**RTA**

**2640**

**Other Injuries**

**5958**

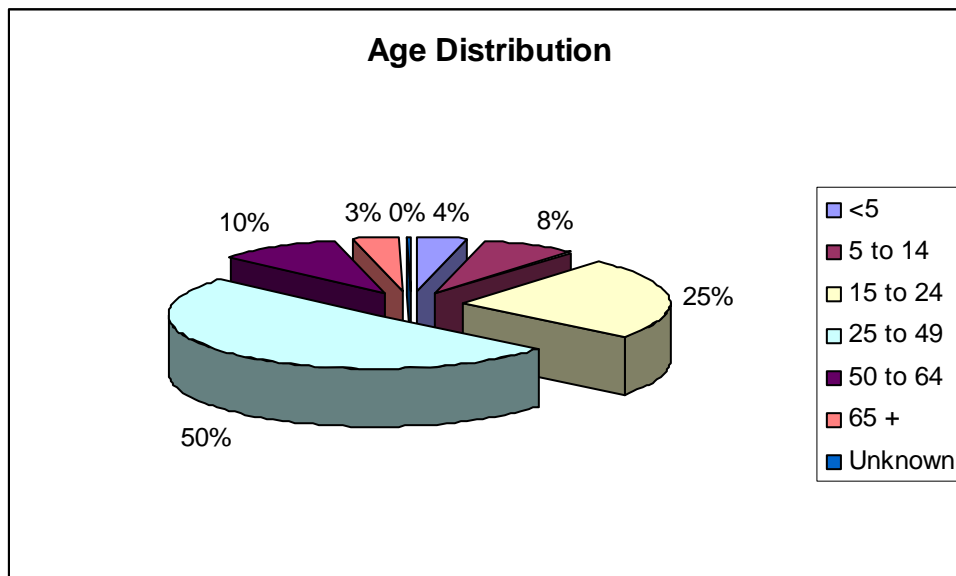


## DISTRIBUTION OF ALL INJURIES BY AGE GROUP

The maximum incidence was seen in the age group 25 – 49 yrs which accounted for about half of all injuries. This was followed by 15-24 age group accounting for one fourth of all injuries.

**Table 1. Distribution of injuries by age group**

Frequency Distribution		
Age Group ( Yrs)	N	%
<5	332	4
5 - 14	646	8
15 - 24	2110	25
25 - 49	4377	50
50 - 64	824	10
65 +	294	3
Unknown	29	
Data Available [8568 / 8612]		99.4

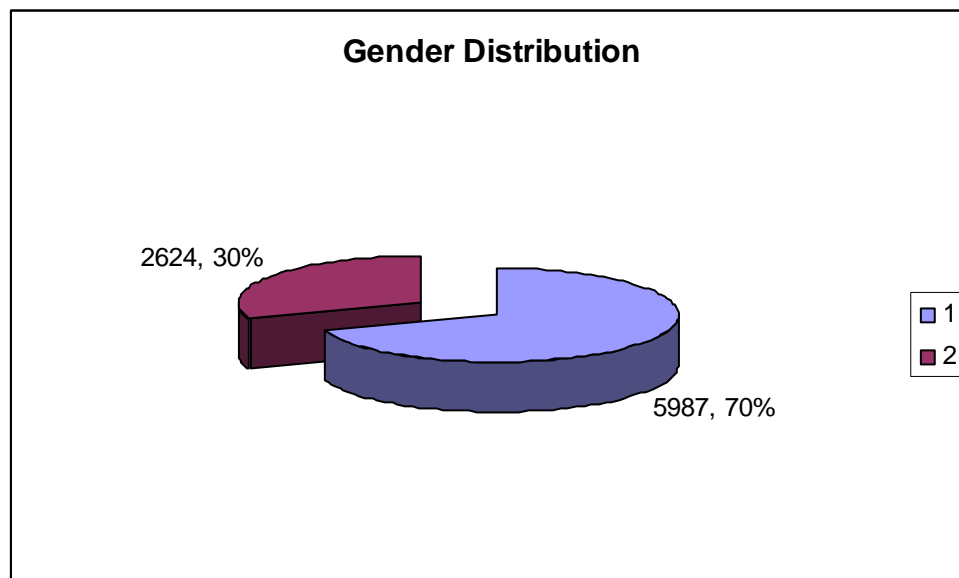


## DISTRIBUTION OF ALL INJURIES BY GENDER GROUP

The incidence of injuries in men was more than twice that seen in women. On analyzing the type of injuries, men were found to be four times more likely than women to sustain an RTA

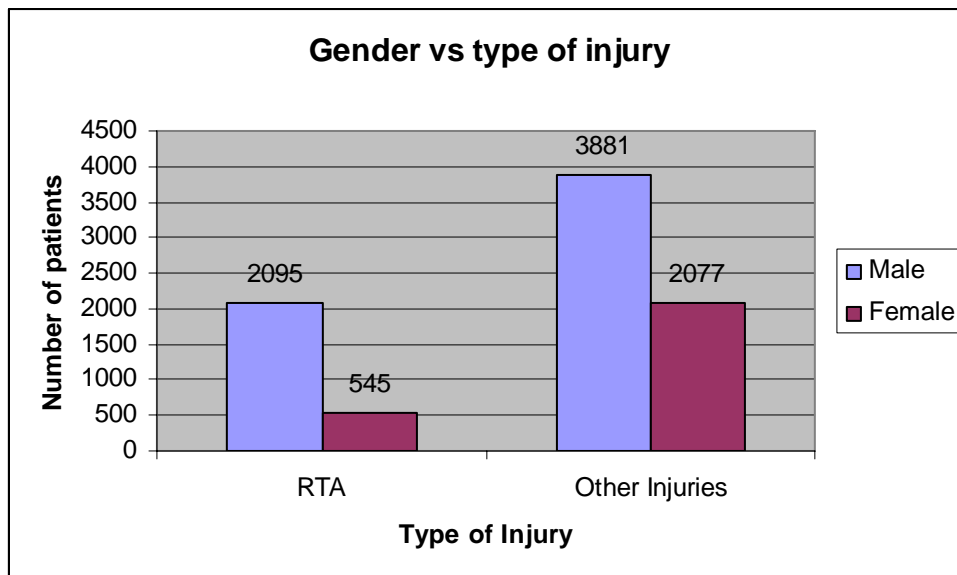
**Table2 : Gender Distribution**

Gender	n	%
Male	5987	70
Female	2624	30
% Data Available (8611/8612)	%	99.9

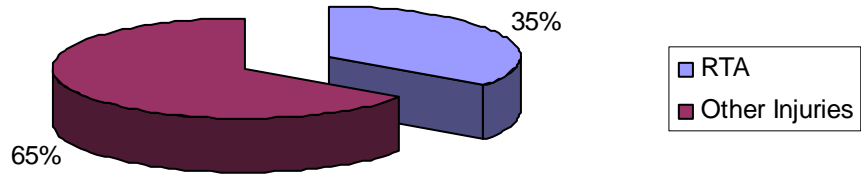


**Table 3 Gender by type of Injury**

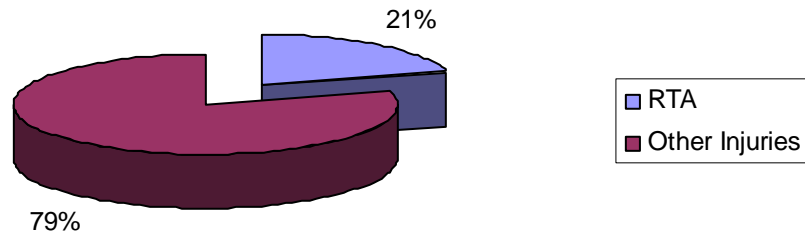
	RTA		Other Injuries	
	n	%	N	%
<b>Male</b>	2095	<b>35</b>	3881	<b>65</b>
<b>Female</b>	545	<b>21</b>	2077	<b>79</b>
<b>Total</b>	2640	<b>31</b>	5958	<b>69</b>



