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Pattern of injuries in two wheeler accidental deaths in and around Guntur City, Andhra Pradesh

Dr. K.Ravimuni[1], Dr. M. Malleswari[2], Dr.Chebrolu Srinivas[3]
[1,]*Assistant Professor, Department Of Forensic Medicine, NRI Medical College, Chinakakani, Guntur Dist*
[2]*Associate Professor, Department of Forensic Medicine, NRI Medical College, Chinakakani, Guntur Dist*
[3]*Professor&H.O.D, Department Of Forensic Medicine, NRI Medical College, Chinakakani, Guntur Dist*

Abstract:*Two wheeler accidental deaths are one of the leading causes of morbidity and mortality in the world. The present study is based on the autopsy records of unnatural deaths occurred in and around Guntur city Andhra Pradesh, India. The cause of death in majority of cases was head injury i.e., with fracture of skull or intracranial hemorrhages or injury to brain. Extremities (upper limbs and lower limbs) were most commonly injured than any other regions of the body. Liver was more commonly injured than any other organ of the body. Grazed abrasion was most common injuries present externally.It is essential to study the problems of traffic accidents from time to time so that improved measures can be suggested to minimize the morbidity, mortality and subsequent economic loss and thereby to pave the way for the development of traffic medicine. Timely intervention in treatment will decrease the mortality rate.*

Keywords:*Two wheeler accidents, head injury, unnatural deaths, timely intervention*

I. Introduction

Accident is an event, occurring suddenly, unexpectedly and inadvertently under unforeseen circumstances [(1)]. An accident that takes place on the road involving a vehicle is termed as road traffic accident [(2).]The problem of road traffic accidents on a large scale has arisen for the first time from the beginning of the 20th century with rapid motorization and modernization. The problem of two wheeler traffic accidents is directly proportional to the development and motorizations of a country [(2).]

Accidents are world's most serious health problem. They are considered as number one killer in developing countries.According to NCRB (National Crime Records Bureau) the total road accidents in India are 1, 26,896 in the year 2009, of these victims of two wheeler road accidental deaths were 20.7 %, it reveals that 72 deaths were happened by two wheelers per day in India. According to the records, the two wheeler sex wise road accident deaths of male and female are 23180 and 3039 and the total deaths are 26219 in India in the year 2009[(3)].

According to SCRB (State Crime Records Bureau) of Andhra Pradesh, the total accidents in the year 2010 were 56,695, died victims were 15,325. Among these around 6,800 were two wheeler accidents and died victims were around 2,880. In the year 2011, around 59,423 accidents were happened and around 16,596 were killed. Among these 59,493 two wheeler accidents are 6,900, the death victims are 3122.

According District Crime Records Bureau (DCRB) Guntur, the total number of accidents occurred in and around Guntur in the year of 2011 (from 1st January to 31st December) are 2093, of these 778 deaths happened. Among these 2093 total accidents, two wheeler motor vehicular accidents are 367 and out of these 367, 183 deaths happened. This constitutes 35% of deaths from two wheeler accidental deaths which occurred in Guntur andits surroundings. Presently about 5 million people are dying worldwide as a result of injury every year. It is estimated that by the year 2020, 8.4 million people will die every year from injury and injuries from road traffic accidents will be the third most common cause of disability worldwide and the second most common cause in the developing world.

The development of science in various aspects of human life has evolved the motorized transportation media like road transport vehicles, trains, airplanes etc. With fast moving vehicular traffic, vast urbanization and changing social patterns, personal and emotional problems have contributed to increase in the incidence of trauma to the human body. The number of minor as well as serious injuries, being suffered by human being and economic loss due to disabilities caused by the accidents is invaluable. Traffic accident is an endemic disease, which affects mainly young people. A middle-aged male is more likely to die from injuries received in a traffic accident than from any other cause, and motor vehicle accidents are single leading cause of death[(5)]. Thus while medical science had conquered the ravages of many diseases and epidemics, accidents have become a new epidemic of public health importance calling for equal efforts for control and prevention [(4)]

There is a serious risk to the community due to traffic accidents on roads. Many factors operate at the time of traffic accident, of these important are human errors relating to driver and victim due to poor traffic sense, mechanical fault of the vehicle, conditions of the roads, traffic congestion, road encroachments, violation

of traffic rules, alcohol consumption by drivers, talking in cellular phones during driving, triple riding, poor signal following, poor light conditions, bad parking habits without signal lights, allowing pet and domestic animals on to the road etc.

