

**Characteristic of Head Injury Patients Admitted to Intensive Care Unit in Dr.  
Mohammad Hoesin Palembang General Hospital**

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**Abstract**

**Introduction:** Head injury is both major health and socioeconomic problem worldwide. Epidemiological studies of head injuries are essential for the effective prevention and treatment of head injury patients, but often found with unclear definitions of head injury. The use of the ICU is associated with higher costs and decreased availability for patients who need it. Oftenly, patients with head injuries require admission to the ICU both before surgery and after surgery. We aim to describe the characteristic of patients with head injuries who were admitted to the emergency department (ED) and treated in the ICU at Mohamad Hoesin Hospital

**Methods:** This research was an observational descriptive study. Using secondary data from the medical records of Mohammad Hoesin Hospital, Palembang. Performed in the from July 2019 to December 2019. Samples were all patients diagnosed with head injuries.

**Results:** There were 177 subjects participated who met study criteria, of which 51 subjects were admitted to ICU. ICU-admitted head injured patients were mostly male (78.5%). The largest age distribution is 11-20 year old (33.3%). The most common type of head injuries admitted to ICU according to CT scan was hemorrhagic head injuries (88.9%). The most common type of head injury admitted to ICU according to GCS was severe head injury (51.1%)

**Conclusion:** Male patients, patients age of 11–20-year-old, severe head injury, and hemorrhagic head injury were the most common characteristic of patients diagnosed with head injuries admitted to ICU at Mohammad Hoesin Hospital

**Keyword:** head injuries, intensive care, descriptive, characteristic

## **1. Introduction**

Head injury is both major health and socioeconomic problem worldwide as it can occur in both high- and low-income countries and at any age. Head injuries cover 50.000 deaths in the United States annually. Each year, approximately 1.5 million Americans experience head injuries with 200.000 people being treated and survived. Of these, it is estimated that 80.000-90.000 have long-term disabilities. Motor accidents are the leading cause of death in adults aged <40 years. Head injury is referred to as "silent epidemic", and the term "silent" further reflecting the frequent underestimation of these incidents in actual cases.<sup>1</sup>

Epidemiological studies of head injuries are essential for the effective prevention and treatment of head injury patients. Howeverm they are often found with unclear definitions of head injury. A clear definition of the head injury is essential for understanding the epidemiology of this case. Recent head injury is defined as: changes in brain function, or evidence of brain pathology, caused by external influences. Tagliaferri et al. conducted a systematic review of the epidemiology of head injuries in Europe back in 2006, which they analyzed 23 studies published in 1980 and 2003. There was an incidence of 235 cases per 100.000 people per year, and a mortality rate of 15 per 100.000 people per year.<sup>1</sup>

The utilization of the intensive care unit (ICU) is largely associated with higher costs and decreased availability for patients who actually need it. Oftenly, patients with head injuries require admission to the ICU both before surgery and after surgery. Effective management of critical care may significantly reduce morbidity and mortality in head injury cases. This study aims to describe

the characteristic of patients with head injuries who were admitted to the emergency department (ED) Mohamad Hoesin Hospital (RSMH) and treated in the ICU.

## **2. Method**

This study is an observational descriptive study to determine the description of head injury patients in the intensive care unit at RSMH Palembang. The study was conducted at RSUP Muhammad Hoesin Palembang in January 2020. The population of this study were all head injury sufferers at Dr. Mohammad Hoesin Palembang. The study sample was all head injury patients who were treated in the intensive care unit Dr. Mohammad Hoesin Palembang who met the inclusion criteria. Inclusion criteria included mild, moderate, severe head injury patients admitted to the ICU and head injury patients who had no indication of ICU care due to other illnesses. The exclusion criteria were other serious disease conditions which were mandatory of ICU care. Data were collected from patient registers and RSMH medical records for cases between July 2019 - December 2019. All of the data then coded into table and analyzed univariately using SPSS 22.0

## **3. Results**

The study was conducted by collecting data on head injury patients admitted to Mohammad Hoesin General Hospital Palembang between July 1, 2019 and December 2019. There were 177 patients diagnosed with head injuries and 51 patients who were undergoing treatment in the ICU.