**Distribution of type of Injury-Males**

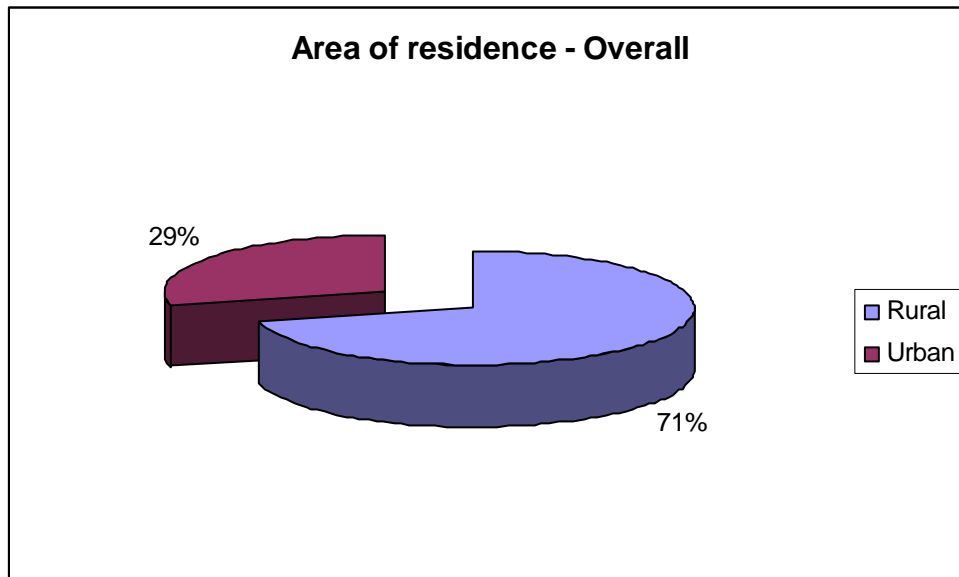


**Distribution of type of Injury-Females**



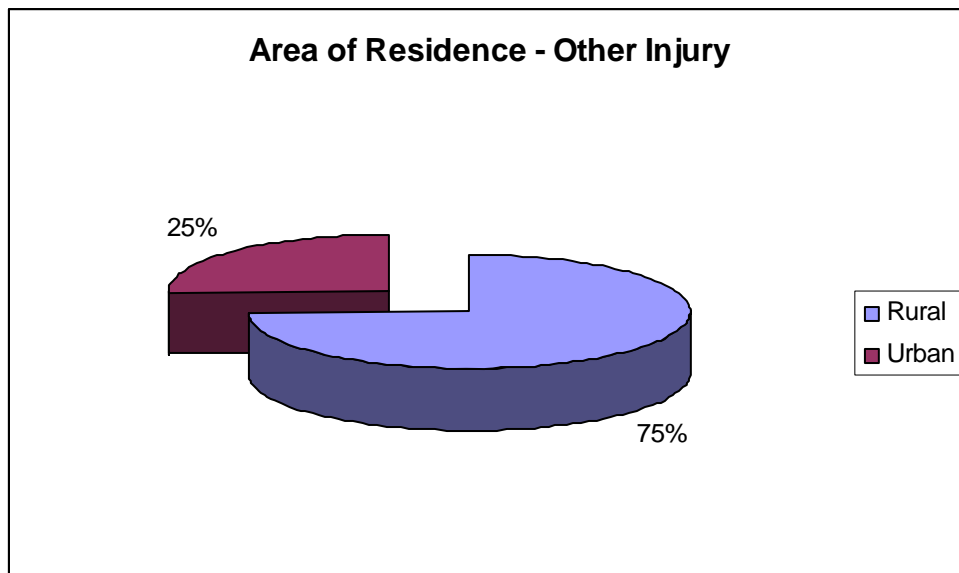
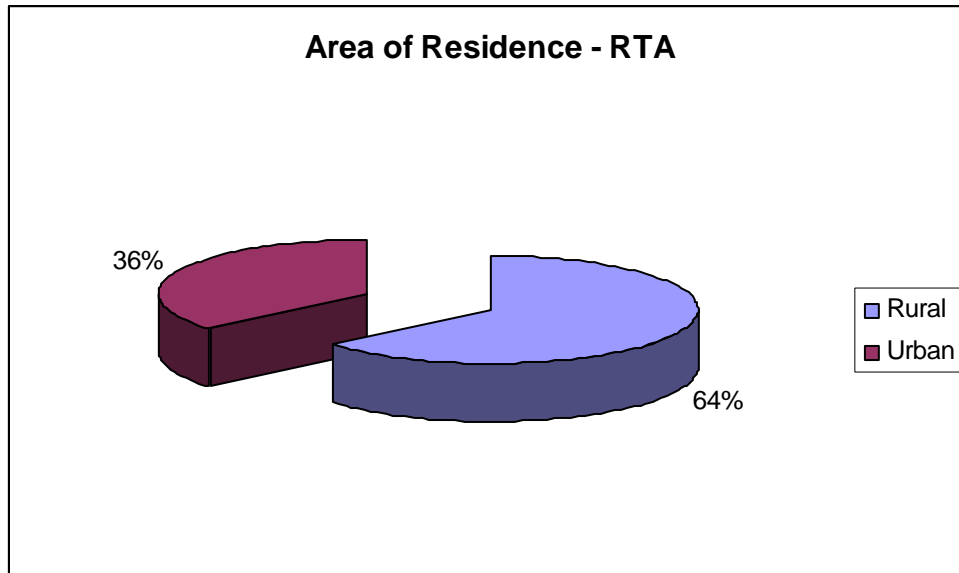
## AREA OF RESIDENCE

More than 70% of injuries seen at JIPMER were from rural areas. Injuries in Urban areas were less than one third. Injuries from the urban setting were more likely to be RTA than those from the rural setting.



**Table4 : Rural Vs Urban**

	RTA		Other Injury	
	N	%	N	%
<b>Rural</b>	1672	<b>27</b>	4452	<b>73</b>
<b>Urban</b>	957	<b>39</b>	1499	<b>61</b>

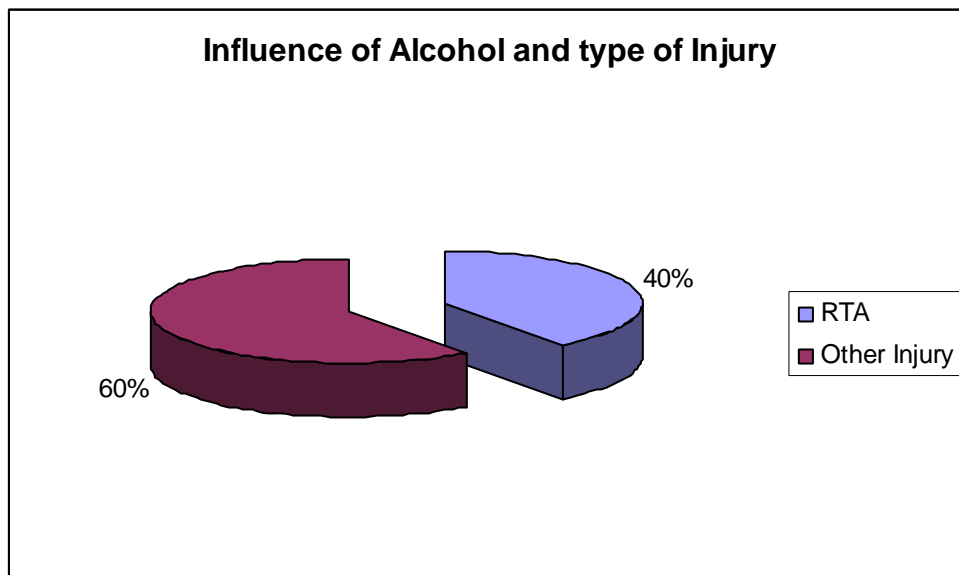


## USE OF ALCOHOL

Explicit mention of the use of alcohol was found only in 396 records. With the information available, we compare the type of injury in those who were recorded as being under the influence of alcohol

**Table5 : Use of Alcohol**

Code	Description	N (%)
1	No information available	8216 (95.4%)
2	Not suspected or no evidence	8 (0.09%)
3	Suspected or evidence	388 (4.5%)

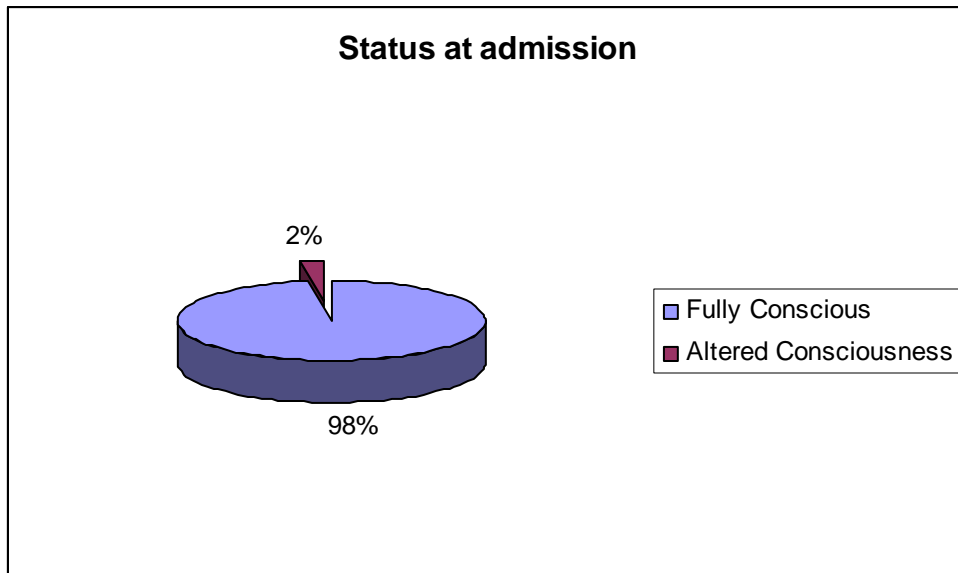


**STATUS OF INJURED AT ADMISSION**

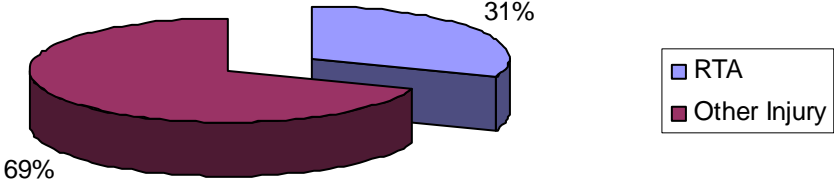
98% of the injured were conscious at admission. Analysing type of injury by conscious status was done only in the patients who were brought conscious as the numbers in the other groups were too small. Patients involved in RTA comprised 31% of the conscious patients. The proportion of patients involved in an RTA who were conscious (98.5%) was not very different from that of patients with other injuries (97.5%)

