

ASSESSMENT OF CONSCIOUSNESS LEVELS IN PATIENTS WITH HEAD INJURY USING THE FULL OUTLINE OF UNRESPONSIVENESS (FOUR SCORE) IN THE EMERGENCY DEPARTMENT

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ABSTRACT

Head injury is one of the causes of neurological disorders that can lead to decreased levels of consciousness, requiring rapid and accurate assessment. One of the instruments that can be used is the Full Outline of UnResponsiveness (FOUR Score), which evaluates eye response, motor response, brainstem reflexes, and respiration. This study aimed to describe the level of consciousness in head injury patients using the FOUR Score. This research employed a quantitative descriptive observational design with a cross-sectional approach. The sample consisted of 27 respondents selected based on inclusion criteria using consecutive sampling techniques. Data were collected using the FOUR Score observation sheet and analyzed using the first quartile (Q1), third quartile (Q3), and interquartile range (IQR). The results showed that the highest FOUR Score values were found in mild head injury (Q1=15.5; Q3=16; IQR=0.5), while the lowest values were found in severe head injury (Q1=7.25; Q3=7.75; IQR=0.5). The findings indicated that an increase in head injury severity was accompanied by a decrease in FOUR Score values, reflecting a decline in the patient's level of consciousness.

Keywords: *Head injury, Level of consciousness, FOUR Score.*

INTRODUCTION

Head injury is one of the forms of traumatic brain injury (TBI) that remains a major cause of mortality and disability worldwide. Head trauma can result in brain tissue damage, intracranial hemorrhage, cerebral edema, and increased intracranial pressure, which may reduce cerebral perfusion and subsequently impair neurological function and the patient's level of consciousness. A decreased level of consciousness is an important indicator in determining neurological conditions; therefore, rapid, accurate, and comprehensive assessment is required to support clinical decision-making in head injury patients (Kristina et al., 2024).

Globally, head injury remains a significant public health problem. According to the World Health Organization (WHO), head injury continues to be a serious health issue worldwide. Each year, approximately 1.2 million people die due to head injuries, with the majority caused by traffic accidents (Yani et al., 2024). In Indonesia, the incidence of head injury is also relatively high. Based on data from the Ministry of Health of the Republic of Indonesia (2022), approximately 120,000 cases of head injury are reported annually. At the provincial level, the East Java Health Office (2022) recorded around 18,000 cases of head injury each year. Based on data from RSI Sakinah Mojokerto, 681 head injury patients received treatment in the Emergency Department during 2025. The high incidence of head injuries indicates that accurate neurological assessment plays an important role in the initial management of head injury patients.

The assessment of consciousness levels in various healthcare facilities is still predominantly performed using the Glasgow Coma Scale (GCS). Although GCS has been

widely used as a standard assessment instrument, this method has several limitations, particularly in intubated patients where the verbal response component cannot be assessed. Furthermore, GCS is unable to evaluate brainstem function and respiratory patterns, which are important aspects of neurological assessment in head injury patients (Prasetyowati, 2020; Wijdicks et al., 2005). As an alternative, the Full Outline of UnResponsiveness (FOUR Score) was developed to assess four neurological components, including eye response, motor response, brainstem reflexes, and respiration, thereby providing a more comprehensive overview of neurological conditions compared to GCS (Pujiastuti, 2022).

Previous studies have demonstrated that the FOUR Score has good ability in evaluating patients' levels of consciousness (Riduansyah et al., 2020), explained that the FOUR Score provides a more comprehensive neurological assessment because it includes brainstem function and respiratory patterns. A study by (Pujiastuti 2022) also stated that the FOUR Score can help predict neurological deterioration more accurately compared to assessments using only the GCS. However, most previous studies have focused on evaluating the validity, reliability, or predictive ability of the FOUR Score, while studies describing the distribution of consciousness levels in head injury patients using the FOUR Score in emergency care settings, particularly at RSI Sakinah Mojokerto, remain limited. Based on this condition, this study aimed to describe the level of consciousness in head injury patients using the Full Outline of UnResponsiveness (FOUR Score) assessment in the Emergency Department of RSI Sakinah Mojokerto. This study is expected to provide information regarding the distribution of patients' consciousness levels based on the FOUR Score as a basis for neurological condition monitoring and to serve as a reference for nurses in implementing more comprehensive neurological assessments for head injury patients in emergency departments.

METHOD

This study was a quantitative descriptive observational study with a cross-sectional approach aimed at describing the level of consciousness in head injury patients using the Full Outline of UnResponsiveness (FOUR Score). The study was conducted in the Emergency Department (ED) of RSI Sakinah Mojokerto during the period of April 20–May 20, 2026.

The study population consisted of all head injury patients who visited the Emergency Department of RSI Sakinah Mojokerto during the study period. The sample consisted of 27 respondents who met the inclusion criteria and were selected using consecutive sampling techniques. Data were collected using a FOUR Score observation sheet through direct observation of patients according to neurological assessment procedures. The FOUR Score instrument consists of four assessment components, namely eye response, motor response, brainstem reflexes, and respiration, with a total score range of 0–16. A higher FOUR Score indicates a better level of consciousness in patients (Sugiyono, 2019).

Data were analyzed using descriptive statistics. Respondent characteristics were presented in the form of frequency distributions, percentages, and means, while the level of consciousness based on the FOUR Score was analyzed using the first quartile (Q1), third quartile (Q3), and interquartile range (IQR) to describe the distribution of FOUR Score values among respondents. This study was conducted in accordance with the ethical principles of health research, including respect for persons, beneficence, non-maleficence, justice, and maintaining the confidentiality of respondent identities.