**Table 1.** Characteristics of head injury patients admitted to the ICU

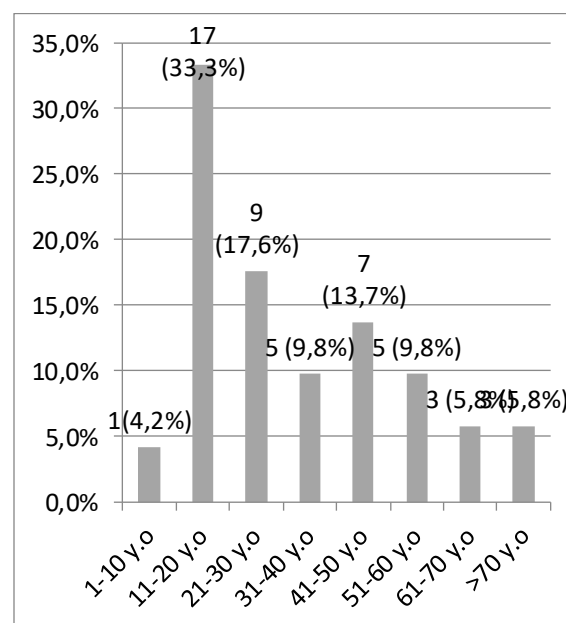
<b>Characteristics</b>	<b>n (%)</b>	<b>Mean</b>
<b>Age</b>	51 (100)	34.39 years
<b>Gender</b>		
Women	11 (21.5)	
Man	40 (78.5)	
<b>Classification of head injuries</b>		
Mild	7 (13.7)	
Moderate	18 (35.2)	
Severe	26 (51.1)	
<b>CT scan abnormalities</b>		
Bleeding	45 (88.9)	
No bleeding	6 (11.1)	
<b>Management</b>		
Operative	42 (92.1)	
Conservative	5 (7.9)	
<b>Output</b>		
Outpatient	47 (92.1)	
Died	4 (7,9)	

Patient characteristics in this study are described in table.1 Based on the table, the mean age of patients undergoing ICU care was 34.39 years with a minimum age of 9 years and a maximum age of 76 years. The age group 11-20 years accounted for 17 subjects (33.3%), 21-30 years accounted for 9 subjects (17.6%), 31-40 years amounting to 5 subjects (9.8%), 41-50 years accounted for 7 subjects (13,7%), 51-60 years amounted to 5 subjects (9.8%), 61-70 years accounted for 3 subjects (5.8%), and over 70 years amounted to 3 subjects (5.8%). This finding was in contrast to research conducted by Azeez in which the age group that underwent the most ICU treatment due to head injuries was the 30–40-year age group.

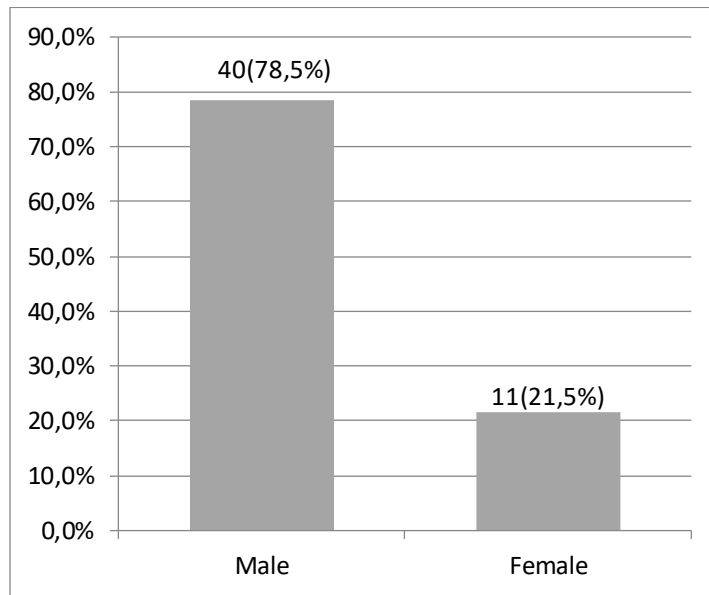
In our study, 11 (21.5%) women and 40 (78.5%) men were undergoing treatment in the intensive care unit due to head injury. Similar to research conducted by Azeez which shows the ratio of men to women is 3:1. Tawil's research also shows that 75% of head injury patients are male

Based on the type of head injury severity assessed using GCS consecutively starting from the least was mild head injury with 7 (13.7%) patients, moderate head injury were 18 (35.2%) patients, severe head injury were 26 (51.1%) patients. When compared with research conducted by Aziz (2016), the ICU admission rates for head injury patients are as follows, CKR 0.5%, CKS 5.5% and CKB 94%.