**Table 6. Status of Injured at admission**

<b>Status of Consciousness at admission</b>	<b>RTA</b>	<b>Other Injury</b>	<b>Total</b>
<b>Unconscious</b>	23	110	133
<b>Responds to stimuli</b>	1	7	8
<b>Conscious</b>	2573	5681	8254
<b>Brought Dead</b>	6	24	30
<b>Others -Drowsy</b>	7	30	37
<b>Totals</b>	2610	5852	8462



**Conscious Patients**



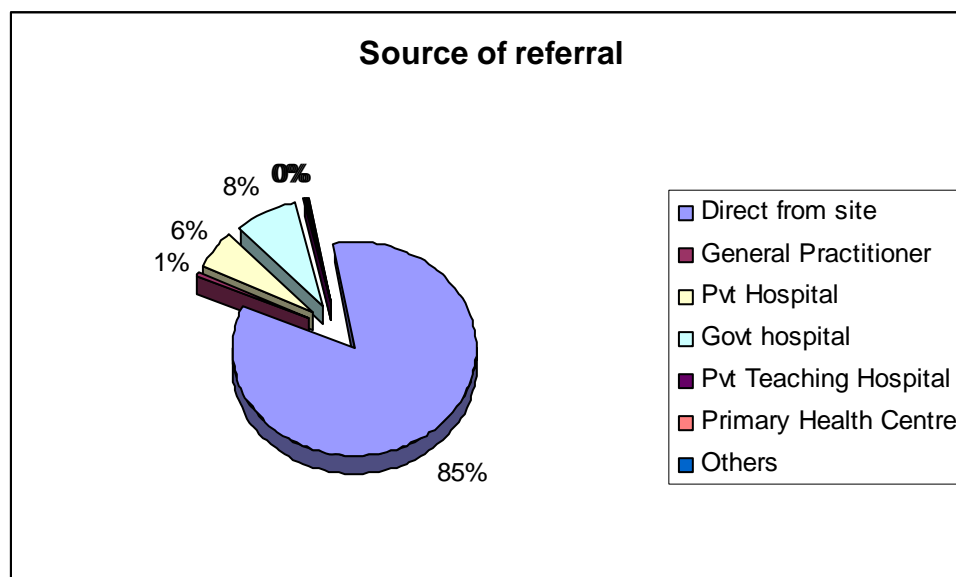
## SOURCE OF REFERRAL

85% of patients with injuries were brought directly from the site. Of the remaining, government hospitals (8%) and private hospitals (6%) accounted for the majority of the referrals.

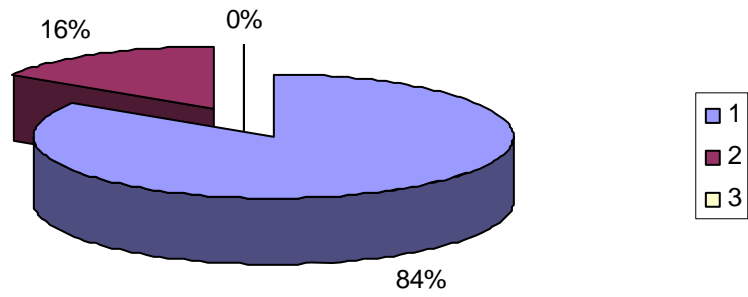
16% of injured patients visited atleast one more centre before reaching JIPMER Hospital

**Table7. Source of referral**

Source of referral	Code	Number
Direct from site	1	7151
General Practitioner	2	73
Pvt Hospital	3	488
Govt hospital	4	711
Pvt Teaching Hospital	5	10
Primary Health Centre	6	38
Others	7	17
<b>Total Available</b>		<b>8488</b>



### No of Health care visits



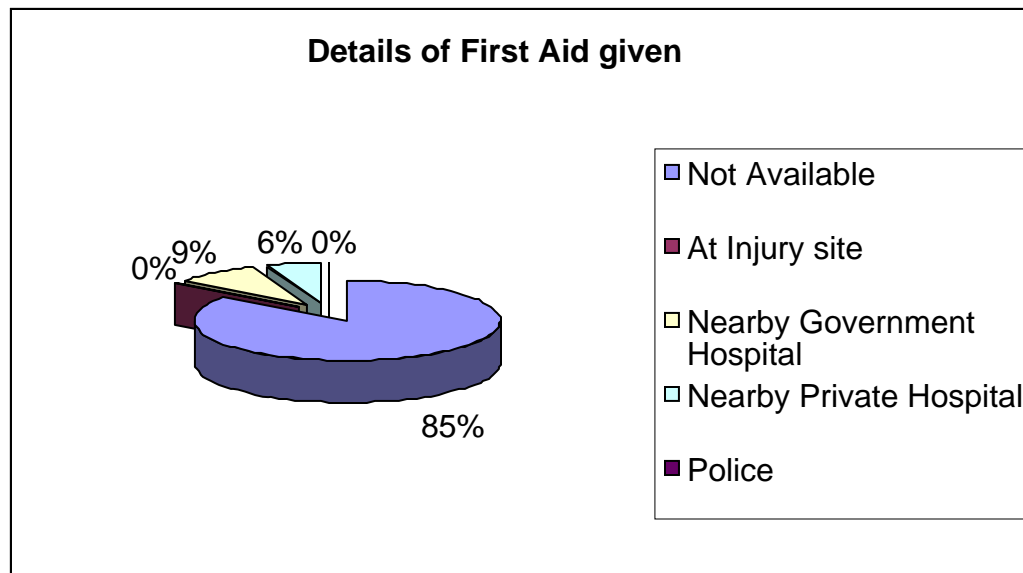
## FIRST AID

Most of the records entered (85%) did not have any mention of the first aid received by the patient. Where entered, government hospital (9%) and private hospitals (6%) were cited as the points of first care.

Patient from rural areas were more likely to receive / seek care at other centres before reaching the point of final care.

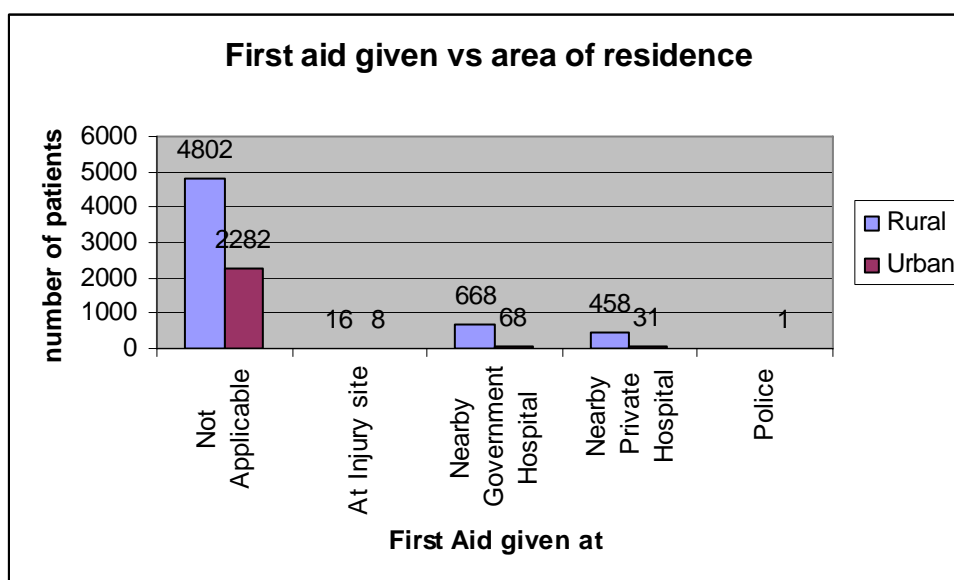
**Table 8 Details of First Aid Given.**

Details of first aid given	Code	n	%
No Information Recorded	1	7094	85
At Injury site	2	24	
Nearby Government Hospital	3	741	9
Nearby Private Hospital	4	489	6
Police	5	1	
Total Data Available (8349/8612)		8349	96.9%



**Table 8. First Aid by area of residence**

Details of First Aid given	Rural		Urban	
	N	%	N	%
No Information Recorded	4802	81	2282	96
At Injury site	16		8	
Nearby Government Hospital	668	11	68	3
Nearby Private Hospital	458	7	31	1
Police			1	
	5944		2389	



## RTA – PLACE OF OCCURRENCE

Highways and City roads accounted for the bulk of road traffic accidents.