It is essential to study the problems of traffic accidents from time to time so that improved measures can be suggested to minimize the morbidity, mortality and subsequent economic loss and thereby to pave the way for the development of *traffic medicine.* Therefore unlike countries in which motorcycle use is limited to recreation and leisure travel, it is an important means of daily transportation for a significant number of people in India. For the group of people, motorcycle ownership and use is less expensive than car ownership and still gives them independence from public transport [(6)]

The present study has been carried out with the above mentioned interest and is based on the Medico-legal autopsies conducted in the department of Forensic Medicine, Guntur Medical College, Guntur. The problem of two wheeler motor vehicular accidents in this part of the country requires many different angles of consideration as it differs – Socio, economic and cultural setup from other places. This problem in this region cannot be solved only by adapting the recommendations. But one should follow the regulations sincerely and should have alert attitude and behavior while riding the two wheeler motor vehicles.

Though death is inevitable, untimely death is not acceptable. Life is precious. Everybody should fulfill the purpose of life.

II. Materials And Methods

This study has been carried out, in the year 2011(from 1st January to 31st December), after approval from the ethical committee of Guntur Medical College/General Hospital, 1365 post-mortem examinations were conducted in the department of Forensic Medicine, Guntur Medical College, Government General Hospital Modern Mortuary, Guntur, out of which 380 (27.8%) cases were deaths due to motor vehicle accidents, and out of that, 183(13.45%) cases were deaths due to motorcycle accidents. This indicates that in all motor vehicle accidents deaths, 48.15% deathswere involved in motorcycles.

All the autopsies reported were done in the modern mortuary, Guntur General Hospital, Guntur. The victims were said to have died of road accident during the period from 1st January 2011 to 31st December 2011. Among those cases, which were admitted into the hospital, the details regarding the duration of stay in the hospital, the period of survival were recorded. Based on these observations and history obtained from the police regarding the accidents an attempt has been made to give some recommendations to reduce the number of accidents, to increase the traffic awareness in public, to develop traffic emergency medicine in the field of public health. The materials used for this study were inquest reports, inpatient case sheets, per usual of police papers, data from District Crime Records Bureau (DCRB), Guntur, Records from medical record section of Guntur General Hospital, postmortem reports of all cases, information collected from the investigation officer, relatives and friends of the deceased accompanying dead bodies and various standard text books and internet sources and journals.To enumerate the pattern of injuriesScalp injuries, skull fracture and intracranial hemorrhages neck injuries, injuries of limbs and chest and the fractures, lacerations, contusions, abrasions are taken to enumerate the pattern of injuries to ascertain the common injuries so that one can betaken the preventive measures.

III. ObservationsAnd Results

In this study out of all 103 cases, scalp injuries were present in 86 cases (83.49%) and skull fractures were present in 33 cases (32.03%), intracranial lesions were present in 82 cases (79.61%). In scalp injuries, contusions were the most common injuries in 68 cases (66%) followed by both lacerations and contusion in 13 cases (14.56%). These findings were consistent with the studies made by Drysdale et al[(7)] (1973), D. M. Sosin, J. J. Sacks and P. Holmgreenet al (1979-1986), Kranz K.P. (1985), Andreas Wladis, Lennart Boström, Bo Nilsson et al (1987 – 1994), Chen, Shyr-Chyr MD; Lin, Fang-Yue MD; Chang, King-Jen MD (1999), Lin, Mau-RoungHwang, Hei-Fen MS, Kuo, Nai-Wes et al (2001), Julian Stella, Clive Cooke and Peter Sprivulis et al (2002), NilambarJha, D.K. Srinivasan[(8)], Gautam Roy, S. Jagdish et al (2004).

Out of 103 motorcyclists deaths, injuries to head occurred in most cases i.e., 72 (69.9%) followed by limb injuries in 63 cases (63.16%) whereas abdomen injuries in 27 cases (26.21%) and chest injuries in 26 cases (25.24%). These findings were consistent with the studies of Andreas Wladis, Lennart Boström, Bo Nilsson et al (1987 – 1994), Wick M, Ekkernkamp A[(9)], Muhr G, (1992), Bradbury A, Robertson C (1993), Johnson, R. Michael MD; McCarthy, Mary C. (1995), Chen, Shyr-Chyr MD; Lin, Fang-Yue MD; Chang, King-Jen MD (1999), Lateef F (2002), NilambarJha, D.K. Srinivasan, Gautam Roy, S. Jagdish et al (2004), K-Y Tham, E Seow, G LauEmerg[(10)] (2004).

