National Trauma Database
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# National Trauma Database

## January 2008 to December 2008
## Third Report

MOH/S/CRC/14.10(TR)

**National Trauma Database**

Ministry of Health Malaysia

# NATIONAL TRAUMA DATABASE JANUARY 2008 TO DECEMBER 2008 THIRD REPORT

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The National Trauma Database Committee would like to thank all those who have participated and contributed to our third report, from January 2008 to December 2008.

We would like to especially thank the following:

1. All centre coordinators, doctors, medical assistants and staff nurses from the Emergency Departments of the participating hospitals. Without their commitment, hard work, timely data collection and submission, this report would not be possible.

2. The Clinical Research Centre for its technical support, especially Dr Lim Teck Onn, Dr Goh Pin Pik and Dr Jamaiyah Haniff, for their continuous support and guidance.

3. The Ministry of Health, Malaysia for the research grants to set up the registry.

## INTRODUCTION

The purpose of this report is to provide a descriptive analysis of patients hospitalised with major trauma in participating Ministry of Health (MOH) hospitals in Malaysia for 2008. The data source for this report is the National Trauma Database (NTrD). Major trauma cases were selected based on the following criteria:

i. Patients who died from injuries after admission.
ii. Patients with Injury Severity Score (ISS) of >(more than) 15.
iii. Patients admitted to Intensive Care Units (ICUs) or High Dependency Wards (HDWs) for >(more than) 24 hours and who were mechanically ventilated.
iv. Urgent surgery within 24 hours for intra-cranial, intra-thoracic, intra-abdominal, or fixation for pelvic or spinal injuries.
v. All severe head injury patients rated 3-8 on the Glasgow Coma Scale (GCS)

The National Trauma Database 2008 – Third Report provides information about the profile of persons with major trauma who were admitted to participating hospitals throughout Malaysia.

The report is presented in Five Chapters:

*Chapter 1* provides an overview on the demographics of the patients, including gender, age group, race, admission time, admission day and admission type.

*Chapter 2* discusses the injury details of the patients, such as injury mechanisms, injury intent, injury causes, injury places, medical reviewers, disposition, ICU admission, and systolic BP. The patients were also rated on the Glasgow Coma Scale (GCS), Revised Trauma Score (RTS), Abbreviated Injury Scale (AIS) and Injury Severity Score (ISS).

*Chapter 3* describes the operative management carried out on patients, including the management of operations and procedures.

*Chapter 4* provides information on the outcome of the patients, which is then categorised according to age groups, injury mechanisms, injury causes, injury places, the mechanisms, causes and places of injury, admission types, systolic BP, GCS, RTS, AIS, ISS, and ICU admission. The probability of survival is also measured using the Trauma Revised Injury Severity Score (TRISS) methodology which includes the RTS, ISS, mechanisms of injury and patient's age.

*Chapter 5* includes the total length of stay in hospital and ICU.

The limitations of the study are:

i. Under reporting - The reported data came from less than the actual number of cases.

ii. Missing data - Missing values not included in the analysis makes the sample size for some of the time periods shorter than others.

Hopefully the information in this report will be used to implement strategies to strengthen and improve trauma care in the country.

**About NTrD**

The National Trauma Database (NTrD) is a service initiated and supported by the Ministry of Health (MOH) to collect information about trauma incidences in Malaysia, and to evaluate its risk factors and treatment in the country. Such information will be of use to the MOH, Non-Governmental Organisations, private healthcare providers and other interested parties in programme planning and evaluation, leading to trauma prevention and control.

The NTrD is co-sponsored by the following organisations of the Ministry of Health Malaysia:

i. Emergency Medical and Trauma Services
ii. Neurosurgery Services
iii. Surgery Services
iv. Clinical Research Centre

The objectives of the NTrD are to:

1. Determine the frequency, mechanisms of injury and distribution of major trauma in Malaysia. The statistics and data will be of importance in determining precisely the private and public resources utilised in its management.
2. Determine the outcome and probability of survival of trauma patients.
3. Evaluate major trauma management practices in the participating hospitals and to come up with guidelines for improved trauma care.
4. Determine the effectiveness and impact of the introduction of improved practices.
5. Stimulate and facilitate research on major trauma and its management.

The key data sources identified for this database are:

- All Emergency Physicians and Neurosurgeons in Malaysia beginning with those currently working in the MOH, and later extending to those beyond MOH (private organisation, universities (private and university hospitals) and the Armed Forces), for data on Major Trauma and Head Injury patients in the country.

## METHOD OF DATA COLLECTION

### Coverage

In 2008 there were eight participating MOH hospitals. The number of these centres has increased as with the previous two reports involving the May 2006 to April 2007 cases and January 2007 to December 2007 cases.

### Registration method

One Notification Form, called the Case Report Form (CRF), is employed in data collection (Refer to Appendix A). The CRF gathers information on patient demography, admission, injury details, clinical details, diagnostic and operative procedures, in-hospital outcome and Injury Severity Scores. The CRFs are used as part of the clinical record. The completed forms are sent to NTrD where the data is analysed, interpreted and presented in regular reports and disseminated to the users. The participation of Source Data Providers (SDPs) is entirely voluntary.

The data transferred to NTrD is kept strictly confidential with access only to authorised individuals working in the NTrD.

### Statistical analysis

This report is a descriptive analysis. All data is described in terms of percentages except continuous data like length of stay (LOS). Missing data was ignored and the analysis confined to available data. The TRISS methodology is used for the probability of survival which incorporates ISS, RTS, mechanisms of injury and the patient's age.

## MEMBERS OF THE STEERING COMMITTEE OF THE NTrD

| | | |
|---|---|---|
| 1. | Dr Lim Teck Onn<br>(Chairman) | Clinical Research Centre,<br>Ministry of Health |
| 2. | Dr Sabariah Faizah Bte Jamaluddin<br>(Co-Chairman) | Head of Department<br>Emergency Department,<br>Hospital Sungai Buloh |
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| 6. | Dr Hoo Ling Ping | Consultant Biostatistician,<br>ClinResearch Sdn. Bhd. |

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| 2. | Clinical Data Manager | Ms Teo Jau Shya |
| 3. | Medical Reviewer | Ms Anne John Michael |
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| | : MA Bala Krishnian a/l Muniandy |

## ABBREVIATIONS

| | |
|---|---|
| AIS | Abbreviated Injury Scale |
| BP | Blood Pressure |
| CRC | Clinical Research Centre |
| CRF | Case Report Form |
| GCS | Glasgow Coma Score |
| HDW | High Dependency Ward |
| ICU | Intensive Care Unit |
| ISS | Injury Severity Score |
| MOH | Ministry of Health |
| NTrD | National Trauma Database |
| OP | Operation Procedure |
| RTS | Revised Trauma Score |
| SDP | Source Data Provider |
| TRISS | Trauma Revised Injury Severity Score |

## GLOSSARY

| | |
|---|---|
| Disease Register | The on-going systemic collection, analysis and interpretation of specific disease data essential to the planning, implementation and evaluation of clinical and public health practices, closely integrated with dissemination of these data to those who need to know. The final link in the chain is the application of these data to the management, prevention and control of the disease. A registration system includes a functional capacity for data collection, analysis and dissemination, linked to clinical and public health programmes. |
| Site | The location of a SDP reporting data on registrable patients to the registry. |
| Source Data Providers | The individuals or institutions that report the required data to the registry. |
| Sponsors | The individuals or institutions that own the registry. |
| Expert Panel | Individuals who are subject matter experts i.e. Emergency Physicians and Neurosurgeons. The expert group will keep abreast of the latest development in this area. They should be convened to decide on the initial data collection process, develop the Performa and data content, as well as a guide for future development. They ensure that the database has a sound technical as well as scientific basis. |

## EDITORIAL TEAM

Chief Editor : Dr Sabariah Faizah Bte Jamaluddin

Members : Dr Mahathar Bin Abd Wahab
Dr Fatahul Laham Bin Mohamed
Assoc Prof Dr Ismail Bin Mohd Saiboon

NTrD : Ms Lithnes Kalaivani Palniandy

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**CONTENTS**

# REPORT SUMMARY

## CHAPTER 1: DEMOGRAPHICS

In 2008, a total of 147,607 trauma patients were admitted to the Emergency Department of the eight participating centres. Out of these, 0.8 % were major trauma patients. Majority of these cases (59.6 %) were direct admissions. The highest admission of major trauma patients was from Centre B with a total of 41,617 patients (22.3 %).However, most of these cases from this centre were referral cases in which most of the referrals were from other hospitals with specialists. Centre H had the highest number of direct admission cases (100 %).

Majority of the major trauma patients were male (87.7 %), within the age groups of 15-24 (32.4 %) and 25-34 (23 %). The Malays was the highest group (48.0%) and 14.7 % of the total admissions were foreigners.

Friday was the busiest day with 15.6 % admissions, followed by Thursday (15.2 %). Most of the admissions occurred in the evening between 1801h and 2400h (30.1 %).

## CHAPTER 2: INJURY DETAILS

About ninety three percent (93.2 %) of major trauma cases were recorded as blunt injury with about eighty eight percent (88.4 %) of the cases being unintentional. Road traffic accidents contributed to 74.3 % of cases as compared to other causes of injury. The most common road traffic accidents, 62 %, involved motorcycle riders. Most of these cases were initially reviewed by the emergency and surgical medical officers or trainees, 92.2 % and 79.8 % respectively. About twenty nine percent (28.7 %) of major trauma cases were admitted to the general wards after management in emergency departments. A total of 40.4 % cases were admitted to ICUs.

About sixty two percent (61.8 %) of major trauma cases had systolic BP greater than 120mmHg, while only 6.5 % of cases had systolic BP less than 90mmHg. Most of the major trauma cases had Glasgow Coma Scale (GCS) of 3 to 8 (51.7%). Most of the intra-cranial injuries recorded were due to traumatic subdural haemorrhage (43.7 %).

About thirty percent (29.6 %) of patients had low Revised Trauma Score (RTS) of between 0 to <5. The body region most commonly injured was the head and neck (65.2 %). Twenty six percent (26 %) of the injuries had an Abbreviated Injury Score (AIS) of 3. The Injury Severity Score (ISS) was mainly between 16-25 (64.6%), while 13.5 % of cases had an ISS of <(less than) 10.

## CHAPTER 3: OPERATIVE MANAGEMENT

Endotracheal intubation was performed on 61.7% of patients with 53.1% of the cases intubated at the referring hospitals, prior to transfer. CT Scan was done on 65.3% of patients. CT Brain amounted to 92.7% of the CTs performed on the major trauma patients, while only 11.8% was for abdominal CTs. Ultrasound/FAST was carried out in 24.4 % of the cases.

About forty seven percent (46.9%) of the major trauma patients underwent surgery; the commonest being for intra-cranial injuries (54.5%). Evacuation of haematoma was the commonest intra-cranial operative procedure done (30.4%), followed by decompressive craniotomy (28.8%) and insertion of external ventricular drain (14.5%). Intra-abdominal injuries made up 14.9% of the operations performed.

## CHAPTER 4: OUTCOME

For the year 2008, the survival rate for major trauma cases was 68.8 %. This ranged from 46.4 % to 81.3 %, the highest percentage was from Centre H. Centre E had the highest mortality rate at 53.6 %.

Of those that survived, the majority, 70.1 %, were discharged home. Others were either transferred back to the referring hospital (15.4 %), transferred to other hospitals (10.5 %) and a small percentage discharged against medical advice (4 %).

The survival rate was higher (ranging between 67.4 % and 84.5 %) among the younger age group, that is less than 55 years old. The elderly, aged more than 85 years old had a survival rate of only 25 %.

The majority of injuries were caused by road traffic accidents (74.4 %). This was followed by falls from more than 2 meter height (7.4 %), falls from less than 2 meter height (4.8 %) and other assaults (4.8 %). Other causes were industrial accidents, sports injuries, burns, stabbing, gunshot wounds, unknown and others.

The highest number of survivors was motorcycle pillion riders (76.4 %). The highest percentage of death (38.6 %) was reported among pedestrians, followed by cyclists (37.5 %), drivers of vehicles (36.5 %), motorcycle riders (30.4 %), back seat passengers (29.4 %), front seat passengers (27.3 %) and motorcycle pillion riders (23.6 %).

Of those that were admitted directly 66.3 % survived, and of those that were transferred or referred, 72.7 % survived.

Patients who had a systolic blood pressure (BP) of more than 89mmHg on arrival had a higher survival rate compared to those that were presented with systolic BP of less than 76mmHg. The survival rate was higher in those with GCS of 13-15 (87.2 %) and 9-12 (82.1 %). The survival rate for patients with GCS 3-8 was only 53.8 %.

Patients who had a Revised Trauma Score (RTS) of more than 5 had a much better outcome, with a survival rate of more than 65 %. Similarly, for those who had an Abbreviated Injury Scale (AIS) of more than or equal to 3, survival rate was 66.9 %. Out of the patients who had an Injury Severity Score (ISS) of more than 15, 25.4 % of them did not survive. With regards to Intensive Care Unit (ICU) admission, the mortality rate was 30.2 % for those that were admitted to ICU and 31.9 % for those that were not admitted to ICU.

Trauma Revised Injury Severity Score (TRISS) determines the probability of survival (Ps) of a patient and is calculated based on RTS, ISS, age and type of injury either blunt or penetrating**.** About eighty one percent (80.9 %) of major trauma patients were expected to survive (Ps≥0.5) compared to the actual observed survival rate of 68.8 %. Out of the major trauma patients who were expected to survive, 26.3% of them actually died. About forty eight percent (47.8%) of major trauma patients survived even though they were expected to die based on TRISS calculation.

## CHAPTER 5: LENGTH OF STAY

The average length of hospital stay (ALOS) for all 8 centres was between 7 and 15 days. The shortest average length of stay was 7 days (Centre G) and longest was 15 days (Centre F).

Patients that survived had a longer ALOS as compared to those that died, the longest being 20 days. The majority of ICU patients with major trauma were

admitted for 5 to 6 days, with 10 days being the longest (Centre F). The average lengths of ICU stay for survivors were also 5 to 10 days. However, the average length of ICU stay for those that did not survive had a wider range, between 1 to 12 days.

In terms of type of admission, those who were admitted directly to the hospitals had an ALOS of 11 days compared to referral cases at 9 days.

Patients with injuries related to road traffic accidents (RTAs) had the longest total LOS, but in terms of ALOS it was only the fourth longest (10 days). ALOS was recorded longest for industrial accidents, at 24 days.

## Listing of Tables

## Listing of Figures

# Chapter 1: DEMOGRAPHIC

**Figure 1.1. Total Trauma Emergency Department Admissions by Centre**

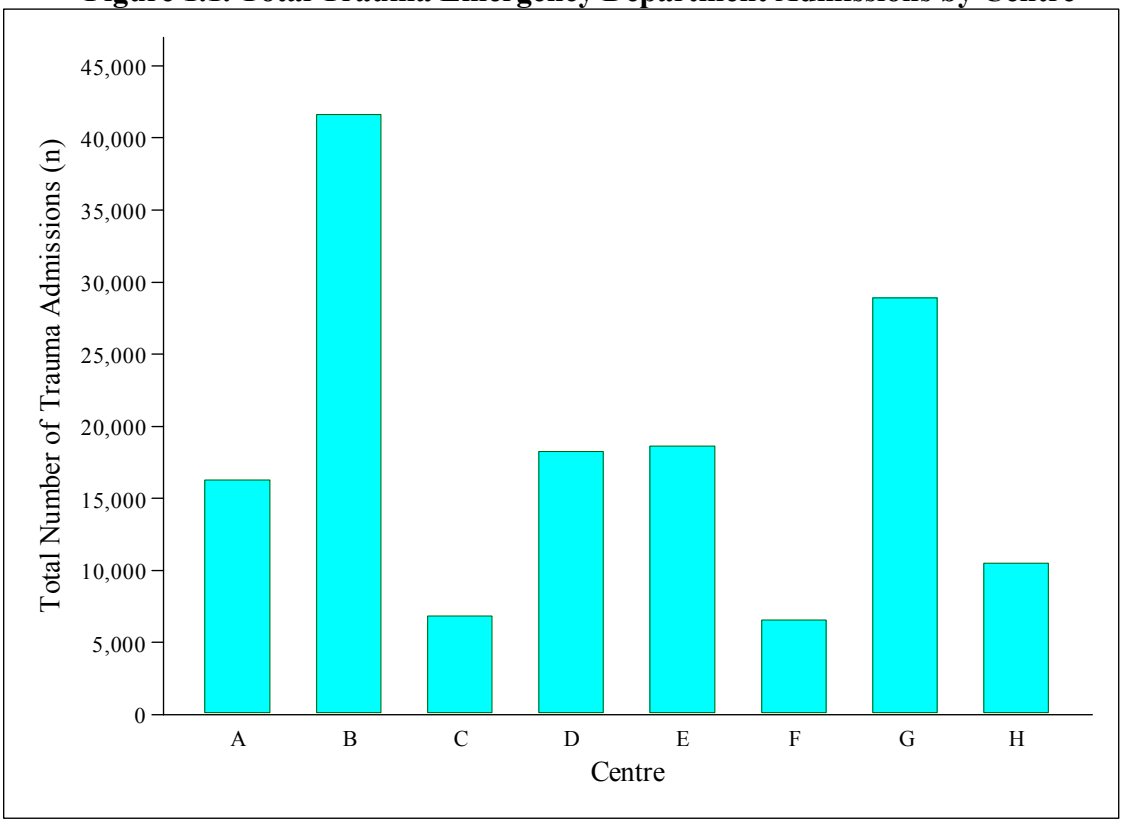

**Figure 1.1a. Total Trauma Emergency Department Admissions by Centre**

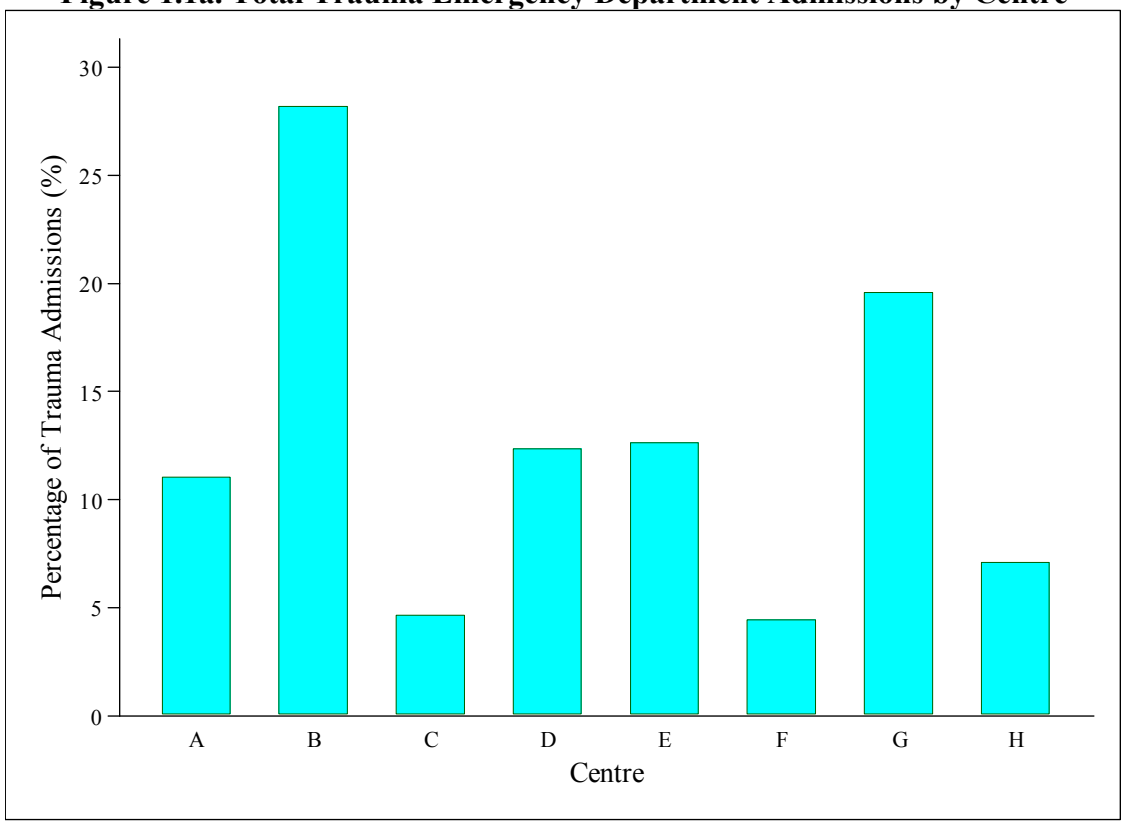


**Table 1.1. Total Trauma Emergency Department Admissions by Centre**

| Centre | No | % |
|---|---|---|
| A | 16289 | 11.04 |
| B | 41617 | 28.19 |
| C | 6852 | 4.64 |
| D | 18235 | 12.35 |
| E | 18621 | 12.62 |
| F | 6572 | 4.45 |
| G | 28921 | 19.59 |
| H | 10500 | 7.11 |
| TOTAL | 147607 | 100 |

**Figure 1.2. Major Trauma Cases by Centre**

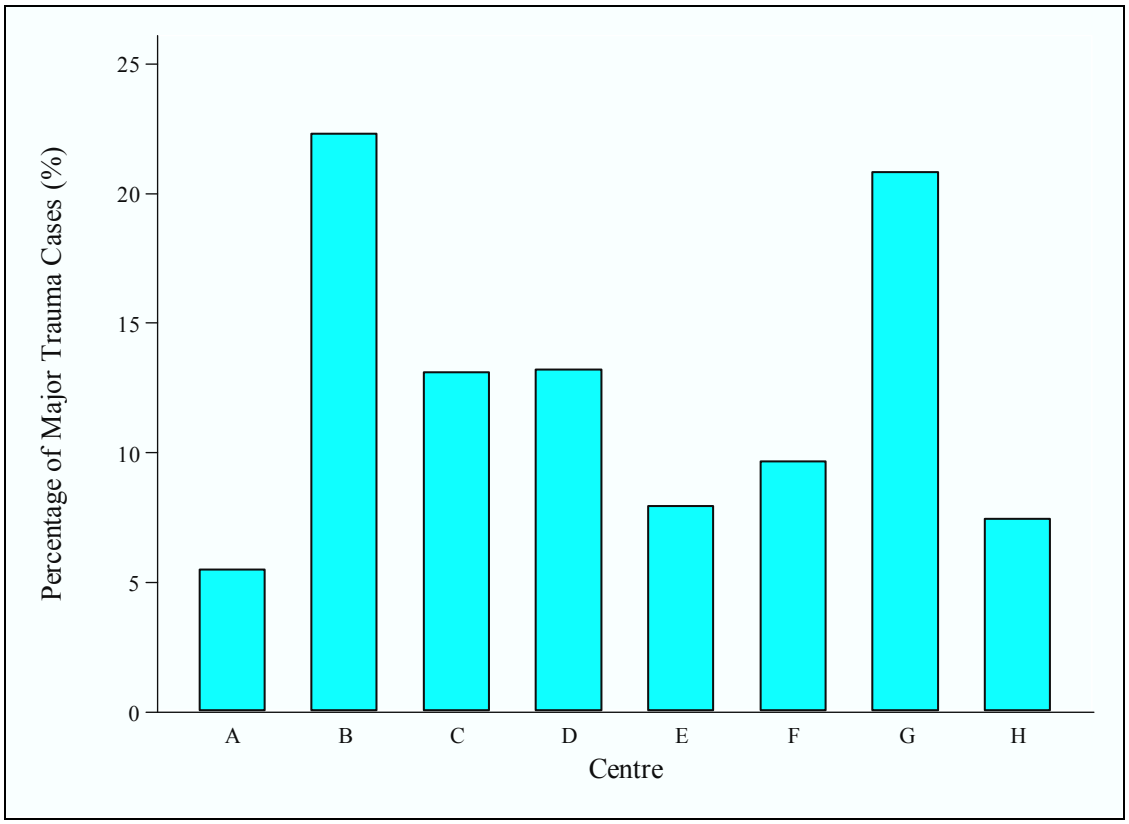


**Table 1.2. Major Trauma Cases by Centre**

| Centre | No. | % |
|---|---|---|
| A | 67 | 5.49 |
| B | 272 | 22.3 |
| C | 160 | 13.11 |
| D | 161 | 13.2 |
| E | 97 | 7.95 |
| F | 118 | 9.67 |
| G | 254 | 20.82 |
| H | 91 | 7.46 |
| TOTAL | 1220 | 100 |

*Total number of patients=1618; 2 patients with two different notifications were recorded, ,PatientID 2233 & 1927

**Figure 1.3. Major Trauma Cases by Gender**

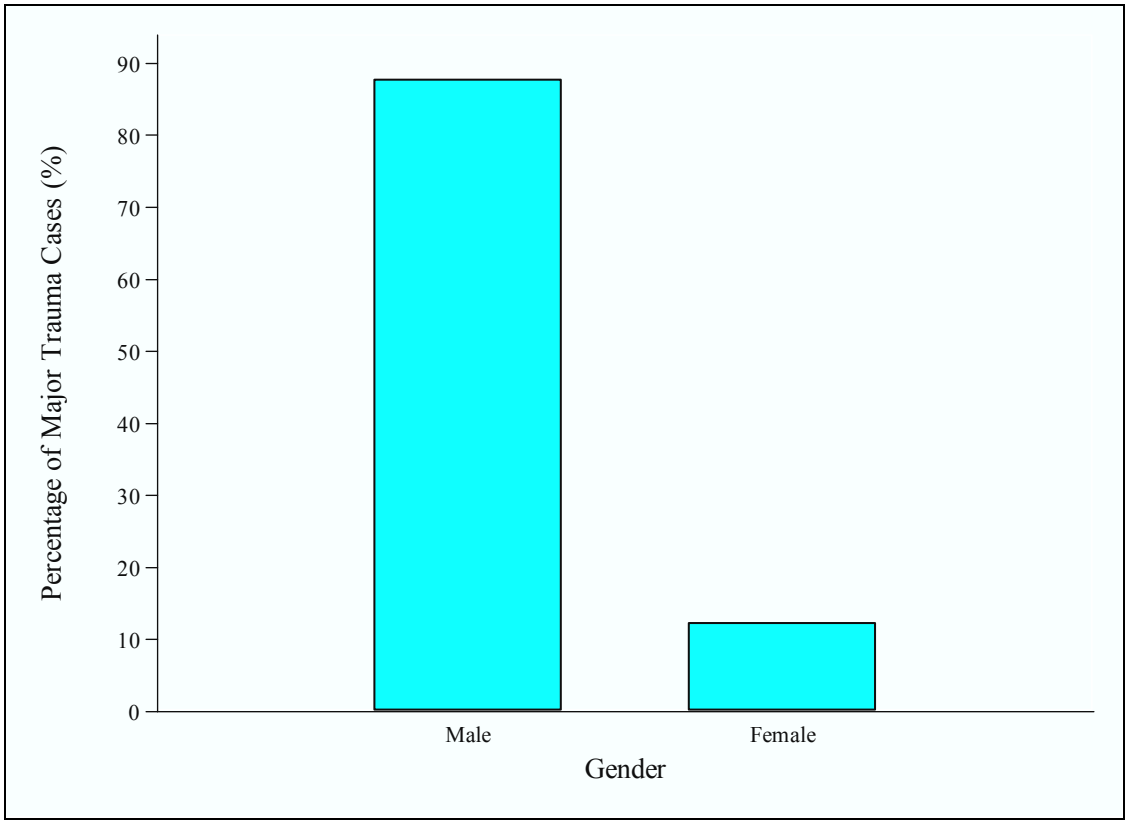


**Table 1.3. Major Trauma Cases by Gender**

| Gender | No. | % |
|---|---|---|
| Male | 1070 | 87.7 |
| Female | 150 | 12.3 |
| TOTAL | 1220 | 100 |

**Figure 1.4. Major Trauma Cases by Age Group**

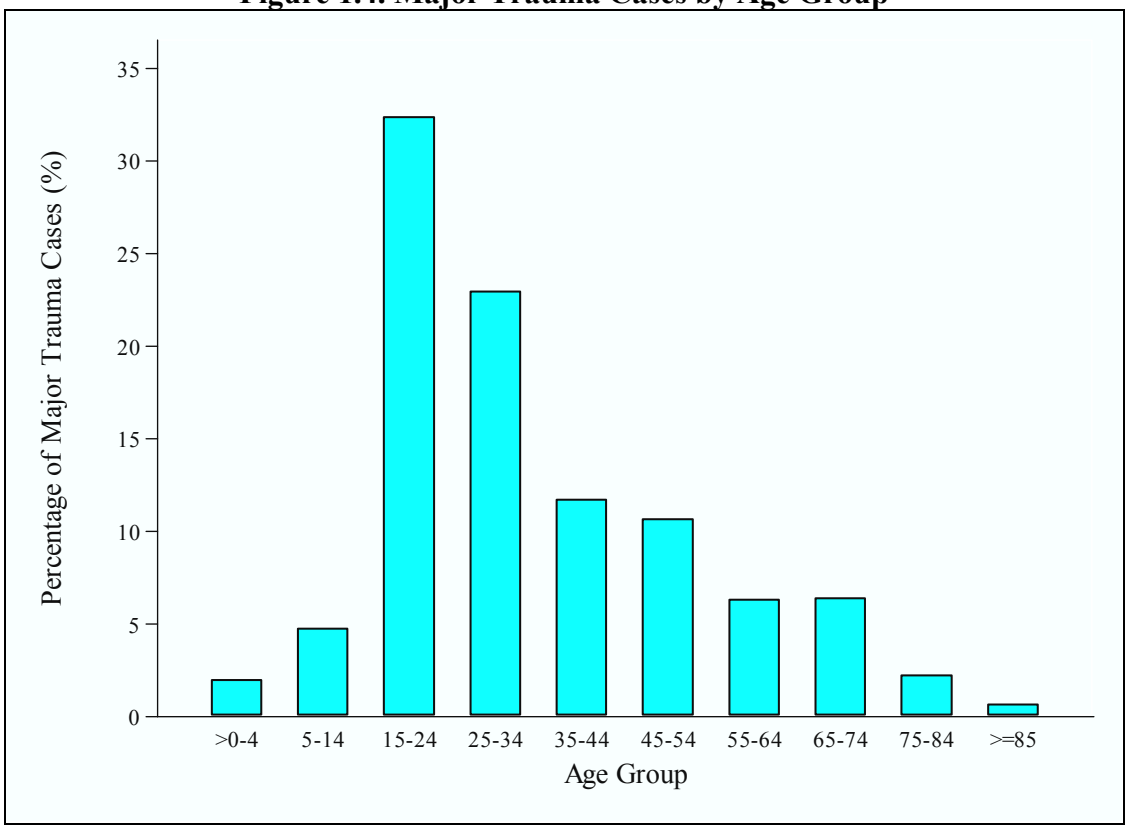


**Table 1.4. Major Trauma Cases by Age Group**

| Age group | No. | % |
|---|---|---|
| >0-4 | 24 | 1.97 |
| 5-14 | 58 | 4.75 |
| 15-24 | 395 | 32.38 |
| 25-34 | 280 | 22.95 |
| 35-44 | 143 | 11.72 |
| 45-54 | 130 | 10.66 |
| 55-64 | 77 | 6.31 |
| 65-74 | 78 | 6.39 |
| 75-84 | 27 | 2.21 |
| ≥85 | 8 | 0.66 |
| TOTAL | 1220 | 100 |