Age by place of occurrence tables show which age group is more susceptible to injury at a given place.

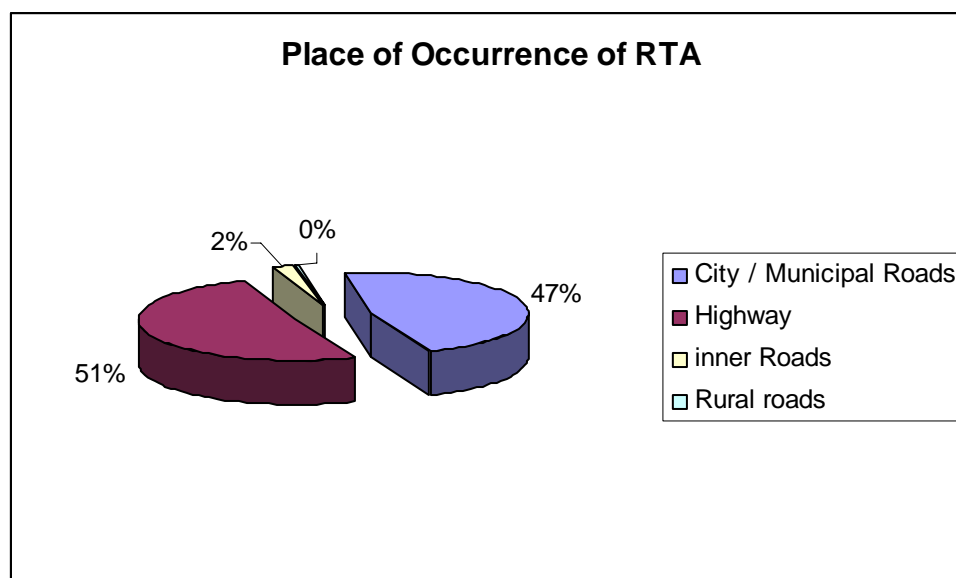
Children under the age of 5 yrs were more likely to get injured on city roads. This was similar in the 5-14 age group too.

The incidence of Highway injuries is maximum in the 15 – 50 age group and accounts for more than half of all injuries sustained in these age groups.

The incidence of injuries was not very different among the genders as far as the place of occurrence was concerned.

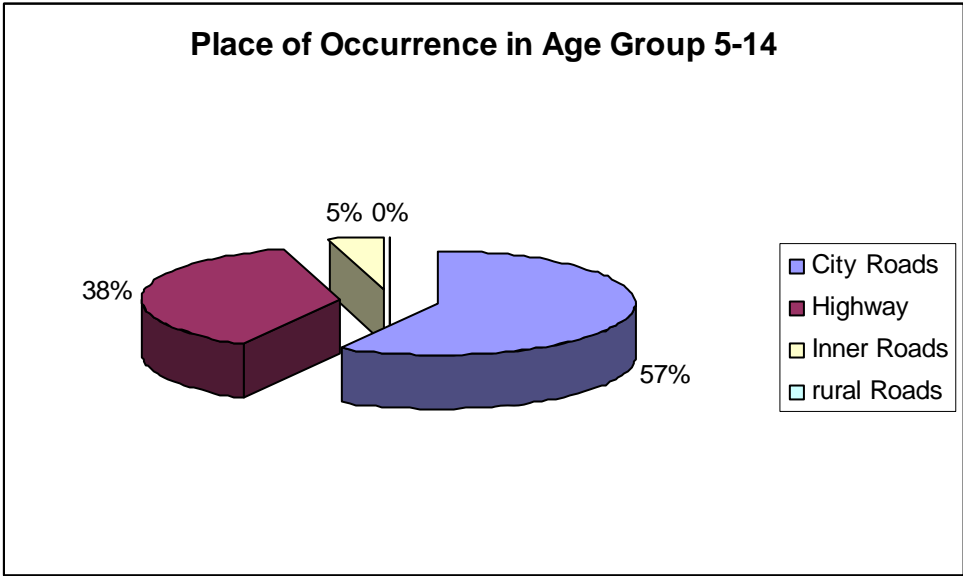
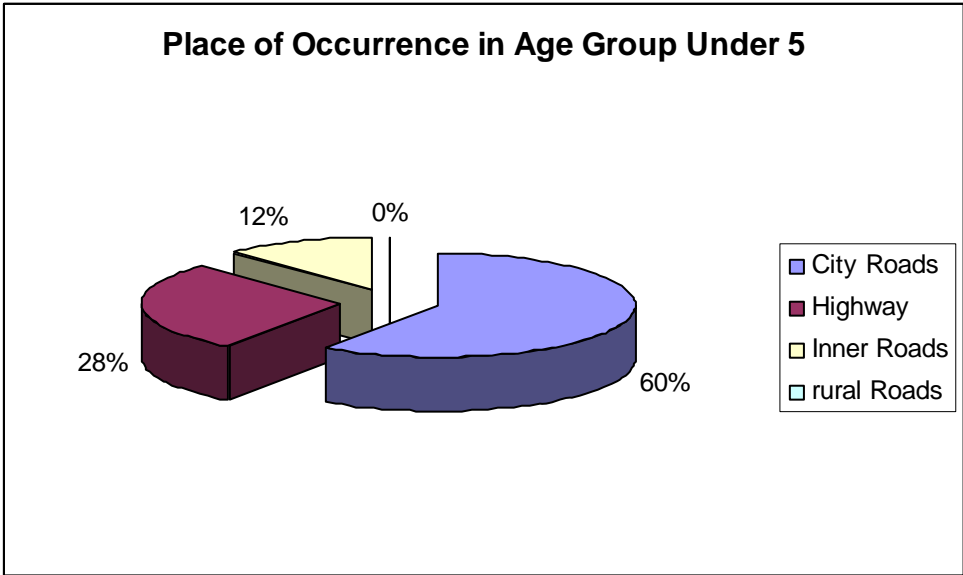
**Table 9. Place of Occurrence of RTA**

Place of Occurrence	Code	Number of Patients	%
City / Municipal Roads	1	1171	47
Highway	2	1278	51
Inner Roads	3	57	2
Rural roads	4	8	0
Others	5		
<b>Total Available ( of 2640 RTA records)</b>		2514	

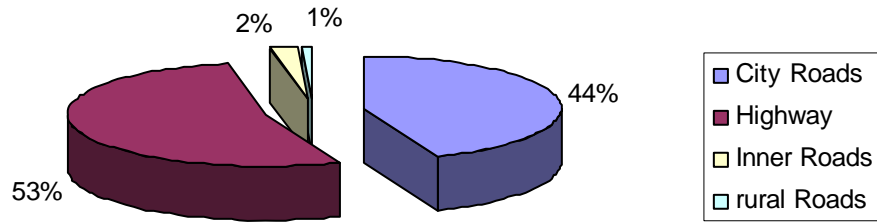


**Table 10. Place of Occurrence by Age group**

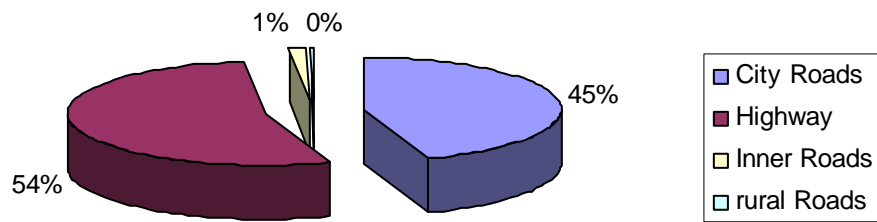
Age Group	City Roads		Highway		Inner Roads		rural Roads	
	n	%	n	%	n	%	n	%
Under 5	44	<b>60</b>	21	<b>28</b>	9	<b>12</b>		
5-14	102	<b>57</b>	66	<b>38</b>	8	<b>5</b>		
15-24	226	<b>44</b>	274	<b>53</b>	12	<b>2</b>	4	
25-49	607	<b>45</b>	730	<b>54</b>	20	<b>1</b>	3	
50-64	140	<b>48</b>	142	<b>50</b>	7	<b>2</b>	1	
65+	48	<b>54</b>	40	<b>45</b>	1	<b>1</b>		



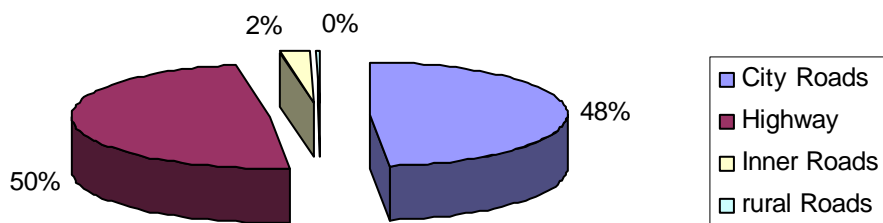
### Place of Occurrence in Age Group 15-24