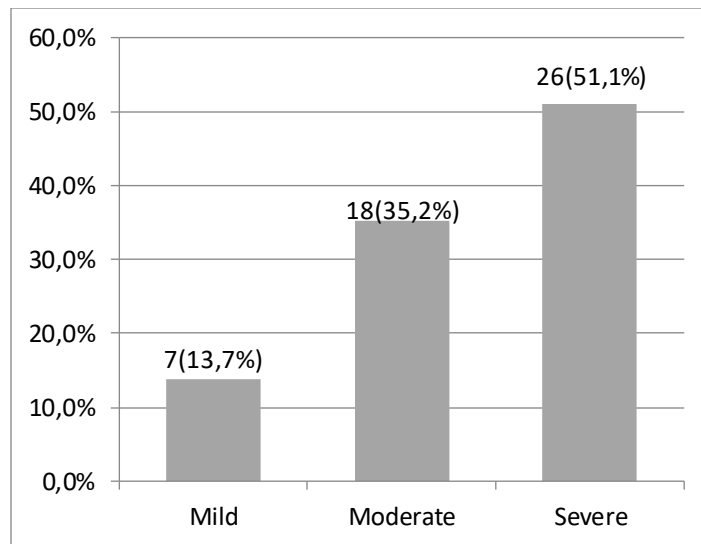
In this study we divided the CT scan results into two groups, hemorrhage and without hemorrhage. It was found that patients with hemorrhage were 45 patients (88.9%) while without hemorrhage were 6 (11.1%). Of the hemorrhagic patients, 41 (91.1%) received operative management and 4 (8.9%) patients received conservative management. Only one patient without hemorrhage received operative management of tension pneumoencephaly with decompression craniectomy. Overall, there were 42 patients who underwent operative management (82.3%) and 9 (17.7%) who underwent conservative management.



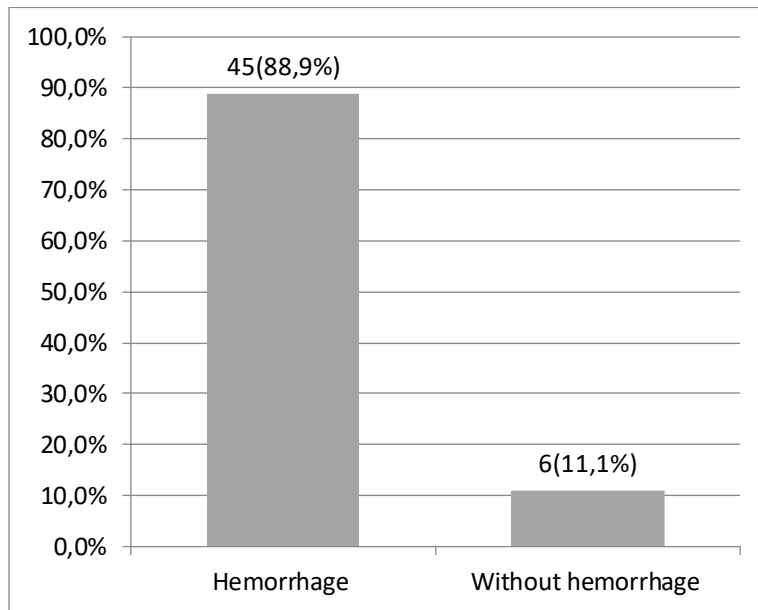
**Graph 1.** Frequency of age of head injury patients admitted to the ICU