**Figure 1.5. Major Trauma Cases by Race**

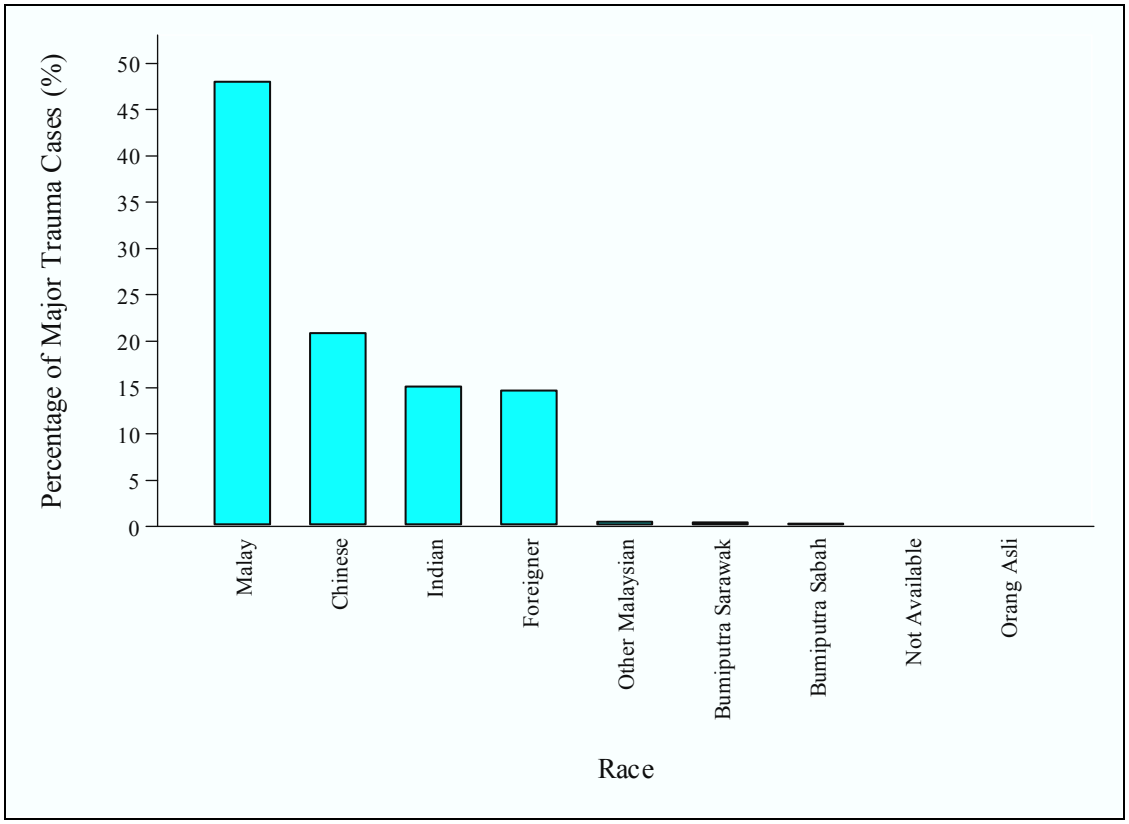


**Table 1.5. Major Trauma Cases by Race**

| **Race** | **No.** | **%** |
|---|---|---|
| Malay | 586 | 48.03 |
| Chinese | 255 | 20.9 |
| Indian | 184 | 15.08 |
| Orang Asli | 0 | 0 |
| Bumiputra Sabah | 4 | 0.33 |
| Bumiputra Sarawak | 5 | 0.41 |
| Other Malaysian | 6 | 0.49 |
| Foreigner | 179 | 14.67 |
| Not Available | 1 | 0.08 |
| TOTAL | 1220 | 100 |

**Figure 1.6. Time of Admission for Major Trauma Cases**

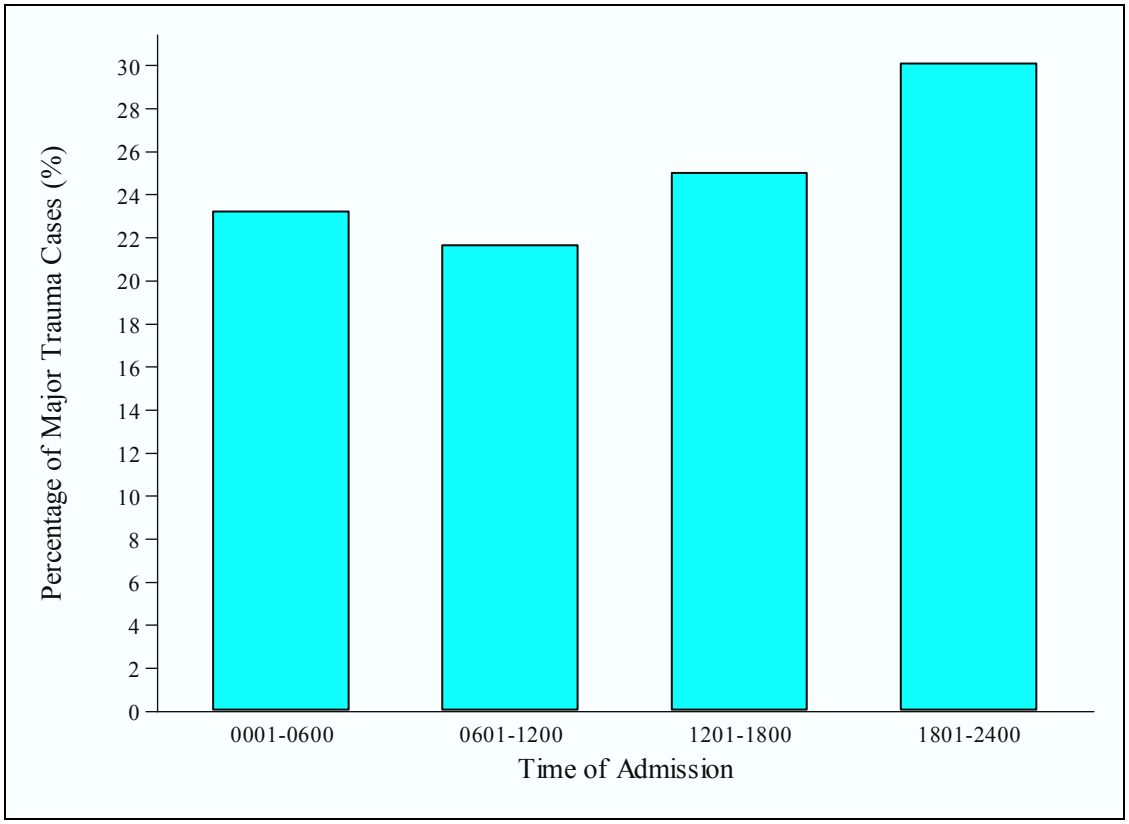


**Table 1.6. Time of Admission for Major Trauma Cases**

| Time of Admission (Hours) | No. | % |
|---|---|---|
| 0001-0600 | 283 | 23.22 |
| 0601-1200 | 264 | 21.66 |
| 1201-1800 | 305 | 25.02 |
| 1801-2400 | 367 | 30.11 |
| TOTAL | 1219 | 100 |

*1 case has no information on "Time of Admission"

**Figure 1.7. Day of Admission for Major Trauma Cases**

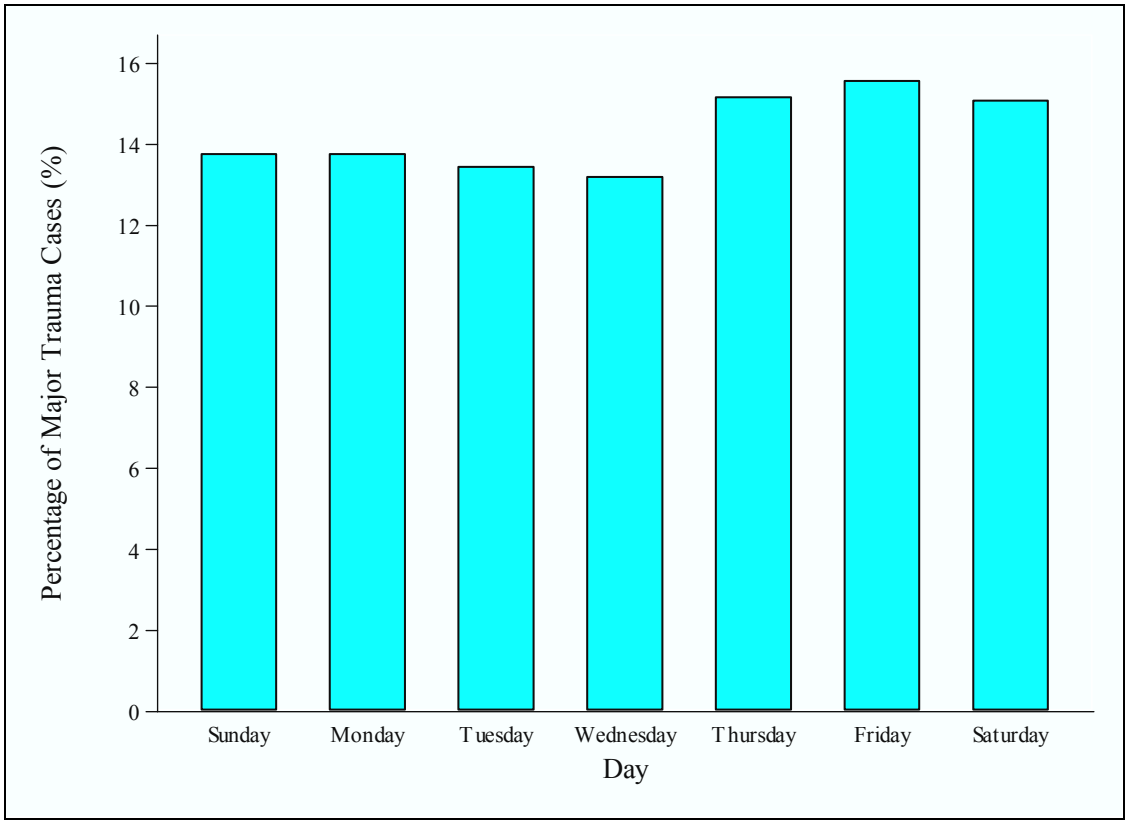


**Table 1.7. Day of Admission for Major Trauma Cases**

| Admission (Days) | No. | % |
|---|---|---|
| Sunday | 168 | 13.77 |
| Monday | 168 | 13.77 |
| Tuesday | 164 | 13.44 |
| Wednesday | 161 | 13.2 |
| Thursday | 185 | 15.16 |
| Friday | 190 | 15.57 |
| Saturday | 184 | 15.08 |
| TOTAL | 1220 | 100 |

**Figure 1.8. Type of Admission for Major Trauma Cases**

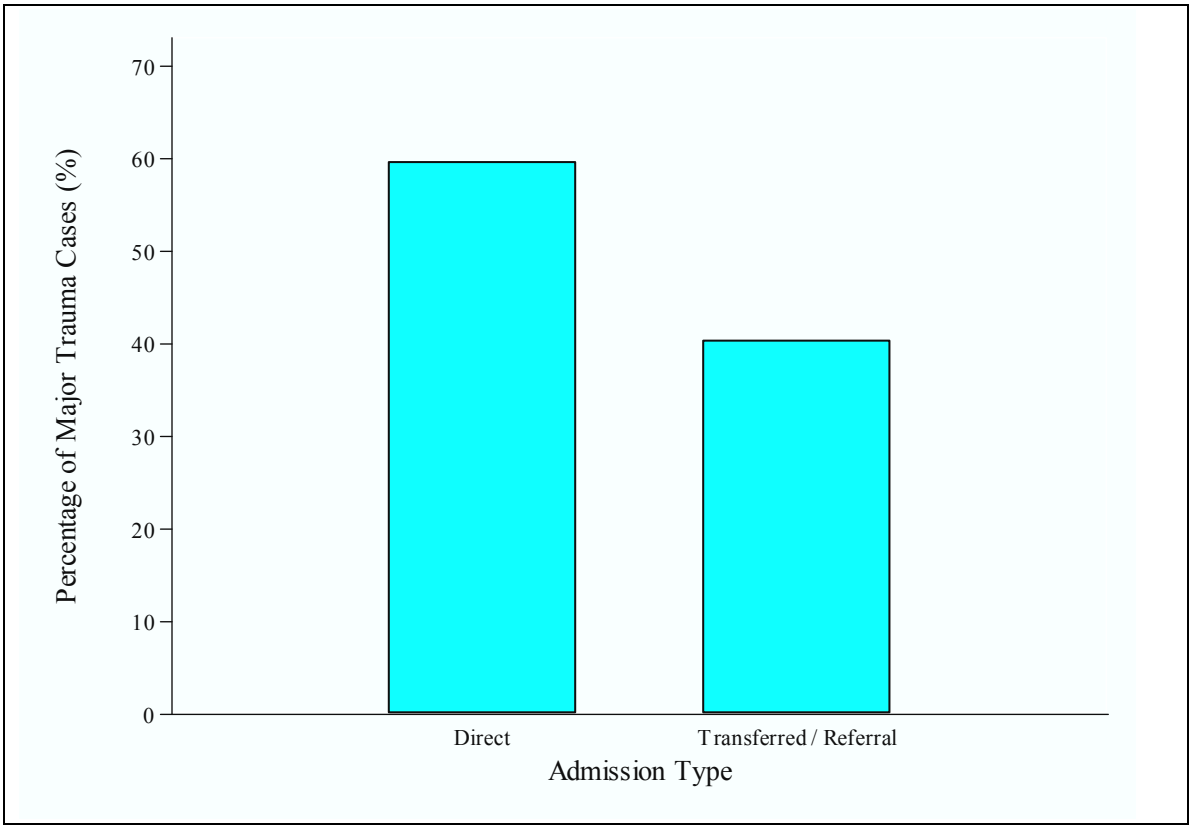


**Table 1.8. Type of Admission for Major Trauma Cases**

| Admission Type | No. | % |
|---|---|---|
| Direct | 725 | 59.62 |
| Transferred / Referral | 491 | 40.38 |
| TOTAL | 1216 | 100 |

*4 cases has no information on "Admission Type"

**Figure 1.8a. Type of Admission for Major Trauma Cases by Centre**

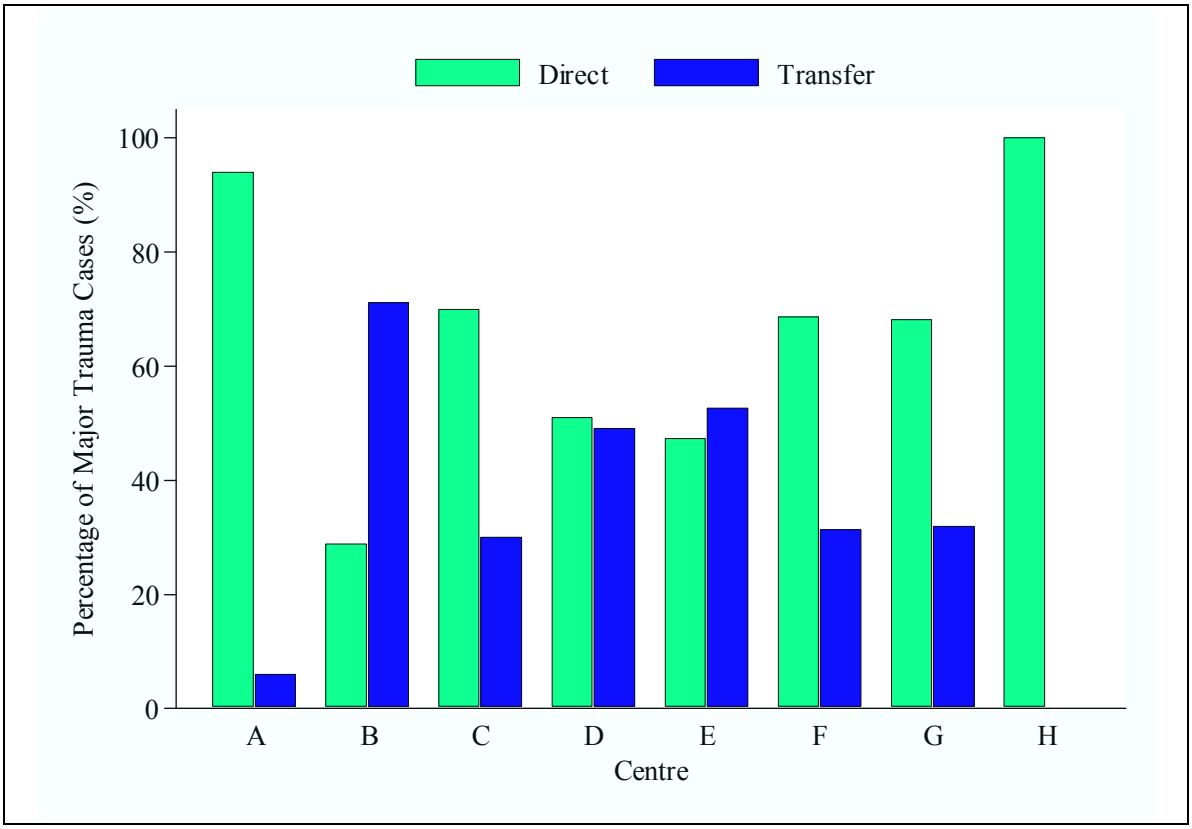


**Table 1.8a. Type of Admission for Major Trauma Cases by Centre**

| Centre | Direct | | Transferred / Referred From | | Total |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| A | 63 | 94.03 | 4 | 5.97 | 67 |
| B | 78 | 28.89 | 192 | 71.11 | 270 |
| C | 112 | 70 | 48 | 30 | 160 |
| D | 82 | 50.93 | 79 | 49.07 | 161 |
| E | 45 | 47.37 | 50 | 52.63 | 95 |
| F | 81 | 68.64 | 37 | 31.36 | 118 |
| G | 173 | 68.11 | 81 | 31.89 | 254 |
| H | 91 | 100 | 0 | 0 | 91 |
| TOTAL | 725 | 59.62 | 491 | 40.38 | 1216 |

*4 cases has no information on "Admission Type"

**Figure 1.9. Type of Admission Referred From for Major Trauma Cases**

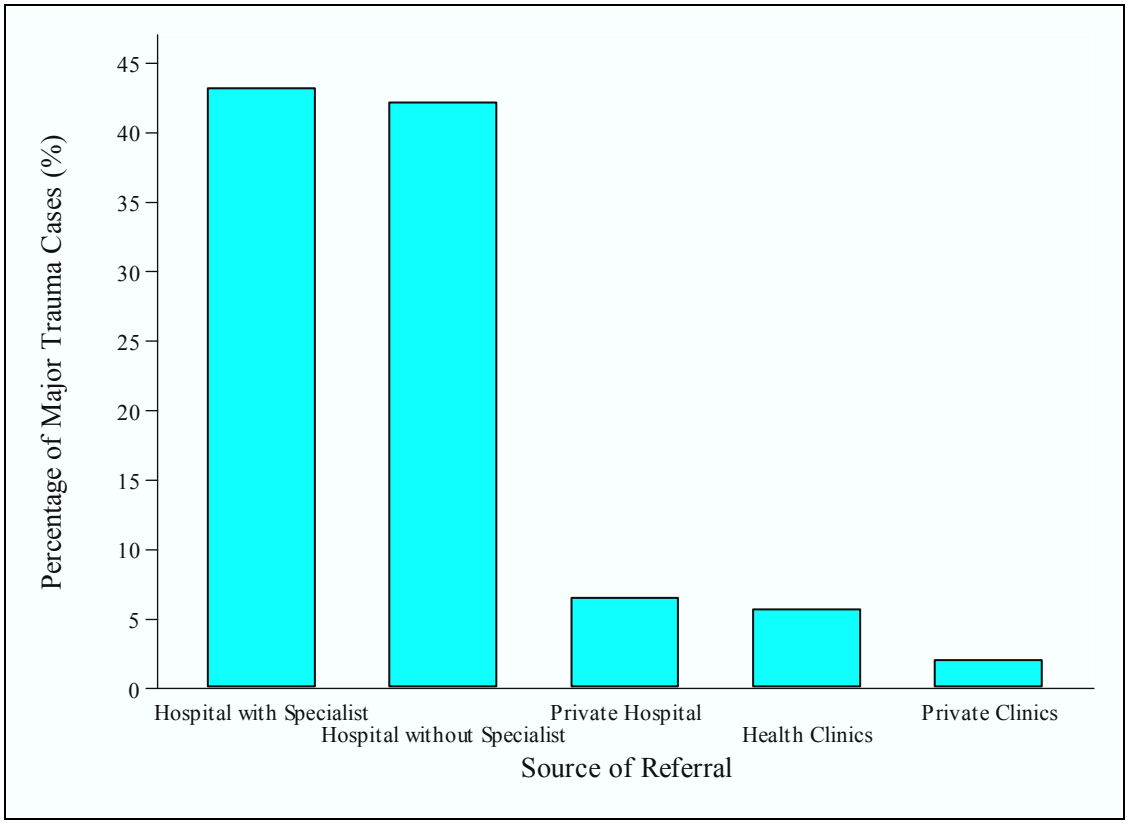


**Table 1.9. Type of Admission Referred From for Major Trauma Cases**

| Source of Referral | No. | % |
|---|---|---|
| Hospital with Specialist | 212 | 43.18 |
| Hospital without Specialist | 207 | 42.16 |
| Health Clinics | 28 | 5.7 |
| Private Hospital | 32 | 6.52 |
| Private Clinics | 10 | 2.04 |
| TOTAL | 491 | 100 |

# Chapter 2: INJURY DETAILS

**Figure 2.1. Mechanism of Injury for Major Trauma Cases**

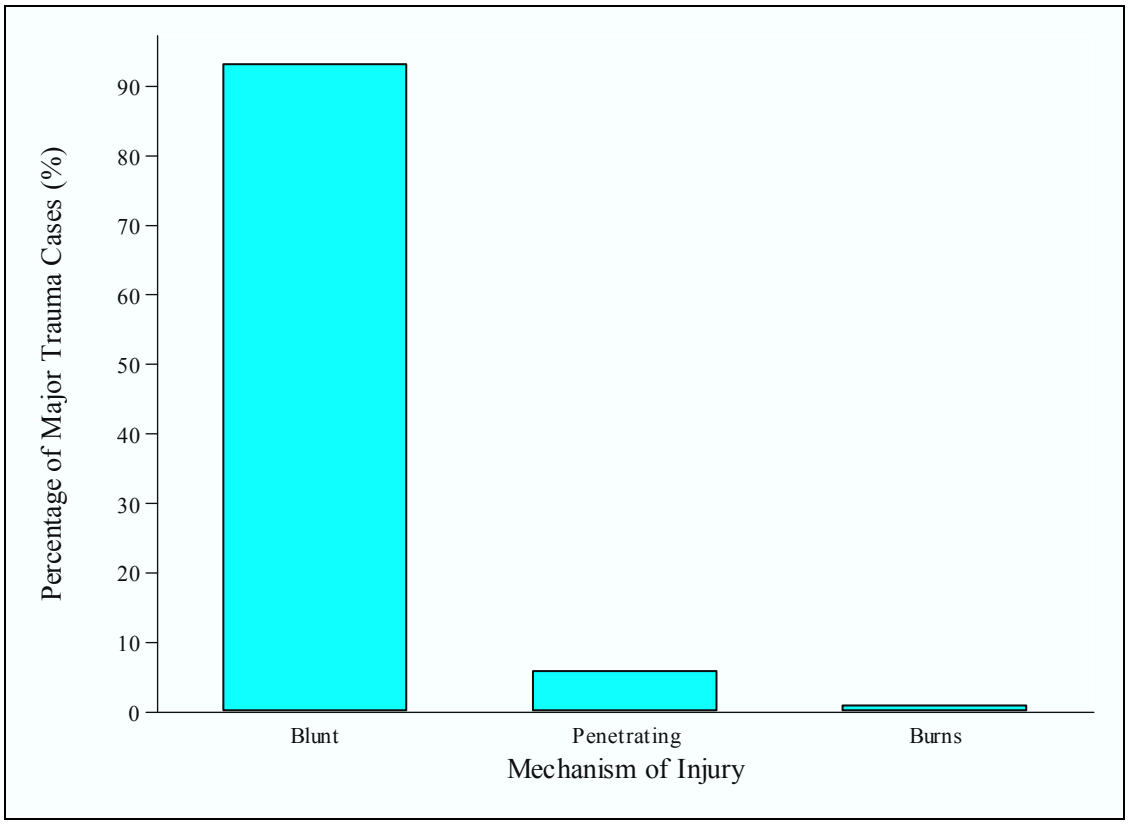


**Table 2.1. Mechanism of Injury for Major Trauma Cases**

| Mechanism of Injury | No. | % |
|---|---|---|
| Blunt | 1136 | 93.19 |
| Penetrating | 72 | 5.91 |
| Burns | 11 | 0.9 |
| TOTAL | 1219 | 100 |

* 1 case has no information on "Mechanism of Injury"

**Figure 2.2. Major Trauma Cases by Injury Intent**

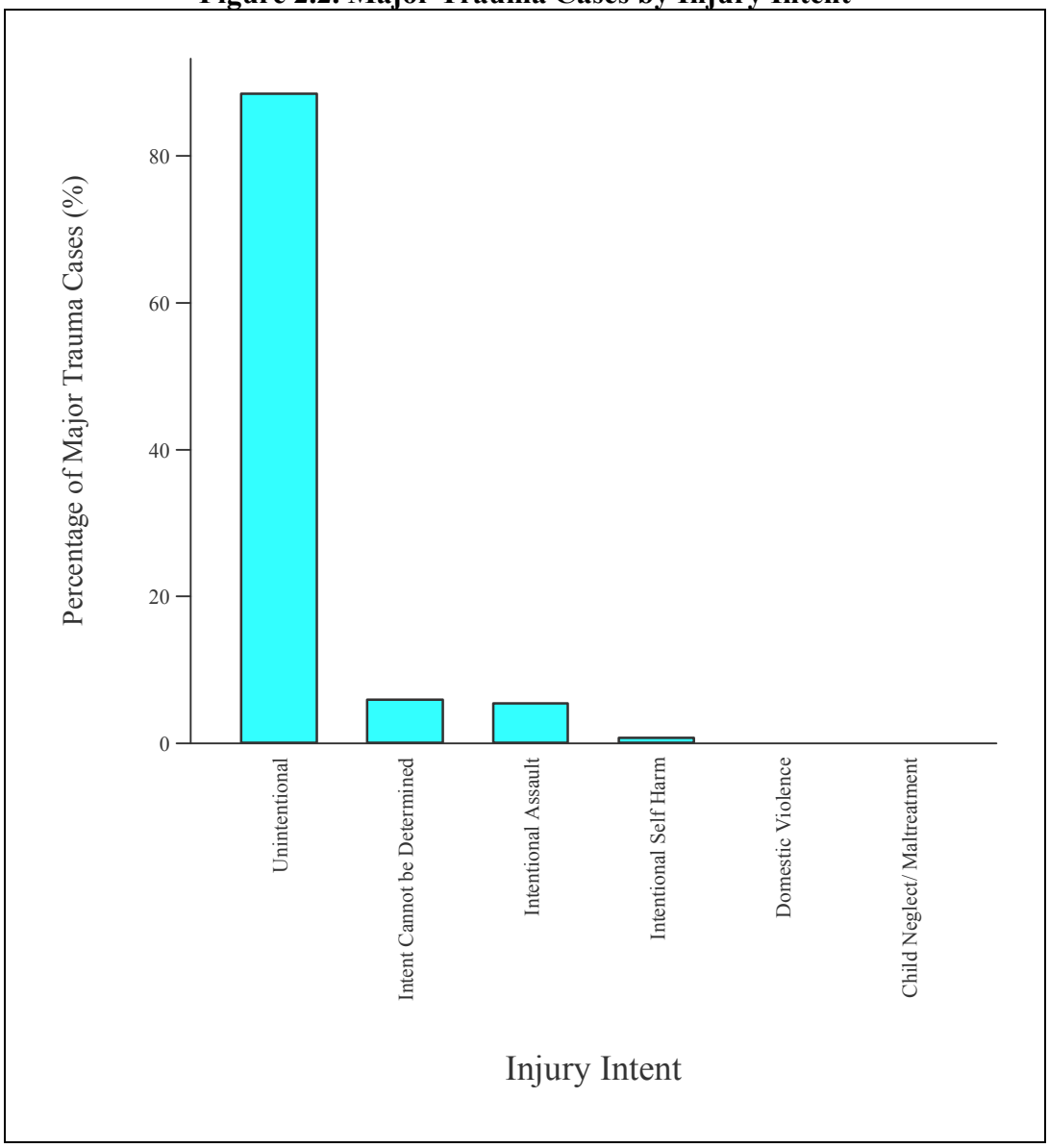


**Table 2.2. Major Trauma Cases by Injury Intent**

| **Injury Intent** | **No.** | **%** |
|---|---|---|
| Unintentional | 1079 | 88.44 |
| Intentional Self Harm | 9 | 0.74 |
| Domestic Violence | 0 | 0 |
| Intent Cannot be Determined | 73 | 5.98 |
| Child Neglect / Maltreatment | 0 | 0 |
| Intentional Assault | 66 | 5.41 |
| TOTAL | 1220 | 100 |

**Figure 2.3. Major Trauma Cases by Cause of Injury**

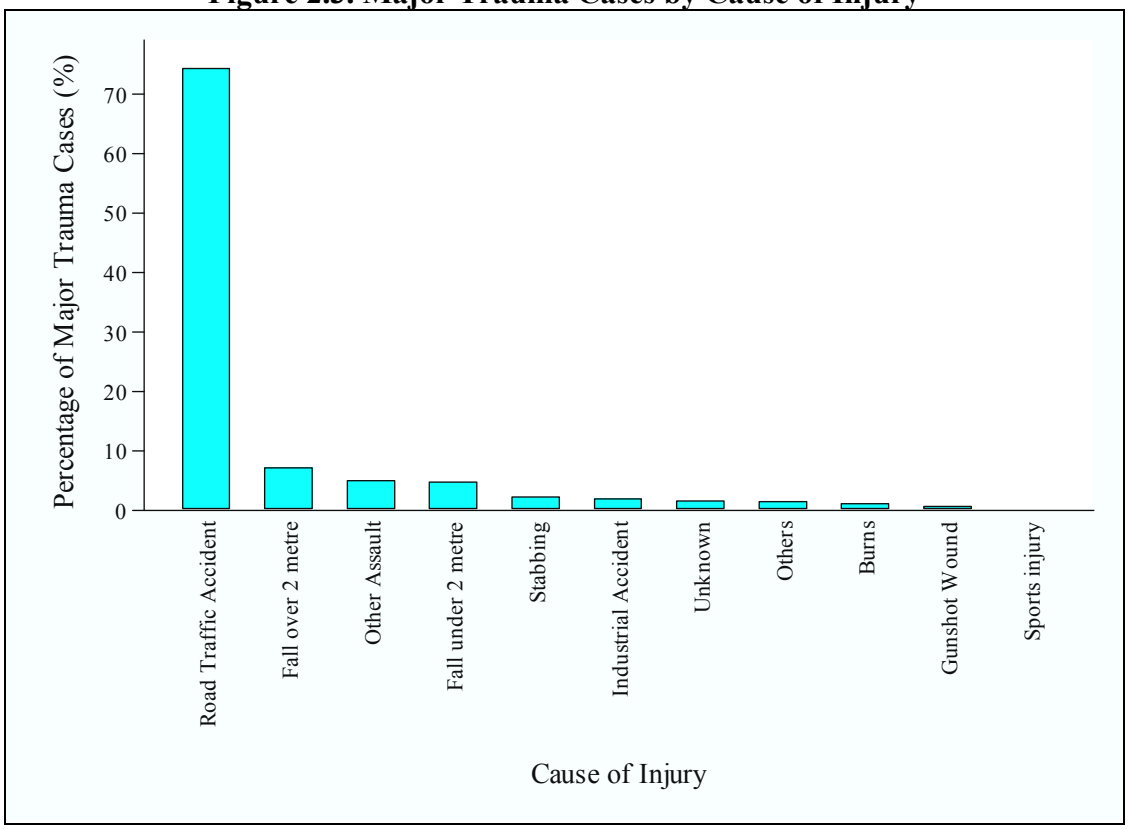


**Table 2.3. Major Trauma Cases by Cause of Injury**

| Cause of Injury | No. | % |
|---|---|---|
| Road Traffic Accident | 900 | 74.32 |
| Industrial Accident | 20 | 1.65 |
| Fall over 2 meter | 89 | 7.35 |
| Fall under 2 meter (about one door's height) | 59 | 4.87 |
| Sports injury | 1 | 0.08 |
| Burns | 10 | 0.83 |
| Stabbing | 28 | 2.31 |
| Gunshot Wound | 8 | 0.66 |
| Other Assault | 58 | 4.79 |
| Others | 18 | 1.49 |
| Unknown | 20 | 1.65 |
| TOTAL | 1211 | 100 |