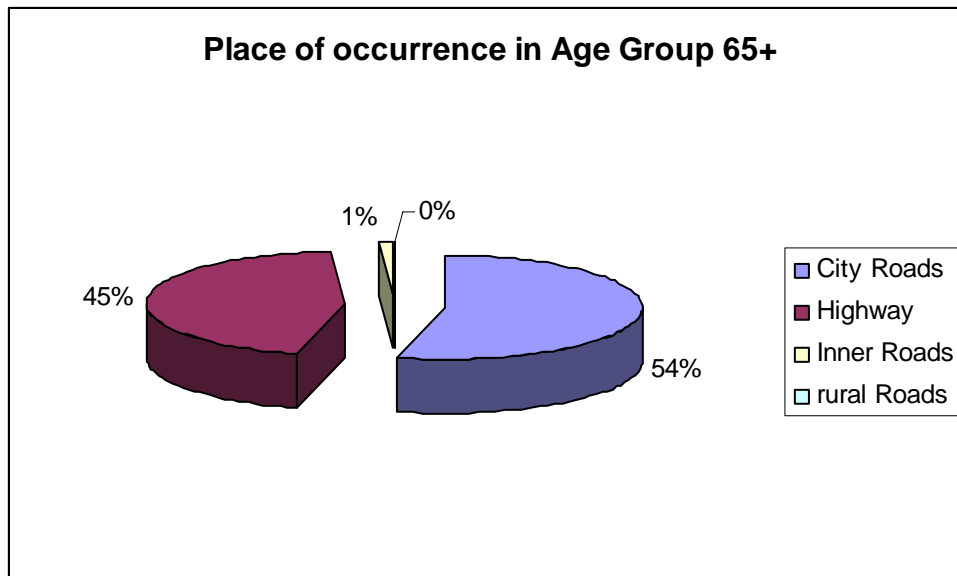


### Place of Occurrence in Age Group 25-49



### Place of Occurrence in Age Group 50-64





**Table 11. Place of Occurrence by Gender**

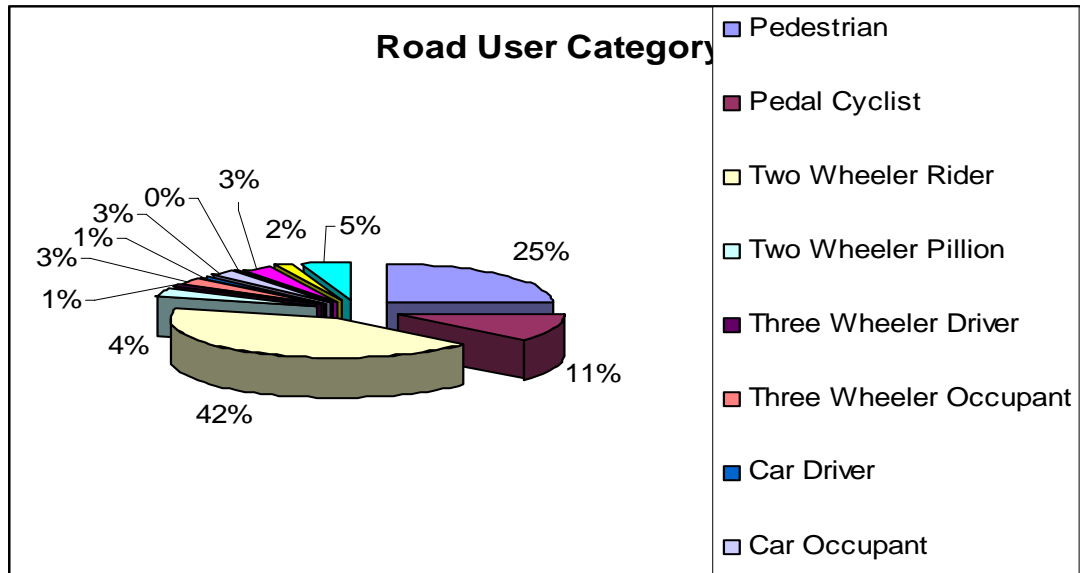
	City Roads		Highway		Inner Roads		Rural Roads	
	n	%	n	%	n	%	n	%
<b>Male</b>	934	<b>47</b>	1026	<b>51</b>	37	<b>2</b>	7	
<b>Female</b>	237	<b>46</b>	252	<b>50</b>	20	<b>4</b>	1	

## ROAD USER CATEGORY

Two wheeler riders, pedestrians and pedal cyclists were more likely than anyone else to get injured in an RTA. It has to be noted that the profile of the injured in the data collected is more rural than urban. This could explain the paucity of heavy vehicle RTAs in this data.

**Table 12. Road User Category**

Road User Category	Number	%
Pedestrian	625	25
Pedal Cyclist	276	11
Two Wheeler Rider	1081	42
Two Wheeler Pillion	88	4
Three Wheeler Driver	29	1
Three Wheeler Occupant	64	3
Car Driver	27	1
Car Occupant	63	3
Bus / Truck Driver	10	0
Bus / Truck Occupant	75	3
Other 4 Wheeler Driver	49	2
Other 4 Wheeler Occupant	115	5



## TYPE OF COLLISION

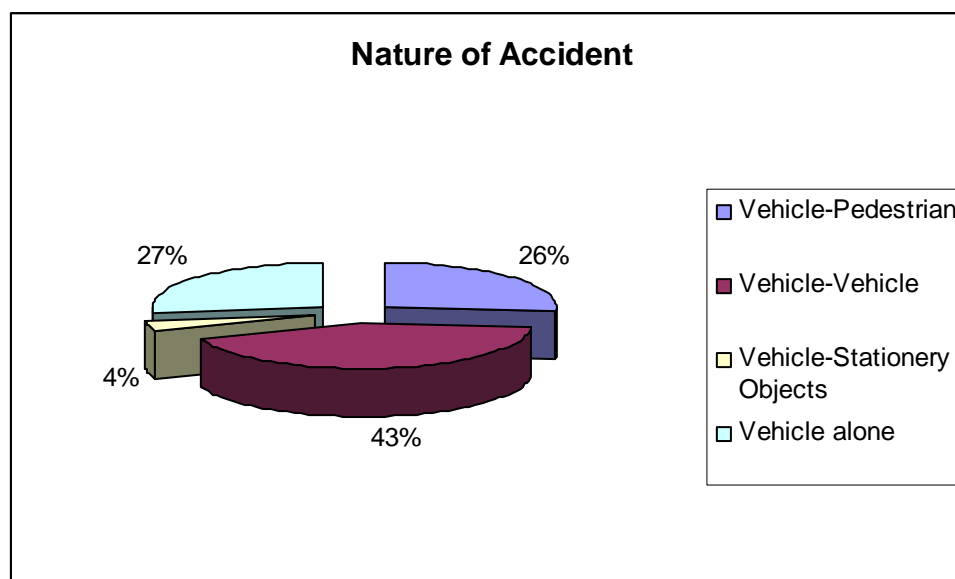
Vehicle- Vehicle collisions were nearly half of all RTA s recorded. The remaining were shared mostly among vehicle-pedestrian or vehicle alone groups

Most of these collisions were on highways and city roads. Vehicle – Stationary object collisions were far more commoner on highways than any other place.

Two-wheelers accounted for the majority of collisions

**Table 13. Type of Collision**

Nature of Accident	Number	%
Vehicle-Pedestrian	662	26
Vehicle-Vehicle	1070	43
Vehicle-Stationery Objects	102	4
Vehicle alone	666	27
Data Available (2500/ 2640)		94.7



**Table 14. Type of Collision by Place of Occurrence**

Type of Collision	City Roads		Highway		Inner Roads		Rural Roads	
	n	%	n	%	n	%	n	%
Vehicle-Pedestrian	371	56	262	40	25	4	3	0
Vehicle-Vehicle	427	40	629	59	12	1		
Vehicle-Stationary Objects	19	19	79	78	3	3		
Vehicle alone	345	52	299	45	16	2	4	

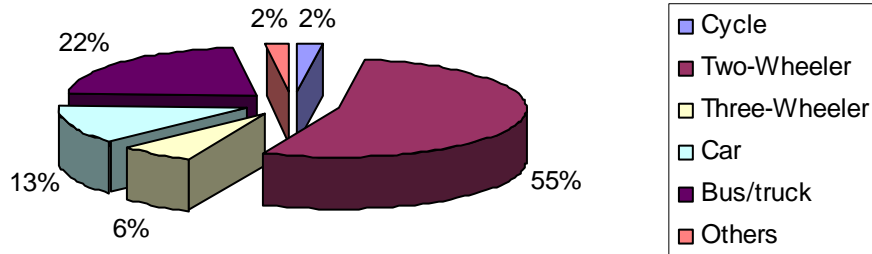
**Table 15. Other vehicle / Vehicle involved in Different types of Collisions**

<b>Vehicle-Pedestrian Collision</b>	<b>n</b>	<b>%</b>
<b>Cycle</b>	13	<b>2</b>
<b>Two-Wheeler</b>	332	<b>55</b>
<b>Three-Wheeler</b>	38	<b>6</b>
<b>Car</b>	80	<b>13</b>
<b>Bus/truck</b>	133	<b>22</b>
<b>Others</b>	12	<b>2</b>