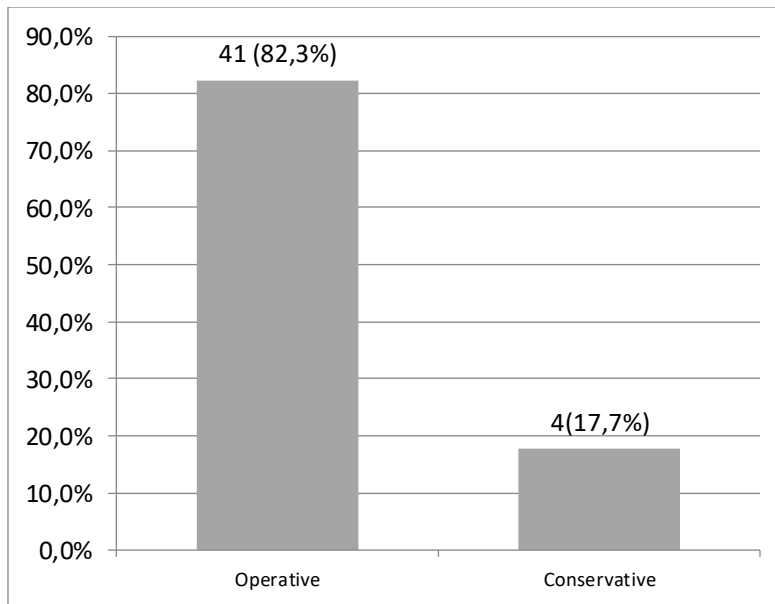
**Graph 2.** Gender distribution of head injury patient at Mohammad Hoesin Hospital, Palembang



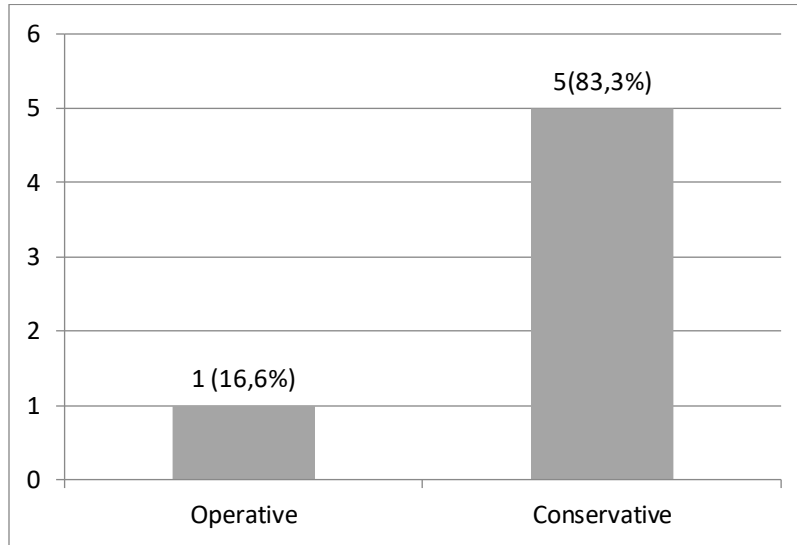
**Graph 3.** Classification of head injuries in patients treated in the ICU of Mohammad Hoesin General Hospital, Palembang



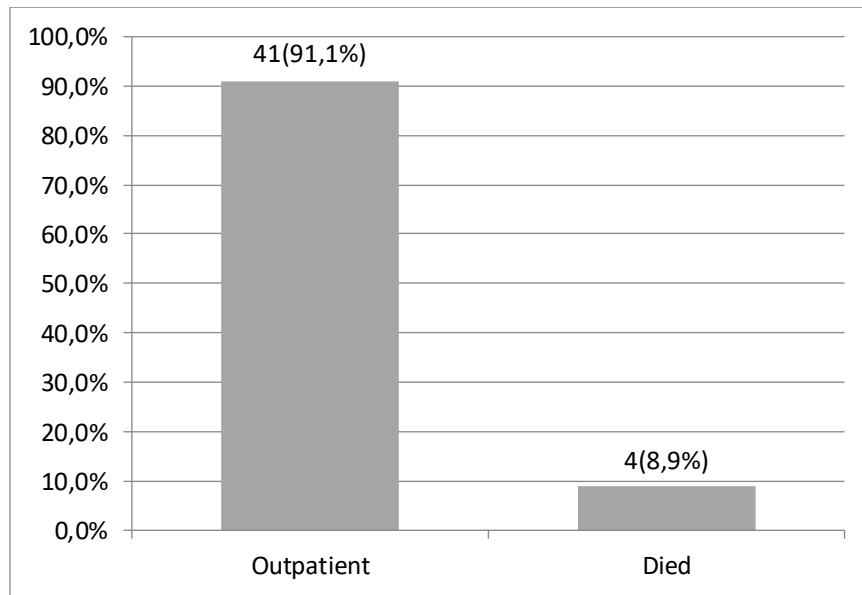
**Graph 4.** CT scan abnormalities in head injured patients admitted to the ICU