* 9 cases have no information on "Cause of Injury"

**Figure 2.3a. Major Trauma Cases by Type of Road Traffic Accident**

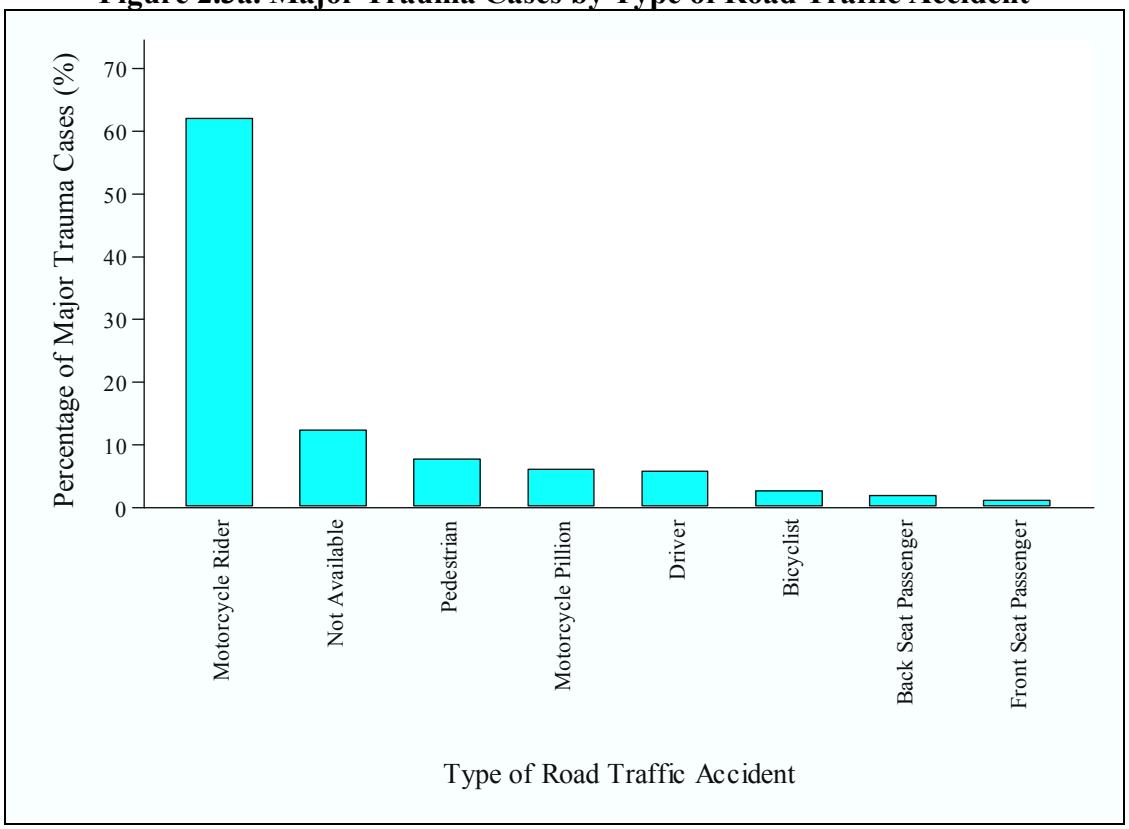


**Table 2.3a. Major Trauma Cases by Type of Road Traffic Accident**

| Type of Road Traffic Accident | No. | % |
|---|---|---|
| Motorcycle Rider | 557 | 62.03 |
| Motorcycle Pillion | 55 | 6.12 |
| Driver | 52 | 5.79 |
| Front Seat Passenger | 11 | 1.22 |
| Back Seat Passenger | 18 | 2 |
| Bicyclist | 24 | 2.67 |
| Pedestrian | 70 | 7.8 |
| Not Available | 111 | 12.36 |
| TOTAL | 898 | 100 |

*2 cases have no information on "Type of Road Traffic Accident"

**Figure 2.4. Major Trauma Cases by Place of Injury**

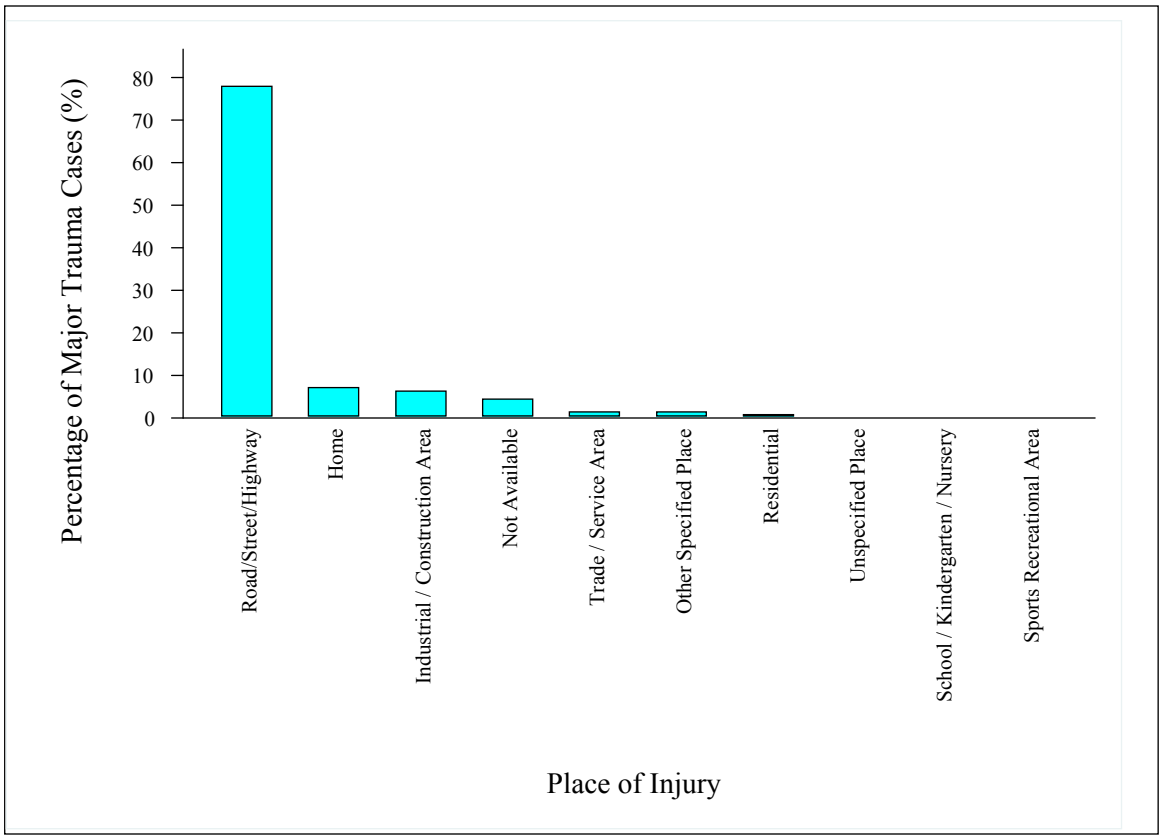


**Table 2.4. Major Trauma Cases by Place of Injury**

| Place of Injury | No. | % |
|---|---|---|
| Road/Street/ Highway | 950 | 77.87 |
| Home | 87 | 7.13 |
| Industrial / Construction Area | 77 | 6.31 |
| School / Kindergarten / Nursery | 4 | 0.33 |
| Sports Recreational Area | 3 | 0.25 |
| Trade / Service Area | 17 | 1.39 |
| Residential Institution | 9 | 0.74 |
| Other Specified Place | 16 | 1.31 |
| Unspecified Place | 4 | 0.33 |
| Not Available | 53 | 4.34 |
| TOTAL | 1220 | 100 |

**Figure 2.5. Category of Initial Reviewing Officer in ED for Major Trauma Cases**

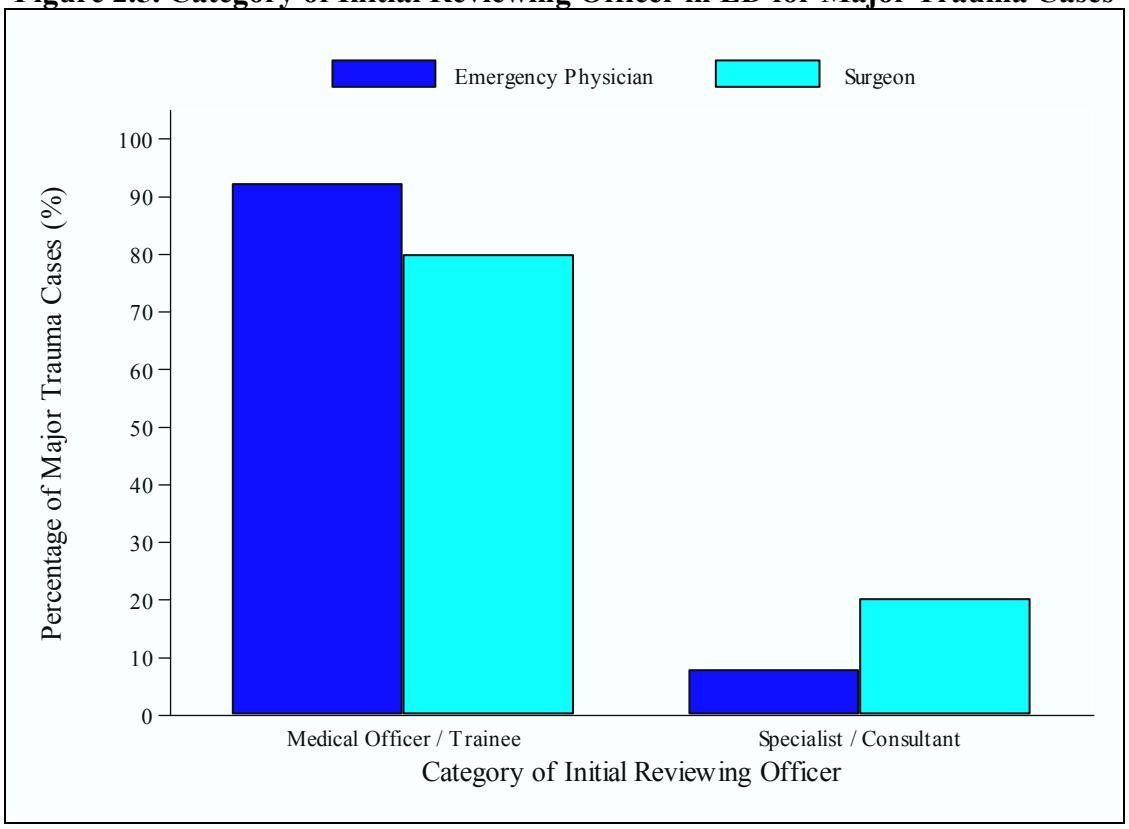


**Table 2.5. Category of Initial Reviewing Officer in ED for Major Trauma Cases**

| Category of Initial Reviewing Officer | Emergency Physician | | Surgeon | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Medical Officer/Trainee | 1136 | 92.21 | 764 | 79.83 |
| Specialist/Consultant | 96 | 7.79 | 193 | 20.17 |
| TOTAL | 1232 | 100 | 957 | 100 |

* Included cases with both category of "Initial Reviewing Officer"

**Figure 2.6. Disposition of Major Trauma Cases from ED**

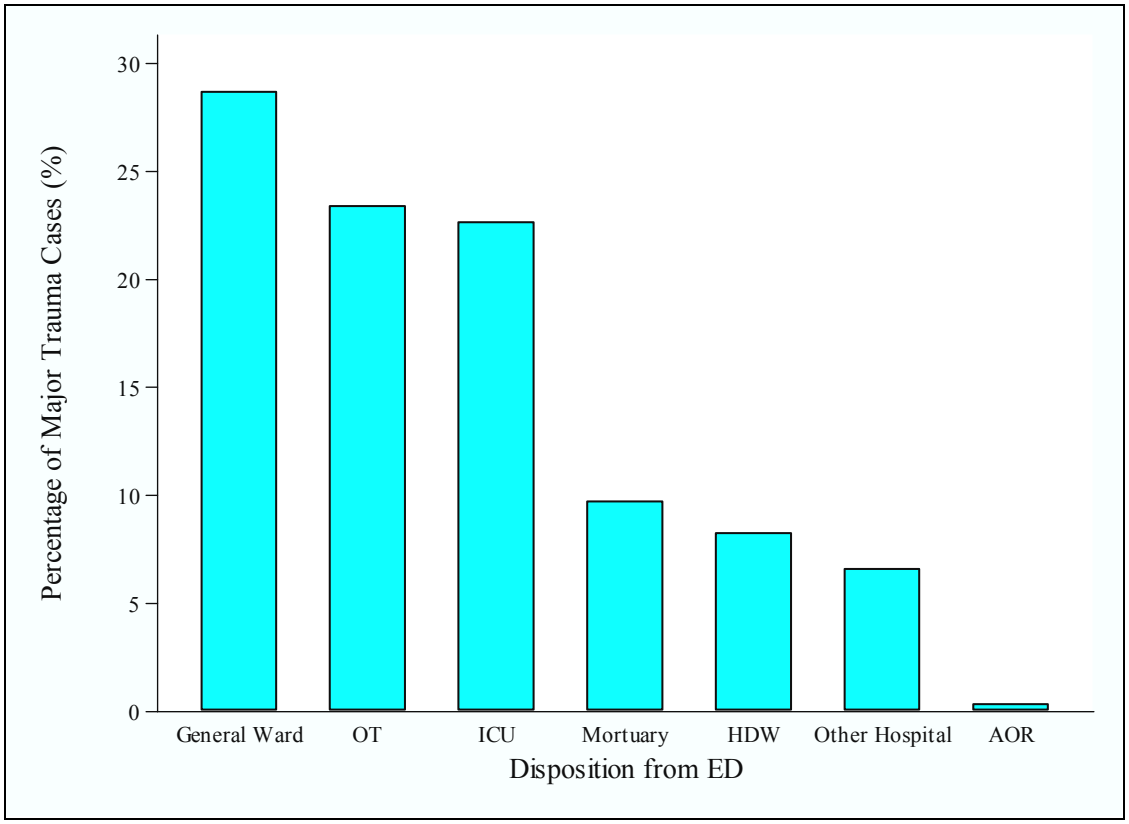


**Table 2.6. Disposition of Major Trauma Cases from ED**

| Disposition From ED | No. | % |
|---|---|---|
| ICU | 275 | 22.65 |
| OT | 284 | 23.39 |
| General Ward | 348 | 28.67 |
| Mortuary | 118 | 9.72 |
| AOR | 4 | 0.33 |
| HDW | 100 | 8.24 |
| Other Hospital | 80 | 6.59 |
| Not Available | 5 | 0.41 |
| TOTAL | 1214 | 100 |

*6 cases have no information on "Disposition from ED"

**Figure 2.7. ICU Admission for Major Trauma Cases**

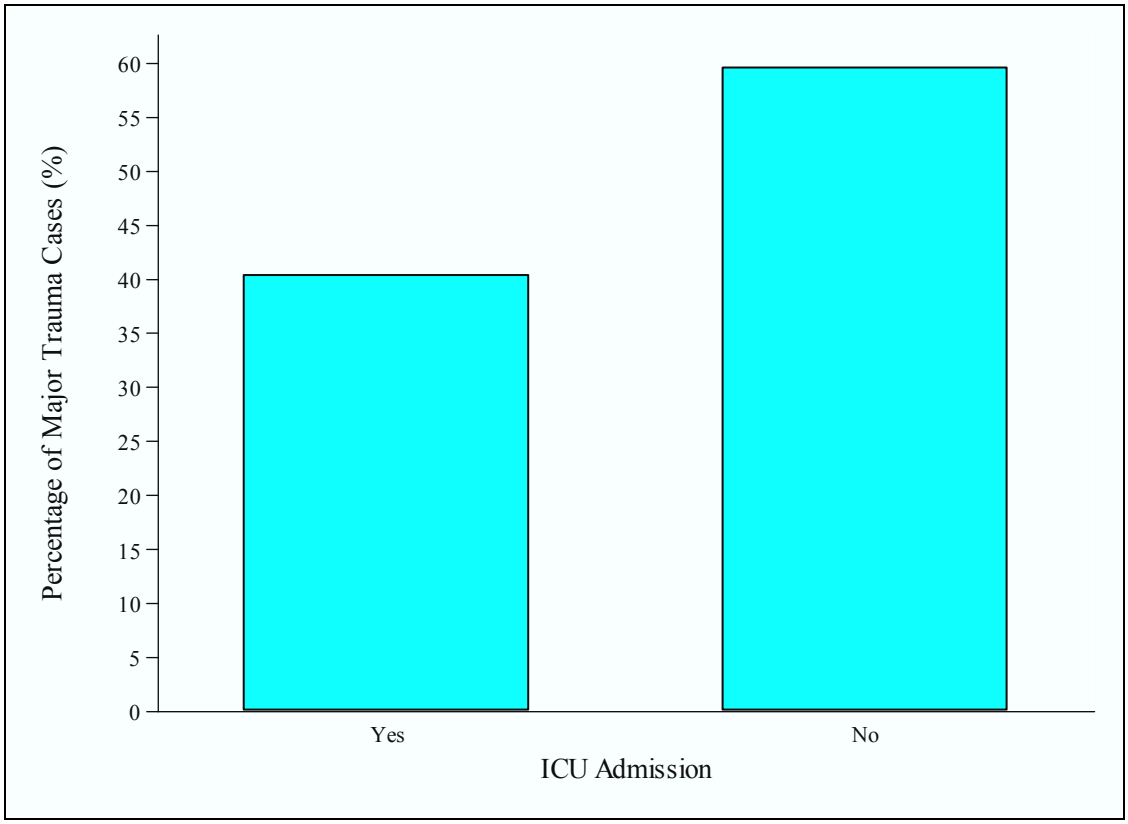


**Table 2.7. ICU Admission for Major Trauma Cases**

| ICU Admission | No. | % |
|---|---|---|
| Yes | 490 | 40.4 |
| No | 723 | 59.6 |
| TOTAL | 1213 | 100 |

*7 cases have no information on "ICU Admission".

**Figure 2.7a. ICU Admissions for Major Trauma Cases by Centre**

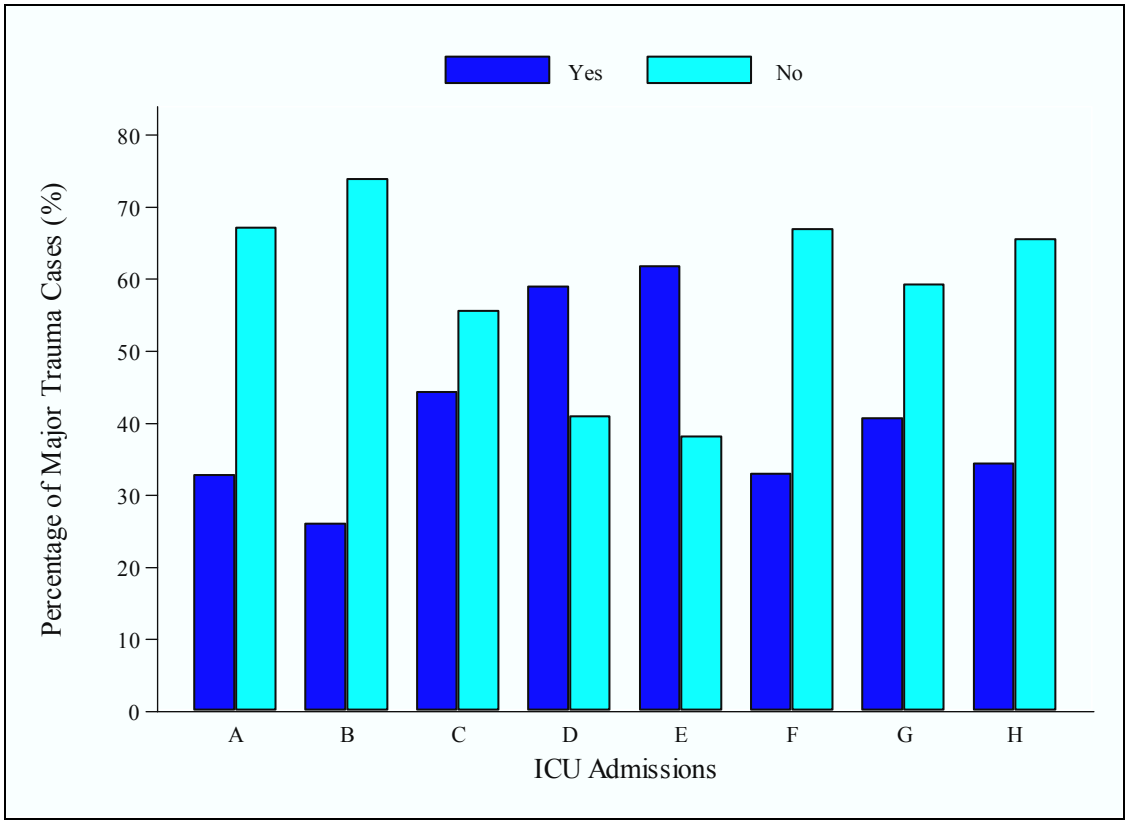


**Table 2.7a. Total ICU Admissions for Major Trauma Cases by Centre**

| Centre | ICU admissions | | | | Total |
|---|---|---|---|---|---|
| | Yes | | No | | |
| | No. | % | No. | % | |
| A | 22 | 32.84 | 45 | 67.16 | 67 |
| B | 71 | 26.1 | 201 | 73.9 | 272 |
| C | 71 | 44.38 | 89 | 55.63 | 160 |
| D | 95 | 59.01 | 66 | 40.99 | 161 |
| E | 60 | 61.86 | 37 | 38.14 | 97 |
| F | 39 | 33.05 | 79 | 66.95 | 118 |
| G | 101 | 40.73 | 147 | 59.27 | 248 |
| H | 31 | 34.44 | 59 | 65.56 | 90 |
| TOTAL | 490 | 40.4 | 723 | 59.6 | 1213 |

*7 cases have no information on "ICU Admission".

**Figure 2.8. Major Trauma Cases by Systolic BP**

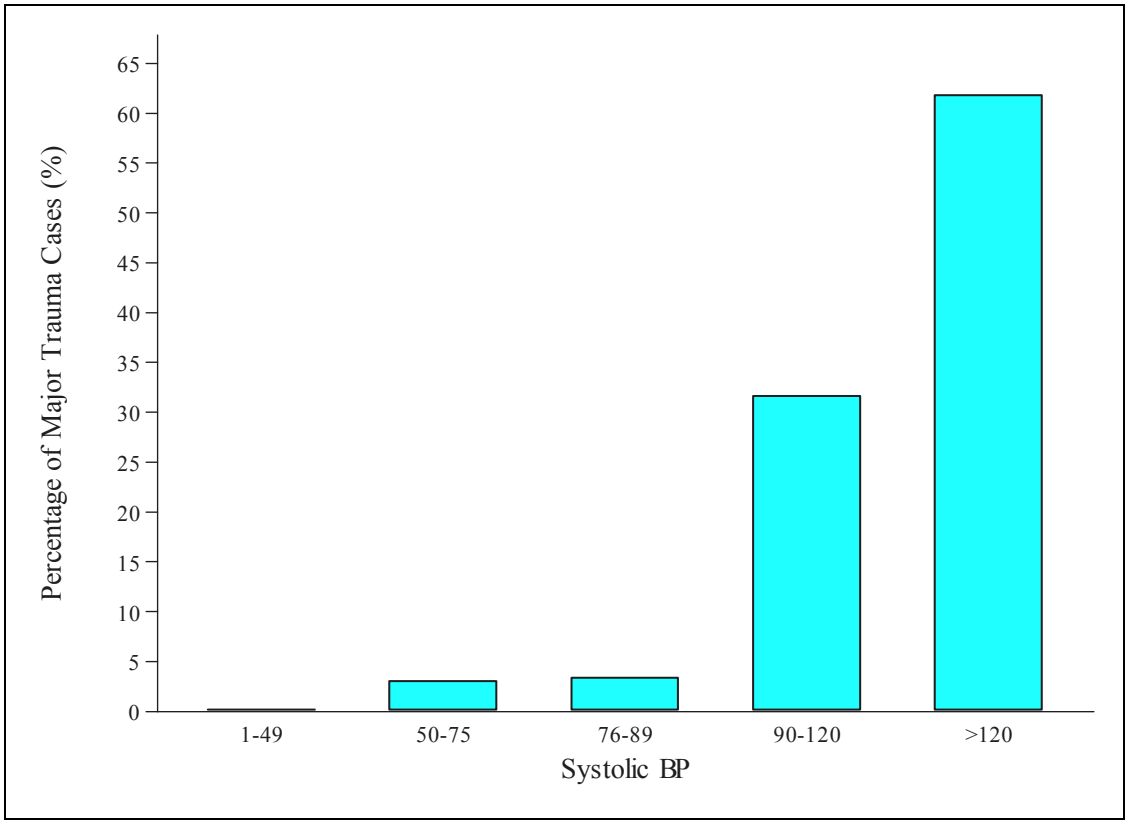


**Table 2.8. Major Trauma Cases by Systolic BP**

| Systolic BP | No. | % |
|---|---|---|
| 1-49 | 2 | 0.17 |
| 50-75 | 36 | 3.02 |
| 76-89 | 40 | 3.35 |
| 90-120 | 378 | 31.66 |
| >120 | 738 | 61.81 |
| TOTAL | 1194 | 100 |

*26 cases have no information on "Systolic BP".

**Figure 2.9. Major Trauma Cases by Glasgow Coma Scale (GCS)**

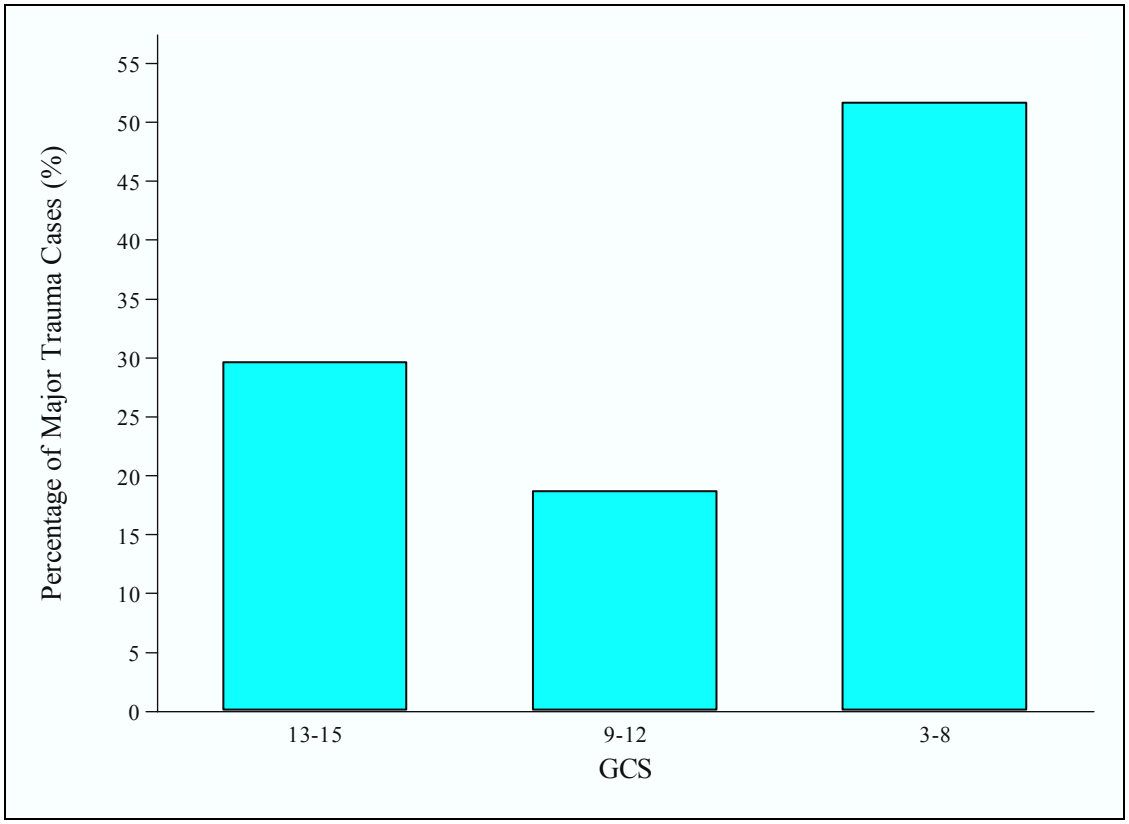


**Table 2.9. Major Trauma Cases by Glasgow Coma Scale (GCS)**

| Glasgow Coma Scale (GCS) | No. | % |
|---|---|---|
| 13-15 | 359 | 29.64 |
| 9-12 | 226 | 18.66 |
| 3-8 | 626 | 51.69 |
| TOTAL | 1211 | 100 |

*9 cases have no information on "GCS".