In this study, skull fractures were seen in 36(32.03%) cases out of 103 cases. Linear fractures were the most common type of skull fractures observed in 13 (12.62%) casesfollowed depressed fractures which were 8

(7.7%) and the remaining 4 (3.88%). are sutured fractures in number(3.88%). Out of 103 cases in this study, intracranial injuries were present in 82cases (79.61%).In this, subdural hemorrhage and subarachnoid hemorrhage were found in 40 cases (38.83%), subdural hemorrhage were in 23 cases (22.3%). Sub arachnoid hemorrhage cases were 8(7.76%) and 11 cases (10.67%) were extradural hemorrhage. These findings were consistent with the studies made by Kranz K.P. (1985), Sahdev P, Lacqua MJ[11], Singh B, Dogra TD et al, (1994), *Sarkar, Soumitra MD; Peek, Corinne; Kraus, Jess F* et al (1995), NilambarJha, D.K. Srinivasan[8], Gautam Roy, S. Jagdish et al (2004).

Out of 103 cases mandible was fractured in 2 cases (1.94%) followed by other facial bone fractures in 4 cases (3.38%). 4 abrasions (3.88%) and 5 laceration (4.85%) were found on neck. Fractures of the cervical vertebrae were seen in 3 cases (2.91%).

Fractures of clavicle were seen in 2 cases (1.94%). Fracture of the sternum was seen 3 cases (2.91%). Fractures of ribs were seen in 10 cases (9.7%). In external chest injuries, 6 cases (5.82%) lacerations, 5 cases (4.85%) abrasions and abraded contusions were 3 cases (2.91%). Injuries to lungs present in 12 cases (11.65%). Injuries to heart present in 3 cases (2.91%).

Abrasions were most common injuries present on abdominal wall. Liver was involved in 11 cases (10.67. %). Out of these 11 injuries in liver, 6 cases (5.82%) lacerated liver was found in 6 cases and the remaining 5(4.85%) were contusions. Spleen was involved in 7 cases (6.79%). Out of these 7 cases, 4 cases (3.88%) were contusions and 3 cases (2.91%) were lacerations. Kidneys were involved in 3 cases (2.91%). These 3 cases were contusions. Intestines were involved in 6 cases (5.8%). These 6 cases were contusions. Lacerations were more common in liver and spleen. Contusions were more common in all. Fracture of pelvis seen in 5 cases (4.85%) associated with 4(3.88) bladder injuries and 6 (5.82) external genital injuries. Abdominal and pelvic regions injuries accounted for 41% of cases. This finding was consistent with the study made by E. O. Odelowo[12] (1994).

In this study, extremities were the common sufferers.Abrasions were most common injuries present on extremities. In upper limbs, Radius and ulna was the most commonly fractured bone seen in 6 cases (5.82%) followed by humerus in 2 cases (1.94%). In lower limbs, Tibia and Fibula were the most commonly fractured bones each consisting 9(8.73%) cases and 8(7.76%) cases followed by Femur in 4 cases (3.88%). In case of long bones, lower limbs were at high risk than the upper limbs. These findings were consistent with Wick M, EkkernkampA[13], Muhr G, (1992), Chen, Shyr-Chyr MD; Lin, Fang-Yue MD; Chang, King-Jen MD (1999), NilambarJha, D.K. Srinivasan[14], Gautam Roy, S. Jagdish et al (2004), K-Y Tham, E Seow, G LauEmerg (2004).

In this study out of 103 cases, fractures of the vertebral column were seen in 3(2.91%) cases. Cervical vertebra was fractured in 3 cases (2.91%).

Out of 103 cases, 11 cases underwent for craniotomy, 4 cases underwent for tracheostomy and remaining 88 were treated by supportive measures only. It indicates the early need of surgical intervention to improve the survival rate or to decrease the mortality role.

In this study out of 103 cases, 74(71.84%) persons died primarily of head injury associated either with fracture of skull or intracranial hemorrhages or brain injuries. 29 cases (28.15%) of multiple injuries were present. This finding was consistent with the studies of Gissane[15] and Bull (1962), Bhaskaranetal (1967), Kranz K.P. (1985), Sahdev P, Lacqua MJ, Singh B, Dogra TD et al, (1994), Sarkar, Soumitra MD[16], MPH; Peek, Corinne MPH; Kraus, Jess F et al (1995), Konrad CJ, Fieber TS[17], Schuepfer GK, Gerber HR etal (1997), Julian Stella, Clive Cooke and Peter Sprivulis et al (2002).