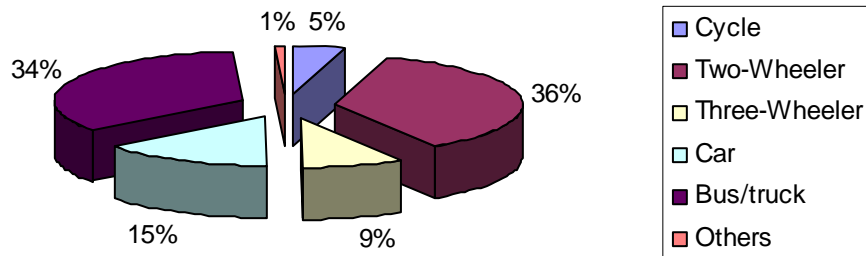
**Table 16. Other vehicle / Vehicle involved in Different types of Collisions**

<b>Other Vehicle involved in Vehicle-Vehicle Collision</b>	<b>n</b>	<b>%</b>
<b>Cycle</b>	47	<b>5</b>
<b>Two-Wheeler</b>	380	<b>36</b>
<b>Three-Wheeler</b>	89	<b>9</b>
<b>Car</b>	157	<b>15</b>
<b>Bus/truck</b>	357	<b>34</b>
<b>Others</b>	10	<b>1</b>

Vehicle in Vehicle - Pedestrian Collision



Vehicle involved in Vehicle - Vehicle Collision



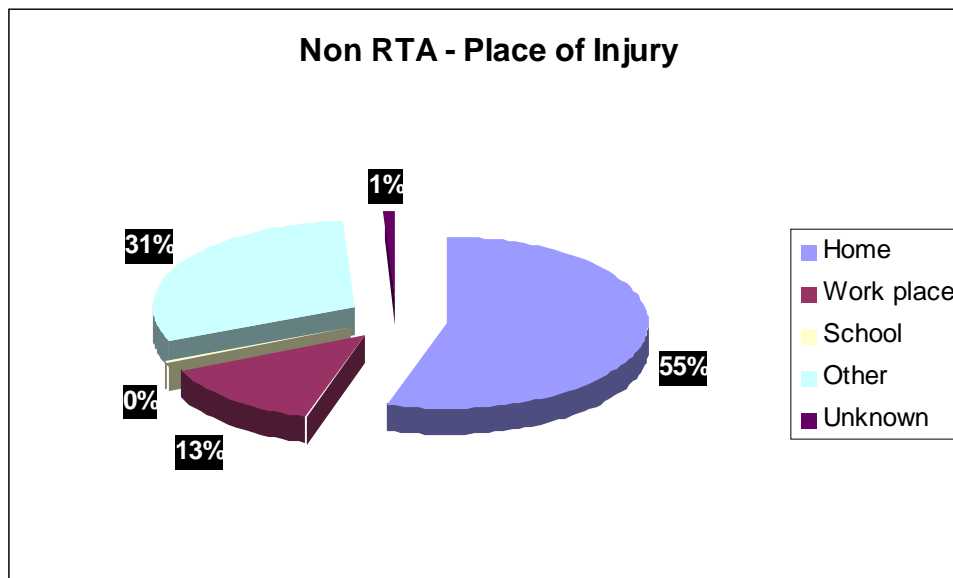
## NON RTA INJURY

### Place of Injury

Non RTA injuries were more likely to occur in and around the place of residence of the injured. No useful information could be obtained from the activity at the time of injury

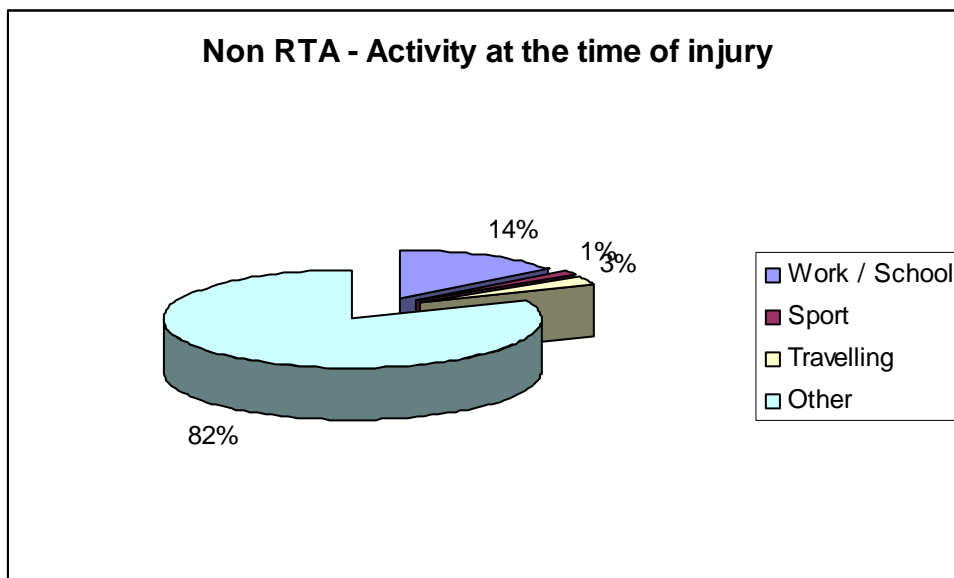
**Table 17 Other Injury – Place of Injury**

Place of Injury	n	%
Home	3267	<b>55</b>
Work place	796	<b>13</b>
School	23	<b>0</b>
Other	1829	<b>31</b>
Unknown	43	<b>1</b>



**Table 18 Activity at the time of injury**

Activity at the time of injury	code	n	%
Work / School	1	849	<b>14</b>
Sport	2	86	<b>1</b>
Travelling	3	173	<b>3</b>
Other	4	4813	<b>82</b>



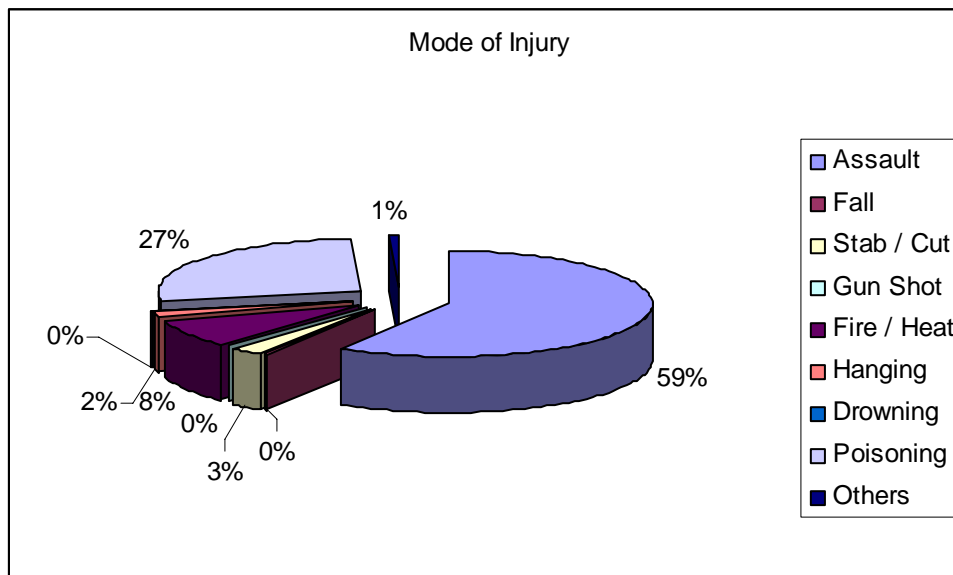
## NON RTA - MODE OF INJURY

Assault and poisoning were the most common modes of getting injuries in the Non RTA group.

1% of these injuries marked 'others' were women hospitalized following an attempted illegal abortion.

**Table 19 Mode of Injury**

Mode of Injury	n	%
Assault	3455	59
Fall	8	
Stab / Cut	168	3
Gun Shot	1	
Fire / Heat	487	8
Hanging	90	2
Drowning	17	
Poisoning	1578	27
Others	53	1



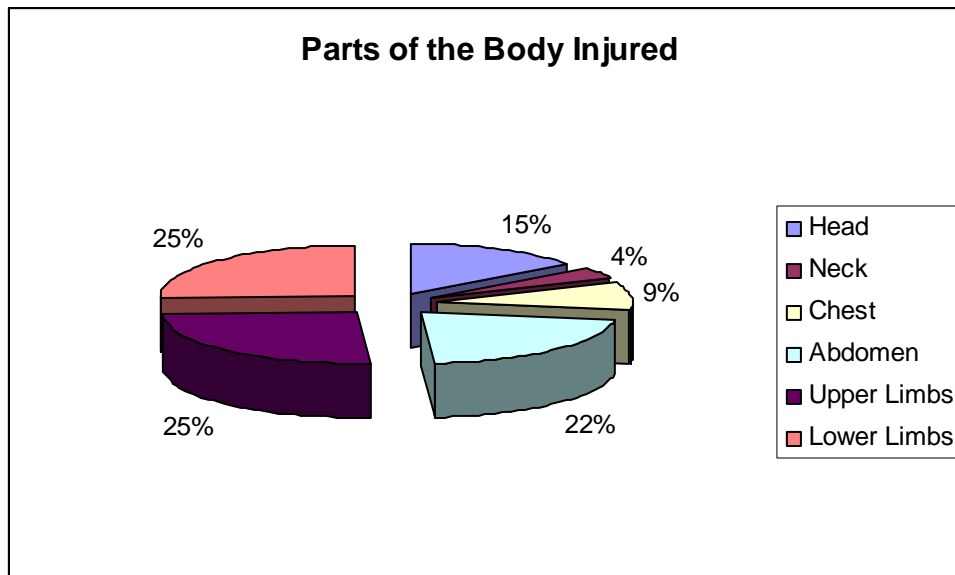
## **PART OF THE BODY INJURED**

Limbs and abdomen accounted for about three fourths of all injuries. This was followed by head injuries.