**Figure 2.10. Traumatic Brain Injuries for Major Trauma Cases**

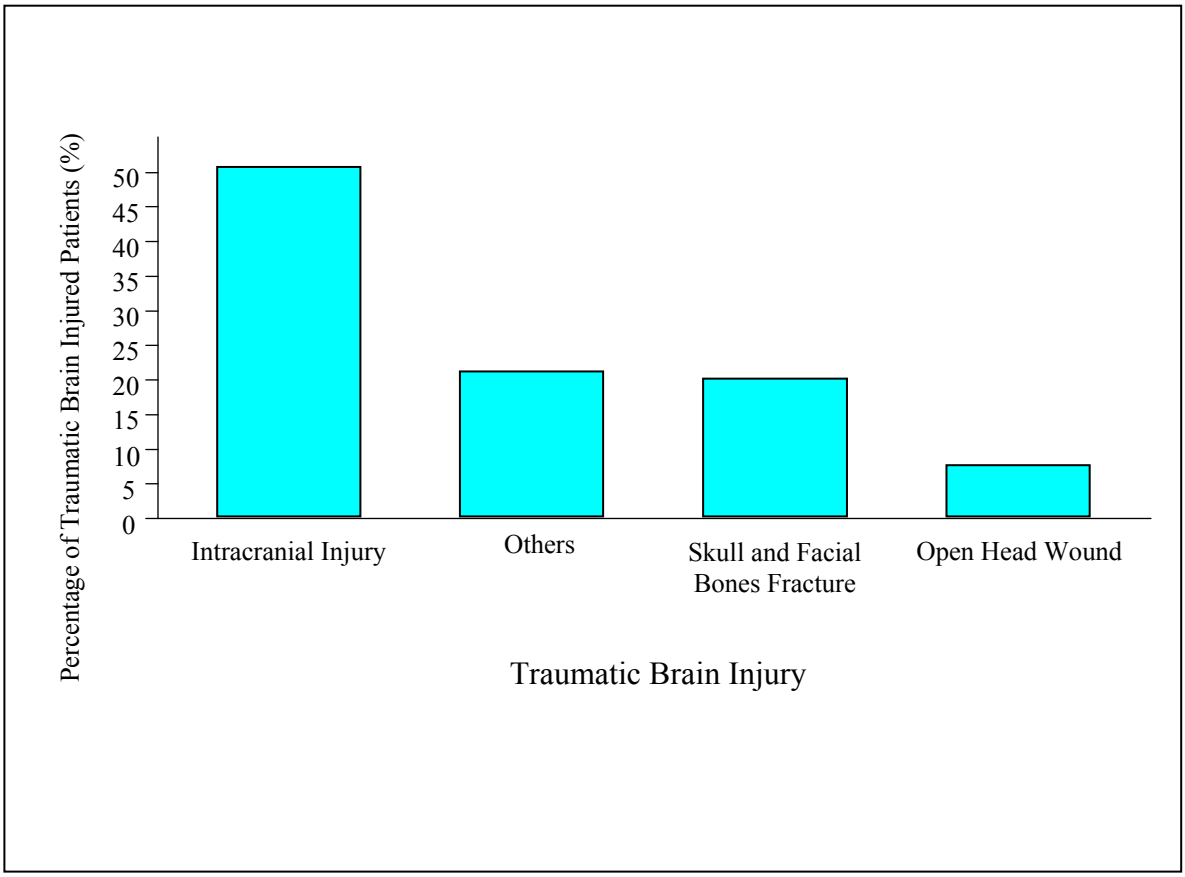


**Table 2.10. Traumatic Brain Injuries for Major Trauma Cases**

| Traumatic Brain Injury | No. | % |
|---|---|---|
| Open Head Wound | 124 | 7.75 |
| Skull and Facial Bones Fracture | 324 | 20.24 |
| Intracranial Injury | 813 | 50.78 |
| Others | 340 | 21.24 |
| TOTAL | 1601 | 100 |

* Included cases with more than one type of "Traumatic Brain Injury".

**Figure 2.11. Intracranial Injury for Major Trauma Cases**

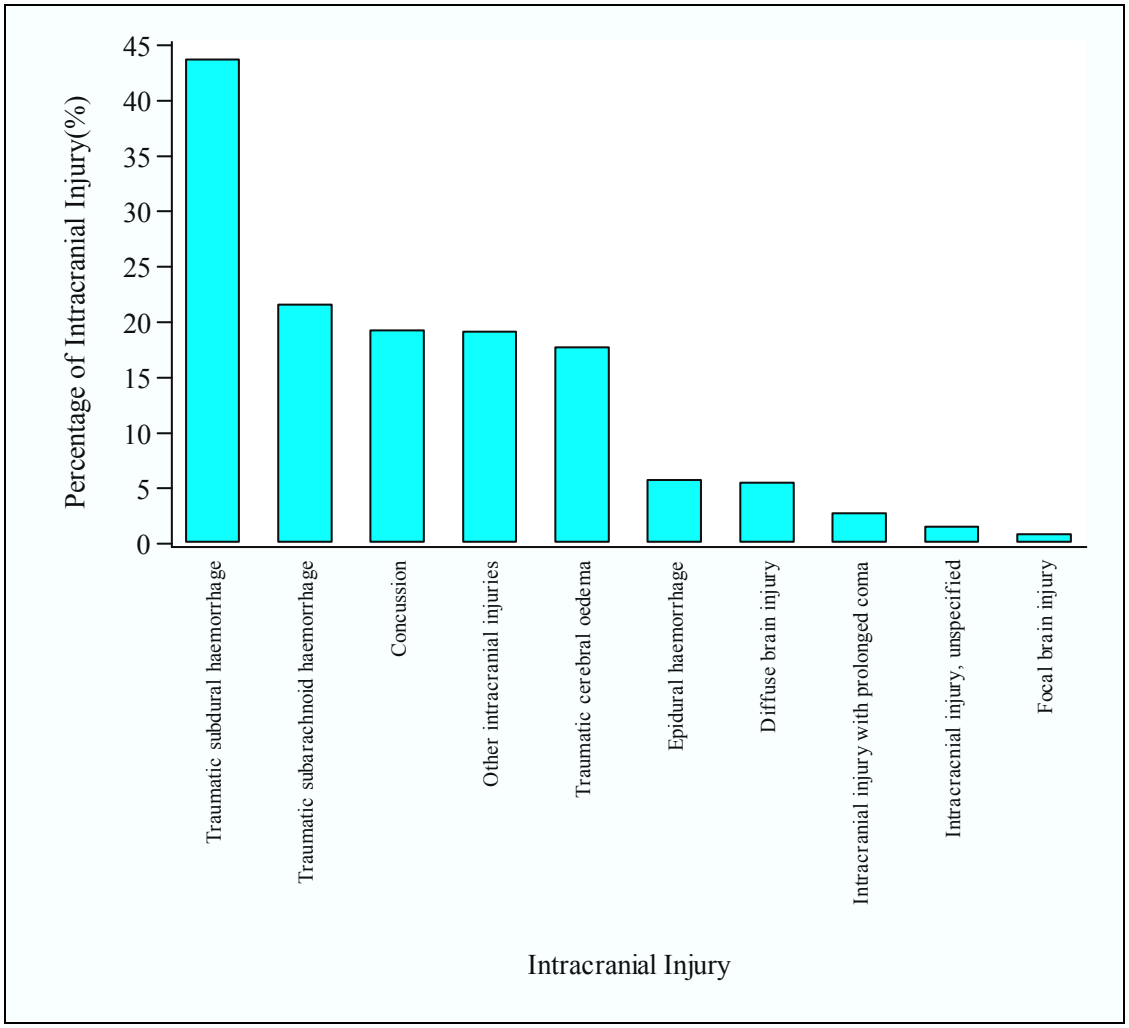


**Table 2.11. Intracranial Injury for Major Trauma Cases**

| **Intracranial Injury** | **No.** | **%** |
|---|---|---|
| Concussion | 174 | 19.27 |
| Traumatic cerebral oedema | 160 | 17.72 |
| Diffuse brain injury | 50 | 5.54 |
| Focal brain injury | 8 | 0.89 |
| Epidural hemorrhage | 52 | 5.76 |
| Traumatic subdural hemorrhage | 395 | 43.74 |
| Traumatic subarachnoid hemorrhage | 195 | 21.59 |
| Intracranial injury with prolonged coma | 25 | 2.77 |
| Others | 173 | 19.16 |
| Intracranial injury, unspecified | 14 | 1.55 |
| TOTAL | 1246 | 100 |

* Included cases with more than one type of "Intracranial Injury".

**Figure 2.12. Major Trauma Cases by RTS**

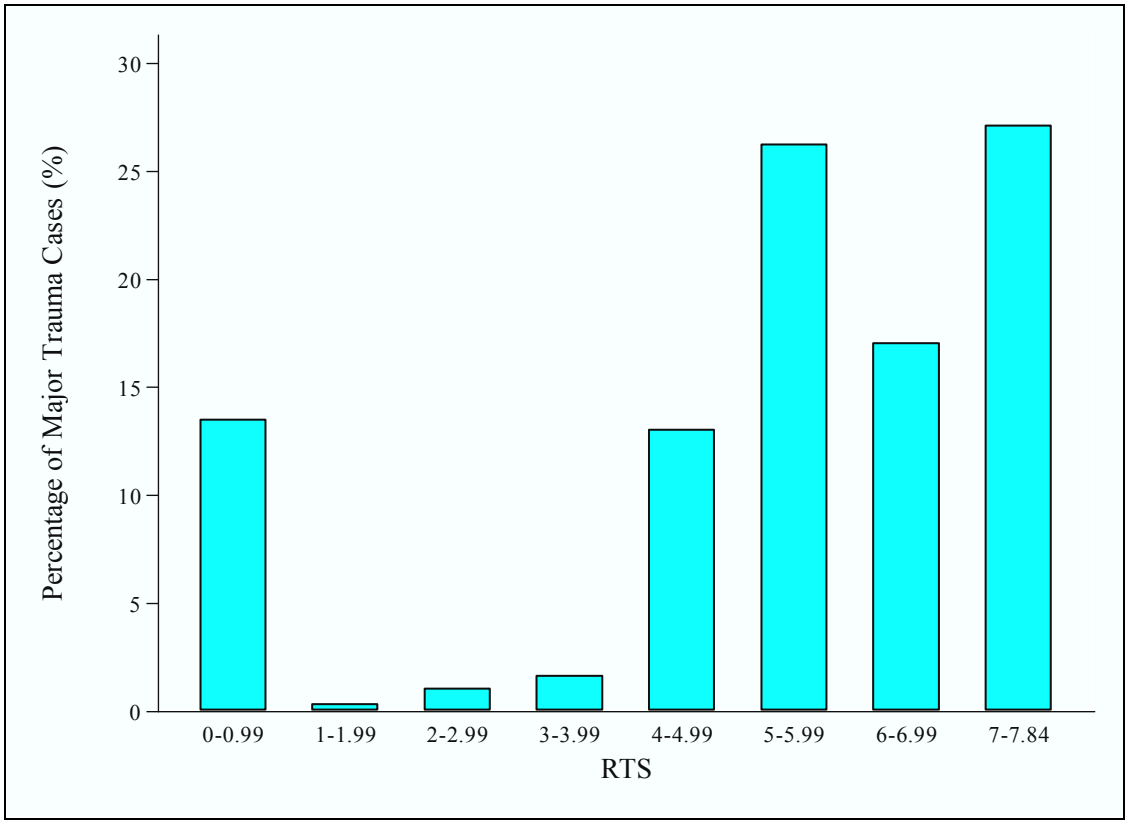


**Table 2.12. Major Trauma Cases by RTS**

| RTS | No. | % |
|---|---|---|
| 0-0.99 | 165 | 13.52 |
| 1-1.99 | 4 | 0.33 |
| 2-2.99 | 13 | 1.07 |
| 3-3.99 | 20 | 1.64 |
| 4-4.99 | 159 | 13.03 |
| 5-5.99 | 320 | 26.23 |
| 6-6.99 | 208 | 17.05 |
| 7-7.84 | 331 | 27.13 |
| TOTAL | 1220 | 100 |

**Figure 2.13. Injuries According to Body Region for Major Trauma Cases**

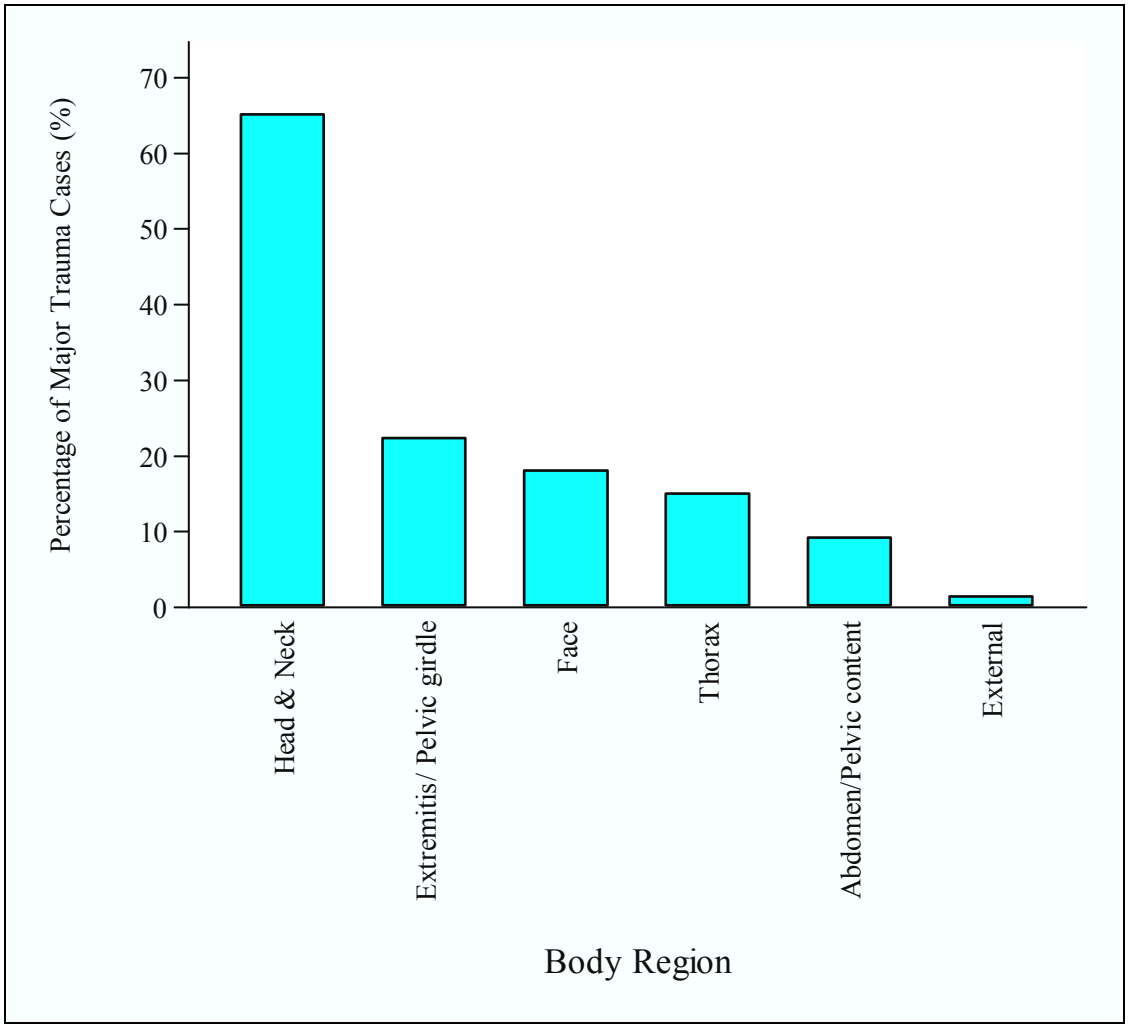


**Table 2.13. Injuries According to Body Region for Major Trauma Cases**

| Body Region | No. | % |
|---|---|---|
| Head & Neck | 1060 | 65.15 |
| Face | 295 | 18.13 |
| Thorax | 245 | 15.06 |
| Abdomen/Pelvic content | 150 | 9.22 |
| Extremitis/ Pelvic girdle | 365 | 22.43 |
| External | 24 | 1.48 |

**Figure 2.14. Abbreviated Injury Scale (AIS) for All Injuries for Major Trauma Patients**

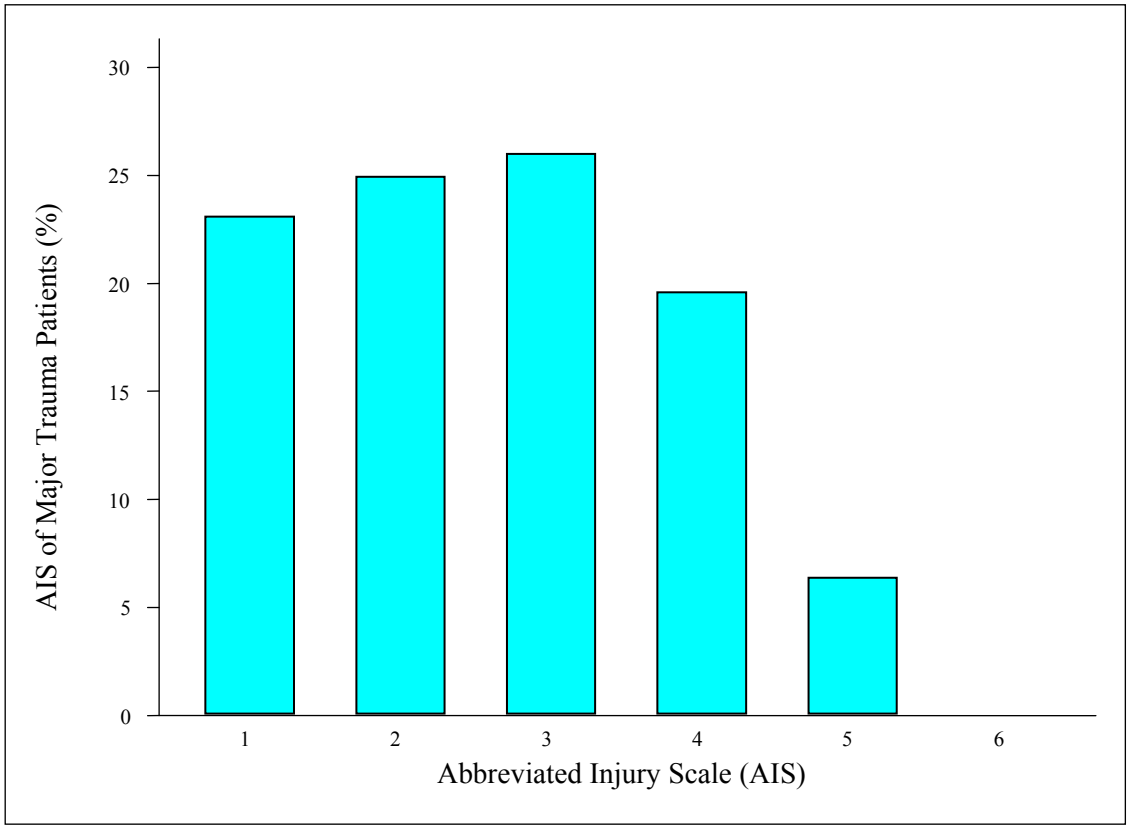


**Table 2.14. Abbreviated Injury Scale (AIS) for All Injuries for Major Trauma Patients**

| AIS | No. | % |
|---|---|---|
| 1 | 928 | 23.08 |
| 2 | 1002 | 24.92 |
| 3 | 1045 | 25.99 |
| 4 | 787 | 19.57 |
| 5 | 256 | 6.37 |
| 6 | 3 | 0.07 |
| TOTAL | 4021 | 100 |

* Included cases with more than one record on "AIS"