In this study out of 103 motorcyclist's deaths, 13(12.62%) deaths were instantaneous deaths. 23 (25.19%) deaths were with in the first 6 hours, followed by 14 deaths (13.59%) from 1 to 2 weeks and 12 (11.65%) deaths from 3 to 7 days. This indicates the need for emergency trauma cares centers in the country to help the injured as early as possible.

IV. Discussion and suggestions

Road traffic accident continues to be a growing menace, incurring heavy loss of valuable human resources.The number of accidents is increasing and road traffic accidents are increasing significantly over the past decade. The maximum fatalities and deaths were occurred due to head injury.It is thus the need of the hour to take suitable preventive measures, so that loss of precious lives can be brought down to a minimum [18].

Few recommendations for the better implementation of the same are as follows

1. Wearing of helmet and avoiding of cell phonewhile driving should be avoided.
2. The state should have zero tolerance policy for violation of traffic rules and drunken driving.

3. Since the two wheeler accidents are cause of the highestmortality, separate department like Traffic Medicine associated with road traffic authority must be established.
4. Educating public by radio, TV channels, posters and pamphlets and safety statements should be delivered by the celebrities and ministers for the sake of life of the people of the state.

5. Since the head injuries are the main injuries which lead to death, the teaching curriculum of schools and colleges should be included with the safety measures of travelling especiallyabout two wheeler accidents [(19)].
6. The government should bring awareness to the public that the first hour after accident is very important. If anybody found an accidental case on the road must bring them to hospital immediately. The helpers and carrying people are the saviors of the life.
7. Separate paths for slowly moving and high speed vehicles and separate paths for the pedestrians must establish in the urbanareas.
8. The roads should be properly maintained with florescent illumination for night riders. Efficient crash reporting and monitoring system withwell-equipped police control room should be established to co-operate immediate rescue measures.
9. Drivers need to be trained by an authorized center in proper maintenance of vehicle, safe driving and first aid [(20)].

More research should be conducted on the collision of road accidents and appropriate new technologies should be introduced in vehicles to prevent fatal injuries in different road users. Organized team work is required by people in many disciplines such as education, engineers, medical practitioners, psychologists and enforcement officers for effective prevention of road accidents and to minimize their consequences.

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Table 1: Region wise injuries incidence

Region involved	No. of cases	%
Head	72	69.9
Neck	8	7.76
Chest	26	25.24
Abdomen	27	26.21
Pelvis	6	5.82
Genitals	6	5.82
Limbs	63	61.16

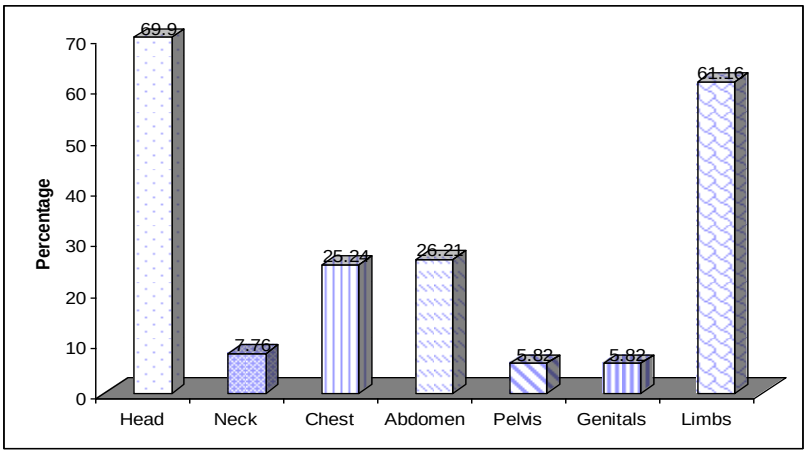


Table 2: Pattern of Head injuries

Scalp injuries n = 86 (83.49%)			**Skull fractures**	**Intracranial Hemorrhage n=82(79.61%)**			
Lacerations	**Contusions**	**Both**		**EDH**	**SDH**	**SAH**	**Both SDH,SAH**
3	68	15	36	11	23	8	40
0.97	6 6	14.56	34.95	10.67	22.3	7.76	38.83