**Graph 5.** Management of head injury patients with hemorrhage who are admitted to the ICU

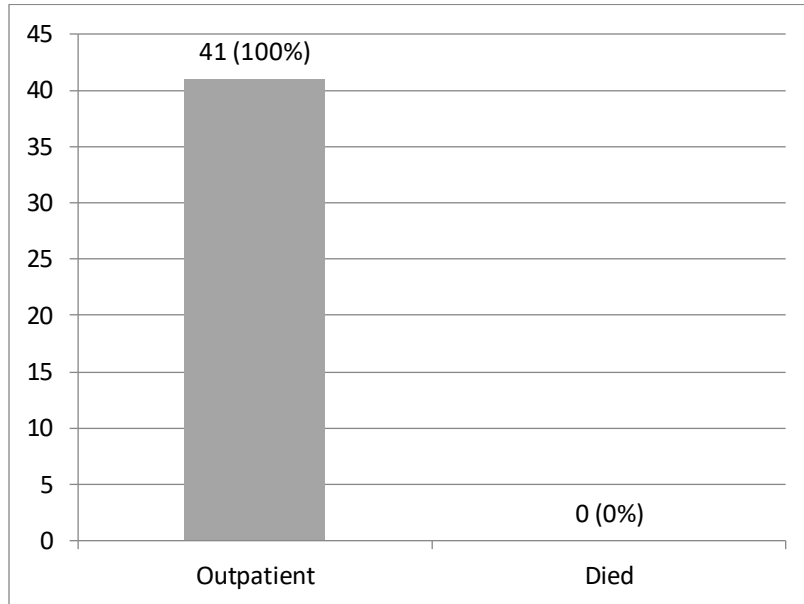


**Graph 6.** Management of head injury patients without hemorrhage who are admitted to the ICU

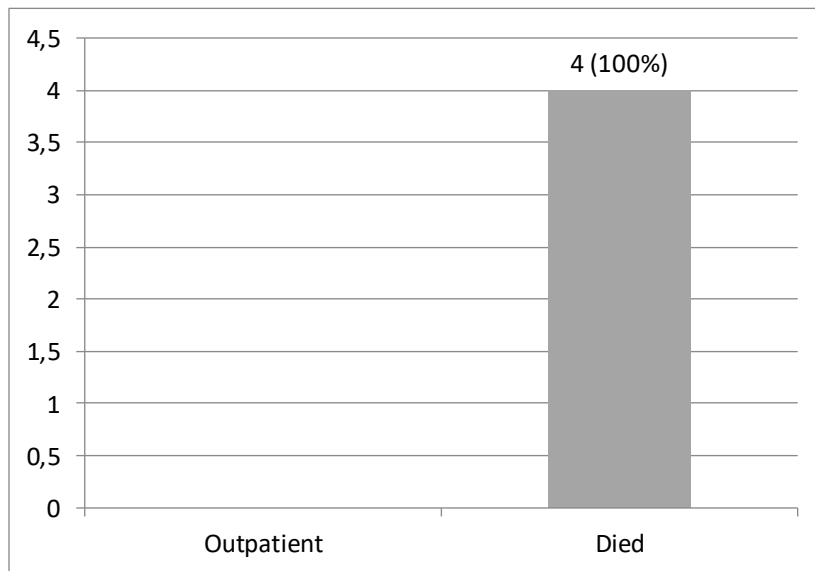


**Graph 7.** Outcome of head injured patient with hemorrhage in the ICU



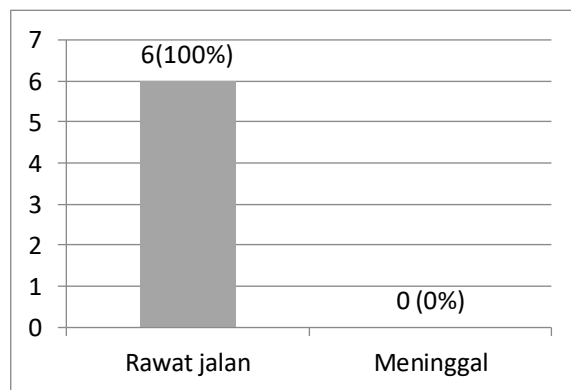


**Graph 8.** Outcome of head injury patients with hemorrhage undergoing operative management in the ICU



**Graph 9.** Out of the head injured patient with hemorrhage who underwent conservative management in the ICU

In this study, we found that the severity of head injuries that most commonly admitted to the ICU was severe head injury, which were 26 (51.1%) patients, followed by moderate head injury, which were 18 (35.2%) patients, and only 7 patients with minor head injury. In a study conducted by Bonow et al, from 44.7% of minor head injury patients who were admitted to the ICU, 17.3% of patients experienced overtriage. In RSMH it seems that overtriage is rare because of the high need for the ICU and the very limited availability of the ICU. Serious head injuries are a major contributor to disability and a leading cause of death worldwide.<sup>14</sup> This finding can be explained because serious head injuries must be carefully considered with the limitation of ICU availability.



**Graph 10.** Outcome of patients without hemorrhage who were admitted to the ICU

In this study, the mean age of patients diagnosed with head injury was 34.39 years. This finding is similar to the study conducted by Azeez et al which obtained the mean age of patients with head injuries admitted to the ICU was  $34 \pm 18.92$  years.<sup>17</sup> The study by Opondo also stated that the mean age of patients admitted to the ICU due to severe head injury was  $34 \pm 17$  years.

Gender which received the most ICU care due to head injuries in this study was male as many as 40 (78.5%) patients. This was similar to research conducted by Azeez et al which shows the ratio of men to women is 3: 1. Tawil's study also showed that 75% of head injury patients were men with the mean age being 36 years. Moreover, the most common CT scan abnormalities in this study were patients with bleeding, amounting to 45 patients (88.9%).