**Figure 2.14a. Abbreviated Injury Scale (AIS) Distribution According to Body Region for Major Trauma Cases**

**Figure 2.14a(i). Head and Neck Region**

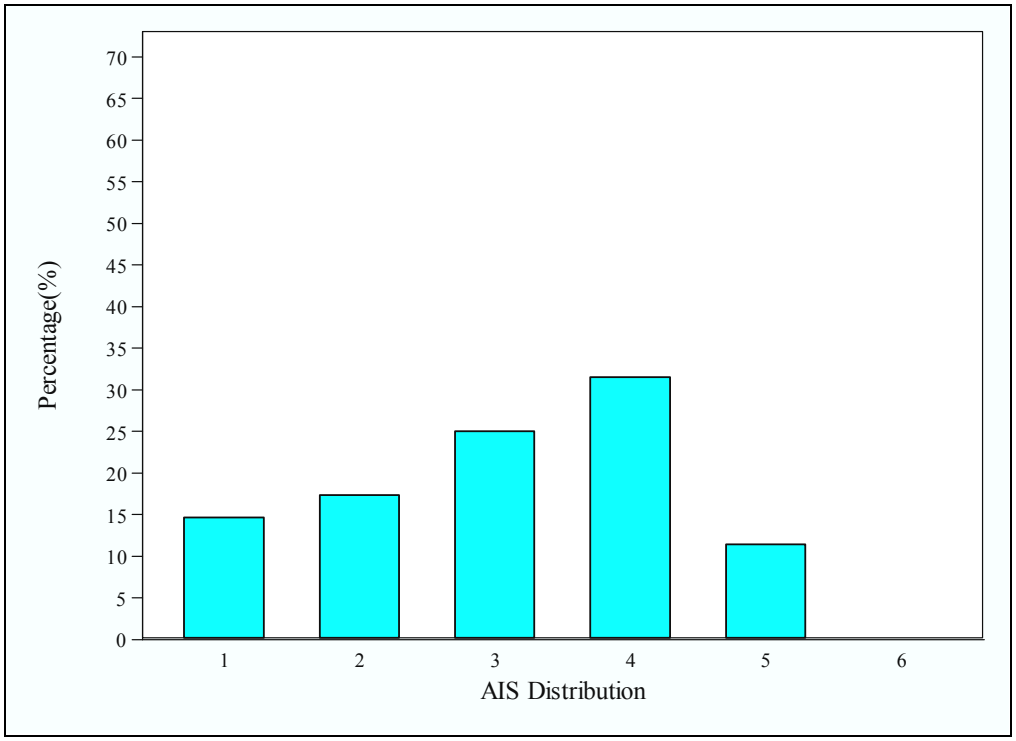


**Figure 2.14a(ii). Face Region**

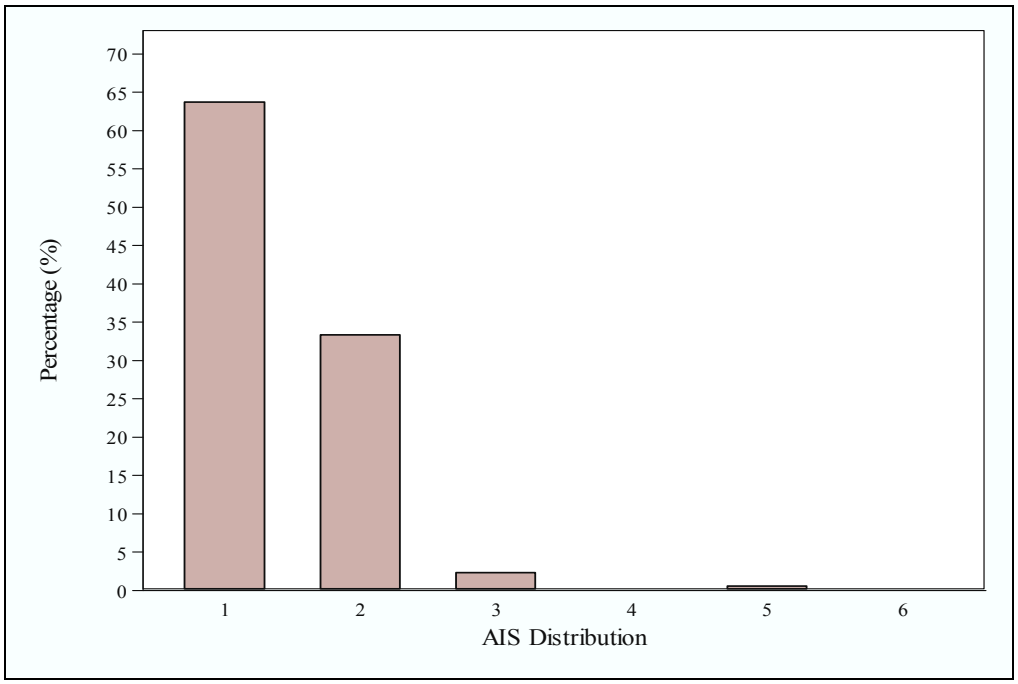

**Figure 2.14a(iii). Thorax Region**

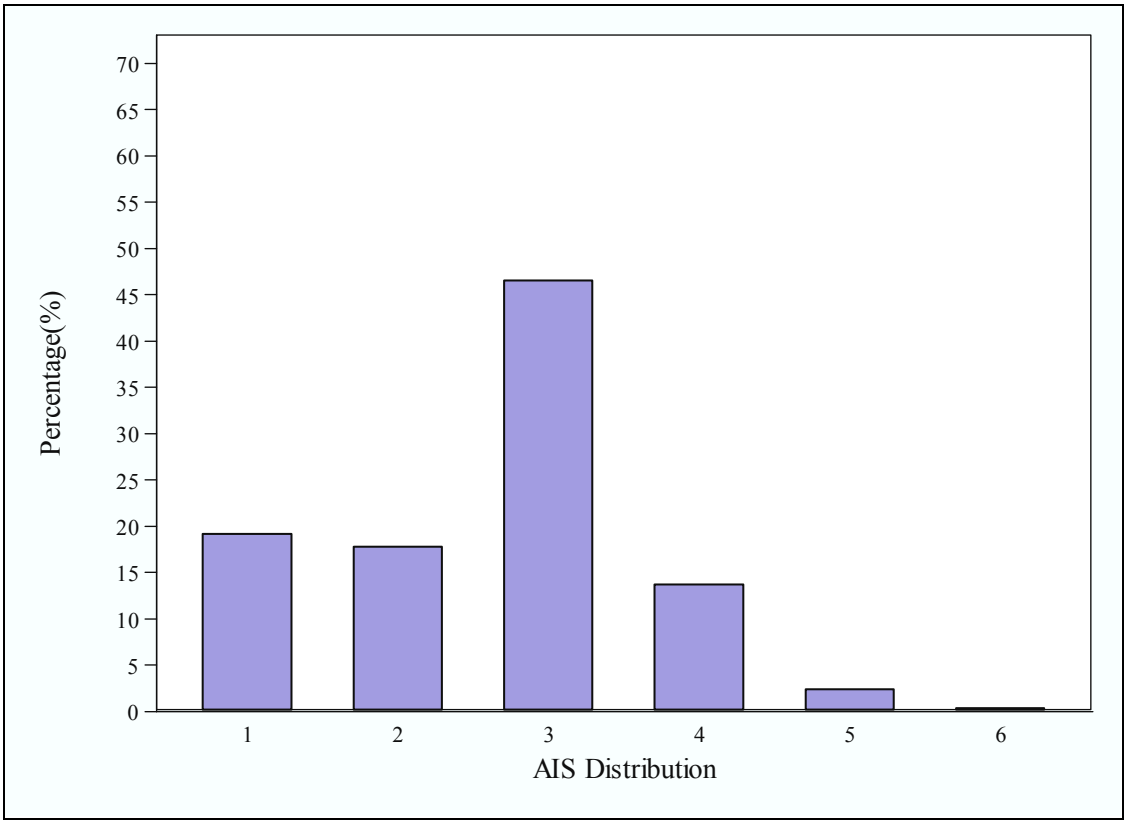


**Figure 2.14a(iv). Abdomen/Pelvic Content Region**

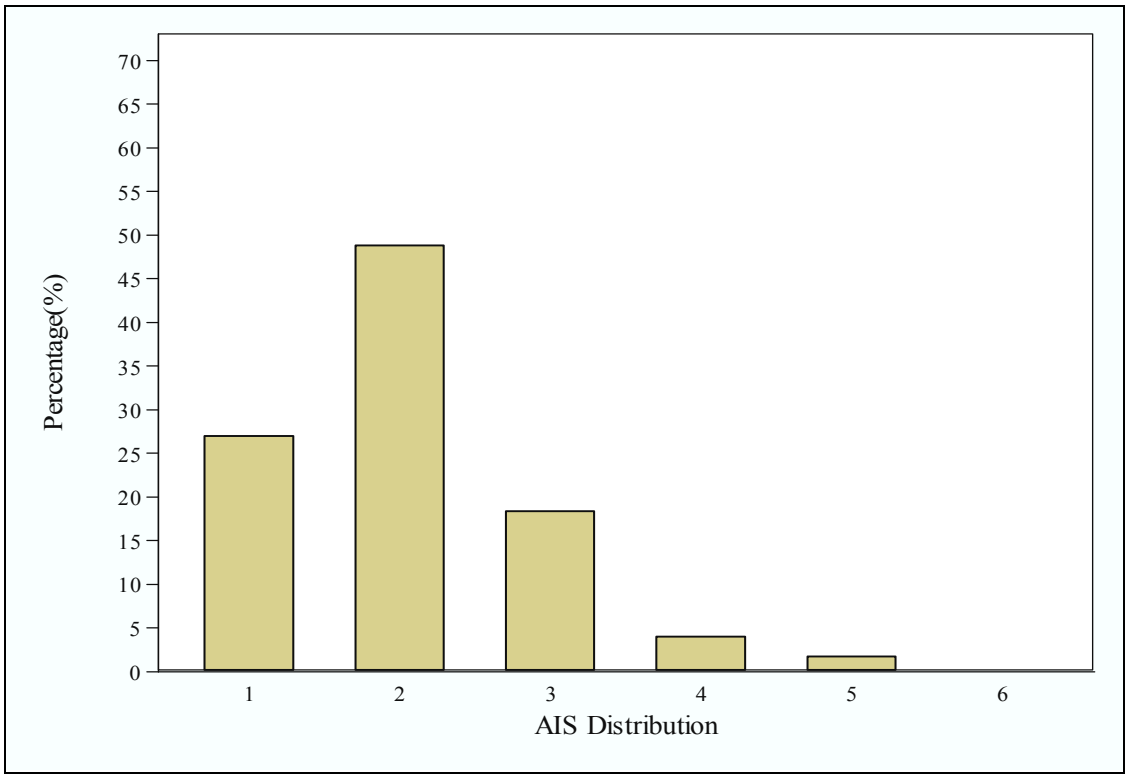

**Figure 2.14a(v). Extremitis /Pelvic Girdle Region**

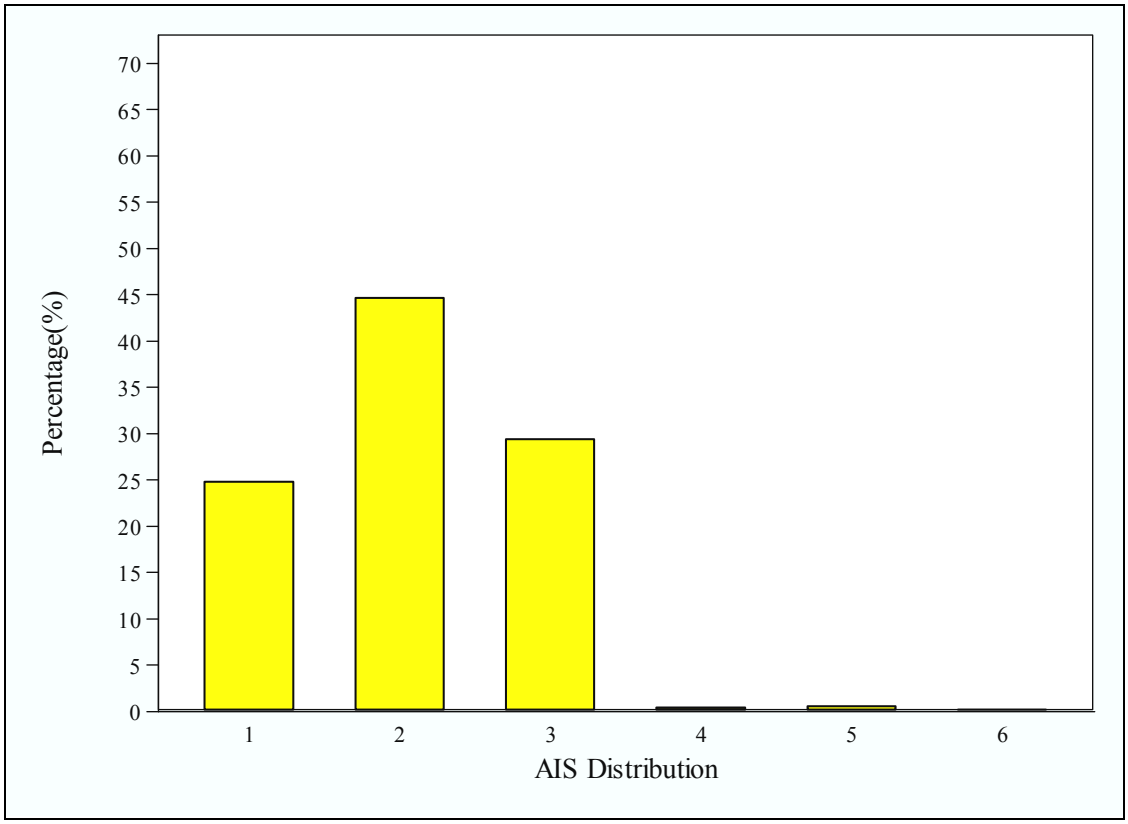


**Figure 2.14a(vi). External Region**

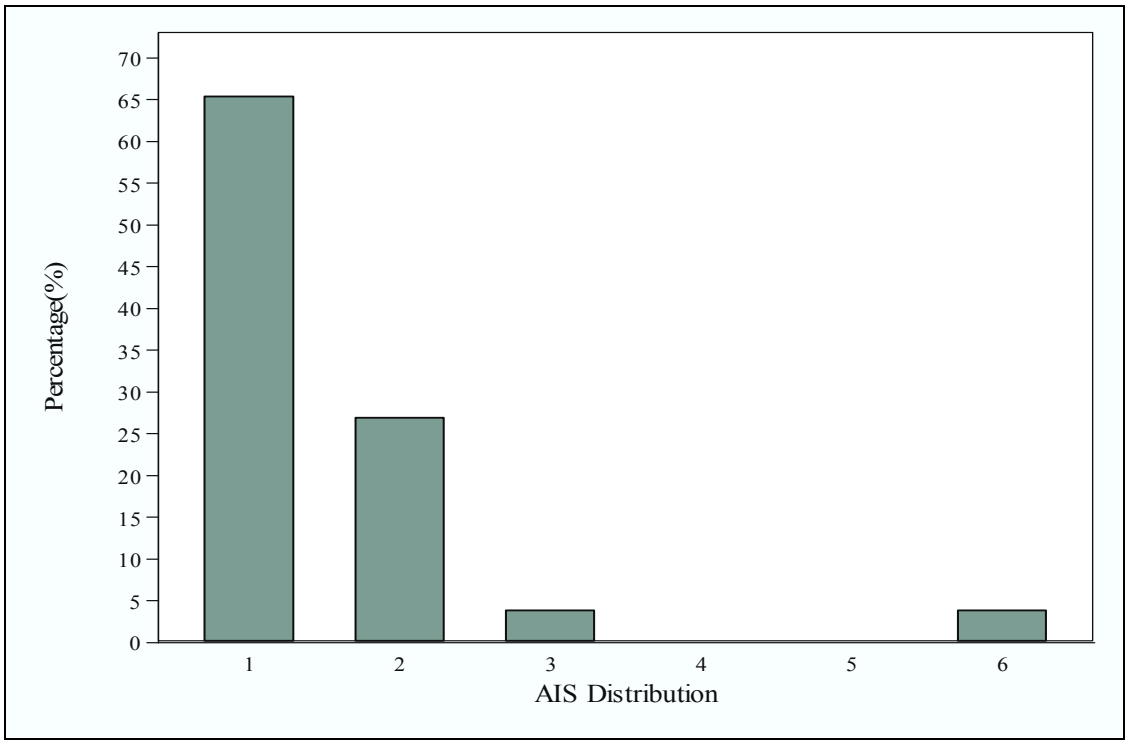

**Table 2.14a. Distribution According to Body Region for Major Trauma Cases**

| AIS | Head and Neck | | Face | | Thorax | | Abdomen/ Pelvic content | | Extremitis/ Pelvic girdle | | External | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1 | 295 | 14.64 | 218 | 63.74 | 56 | 19.18 | 47 | 27.01 | 125 | 24.8 | 17 | 65.38 | 758 | 22.61 |
| 2 | 349 | 17.32 | 114 | 33.33 | 52 | 17.81 | 85 | 48.85 | 225 | 44.64 | 7 | 26.92 | 832 | 24.81 |
| 3 | 505 | 25.06 | 8 | 2.34 | 136 | 46.58 | 32 | 18.39 | 148 | 29.37 | 1 | 3.85 | 830 | 24.75 |
| 4 | 635 | 31.51 | 0 | 0 | 40 | 13.7 | 7 | 4.02 | 2 | 0.4 | 0 | 0 | 684 | 20.4 |
| 5 | 231 | 11.46 | 2 | 0.58 | 7 | 2.4 | 3 | 1.72 | 3 | 0.6 | 0 | 0 | 246 | 7.34 |
| 6 | 0 | 0 | 0 | 0 | 1 | 0.34 | 0 | 0 | 1 | 0.2 | 1 | 3.85 | 3 | 0.09 |
| TOTAL | 2015 | 100 | 342 | 100 | 292 | 100 | 174 | 100 | 504 | 100 | 26 | 100 | 3353 | 100 |

**Figure 2.15. Body Region with Abbreviated Injury Scale (AIS) ≥ 3 for Major Trauma Cases**

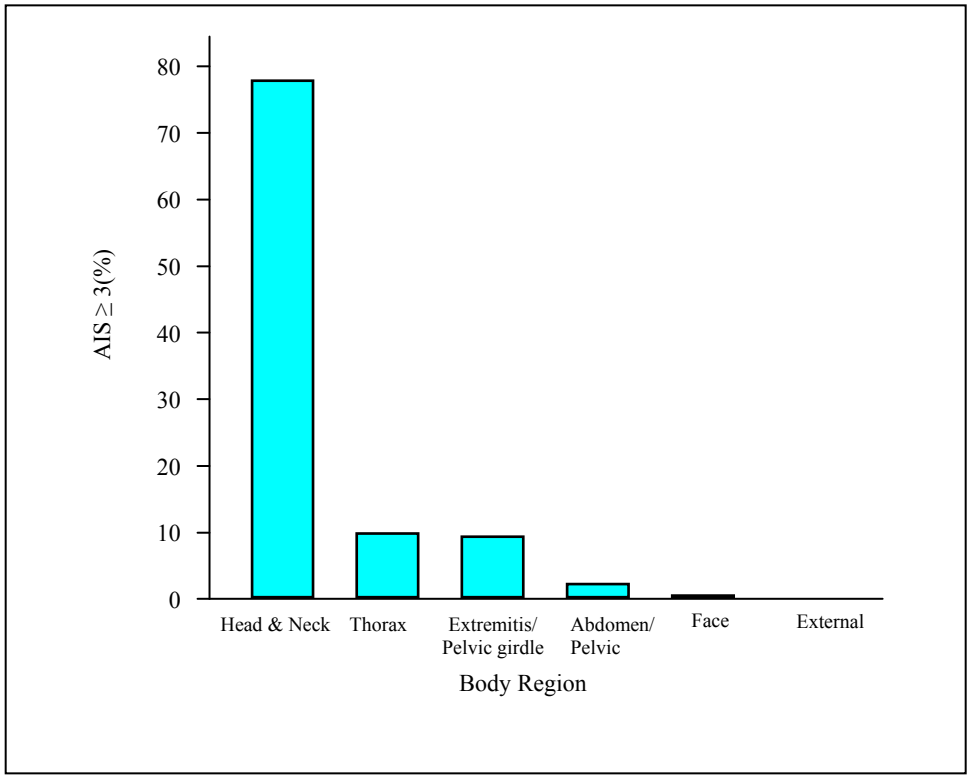


**Table 2.15. Body Region with Abbreviated Injury Scale (AIS) ≥ 3 for Major Trauma Cases**

| Body Region | No. | % |
|---|---|---|
| Head & Neck | 1628 | 77.86 |
| Face | 11 | 0.53 |
| Thorax | 206 | 9.85 |
| Abdomen/Pelvic content | 47 | 2.25 |
| Extremitis/Pelvic girdle | 196 | 9.37 |
| External | 3 | 0.14 |
| TOTAL | 2091 | 100 |

**Figure 2.16. Injury Severity Score (ISS) for Major Trauma Cases**

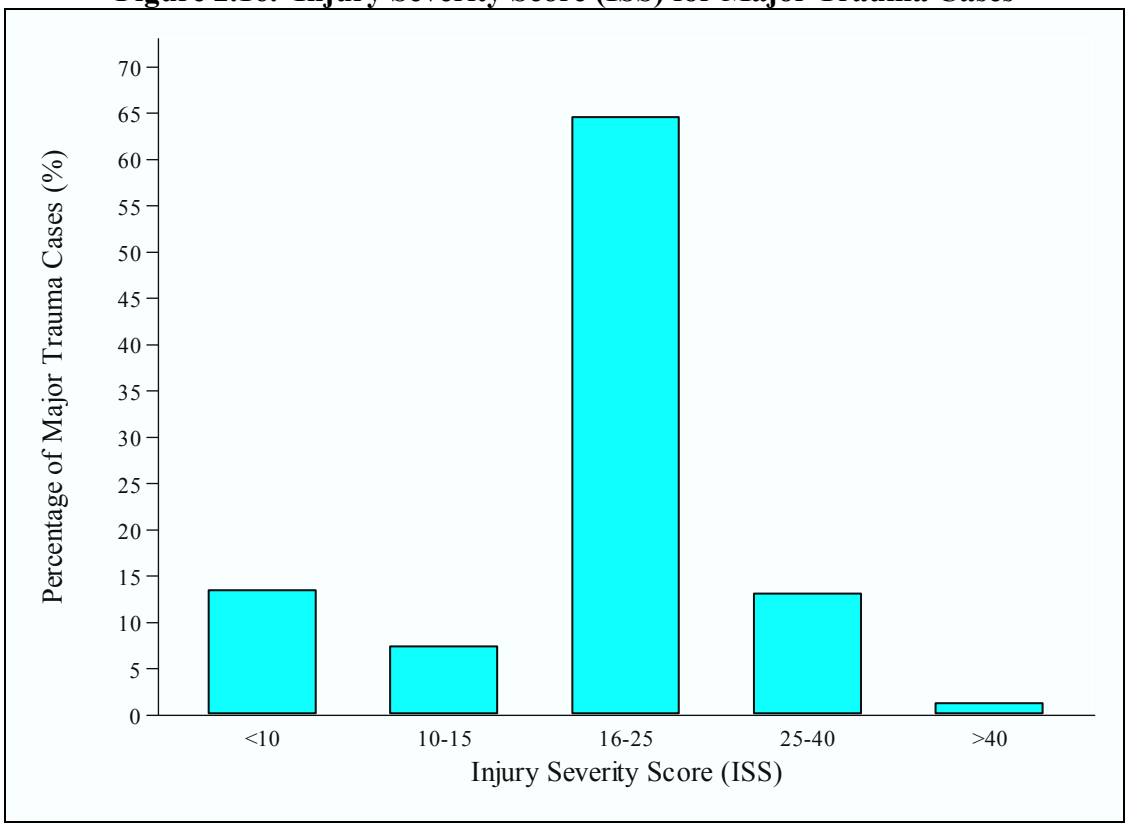


**Table 2.16. Injury Severity Score (ISS) for Major Trauma Cases**

| ISS | No. | % |
|---|---|---|
| <10 | 165 | 13.52 |
| 10-15 | 91 | 7.46 |
| 16-25 | 788 | 64.59 |
| 25-40 | 160 | 13.11 |
| >40 | 16 | 1.31 |
| TOTAL | 1220 | 100 |

# Chapter 3: PROCEDURES AND OPERATIVE MANAGEMENT

**Figure 3.1. Procedure Done in ED for Major Trauma Cases**

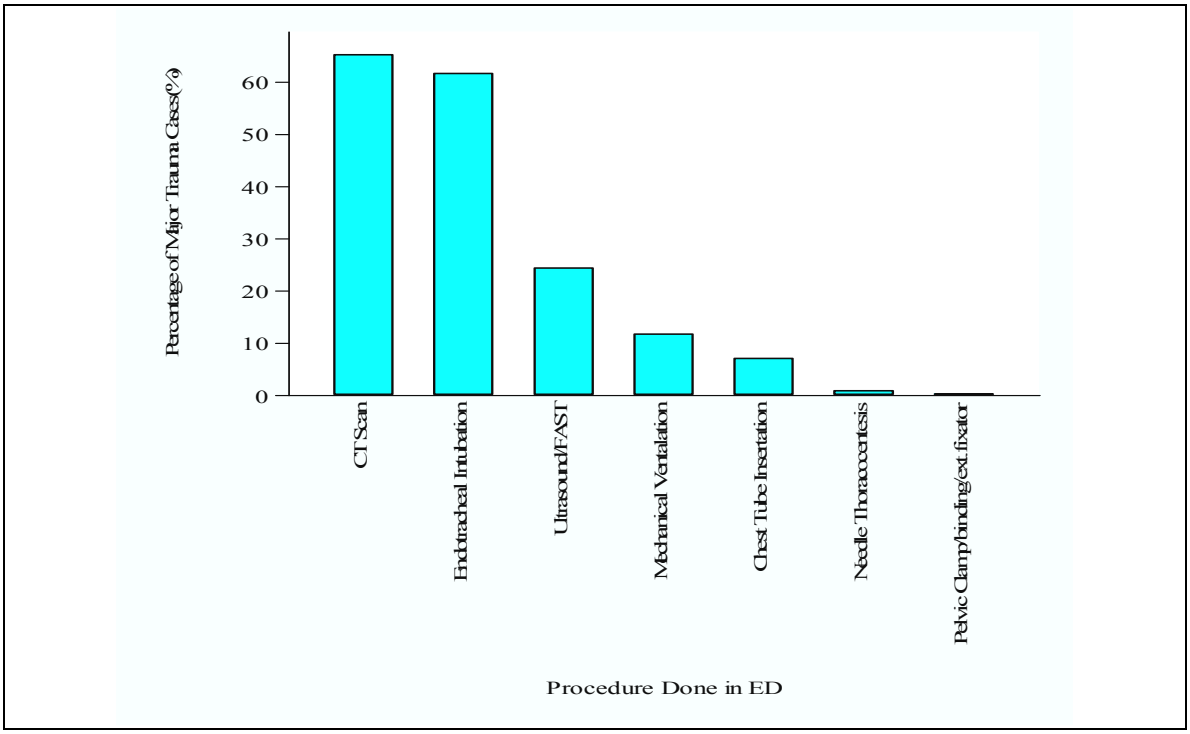


**Table 3.1. Procedure Done in ED for Major Trauma Cases**

| Procedure Done in ED | No. | % |
|---|---|---|
| Endotracheal Intubation | 753 | 61.72 |
| • Intubated at Referral Hospital | 400 | 53.12 |
| • Intubated at Current Hospital | 339 | 45.02 |
| • Not Available | 14 | 1.86 |
| Needles Thoracocentesis | 11 | 0.9 |
| Pelvic Clamp/Binding/ext. Fixator | 4 | 0.33 |
| CT Scan | 796 | 65.25 |
| • Brain | 738 | 92.71 |
| • Cervical Spine | 429 | 53.89 |
| • Abdomen | 94 | 11.81 |
| • Pelvis | 18 | 2.26 |
| • Thorax | 28 | 3.52 |
| • Others, specify | 7 | 0.88 |
| Mechanical Ventilation | 144 | 11.8 |
| Chest Tube Insertation | 87 | 7.13 |
| Ultrasound/FAST | 298 | 24.43 |

**Figure 3.2. Operative Management for Major Trauma Cases**

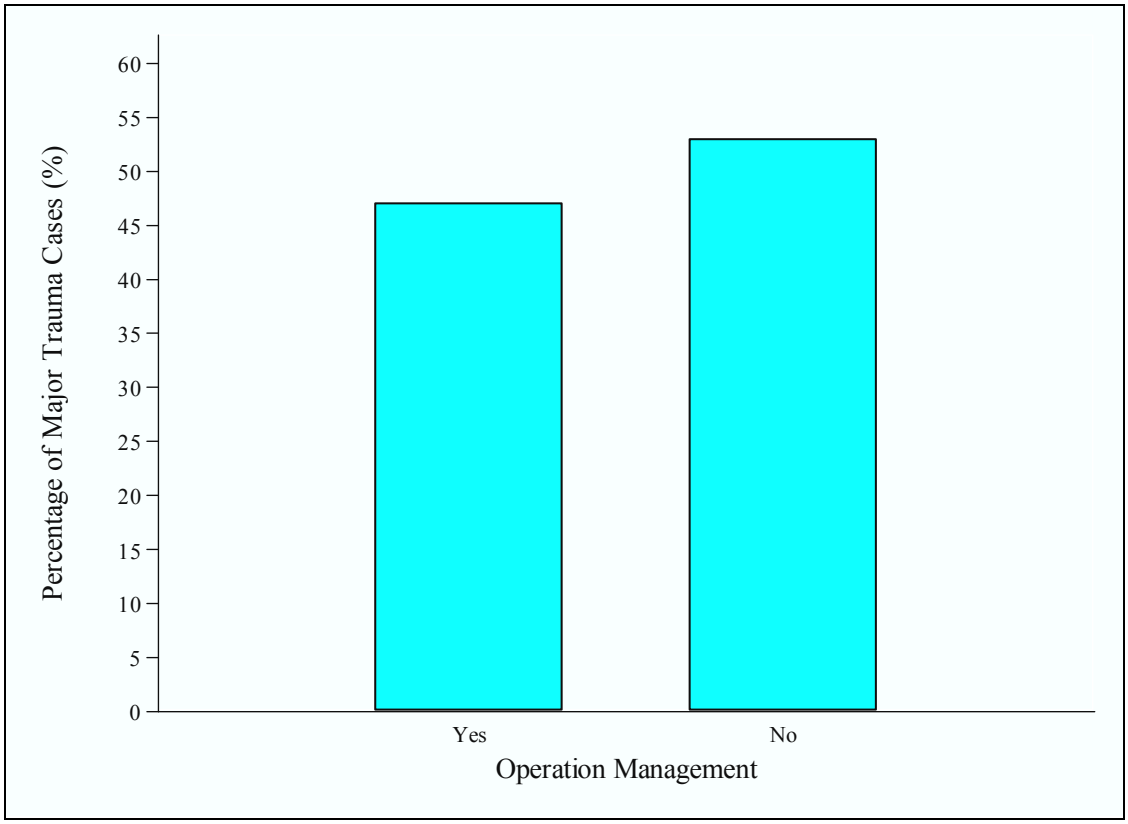


**Table 3.2. Operative Management for Major Trauma Cases**

| Operative Management | Total | |
|---|---|---|
| | No. | % |
| Yes | 564 | 46.88 |
| No | 639 | 53.12 |
| TOTAL | 1203 | 100 |

* 17 cases have no information on "Operative Management"

**Figure 3.3. Operative Procedure for Major Trauma Cases**

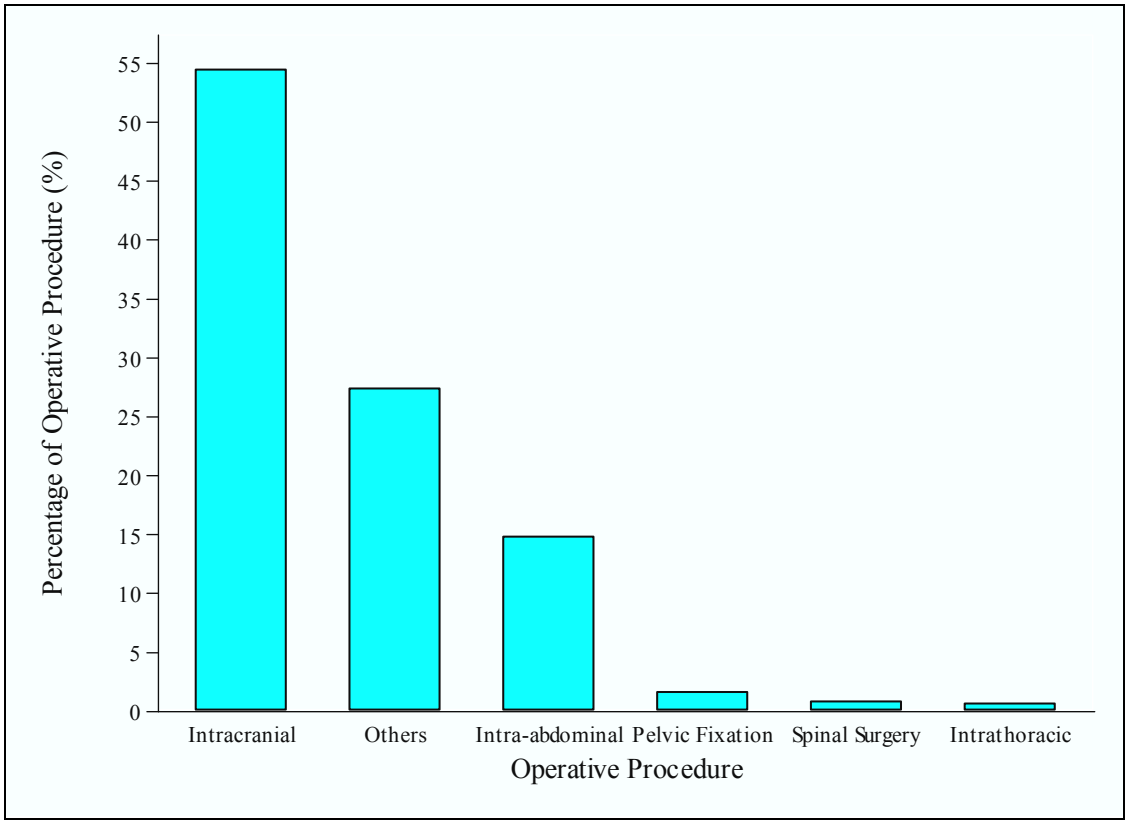


**Table 3.3. Operative Procedure for Major Trauma Cases**

| Operative Procedure | No. | % |
|---|---|---|
| Intracranial | 334 | 54.49 |
| Intrathoracic | 4 | 0.65 |
| Intra-abdominal | 91 | 14.85 |
| Spinal Surgery | 5 | 0.82 |
| Pelvic Fixation | 10 | 1.63 |
| Others | 168 | 27.41 |
| TOTAL | 613 | 100 |

**Figure 3.4. Types of Intracranial Procedure for Major Trauma Cases**

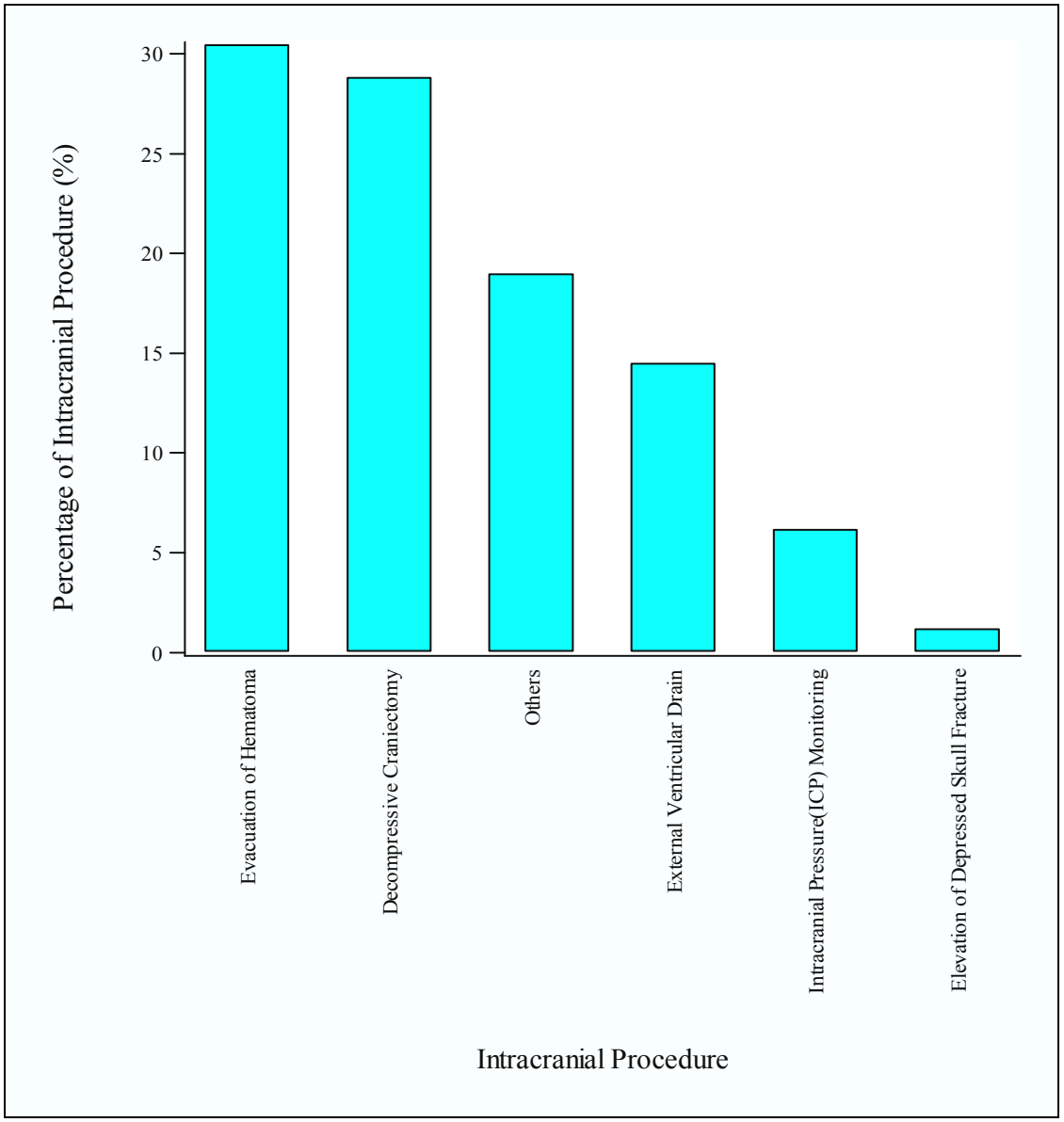


**Table 3.4. Types of Intracranial Procedure for Major Trauma Cases**

| **Intracranial Procedure** | **No.** | **%** |
|---|---|---|
| Evacuation of Hematoma | 183 | 30.45 |
| Decompressive Craniectomy | 173 | 28.79 |
| External Ventricular Drain | 87 | 14.48 |
| Intracranial Pressure(ICP) Monitoring | 37 | 6.16 |
| Elevation of Depressed Skull Fracture | 7 | 1.16 |
| Others | 114 | 18.97 |
| TOTAL | 601 | 100 |

# Chapter 4: OUTCOME

**Figure 4.1. Total Outcome for Major Trauma Cases**

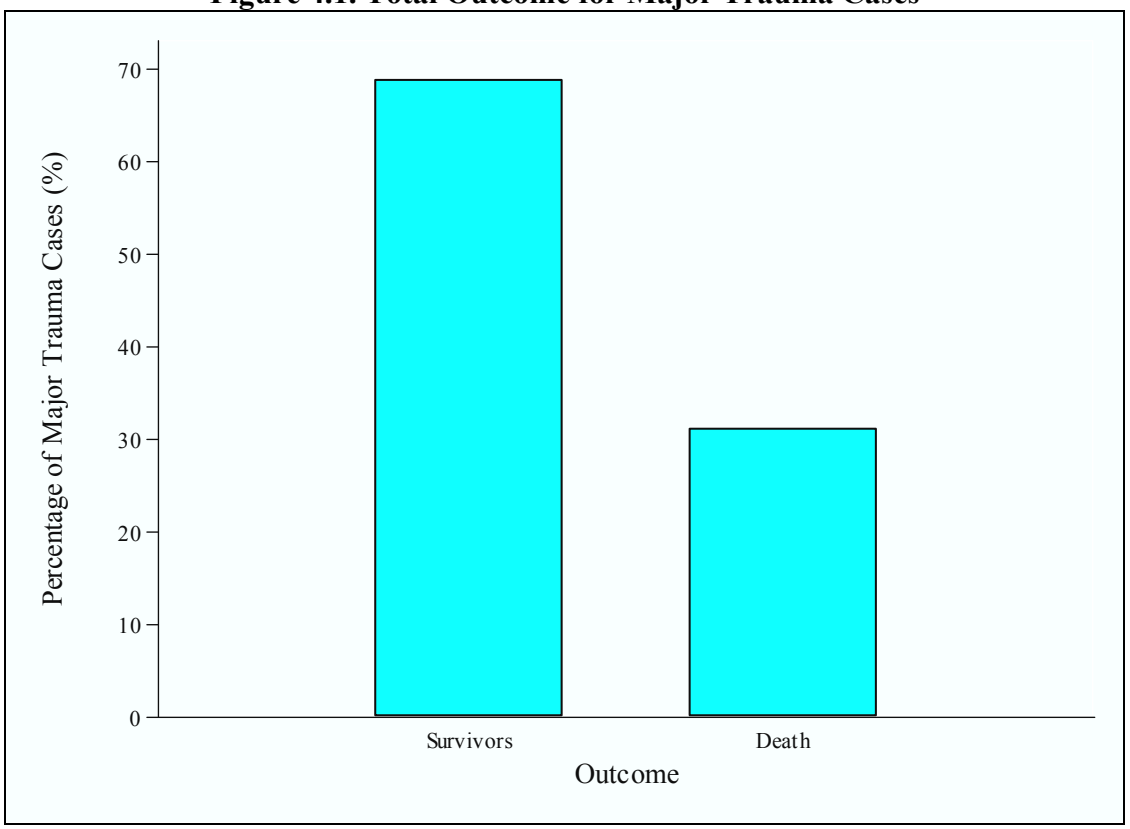


**Table 4.1. Total Outcome for Major Trauma Cases**

| Outcome | No. | % |
|---|---|---|
| Survivors | 836 | 68.81 |
| Deaths | 379 | 31.19 |
| TOTAL | 1215 | 100 |

*5 cases have no information in "Outcome".