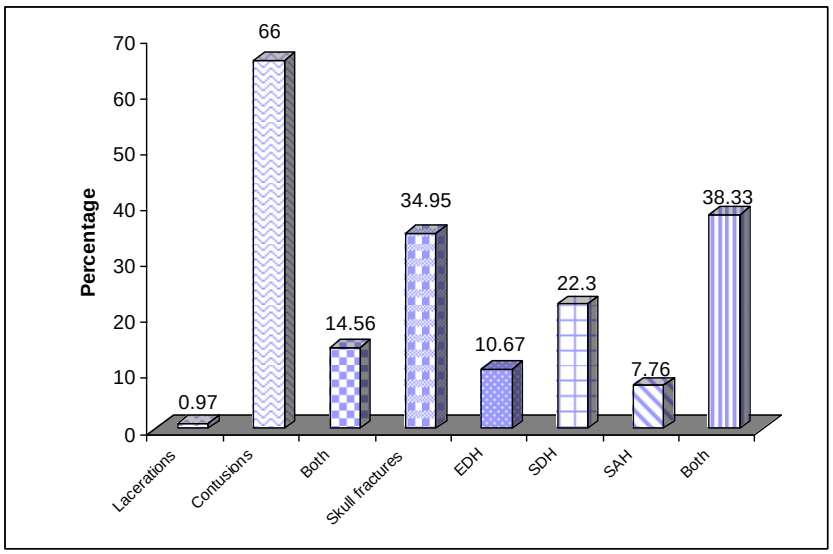


Table 3: Pattern of Scalp Injuries Total No. of cases n =103		
Type of fracture	**No. of cases**	**%**
Contusions	68	66%
Lacerations	3	2.91%
Laceration and Contusion	13	12.62%
Abrasion and contusion	2	1.94%

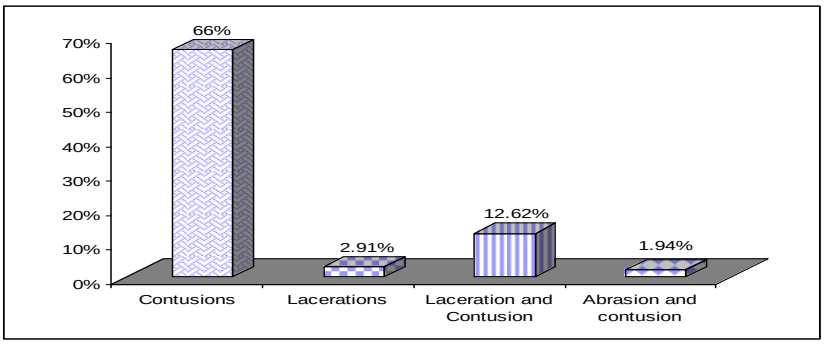


Table 4: Type of Skull fractures

No. of cases n = 103		
Type of fracture	**No. of cases**	**%**
Fissured	7	6.79
Depressed	8	7.7
Comminuted	4	3.88
Sutural	4	3.88
Linear	13	12.62

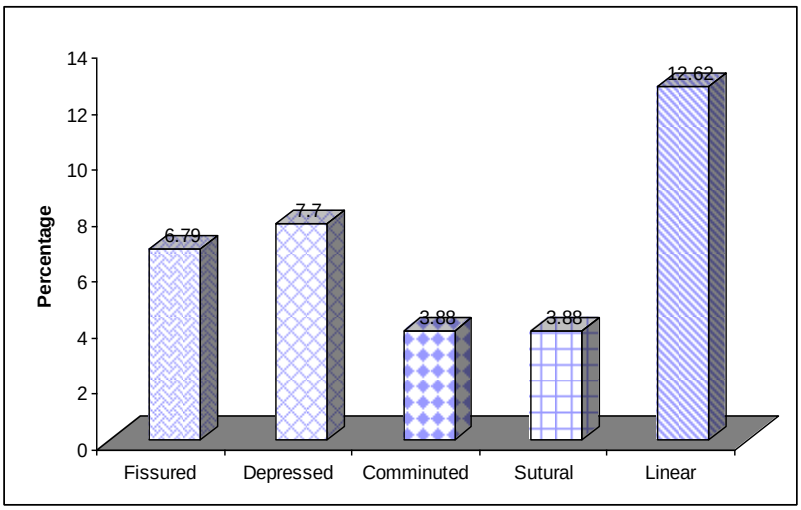


Table 5: Fractures of Facial bones

Total No. of cases n = 103		
	No. of cases	**%**
Abrasions	12	11.65
Laceraton	14	13.59
Abrated contusion	3	2.91
Abrated laceration	2	1.94
Facial bone fracture	4	3.88
Mandible fracture	2	1.94