Abdomen was the most likely injured area in isolated injuries and accounted for about 70% of all isolated injuries

**Table 20. Part of the Body Injured**

<b>Parts of the Body Injured</b>	<b>n</b>	<b>%</b>
<b>Head</b>	1856	15
<b>Neck</b>	471	4
<b>Chest</b>	1117	9
<b>Abdomen</b>	2712	22
<b>Upper Limbs</b>	3221	25
<b>Lower Limbs</b>	3183	25



**Table 21. Isolated Injuries**

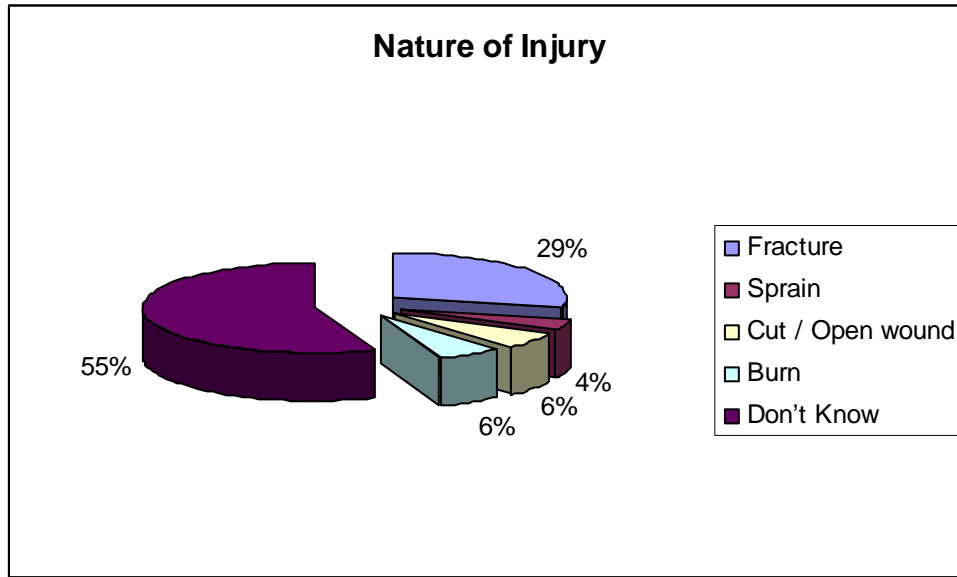
<b>Part of the Body</b>	<b>n</b>	<b>%</b>
<b>Isolated Head Injuries</b>	585	22
<b>Isolated Neck Injuries</b>	112	4
<b>Isolated Chest Injuries</b>	116	4
<b>Isolated Abdominal Injuries</b>	1796	70

## NATURE OF INJURY

Where clearly recorded, fractures were the most common group of injuries.

**Table 22. Nature of Injury**

Nature of Injury	n	%
Fracture	2460	29
Sprain	336	4
Cut / Open wound	498	6
Burn	529	6
Don't Know	4789	55

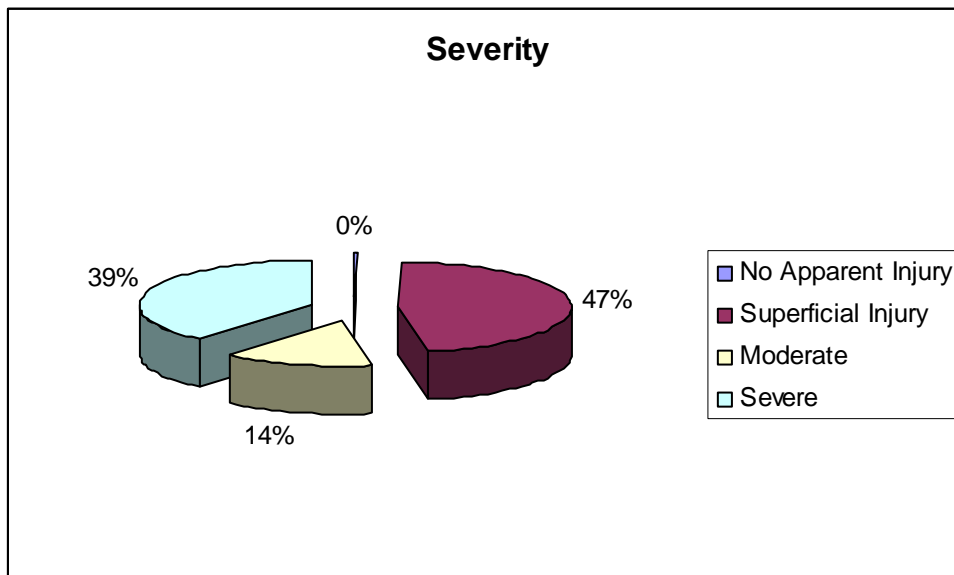


## SEVERITY OF INJURY

About half of all injured patients had non severe injuries

**Table 23. Severity**

Severity of Injury	N	%
No Apparent Injury	27	
Superficial Injury	4002	47
Moderate	1209	14
Severe	3284	39



## **OUTCOMES**

4% of all injured patients died. One fourth of all injured patients needed to be admitted for observation / surgery/ or other treatments.

**Table 24 Outcomes**

<b>Outcomes</b>	<b>N</b>	<b>%</b>
<b>Treated as Out Patient</b>	5792	68
<b>Admitted &amp; Discharged</b>	1975	23
<b>Died</b>	624	7
<b>Don't Know</b>	221	3

**SEVERITY BY OCCUPATION**

Among the different groups of occupations, unskilled laborers were the most likely injured population and also were more likely to be severely injured.

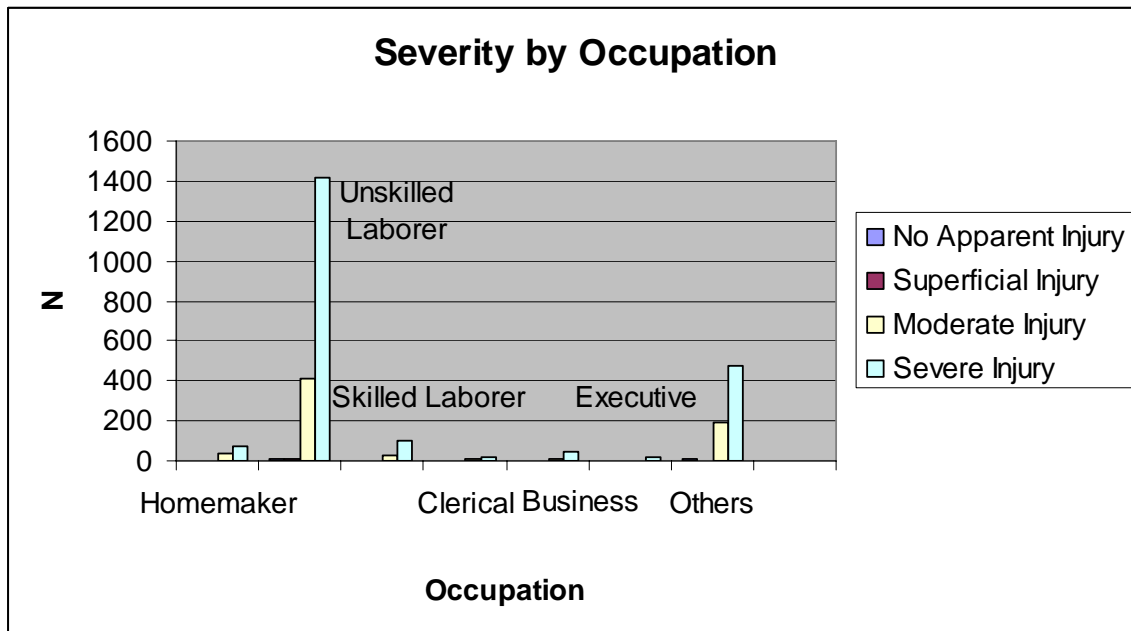
Moderate and severe injuries were reported more from RTA s from highways and city roads and those in the urban setting were more likely to be severe.

38% of injured under the influence of alcohol had severe injuries.

Pedestrian and two wheeler users were more likely to be severely injured.