**Figure 4.1a. Outcome for Major Trauma Cases by Centre**

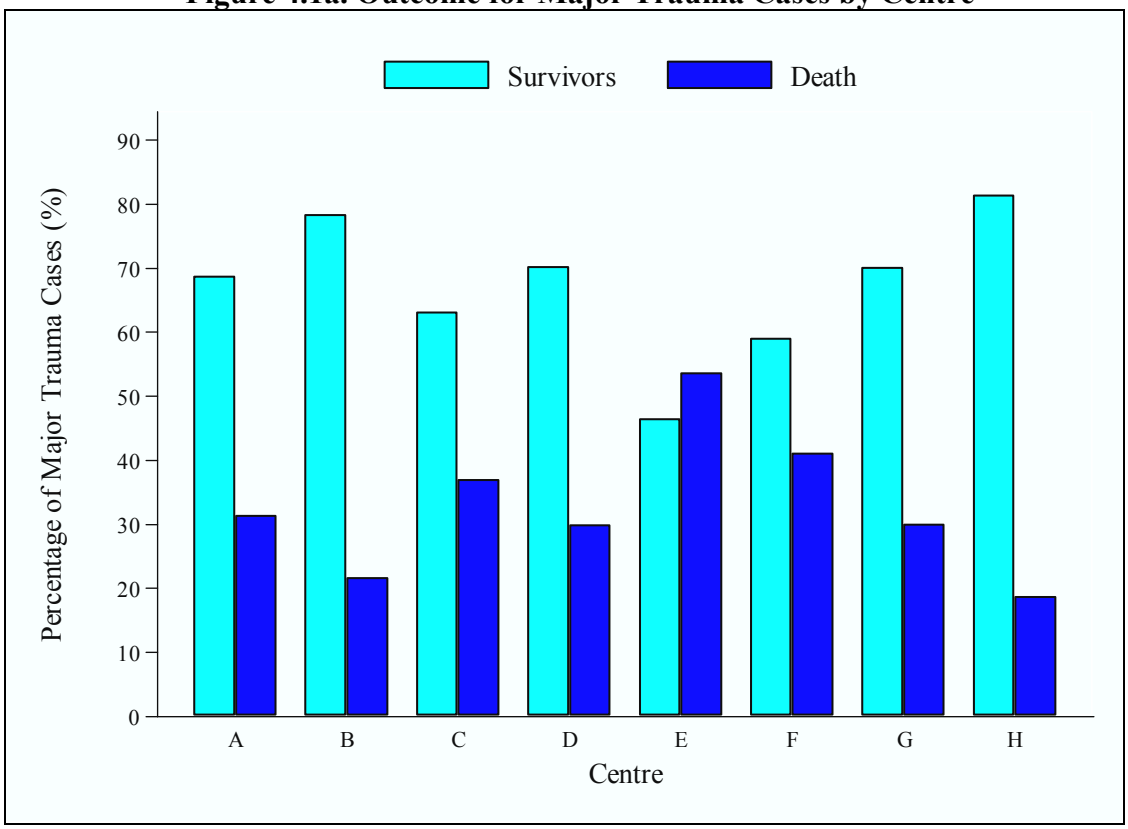


**Table 4.1a. Outcome for Major Trauma Cases by Centre**

| Centre | Survivors | | Death | | Total |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| A | 46 | 68.66 | 21 | 31.34 | 67 |
| B | 210 | 78.36 | 58 | 21.64 | 268 |
| C | 101 | 63.13 | 59 | 36.88 | 160 |
| D | 113 | 70.19 | 48 | 29.81 | 161 |
| E | 45 | 46.39 | 52 | 53.61 | 97 |
| F | 69 | 58.97 | 48 | 41.03 | 117 |
| G | 178 | 70.08 | 76 | 29.92 | 254 |
| H | 74 | 81.32 | 17 | 18.68 | 91 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 |

*5 cases have no information in "Outcome".

**Figure 4.2. Disposition of Survivors at Discharge for Major Trauma Cases**

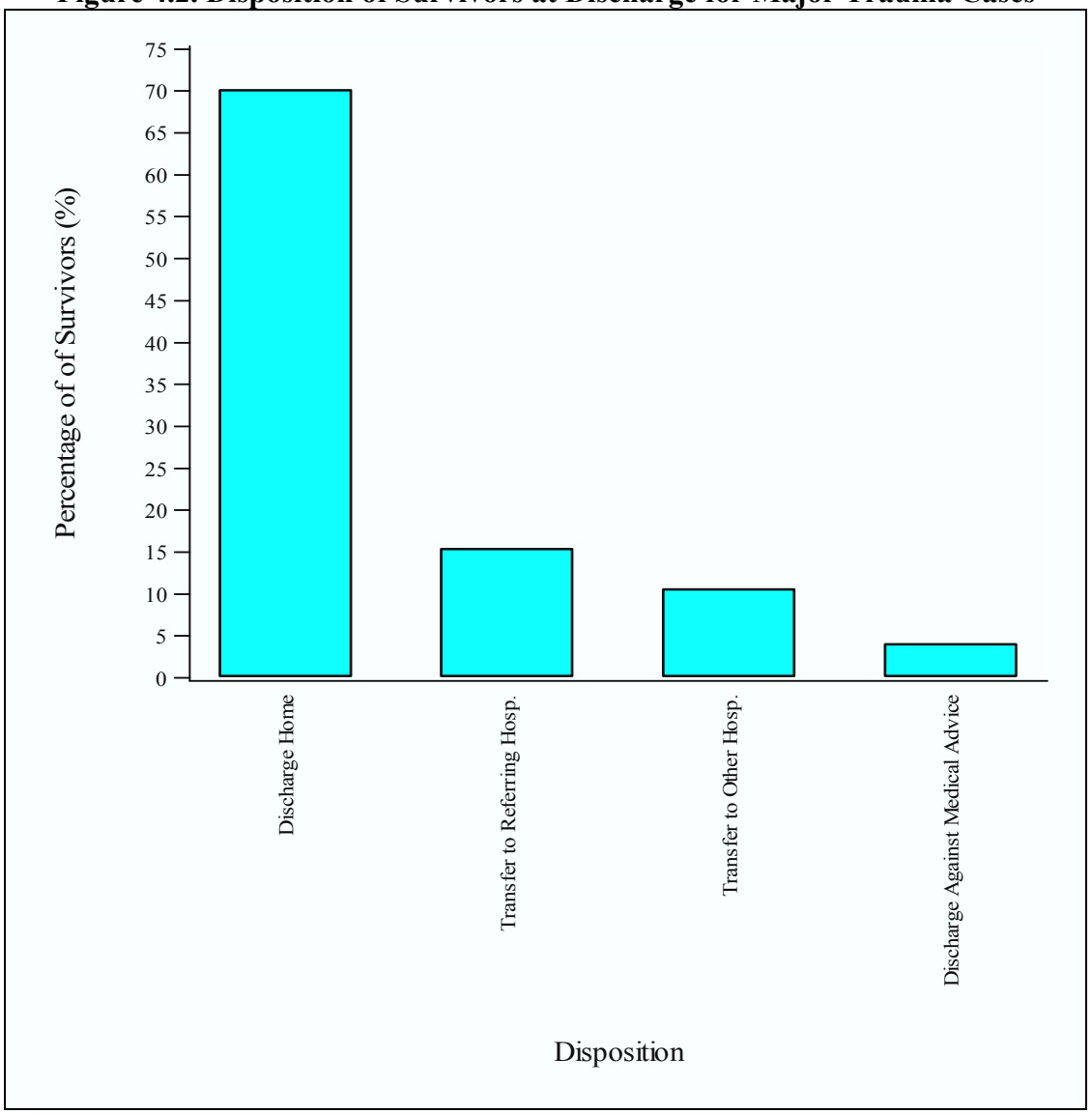


**Table 4.2. Disposition of Survivors at Discharge for Major Trauma Cases**

| Disposition of Survivors | Survivors | |
|---|---|---|
| | No. | % |
| Discharge Home | 579 | 70.1 |
| Transfer to Referring Hospital | 127 | 15.38 |
| Transfer to Other Hospital | 87 | 10.53 |
| Discharge Against Medical Advice | 33 | 4 |
| TOTAL | 826 | 100 |

*10 cases from total number of "Survivors" have no information on discharge.

**Figure 4.3. Outcome for Major Trauma Cases by Age Group**

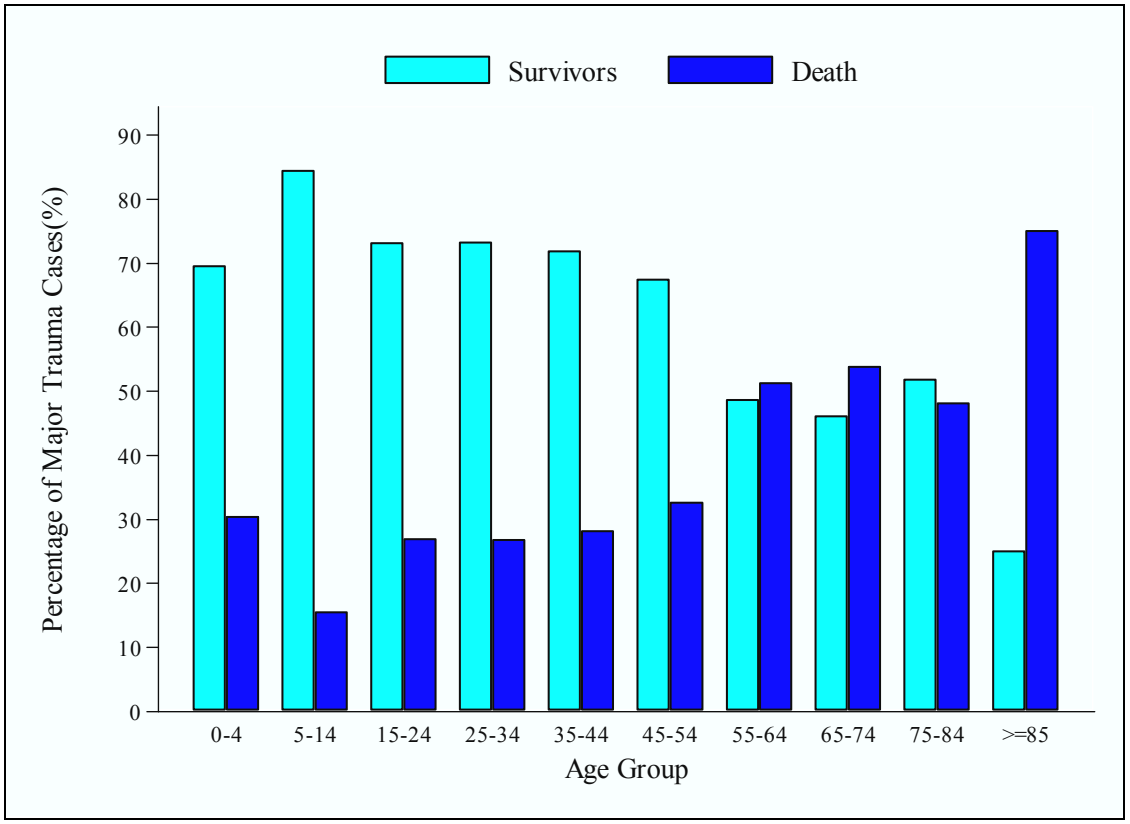


**Table 4.3. Outcome for Major Trauma Cases by Age Group**

| Age Group (years) | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| 0-4 | 16 | 69.57 | 7 | 30.43 | 23 | 1.89 |
| 5-14 | 49 | 84.48 | 9 | 15.52 | 58 | 4.77 |
| 15-24 | 288 | 73.1 | 106 | 26.9 | 394 | 32.43 |
| 25-34 | 205 | 73.21 | 75 | 26.79 | 280 | 23.05 |
| 35-44 | 102 | 71.83 | 40 | 28.17 | 142 | 11.69 |
| 45-54 | 87 | 67.44 | 42 | 32.56 | 129 | 10.62 |
| 55-64 | 37 | 48.68 | 39 | 51.32 | 76 | 6.26 |
| 65-74 | 36 | 46.15 | 42 | 53.85 | 78 | 6.42 |
| 75-84 | 14 | 51.85 | 13 | 48.15 | 27 | 2.22 |
| ≥85 | 2 | 25 | 6 | 75 | 8 | 0.66 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 | 100 |

**Figure 4.4. Mechanism of Injury by Outcome for Total Major Trauma Cases**

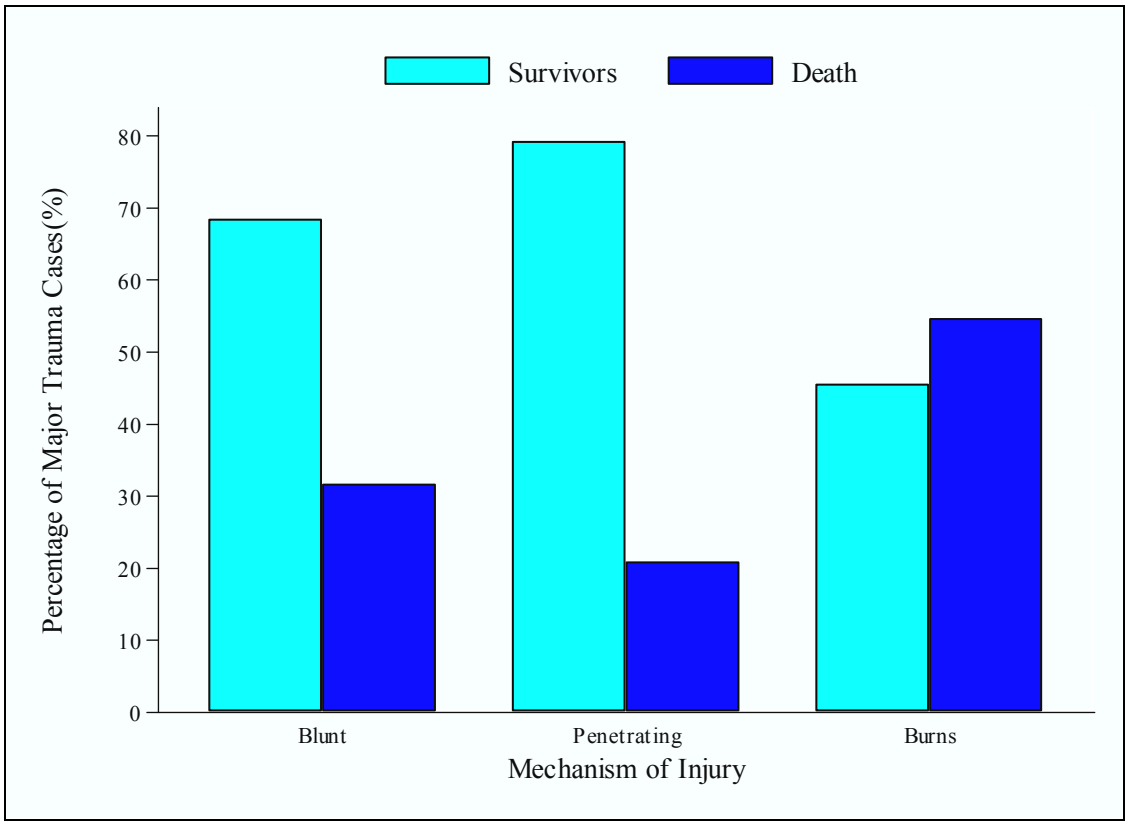


**Table 4.4. Outcome for Major Trauma Cases by Mechanism of Injury**

| Mechanism of Injury | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Blunt | 774 | 68.44 | 357 | 31.56 | 1131 | 93.16 |
| Penetrating | 57 | 79.17 | 15 | 20.83 | 72 | 5.93 |
| Burns | 5 | 45.45 | 6 | 54.55 | 11 | 0.91 |
| TOTAL | 836 | 68.86 | 378 | 31.14 | 1214 | 100 |

* 1 case has no information on both "Mechanism of Injury"

"

**Figure 4.5. Injury Cause for Major Trauma Cases by Outcome**

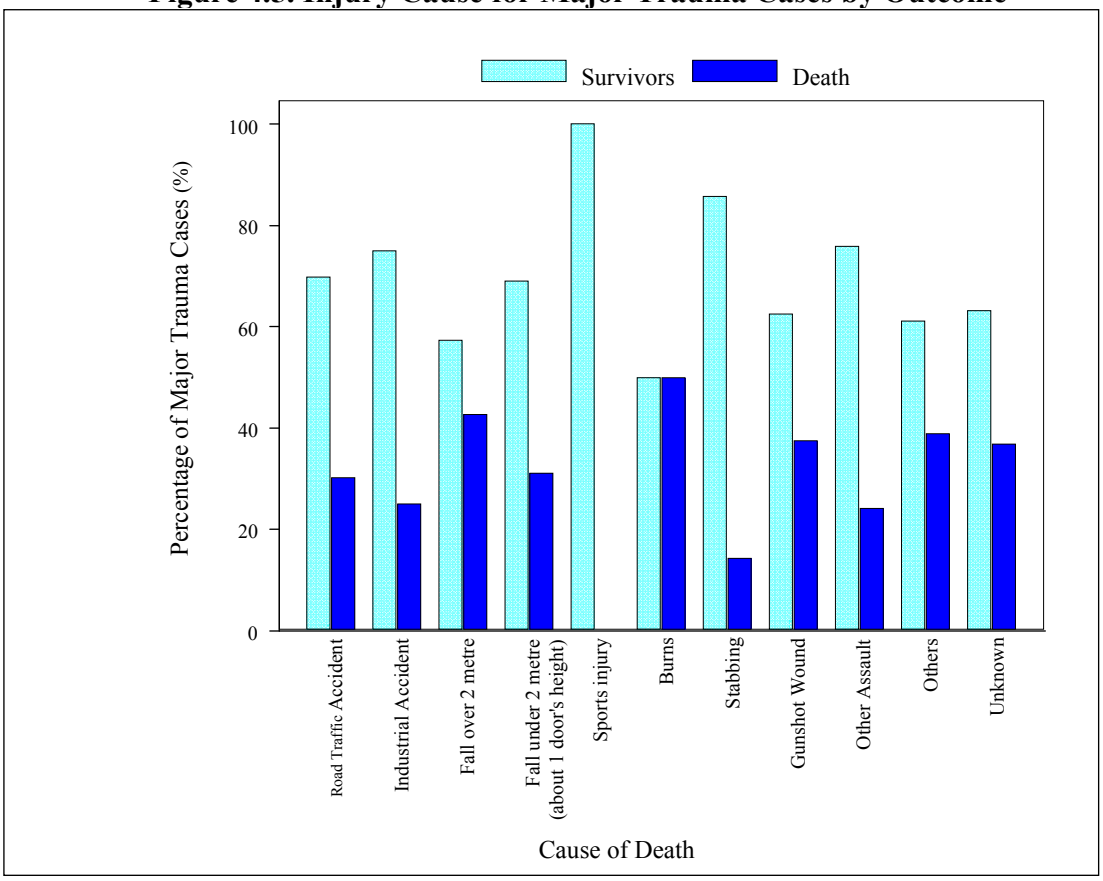


**Table 4.5. Cause of Injury for Major Trauma Cases by Outcome**

| Cause of Injury | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Road Traffic Accident | 626 | 69.79 | 271 | 30.21 | 897 | 74.38 |
| Industrial Accident | 15 | 75 | 5 | 25 | 20 | 1.66 |
| Fall over 2 meter | 51 | 57.3 | 38 | 42.7 | 89 | 7.38 |
| Fall under 2 meter(about 1 door's height) | 40 | 68.97 | 18 | 31.03 | 58 | 4.81 |
| Sports injury | 1 | 100 | 0 | 0 | 1 | 0.08 |
| Burns | 5 | 50 | 5 | 50 | 10 | 0.83 |
| Stabbing | 24 | 85.71 | 4 | 14.29 | 28 | 2.32 |
| Gunshot Wound | 5 | 62.5 | 3 | 37.5 | 8 | 0.66 |
| Others Assault | 44 | 75.86 | 14 | 24.14 | 58 | 4.81 |
| Other | 11 | 61.11 | 7 | 38.89 | 18 | 1.49 |
| Unknown | 12 | 63.16 | 7 | 36.84 | 19 | 1.58 |
| TOTAL | 834 | 69.15 | 372 | 30.85 | 1206 | 100 |

**Figure 4.6. Outcome by Type of Road Traffic Accident for Major Trauma Cases**

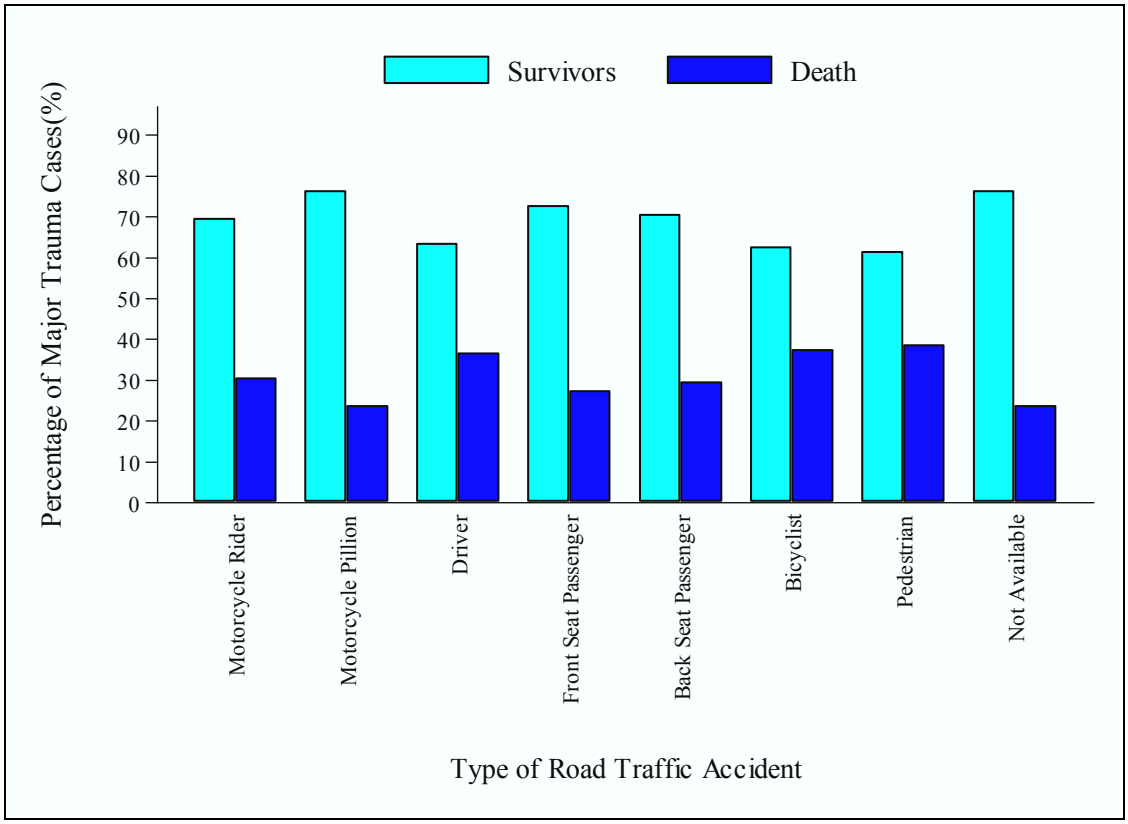


**Table 4.6. Outcome by Type of Road Traffic Accident for Major Trauma Cases**

| Type of Road Traffic Accident | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Motorcycle Rider | 387 | 69.6 | 169 | 30.4 | 556 | 62.12 |
| Motorcycle Pillion | 42 | 76.36 | 13 | 23.64 | 55 | 6.15 |
| Driver | 33 | 63.46 | 19 | 36.54 | 52 | 5.81 |
| Front Seat Passenger | 8 | 72.73 | 3 | 27.27 | 11 | 1.23 |
| Back Seat Passenger | 12 | 70.59 | 5 | 29.41 | 17 | 1.9 |
| Bicyclist | 15 | 62.5 | 9 | 37.5 | 24 | 2.68 |
| Pedestrian | 43 | 61.43 | 27 | 38.57 | 70 | 7.82 |
| Not Available | 84 | 76.36 | 26 | 23.64 | 110 | 12.29 |
| TOTAL | 624 | 69.72 | 271 | 30.28 | 895 | 100 |

**Table 4.7. Place of Injury for Major Trauma Cases by Outcome**

| Place of Injury | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Road/ Street/ Highway | 660 | 69.69 | 287 | 30.31 | 947 | 77.94 |
| Home | 53 | 60.92 | 34 | 39.08 | 87 | 7.16 |
| Industrial / Construction Area | 49 | 63.64 | 28 | 36.36 | 77 | 6.34 |
| School / Kindergarten / Nursery | 3 | 75 | 1 | 25 | 4 | 0.33 |
| Sports Recreational Area | 3 | 100 | 0 | 0 | 3 | 0.25 |
| Trade / Service Area | 12 | 70.59 | 5 | 29.41 | 17 | 1.4 |
| Residential Institution | 7 | 77.78 | 2 | 22.22 | 9 | 0.74 |
| Other Specified Place | 13 | 81.25 | 3 | 18.75 | 16 | 1.32 |
| Unspecified Place | 4 | 100 | 0 | 0 | 4 | 0.33 |
| Not Available | 32 | 62.75 | 19 | 37.25 | 51 | 4.2 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 | 100 |

**Figure 4.8. Type of Admission for Major Trauma Cases by Outcome**

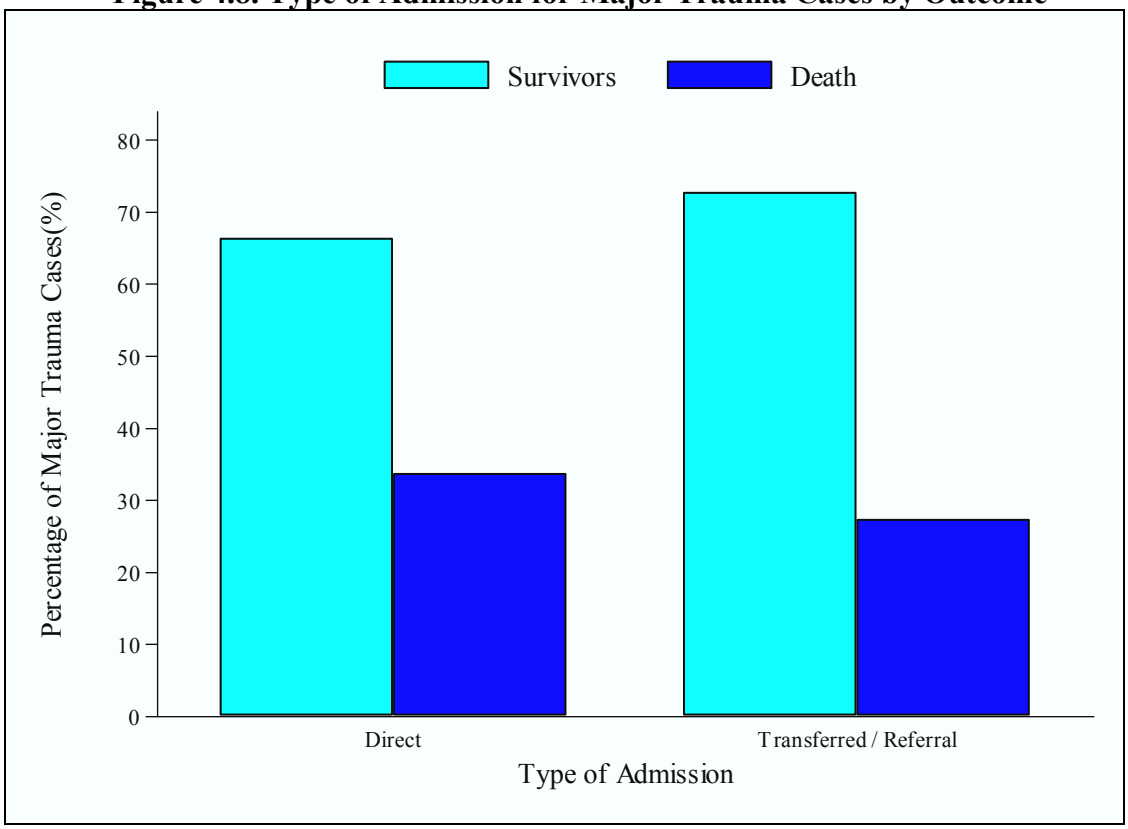


**Table 4.8. Type of Admission for Major Trauma Cases by Outcome**

| Type of Admission | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Direct | 480 | 66.3 | 244 | 33.7 | 724 | 59.79 |
| Transfer / Referred from | 354 | 72.69 | 133 | 27.31 | 487 | 40.21 |
| TOTAL | 834 | 68.87 | 377 | 31.13 | 1211 | 100 |

*4 cases have no information in "Type of Admission".

**Figure 4.9. Systolic BP for Major Trauma Cases by Outcome**

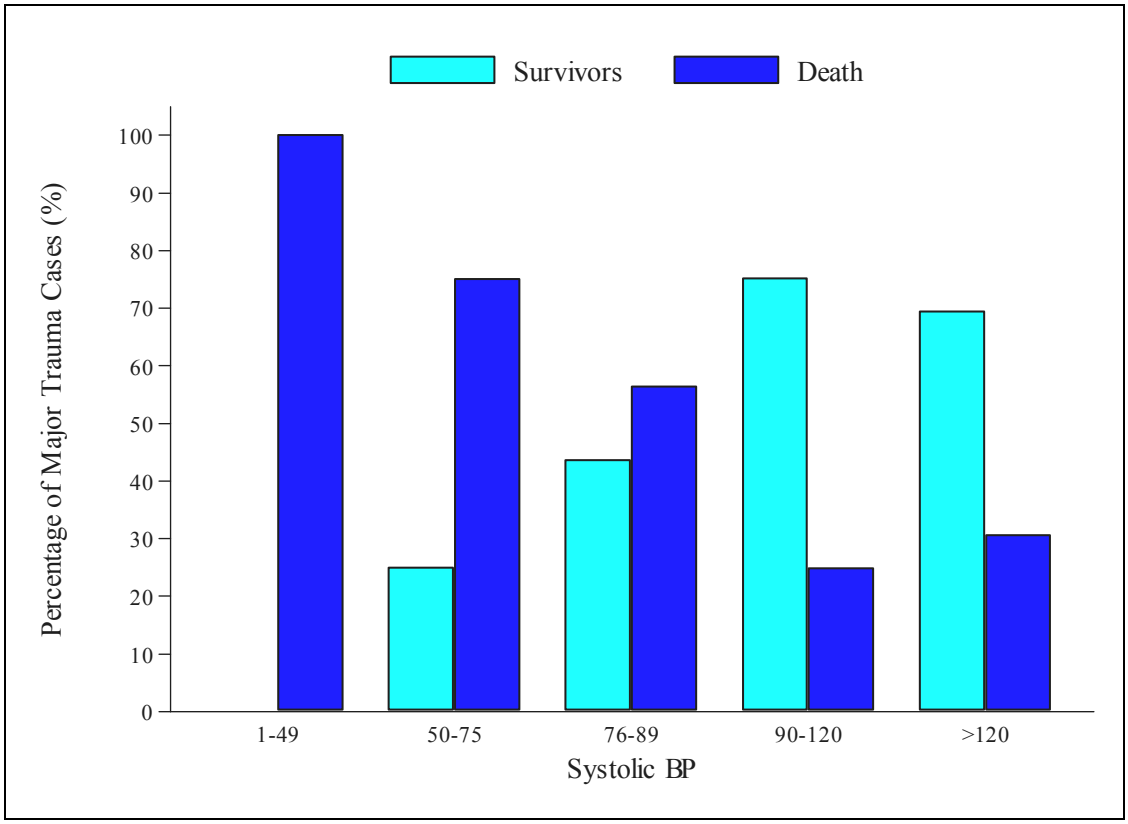


**Table 4.9. Systolic BP for Major Trauma Cases by Outcome**

| Systolic BP | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| 1-49 | 0 | 0 | 2 | 100 | 2 | 0.16 |
| 50-75 | 9 | 25 | 27 | 75 | 36 | 2.97 |
| 76-89 | 17 | 43.59 | 22 | 56.41 | 39 | 3.22 |
| 90-120 | 284 | 75.13 | 94 | 24.87 | 378 | 31.16 |
| >120 | 526 | 69.39 | 232 | 30.61 | 758 | 62.49 |
| TOTAL | 836 | 68.92 | 377 | 31.08 | 1213 | 100 |

*2 cases have no information in "Systolic BP".