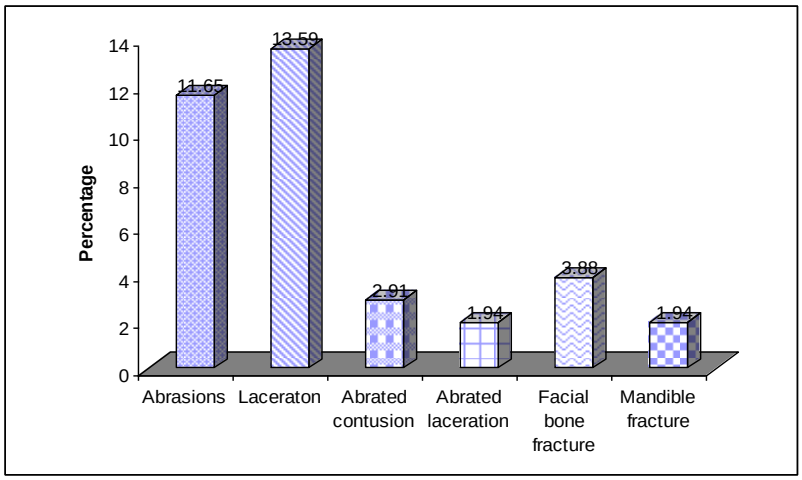


Table 6: Pattern of Neck Injuries

Total No. of cases n = 103		
	No. of cases	**%**
Abrasions	4	3.88
Lacerations	5	4.85
Tracheostomy	4	3.88
Fractures of cervical vertebrae	3	2.91

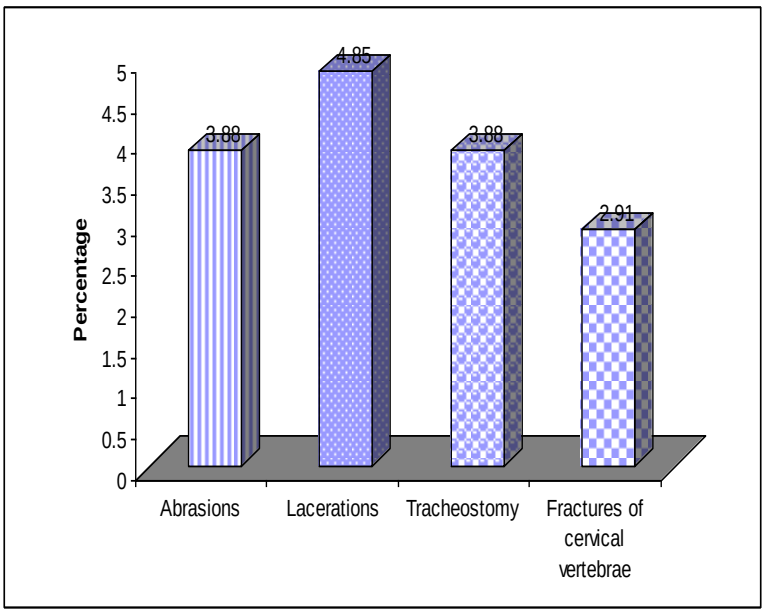


Table 7: Clavicle fractures and Rib fractures

Total No. of cases n = 103			
	Clavicle fractures	Rib fractures	Sternum
No. of cases	2	10	3
%	1.94	9.7	2.91