In Azeez et al's study, the mortality rate for head injury patients admitted to the ICU in Kenya was 54.0%, whereas in our study there were only 4 patients or 7.9% who died during treatment. A study conducted by Jochems et al stated that the ICU mortality rate due to head injury was 33% .<sup>6</sup> The Opondo study examined severe head injury patients who were admitted to the ICU and stated that the mortality rate was 54%.<sup>13</sup> Head injury is one of the leading causes of death and disability in United States and Canada, and prevention is the key to reducing the number of the incidence.

#### **4. Discussion**

In this study, we found that the severity of head injuries that most commonly admitted to the ICU was a severe head injury, which was 26 (51.1%) patients, followed by moderate head injury, which were 18 (35.2%) patients, and only 7 patients. with a minor head injury. In a study conducted by Bonow et al, from 44.7% of minor head injury patients who were admitted to the ICU, 17.3% of patients experienced "over-triage". In RSMH it seems that over-triage is rare because of the high need for the ICU and the very limited availability of the ICU. Serious head injuries are a major contributor to disability and a leading cause of death worldwide.<sup>14</sup> This finding can be explained because in RSMH, severe head injuries must be carefully considered with the limited amount of ICU bed availability.

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## 5. Conclusion

Gender with the most frequent head injuries was male patients (78.5%), with the most common severity admitted to ICU was severe head injuries (51.1%) and the most frequent imaging of CT scan lesions was with hemorrhage (88.9%). Further research is needed regarding the prevalence with a longer period and involving other hospitals to determine the demographics and epidemiology of head injuries undergoing intensive care unit care in Indonesia.

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