**Figure 4.10. Glasgow Coma Score (GCS) for Major Trauma Cases by Outcome**

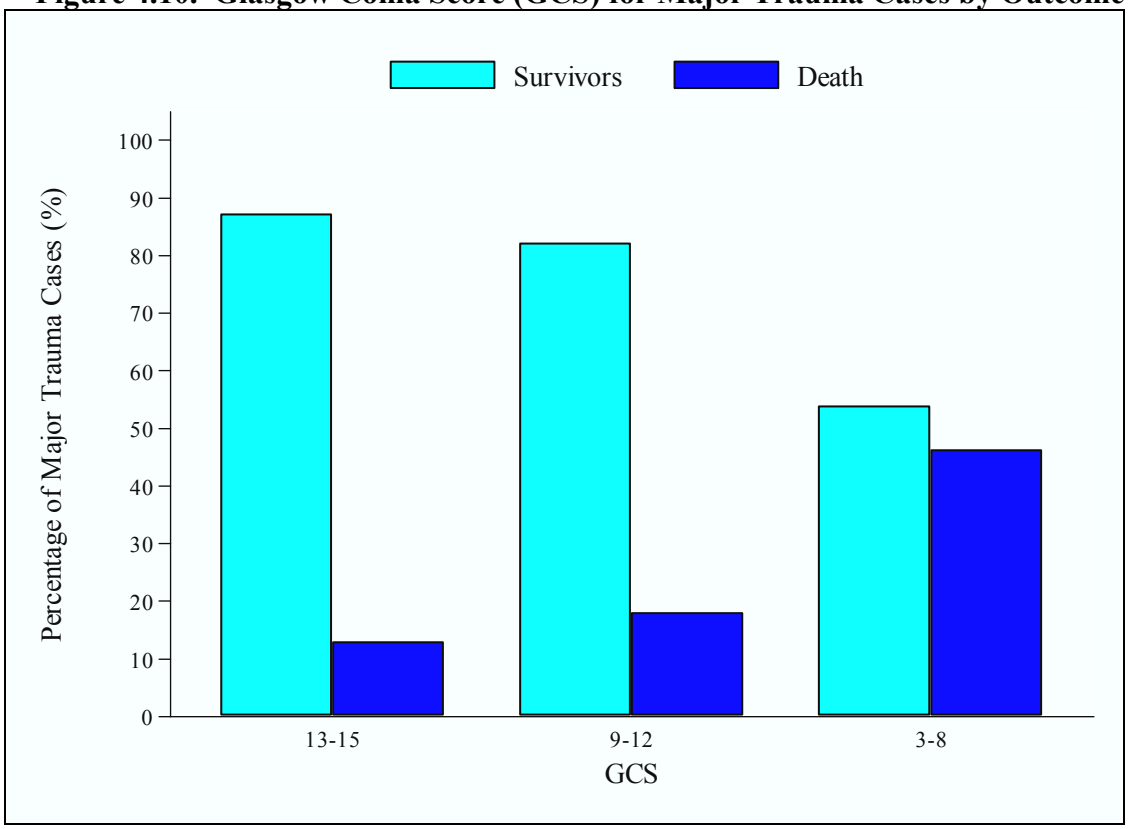


**Table 4.10. Glasgow Coma Score (GCS) for Major Trauma Cases by Outcome**

| Glasgow Coma Score (GCS) | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| 13-15 | 312 | 87.15 | 46 | 12.85 | 358 | 29.66 |
| 9-12 | 183 | 82.06 | 40 | 17.94 | 223 | 18.48 |
| 3-8 | 337 | 53.83 | 289 | 46.17 | 626 | 51.86 |
| TOTAL | 832 | 68.93 | 375 | 31.07 | 1207 | 100 |

*8 cases have no information in "GCS".

**Figure 4.11. Revised Trauma Score (RTS) for Major Trauma Cases by Outcome**

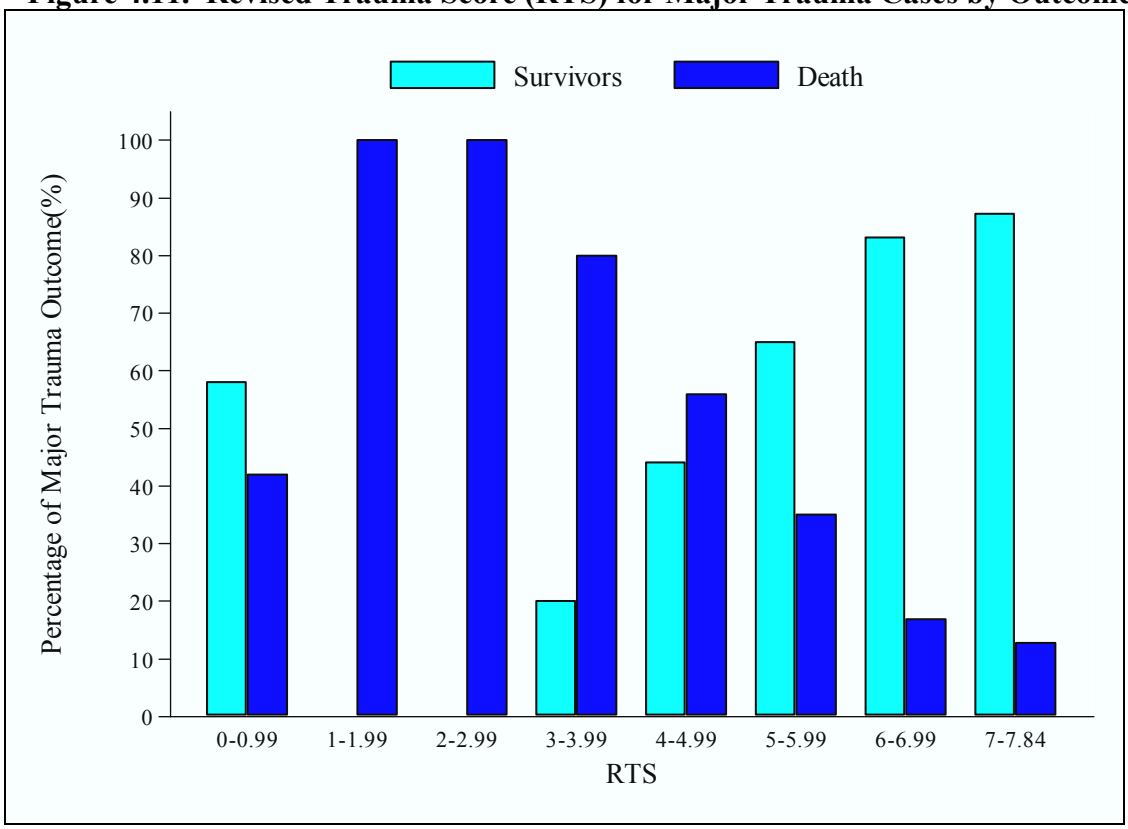


**Table 4.11. Revised Trauma Score (RTS) for Major Trauma Cases by Outcome**

| RTS | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| 0-0.99 | 94 | 58.02 | 68 | 41.98 | 162 | 13.33 |
| 1-1.99 | 0 | 0 | 4 | 100 | 4 | 0.33 |
| 2-2.99 | 0 | 0 | 13 | 100 | 13 | 1.07 |
| 3-3.99 | 4 | 20 | 16 | 80 | 20 | 1.65 |
| 4-4.99 | 70 | 44.03 | 89 | 55.97 | 159 | 13.09 |
| 5-5.99 | 208 | 65 | 112 | 35 | 320 | 26.34 |
| 6-6.99 | 172 | 83.09 | 35 | 16.91 | 207 | 17.04 |
| 7-7.84 | 288 | 87.27 | 42 | 12.73 | 330 | 27.16 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 | 100 |

**Figure 4.12. Outcome with AIS ≥ 3 for Major Trauma Cases**

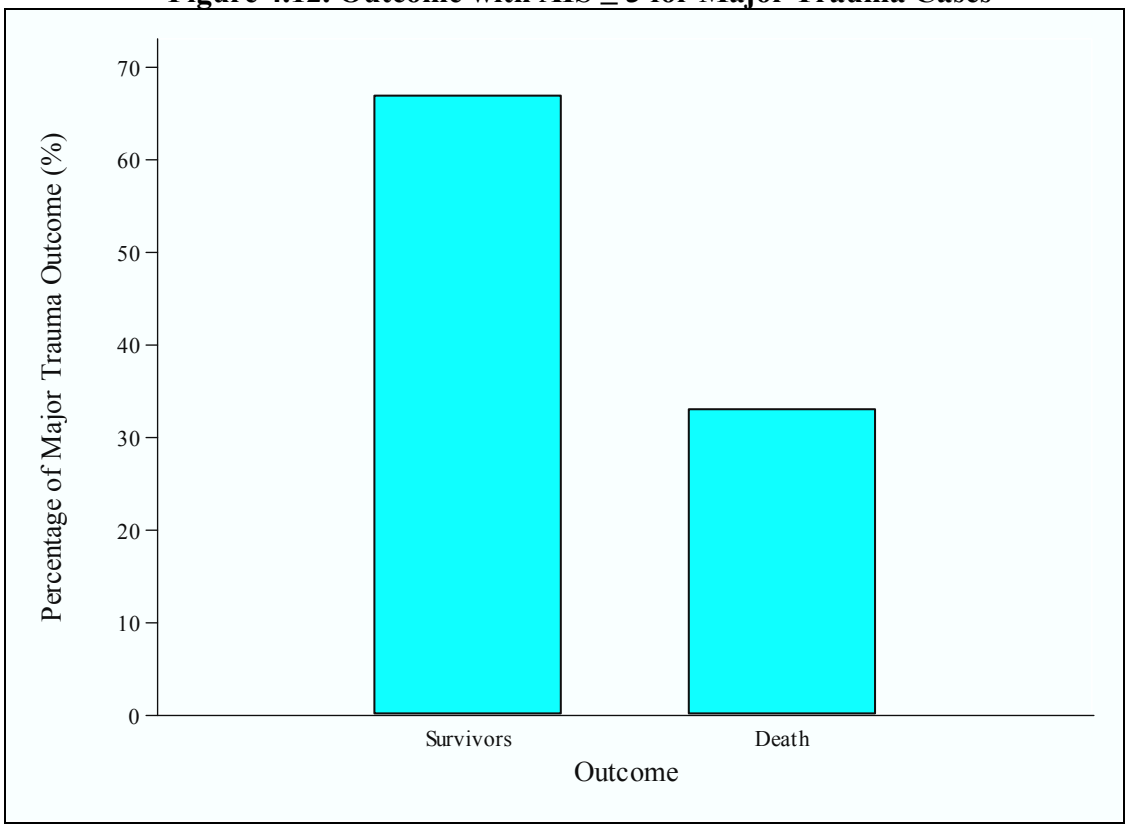


**Table 4.12. Outcome with AIS ≥3 for Major Trauma Cases**

| **Outcome** | **No.** | **%** |
|---|---|---|
| Survivors | 261 | 66.92 |
| Death | 129 | 33.08 |
| TOTAL | 390 | 100 |

**Figure 4.13. ISS for Major Trauma Cases by Outcome**

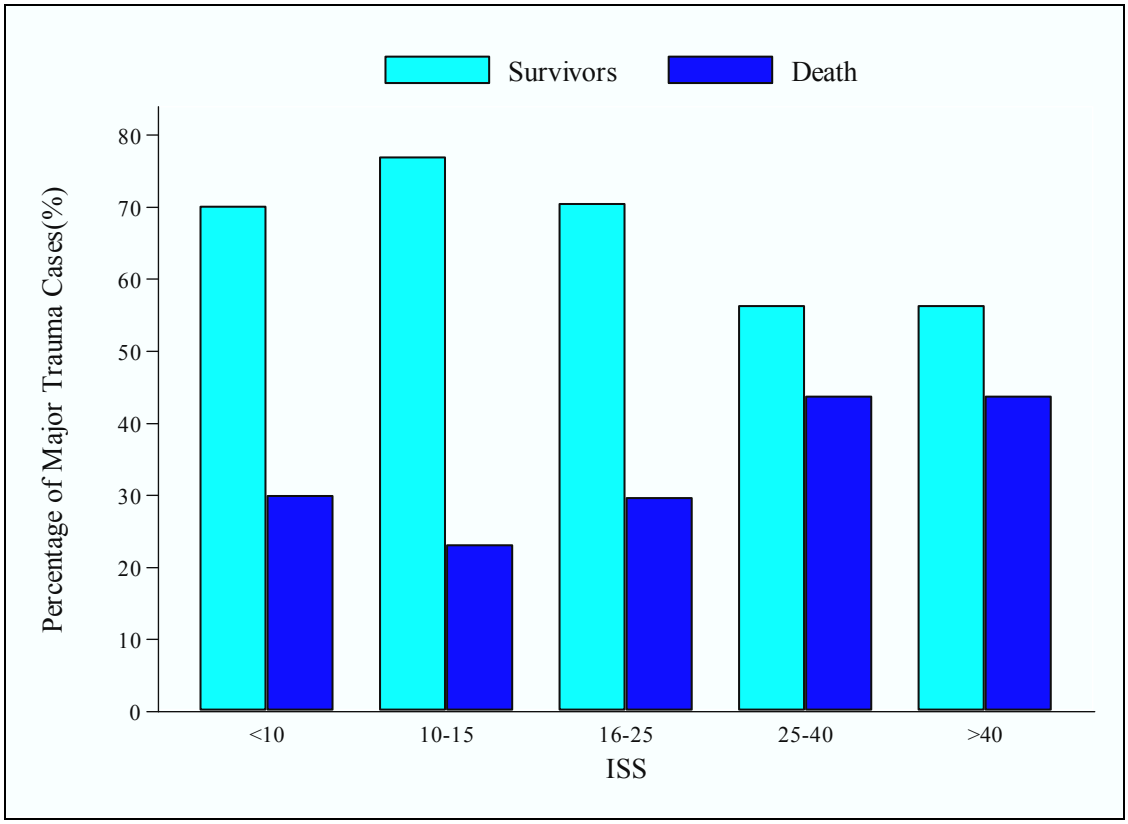


**Table 4.13. ISS for Major Trauma Cases by Outcome**

| ISS | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| <10 | 115 | 70.12 | 49 | 29.88 | 164 | 10.15 |
| 10-15 | 70 | 76.92 | 21 | 23.08 | 91 | 5.63 |
| 16-25 | 552 | 70.41 | 232 | 29.59 | 784 | 48.51 |
| 25-40 | 90 | 56.25 | 70 | 43.75 | 160 | 9.9 |
| >40 | 9 | 56.25 | 7 | 43.75 | 16 | 0.99 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 | 75.19 |

**Figure 4.14. ICU Admissions for Major Trauma Cases by Outcome**

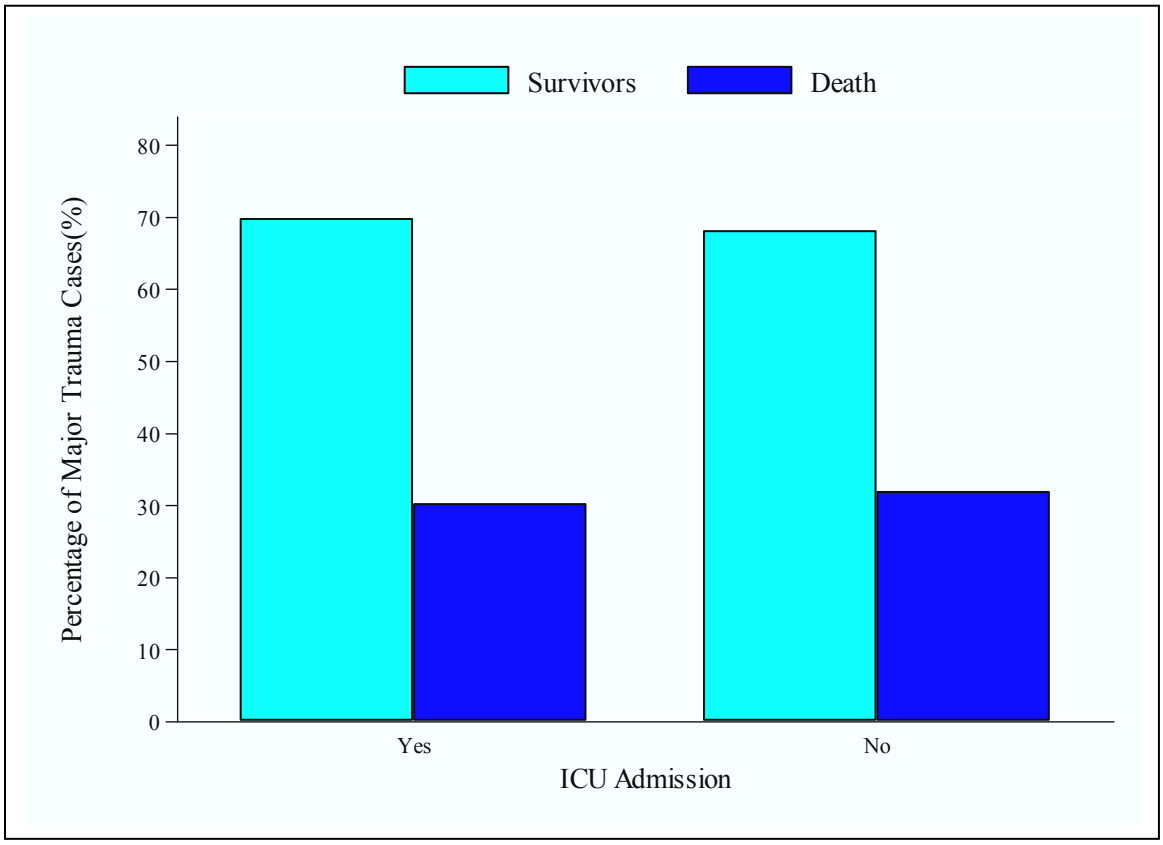


**Table 4.14. ICU Admissions for Major Trauma Cases by Outcome**

| ICU Admissions | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Yes | 346 | 69.76 | 150 | 30.24 | 496 | 40.82 |
| No | 490 | 68.15 | 229 | 31.85 | 719 | 59.18 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 | 100 |

**Figure 4.15. TRISS for Major Trauma Cases**

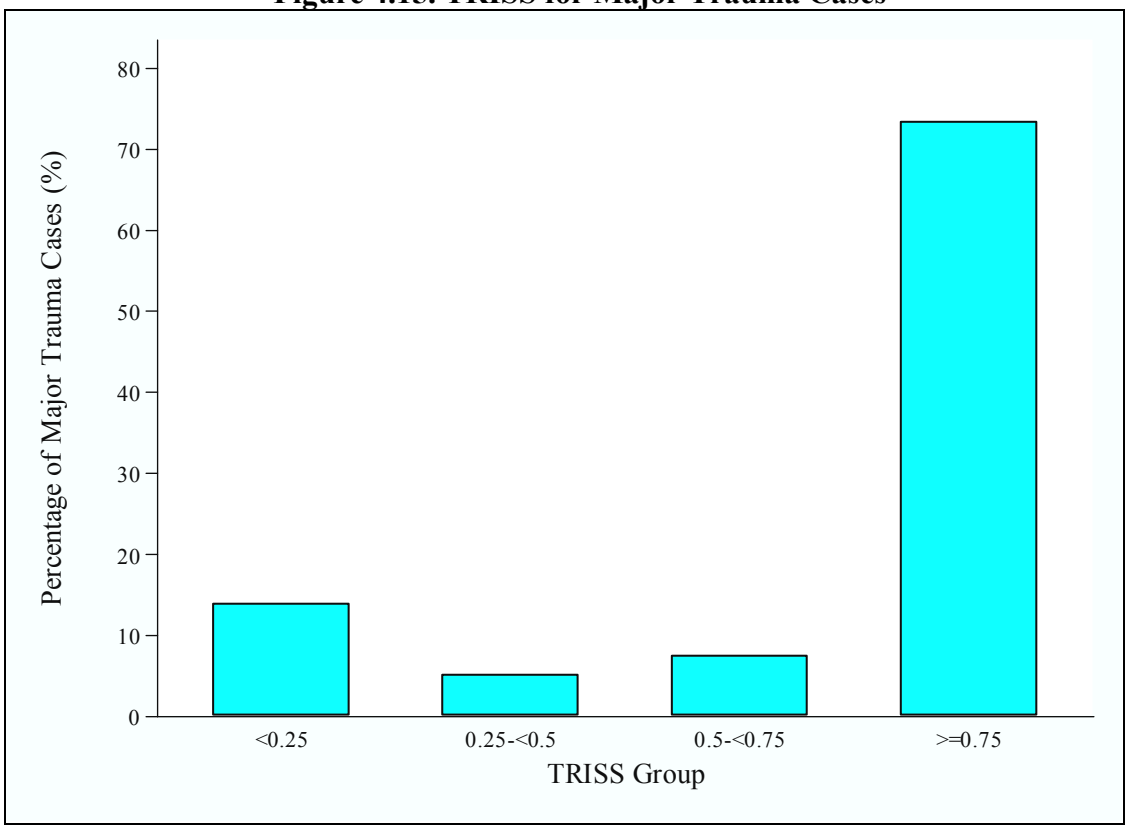


**Table 4.15. TRISS Distribution for Major Trauma Cases**

| TRISS (Ps) | Total | |
|---|---|---|
| | **No.** | **%** |
| <0.25 | 170 | 13.93 |
| 0.25≤Ps<0.5 | 63 | 5.16 |
| 0.5≤Ps<0.75 | 91 | 7.46 |
| Ps≥0.75 | 896 | 73.44 |
| TOTAL | 1220 | 100 |

**Figure 4.16. Observed and Expected Outcome for Major Trauma Cases**

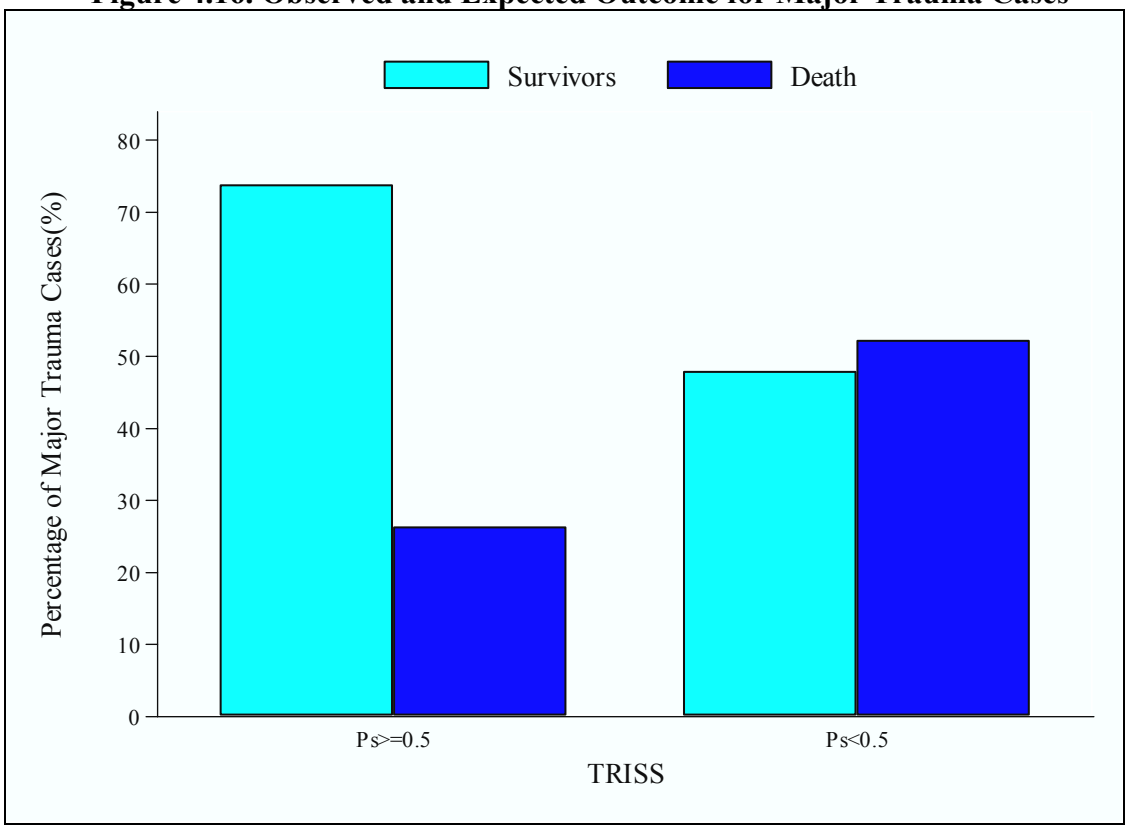


**Table 4.16. Observed and Expected Outcome for Major Trauma Cases**

| TRISS | Survivors | | Death | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Ps≥0.5 | 726 | 73.71 | 259 | 26.29 | 985 | 81.07 |
| Ps<0.5 | 110 | 47.83 | 120 | 52.17 | 230 | 18.93 |
| TOTAL | 836 | 68.81 | 379 | 31.19 | 1215 | 100 |

# Chapter 5: LENGTH OF STAY

**Figure 5.1. Total Length of Hospital Stay for Major Trauma Cases by Centre**

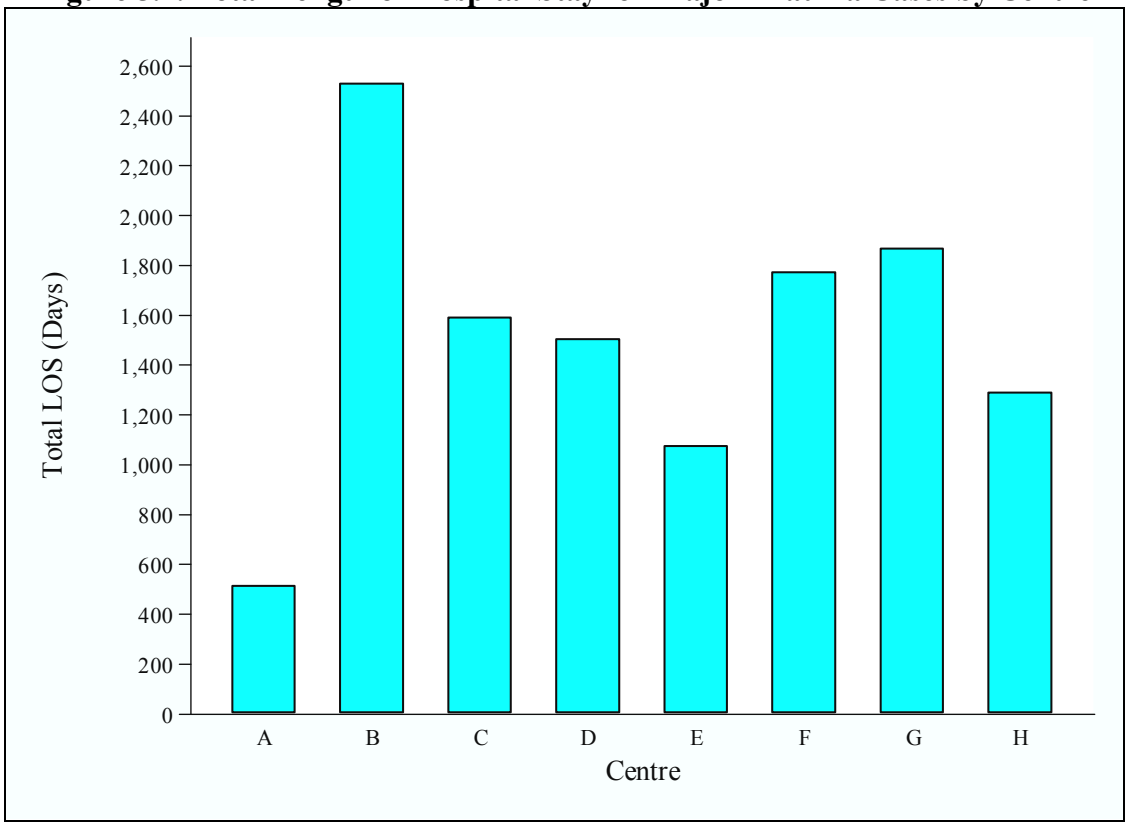


**Table 5.1. Total and Average Length of Hospital Stay for Major Trauma Cases by Centre**

| Centre | Total | | |
|---|---|---|---|
| | No. | Total LOS | Average LOS |
| A | 67 | 515 | 8 |
| B | 266 | 2528 | 10 |
| C | 159 | 1591 | 10 |
| D | 161 | 1505 | 9 |
| E | 96 | 1077 | 11 |
| F | 117 | 1772 | 15 |
| G | 253 | 1867 | 7 |
| H | 91 | 1290 | 14 |

**Figure 5.1a. Average Length of Hospital Stay for Major Trauma Cases by Centre**

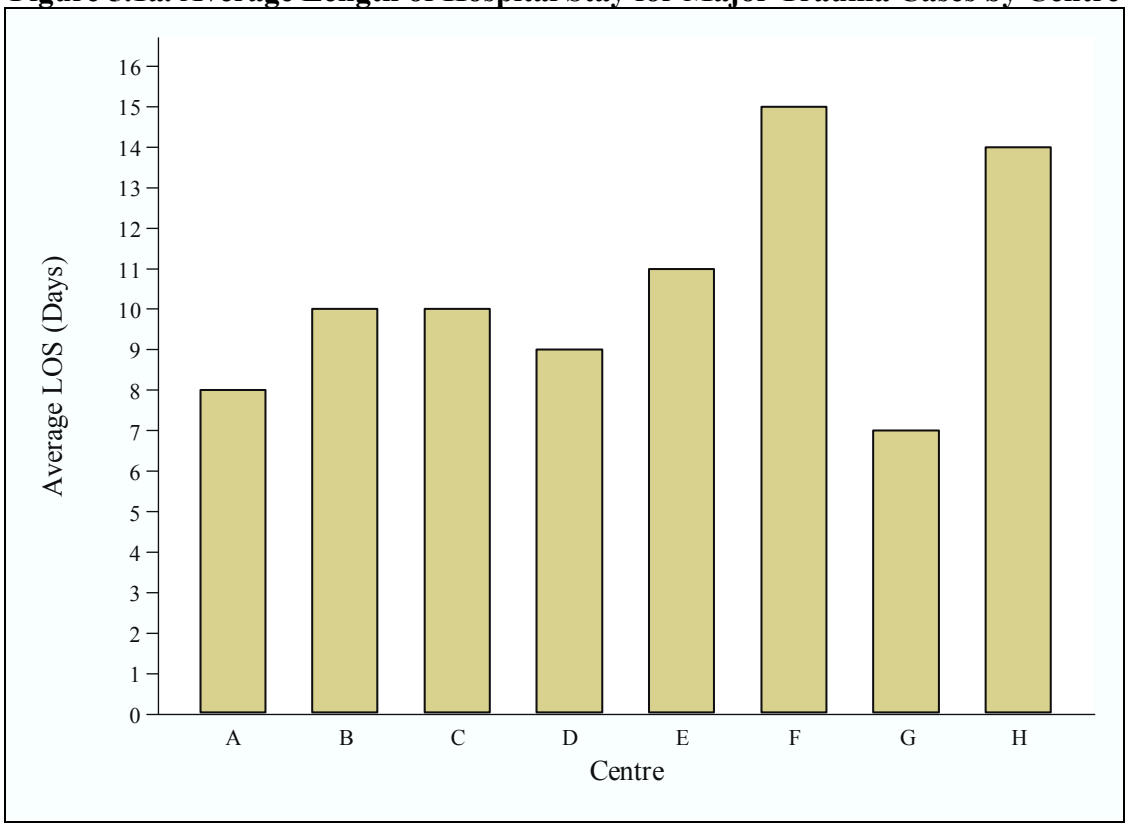


**Table 5.1a. Total and Average Length of Hospital Stay for Major Trauma Cases by Outcome and Centre**

| Centre | Survivors | | | Death | | |
|---|---|---|---|---|---|---|
| | No. | Total LOS | Average LOS | No. | Total LOS | Average LOS |
| A | 46 | 424 | 9 | 21 | 91 | 4 |
| B | 209 | 2275 | 11 | 57 | 253 | 4 |
| C | 101 | 1395 | 14 | 58 | 196 | 3 |
| D | 113 | 1365 | 12 | 48 | 140 | 3 |
| E | 45 | 777 | 17 | 51 | 300 | 6 |
| F | 69 | 1410 | 20 | 48 | 362 | 8 |
| G | 177 | 1665 | 9 | 76 | 202 | 3 |
| H | 74 | 1270 | 17 | 17 | 20 | 1 |