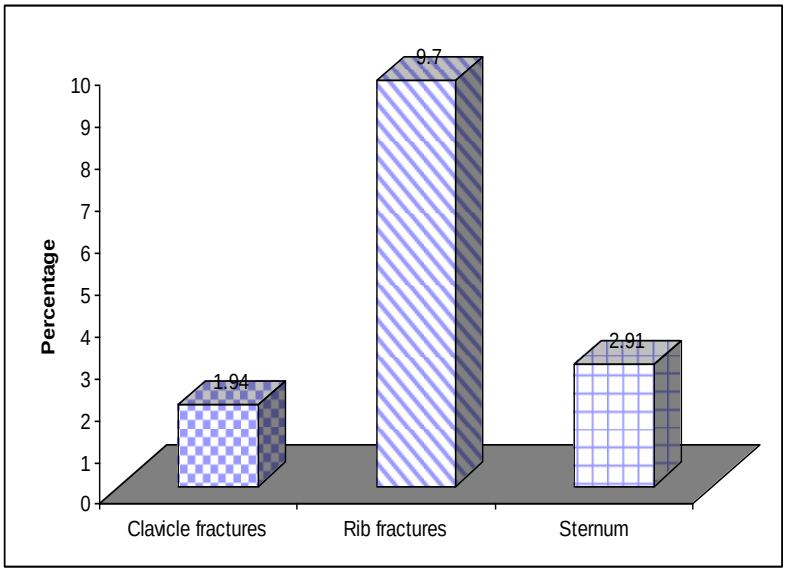


Table 8: Extremities injuries

	Upper limbs	
	No. of cases	Percentage
Abrasions	55	53.39
Contusions	3	2.91
Lacerations	3	2.91
Abrated contusion	2	1.94
Abrasion, laceration	2	1.94
Fractures	7	6.71

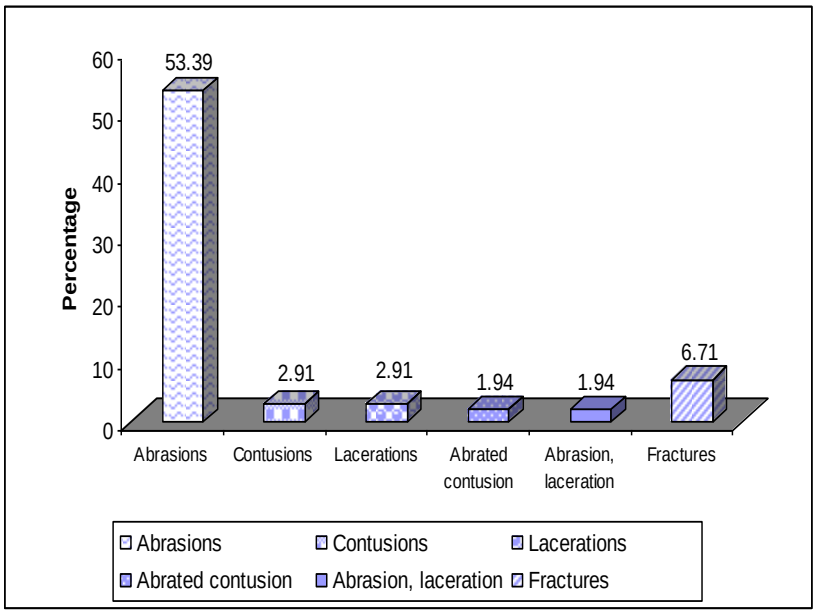


Table 9: Surgical Intervention / Hospital Treatment

Total No. of cases n = 103		
Tracheotomy	4	3.88%
Craniotomy	11	10.67%
Supportive Measures	88	85.43%

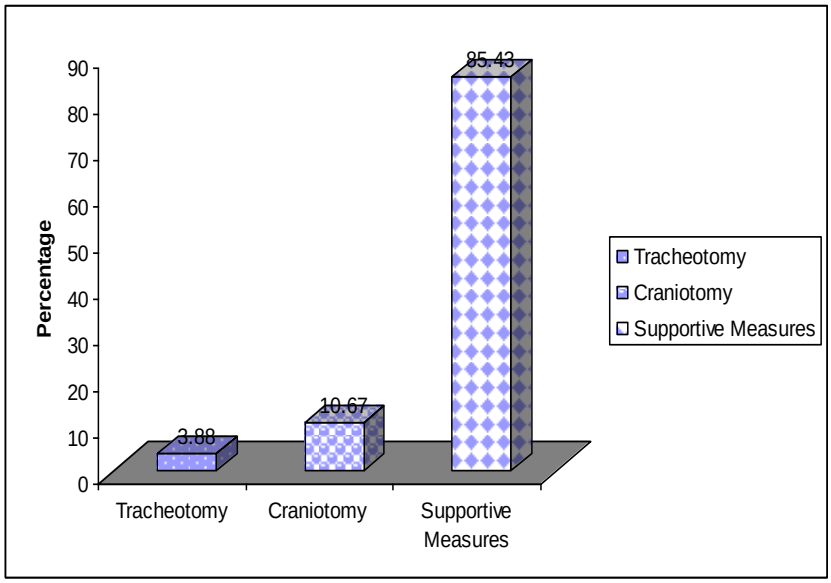


Table 10: Cause of Death

Total No. of cases n = 103		
Cause	**No. of cases**	**%**
Head injuries	74	71.84
Multiple injuries	29	28.15