**Table 25. Severity by Occupation**

Severity	1	2	3	4	5	6	7	8	9
	Unemployed	Retired	Homemaker	Unskilled Laborer	Skilled Laborer	Clerical	Business	Executive	Others
No Apparent Injury				10	1		1		6
Superficial Injury				5					1
Moderate Injury	1	1	33	414	29	7	8	2	190
Severe Injury	2	6	70	1416	103	22	47	21	474



**Table 26. Severity by Place of Residence**

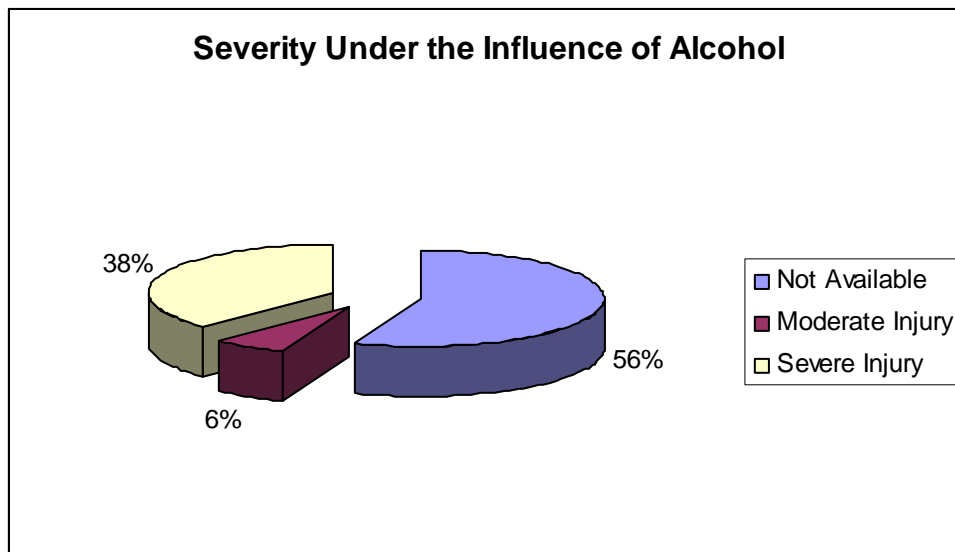
	Rural		Urban	
	N	%	N	%
<b>No Apparent Injury</b>	22	1	5	
<b>Superficial Injury</b>	2	0	7	
<b>Moderate Injury</b>	1026	29	181	18
<b>Severe Injury</b>	2444	70	832	81

**Table 27. Severity by Place of Occurrence for RTA**

	City Roads		Highway		Inner Roads		Rural Roads	
	N	%	N	%	N	%	N	%
<b>No Apparent Injury</b>	4		4		1			
<b>Superficial Injury</b>	1		1					
<b>Moderate Injury</b>	65	60	38	36	2	2	2	2
<b>Severe Injury</b>	507	38	788	59	36	3	3	0

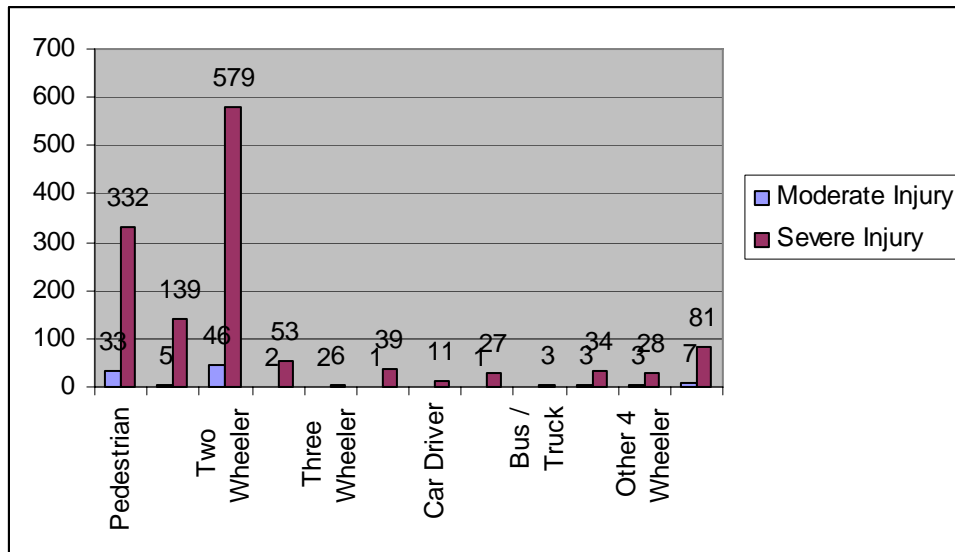
**Table 28. Severity Under the Influence of Alcohol**

<b>Severity of Injury</b>	<b>N under the influence of Alcohol</b>	<b>%</b>
<b>Not Available</b>	217	56
<b>Moderate Injury</b>	25	6
<b>Severe Injury</b>	146	38%



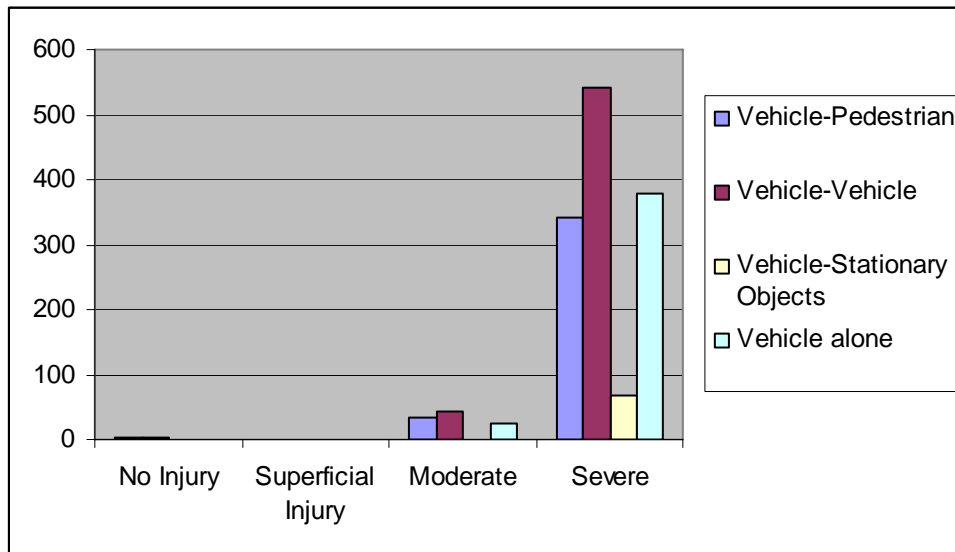
**Table 29. Road User Category by Severity of Injury**

Road User Category	No Injury	Superficial Injury	Moderate Injury	Severe Injury
Pedestrian	4		33	332
Pedal Cyclist	2	1	5	139
Two Wheeler Rider	2	1	46	579
Two Wheeler Pillion			2	53
Three Wheeler Driver			2	6
Three Wheeler Occupant			1	39
Car Driver				11
Car Occupant			1	27
Bus / Truck Driver				3
Bus / Truck Occupant			3	34
Other 4 Wheeler Driver			3	28
Other 4 Wheeler Occupant			7	81



**Table 30. Type of Collision by Severity**

	No Injury	Superficial Injury	Moderate Injury	Severe Injury
<b>Vehicle-Pedestrian</b>	4		35	343
<b>Vehicle-Vehicle</b>	2	1	44	543
<b>Vehicle-Stationary Objects</b>	1		1	68
<b>Vehicle alone</b>	1	1	25	379
<b>Information Available 1448/2640</b>				



## **OUTCOME BY SEVERITY**

Of the severely injured 57% could be sent home. This groups comprised mostly treatable fractures. 31% needed to be admitted before discharge while 10% succumbed to their injuries or injury related complications

**Table 31. Outcome by Severity**

	<b>No Injury</b>	<b>Superficial Injury</b>	<b>Moderate Injury</b>	<b>Severe Injury</b>
<b>Treated as Out Patient</b>	27	9		1889
<b>Admitted &amp; Discharged</b>			1208	765
<b>Died</b>				624
<b>Don't Know</b>				4

## **INADEQUATE INFORMATION RECORDED IN THE MEDICAL RECORDS**

In the following instances , the information recorded in the medical records or coded onto the proforma was found to be inadequate to make any meaningful conclusions. These are areas which can hopefully be sorted out in a prospectively conducted study

### **Q15. Mode of transportation to the hospital :**

Only 15 records out of 8612 had any mention of the mode of transport to the hospital, and as such is inadequate to draw any conclusions.

### **Q22 Helmet used, if in a two wheeler rider / passenger.**

Only two records mentioned use of helmet. No mention of helmet was found in the rest of the records entered.

### **Q23 Use of seat belt, if driving in a car**

Use of seat belt recorded in five records. No mention of seat belt was found in the rest of the records entered.

### **Q 29 Intent**

Data inconsistent with the rest of the records. There was an error in understanding the terms resulting in a large number of entries being marked as intentional while a significant number of them happened to be self – harm or unintentional

### **Q 30 Object Used**

There were discrepancies in other areas too, but the information available allowed us to reach some kind of understanding regarding the factors involved