**Table 5.2. Total and Average Length of ICU Stay for Major Trauma Cases by Centre**

| Centre | Total | | |
|---|---|---|---|
| | No. | Total LOS | Average LOS |
| A | 21 | 124 | 6 |
| B | 133 | 672 | 5 |
| C | 76 | 399 | 5 |
| D | 82 | 476 | 6 |
| E | 51 | 439 | 9 |
| F | 47 | 488 | 10 |
| G | 109 | 556 | 5 |
| H | 24 | 164 | 7 |

**Figure 5.2. Total Length of ICU Stay for Major Trauma Cases by Centre**

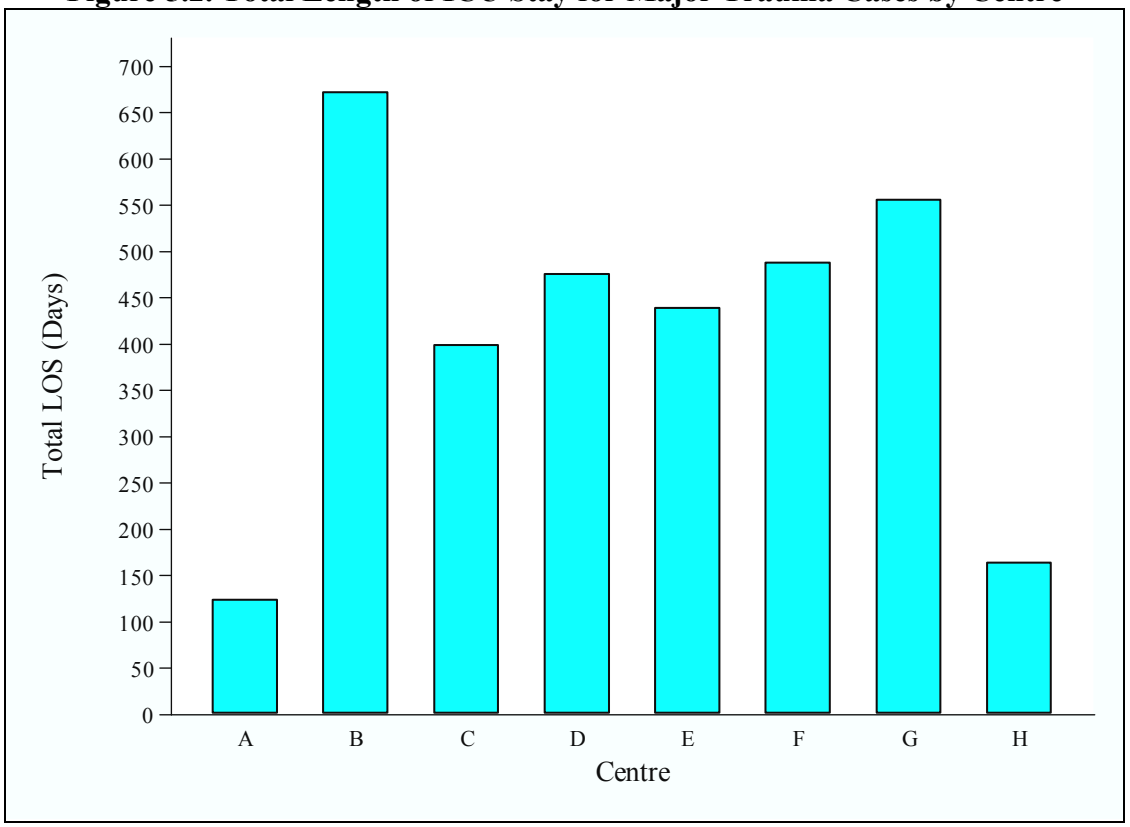

**Figure 5.2a. Average Length of ICU Stay for Major Trauma Cases by Centre**

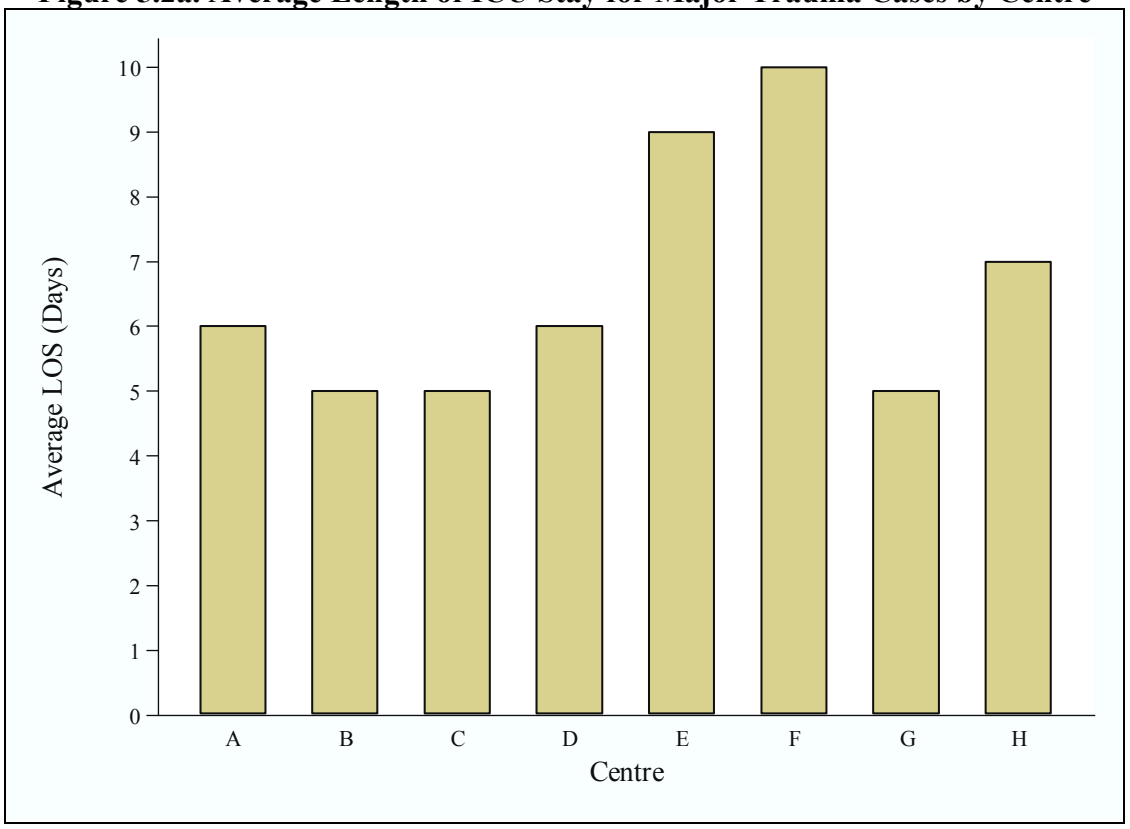


**Table 5.2a. Total and Average Length of ICU Stay for Major Trauma Cases by Outcome and Centre**

| Centre | Survivors | | | Death | | |
|---|---|---|---|---|---|---|
| | No. | Total LOS | Average LOS | No. | Total LOS | Average LOS |
| A | 17 | 111 | 7 | 4 | 13 | 3 |
| B | 106 | 582 | 5 | 27 | 90 | 3 |
| C | 52 | 308 | 6 | 24 | 91 | 4 |
| D | 60 | 377 | 6 | 22 | 99 | 5 |
| E | 21 | 219 | 10 | 30 | 220 | 7 |
| F | 27 | 240 | 9 | 20 | 248 | 12 |
| G | 79 | 419 | 5 | 30 | 137 | 5 |
| H | 23 | 163 | 7 | 1 | 1 | 1 |

**Figure 5.3. Total and Average Length of Hospital Stay for Major Trauma Cases by Admission Type**

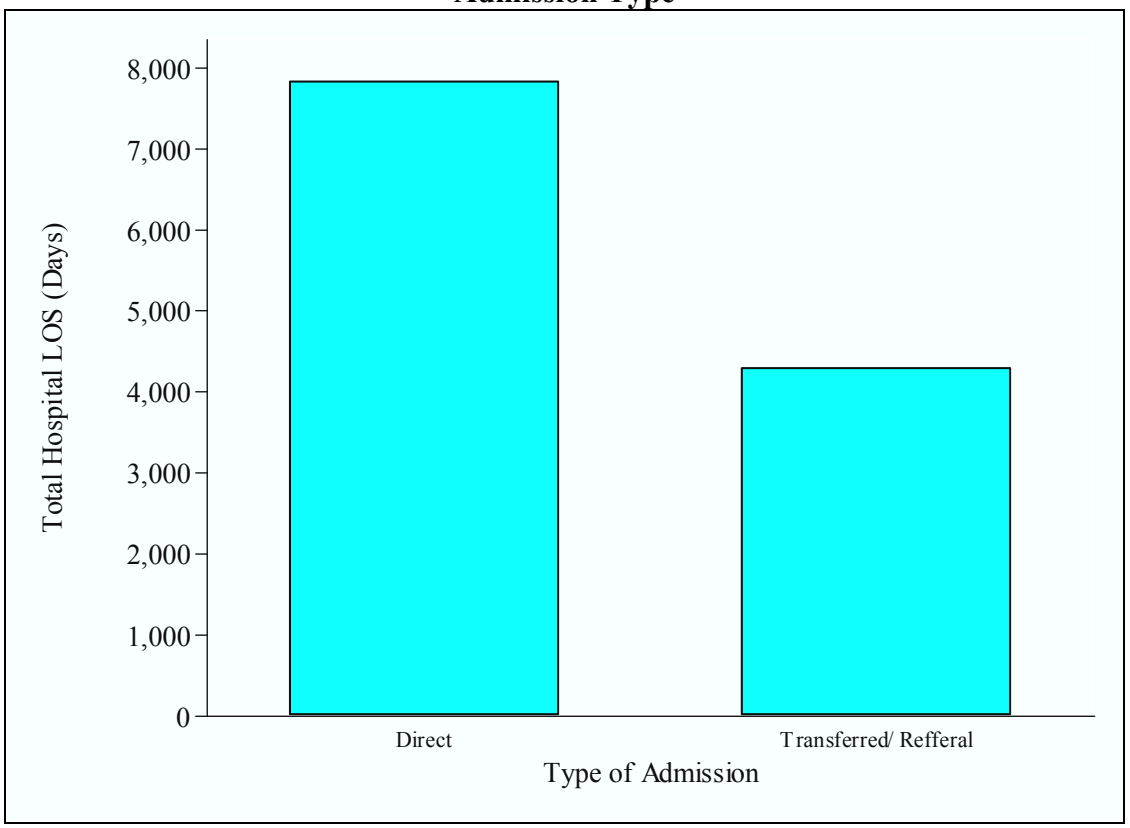

**Figure 5.3a. Total and Average Length of Hospital Stay for Major Trauma Cases by Admission Type**

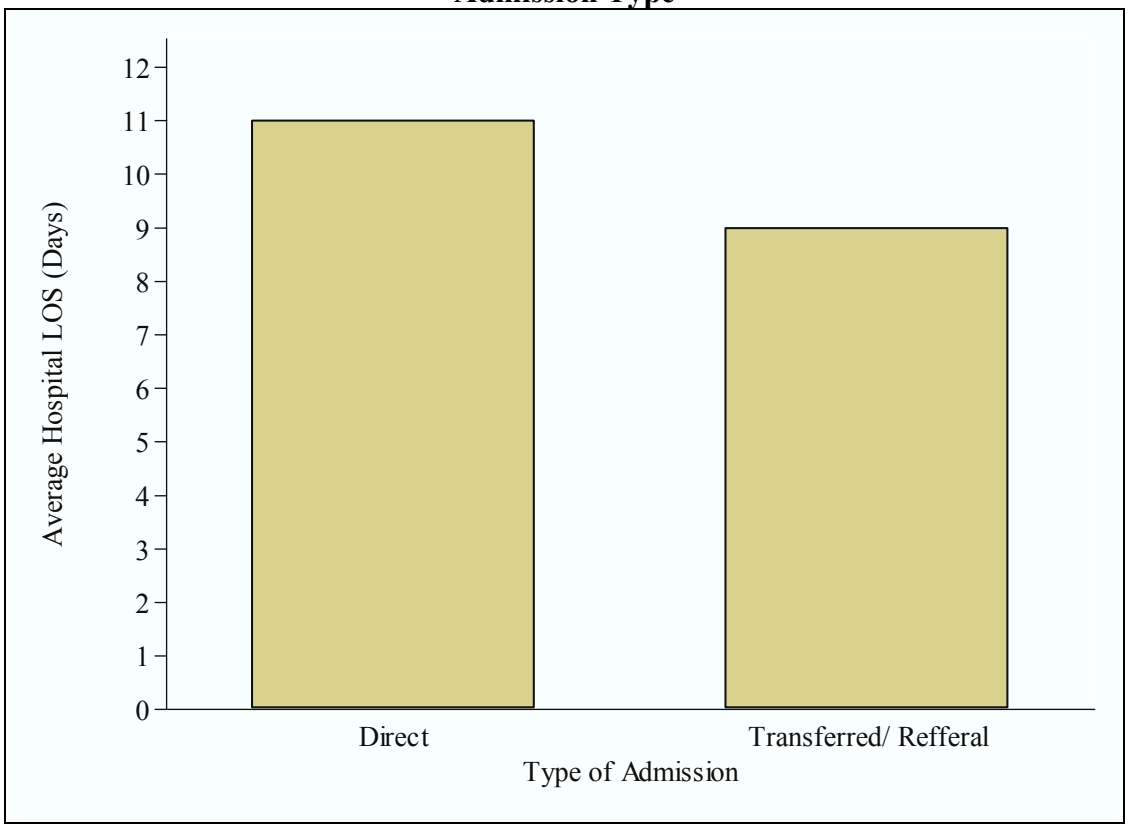


**Table 5.3. Total and Average Length of Hospital Stay for Major Trauma Cases by Admission Type**

| Admission Type | No. | LOS | |
|---|---|---|---|
| | | Total | Average |
| Direct | 722 | 7834 | 11 |
| Transferred/Referrals | 484 | 4293 | 9 |

**Figure 5.4. Total Length of Hospital Stay in Days for Major Trauma Cases by Cause of Injury**

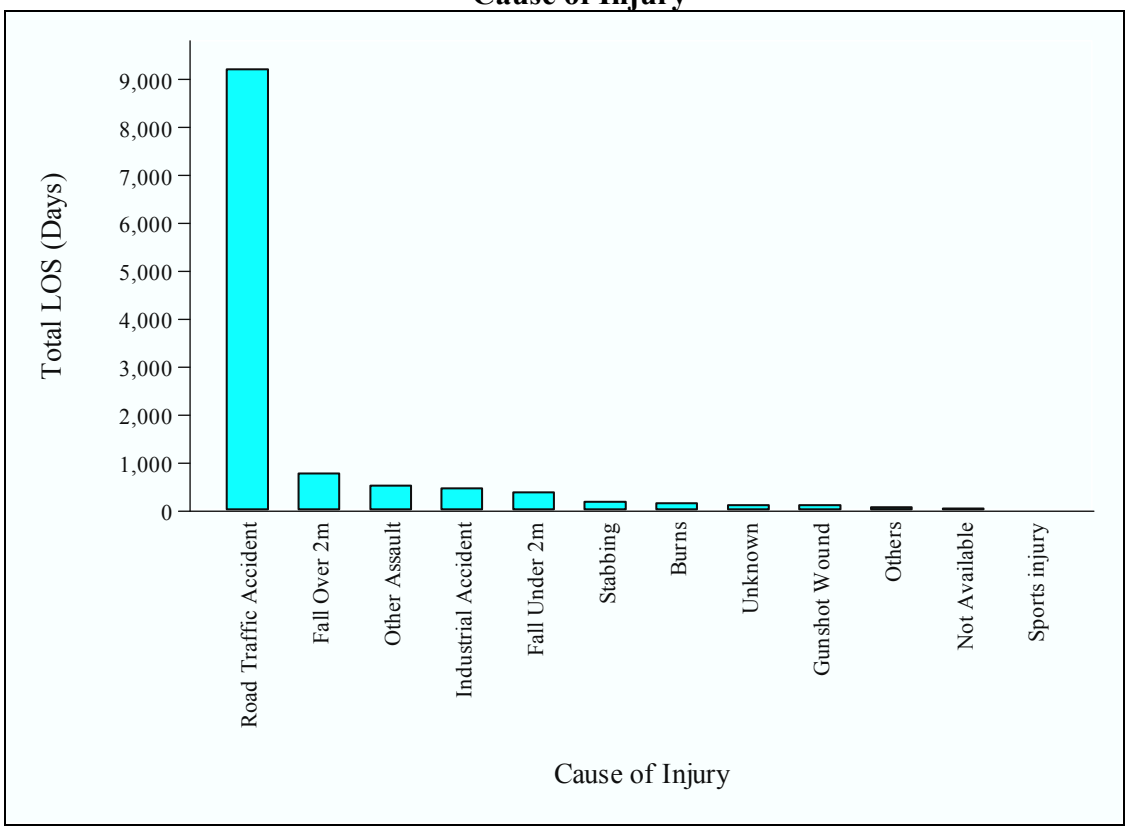

**Figure 5.4a. Average Length of Hospital Stay in Days for Major Trauma Cases by Cause of Injury**

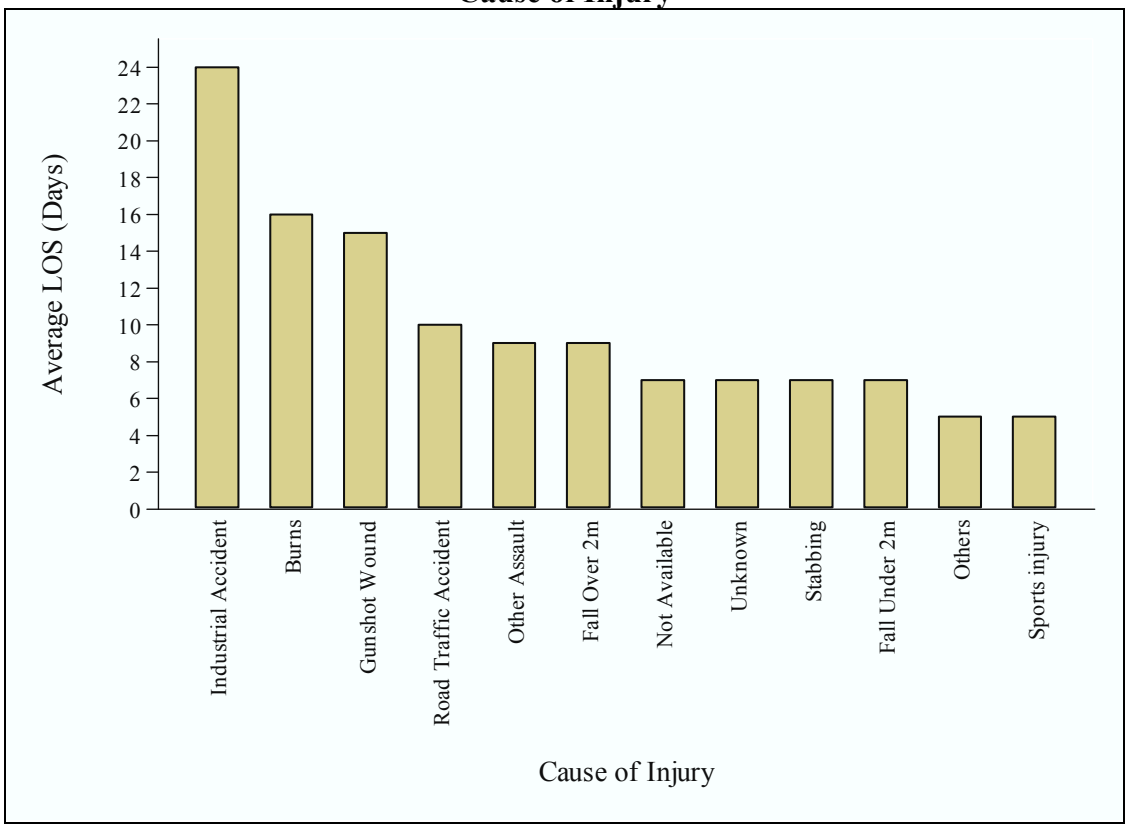


**Table 5.4. Total and Average Length of Hospital Stay in Days for Major Trauma Cases by Cause of Injury**

| Cause of Injury | No. | Total LOS | Average LOS |
|---|---|---|---|
| Road Traffic Accident | 894 | 9215 | 10 |
| Industrial Accident | 20 | 475 | 24 |
| Fall over 2 meter | 89 | 786 | 9 |
| Fall under 2 meter (about 1 door's height) | 58 | 395 | 7 |
| Sports injury | 1 | 5 | 5 |
| Burns | 10 | 161 | 16 |
| Stabbing | 28 | 196 | 7 |
| Gunshot Wound | 8 | 121 | 15 |
| Other Assault | 57 | 526 | 9 |
| Others | 17 | 78 | 5 |
| Unknown | 19 | 125 | 7 |
| Not Available | 7 | 50 | 7 |
| TOTAL | 1208 | 12133 | 10 |

# National Trauma Database (NTrD) Notification Form 2008

Office use:

**A. Reporting Centre Name:**

**B. Date of Notification:** *(dd/mm/yy)*

## SECTION 1 : PATIENT'S PARTICULARS

***1. Name :**

***2. Identification Card Number :**

*MyKad / MyKid:* - -  *Old IC:*

*Other document No: (eg Birth Cert, Mother's IC)*

*Specify type (eg.passport, armed force ID):*

**3. Patient RN :** Admission: ED: Neurosurgery Dept (if different from ED):

**4. Date of Birth :** *(dd/mm/yy)*

***5. Gender :** Male Female

***6. Nationality and Ethnic Group :**

Malaysian →
- Malay
- Chinese
- Indian
- Orang Asli
- Bumiputra Sarawak
- Bumiputra Sabah
- Other M'sian, specify : .....

Non Malaysian → **Specify nationality:** .....

## SECTION 2 : ADMISSION

***7. a. Date of Admission :** *(dd/mm/yy)* **b. Age at Admission:** *(Auto Calculated)*

**8. Time of ED Admission / Registration :** : AM / PM

**9. Type of Admission :**

Direct

Transfer / Referred from →

**a) Hospital Name:** .....

**b) Time of Admission:** : AM / PM

**c) Hospital Type:**
- Hospital with Specialist
- Hospital without Specialist
- Health clinics
- Private Hospital
- Private Clinic
- Not Available

## SECTION 3 : INJURY

**10. Date of Injury :** *(dd/mm/yy)* **11. Time of Injury :** : AM / PM

**12. Mechanism of Injury :**
- Blunt (e.g. MVA)
- Penetrating (e.g. Stab, Gunshot wound)
- Burns

**13. Injury Intent :** *(Check one or more boxes)*
- Unintentional
- Intentional self harm
- Domestic violence
- Intent cannot be determined
- Child neglect / Maltreatment
- Intentional assault

**14. Cause of Injury :**
- Road Traffic Accident
  - Motorcycle Rider
  - Motorcycle Pillion
  - Driver
  - Front Seat Passenger
  - Back Seat Passenger
  - Bicyclist
  - Pedestrian
  - Not Available
- Industrial Accident
- Fall over 2 metre
- Fall under 2 metre (about 1 door's height)
- Sports Injury
- Burns
- Stabbing
- Gunshot Wound
- Other Assault
- Others
- Not Known

**15. Place of Injury :**
- Road, Street, Highway
- Home
- Industrial / Construction Area
- School / Kindergarten / nursery
- Sports / Recreational Area
- Trade / Service area
- Residential institution
- Other specified place
- Not Available

## SECTION 4 : CLINICAL DETAILS (EMERGENCY DEPARTMENT)

**16. Pulse rate :** *(Beats / Min)*

**17. Respiratory rate :** *(Breath / Min)*

**18. Blood pressure :** **a. Systolic :** *(mmHg)* **b. Diastolic :** *(mmHg)*

**19. Temperature :** *(C)*

**20. Pulse Oximetry :** *(%)*

**21. Glasgow Coma Scale :** *(Please score as Verbal 1 if patient is intubated)*

| | | | | | | |
|---|---|---|---|---|---|---|
| **a. Best Eyes opening :** | 1 | 2 | 3 | 4 | | |
| **b. Best Verbal Response :** | 1 | 2 | 3 | 4 | 5 | |
| **c. Best Motor Response :** | 1 | 2 | 3 | 4 | 5 | 6 |
| **d. Total GCS :** *(Auto Calc)* | | | | | | |
| **e. Head Injury Category:** *(Auto Calc)* | Mild (13-15) | Moderate (9-12) | Severe (3-8) | | | |

**22. Procedures done in ED :** *(Check one or more boxes)*
- Endotracheal intubation
  - Intubated at referral hospital
  - Intubated at current hospital
- CT scan
  - Brain
  - Cervical spine
  - Abdomen
  - Pelvis
  - Thorax
  - Others, specify .....
- Needle thoracocentesis
- Pelvic clamp/binding/ext. fixator
- Mechanical ventilation
- Chest tube insertion
- Ultrasound/FAST

**23. Reviewed by :** *(Check one or more boxes)*
- Emergency Physician → Medical Officer / Trainee; Specialist / Consultant
- Surgeon → Medical Officer / Trainee; Specialist / Consultant

**24. Disposition from ED to :** ICU OT General Ward Mortuary Other Hospital AOR HDW

## SECTION 5 : DIAGNOSIS AND OPERATIVE PROCEDURE

**25. Traumatic Brain Injuries (based on ICD10):**

*(Check one or more boxes)*

- ☐ Open wound of head →
  - ☐ Open wound of scalp
  - ☐ Multiple open wounds of head
- ☐ Fracture of skull and facial bones →
  - ☐ Fracture of vault of skull
  - ☐ Fracture of base of skull
- ☐ Intracranial Injury →
  - ☐ Concussion
  - ☐ Traumatic cerebral oedema
  - ☐ Diffuse brain injury
  - ☐ Focal brain injury
  - ☐ Epidural haemorrhage
  - ☐ Traumatic subdural haemorrhage
  - ☐ Traumatic subarachnoid haemorrhage
  - ☐ Intracranial injury with prolonged coma
  - ☐ Other intracranial injuries
  - ☐ Intracranial injury, unspecified
- ☐ Others, specify: .....

**26. Operative Management:** ◯ Yes (if Yes, please fill up below) ◯ No (If No, please proceed to Section 6 directly)

**27. Date of Operation :** | | | | | | | *(dd/mm/yy)*

**28. Time of Operation :** **Start** | | | : | | | AM / PM

**29. Duration Time to Operation : (Time of Admission to Start of Surgery)** *(Auto Calc)*

**30. Operative Procedure :**

*(Check one or more boxes)*

- ☐ None
- ☐ Intracranial →
  - ☐ Evacuation of hematoma
  - ☐ Decompressive craniectomy
  - ☐ External ventricular drain
  - ☐ ICP (Intra cranial pressure) monitoring
  - ☐ Elevation of depressed skull fracture .....
  - ☐ Others, specify: .....
- ☐ Intrathoracic
- ☐ Intra-abdominal
- ☐ Spinal surgery
- ☐ Pelvic fixation
- ☐ Others, specify: .....

## SECTION 6 : IN-HOSPITAL OUTCOME

**31. Discharge Date :** | | | | | | | *(dd/mm/yy)*

**32. Length of Stay in Hospital:** ..... *day (Auto calc. From date of admission to date of discharge)*

**33. Admission to ICU** ◯ Yes → **Number of days:** ..... *day(s)* ◯ No

**34. Patient's Outcome at Discharge:**

**a. Alive** ◯

| Glasgow Outcome Score at Discharge: | |
|---|---|
| 1 - Dead | ◯ |
| 2 - Persistent Vegetative | ◯ |
| 3 - Severe Disability | ◯ |
| 4 - Moderate Disability | ◯ |
| 5 - Well | ◯ |

**Disposition**

- ◯ **Discharge Home**
- ◯ **Discharge to Referring Hospital**
  **Name of Hospital:** .....
- ◯ **Discharge to Other Hospital**
  **Name of Hospital:** .....
- ◯ **Discharge Against Medical Advice**

**b. Death** ◯

| Name : | |
|---|---|

## SECTION 7 : INJURY SEVERITY SCORE

**35. Injuries and Injury Severity Score**

| BODY REGION | INJURY NO. | INJURY DESCRIPTION | AIS | Best AIS | AIS CODE | AIS 2 |
|---|---|---|---|---|---|---|
| Head & Neck | 1. | | | | | |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |
| | 5. | | | | | |
| | 6. | | | | | |
| | 7. | | | | | |
| Face | 1. | | | | | |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |
| | 5. | | | | | |
| | 6. | | | | | |
| | 7. | | | | | |
| Thorax | 1. | | | | | |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |
| | 5. | | | | | |
| | 6. | | | | | |
| | 7. | | | | | |
| Abdomen / Pelvic content | 1. | | | | | |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |
| | 5. | | | | | |
| | 6. | | | | | |
| | 7. | | | | | |
| Extremitis / Pelvic girdle | 1. | | | | | |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |
| | 5. | | | | | |
| | 6. | | | | | |
| | 7. | | | | | |
| External | 1. | | | | | |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |
| | 5. | | | | | |
| | 6. | | | | | |
| | 7. | | | | | |

| | |
|---|---|
| **36. Total ISS :** | *(Auto Calc)* |
| **37. Revised Trauma Score :** | *(Auto Calc)* |
| **38. Please check (√) if patient has one or more criteria:** | ☐ Patient who died from their injuries after admission<br>☐ Patients with injury severity score (ISS) of >15<br>☐ Patients admitted to ICU or high dependency area for >24 hours and mechanically ventilated<br>☐ Urgent surgery (within 24hours) for intracranial, intrathoracic, intraabdominal or fixation for pelvic or spinal injuries. |

# National Trauma Database (NTrD) Follow Up Form

Office use: / Centre:

***Complete this form at 3rd month, 6th month, 12th month and annually after the trauma event. Check (√) one box unless specified otherwise.***

| | |
|---|---|
| **A. Reporting Centre Name** | |
| **B. Date of Follow Up:** | *(dd/mm/yy)* |
| **C. Name :** | Mr/Mrs/Ms/Dr |
| **D. Identification Card Number :** | *MyKad / MyKid:* - - *Old IC:*<br>*Other document No:* *Specify type (eg.passport, armed force ID):* |
| **E. Patient RN :** | **ED:** **Neurosurgery Dept (if different from ED):** |

## PATIENT OUTCOME

**1. Follow Up at:**

- ◉ **3 months**
- ◉ **6 months**
- ◉ **1 year**

**2. Outcome**

| | | |
|---|---|---|
| **a. Alive** | ◉ | |
| **b. Death** | ◉ → | **i) Date of death: (dd/mm/yy)** |
| **c. Transferred to another centre** | ◉ → | **i) Date of last follow up: (dd/mm/yy)**<br>**ii) Name of centre transferred to:** |
| **d. Lost to Follow Up** | ◉ → | **i) Date of last follow up: (dd/mm/yy)** |

**3. Glasgow Outcome Score**

| | |
|---|---|
| **1 - Dead** | ◉ |
| **2 - Persistent Vegetative** | ◉ |
| **3 - Severe Disability** | ◉ |
| **4 - Moderate Disability** | ◉ |
| **5 - Well** | ◉ |