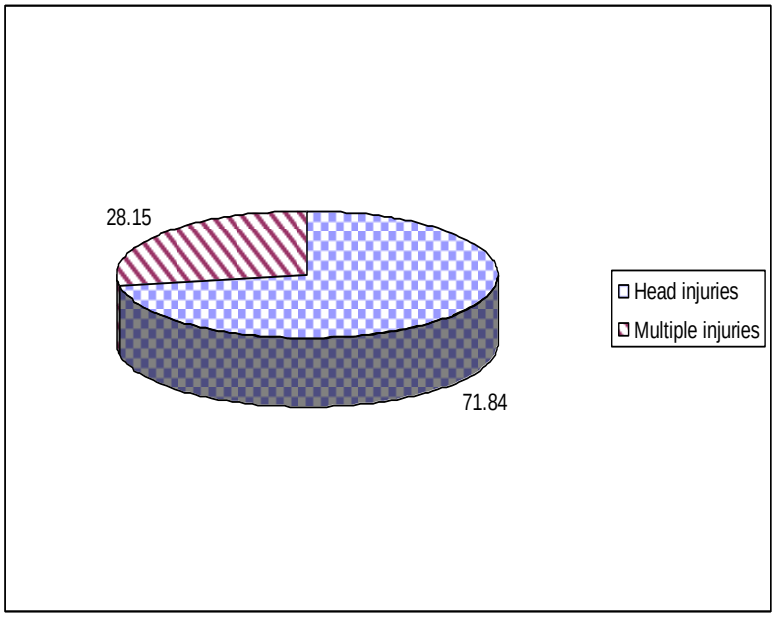
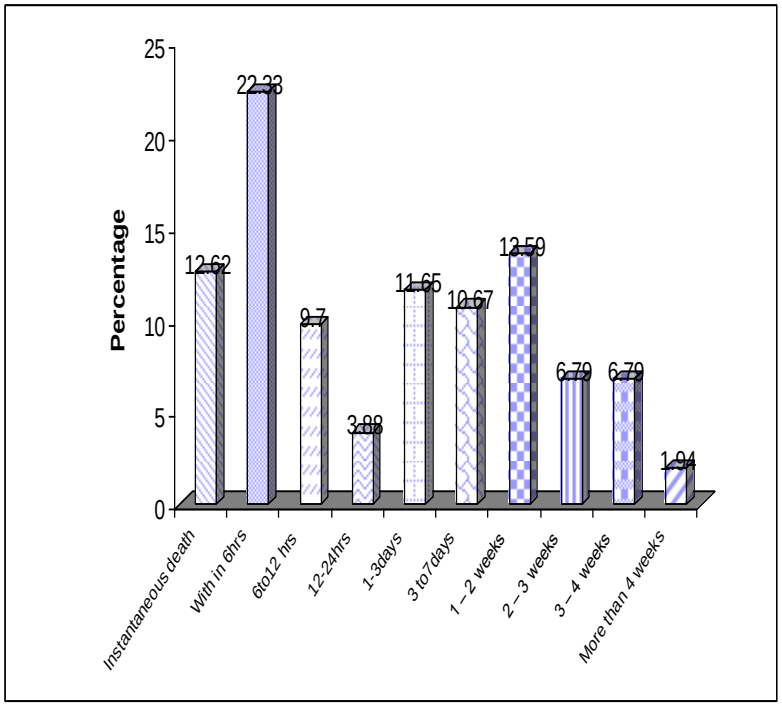


Table11: Survival period in Motorcycle accident deaths

Total No. of cases n = 103		
Period	**No. of cases**	**%**
Instantaneous death	13	12.62
With in 6hrs	23	22.33
6to12 hrs	10	9.7
12-24hrs	4	3.88
1-3days	12	11.65
3 to7days	11	10.67
1 – 2 weeks	14	13.59
2 – 3 weeks	7	6.79
3 – 4 weeks	7	6.79
More than 4 weeks	2	1.94


Percentage
25
20
15
10
5
0
12.62
22.33
9.7
3.88
11.65
10.67
13.59
6.79
6.79
1.94
Instantaneous death
With in 6hrs
6to12 hrs
12-24hrs
1-3days
3 to7days
1 – 2 weeks
2 – 3 weeks
3 – 4 weeks
More than 4 weeks