FINDING AND DISCUSSION

RESEARCH RESULT

Respondent Characteristics

This study was conducted from April 20 to May 20, 2026, in the Emergency Department of RSI Sakinah Mojokerto, involving 27 head injury patients as respondents. The demographic characteristics of the respondents are presented in the following table.

A. General Data

Tabel 1. Mean Age of Head Injury Respondents in the Emergency Department of RSI Sakinah Mojokerto

Mean	Modus	SD	Min	Max
44,33	45	16,74	22	85

Source: Primary Data, 2026

Table 1. shows that the mean age of the respondents was 44.33 years, with a standard deviation of 16.74 years. The mode age was 45 years. The youngest respondent was 22 years old, while the oldest respondent was 85 years old.

Tabel 2. Distribution of Gender Frequency Among Head Injury Respondents in the Emergency Department of RSI Sakinah Mojokerto

No	Gender	f	%
1	Female	14	48,1
2	Male	13	51,9
	Total	27	100,0

Source: Primary Data, 2026

Table 2 shows that the majority of respondents were male, accounting for 14 respondents (51.9%), while nearly half were female, accounting for 13 respondents (48.1%).

Tabel 3. Distribution of Medical Diagnosis Frequency Among Head Injury Respondents in the Emergency Department of RSI Sakinah Mojokerto

No	Medical Diagnosis	f	%
1	Mild Head Injury	19	70,4
2	Moderate Head Injury	6	22,2
3	Severe Head Injury	2	7,4
	Total	27	100,0

Source: Primary Data, 2026

Table 3 shows that the majority of respondents had mild head injury, comprising 19 respondents (70.4%). A smaller proportion had moderate head injury, comprising 6 respondents (22.2%), while the fewest respondents had severe head injury, comprising 2 respondents (7.4%).

B. Specific Data

Table 4. Quartile Values and Interquartile Range of the FOUR Score According to Head Injury Severity Among Respondents in the Emergency Department of RSI Sakinah Mojokerto

Medical Diagnosis	Q1	Q3	IQR
Mild Head Injury	15,5	16	0,5
Moderate Head Injury	10,25	11,75	1,5
Severe Head Injury	7,25	7,75	0,5

Table 4 shows that there were 19 respondents (70.4%) with mild head injury. The first quartile (Q1) was 15.5, the third quartile (Q3) was 16, and the interquartile range (IQR) was 0.5, indicating that the middle 50% of FOUR Score values ranged from 15.5 to 16. Among the 6 respondents (22.2%) with moderate head injury, the first quartile (Q1) was 10.25, the third quartile (Q3) was 11.75, and the interquartile range (IQR) was 1.5, indicating that the middle 50% of FOUR Score values ranged from 10.25 to 11.75. Among the 2 respondents (7.4%) with severe head injury, the first quartile (Q1) was 7.25, the third quartile (Q3) was 7.75, and the interquartile range (IQR) was 0.5, indicating that the middle 50% of FOUR Score values ranged from 7.25 to 7.75.

DISCUSSION

Level of Consciousness Among Head Injury Respondents According to Injury Severity Using the FOUR Score

The results of the study in Table 4 showed that the majority of respondents experienced mild head injury, with 19 respondents (70.4%). In the mild head injury group, the first quartile (Q1) value was 15.5, the third quartile (Q3) was 16, and the interquartile range (IQR) was 0.5. These results indicate that patients with mild head injury had FOUR Score values ranging from 15.5 to 16. The narrow range of values suggests that the level of consciousness in mild head injury patients tended to be good and relatively homogeneous. These findings are consistent with the Advanced Trauma Life Support (ATLS., 2019), which states that mild head injury generally causes minimal brain tissue damage, allowing neurological function to be maintained. This condition enables patients to provide good responses and maintain their level of consciousness. Similarly, (Capizzi et al., 2020) explained that mild traumatic brain injury generally does not cause extensive structural brain damage, resulting in relatively mild neurological impairment, with consciousness function largely preserved.

In the moderate head injury group, consisting of 6 respondents (22.2%), the Q1 value was 10.25, the Q3 value was 11.75, and the IQR was 1.5. These results indicate that patients with moderate head injury had FOUR Score values ranging from 10.25 to 11.75. This range indicates that patients with moderate head injury experienced a decreased level of consciousness compared to the mild head injury group. The decline in consciousness levels among moderate head injury patients may occur due to greater brain tissue damage and an increased risk of secondary brain injury. According to (Totten et al., 2020), moderate head injury can cause neurological disturbances due to cerebral edema, impaired cerebral perfusion, and increased intracranial pressure. This is consistent with Meyfroidt et al. (2022),

who explained that impaired cerebral autoregulation following head injury can affect blood supply to the brain, thereby contributing to decreased neurological function.

In the severe head injury group, consisting of 2 respondents (7.4%), the Q1 value was 7.25, the Q3 value was 7.75, and the IQR was 0.5. These results indicate that patients with severe head injury had FOUR Score values ranging from 7.25 to 7.75. This range illustrates that patients with severe head injury experienced a more severe decrease in consciousness compared to the mild and moderate head injury groups. According to (Daniel et al., 2022), severe head injury is generally accompanied by more extensive brain tissue damage, such as diffuse axonal injury and cerebral edema, resulting in more severe neurological impairment. These conditions can increase intracranial pressure and reduce cerebral perfusion, leading to decreased oxygen supply to brain tissue and worsening impairment of consciousness. Furthermore, sustained increases in intracranial pressure can disrupt brainstem function, affecting eye response, motor response, brainstem reflexes, and respiration. These changes may contribute to a decline in the level of consciousness among patients with severe head injury (Perkins et al., 2022).

According to the researcher, the differences in FOUR Score values based on the severity of head injury indicate that the more severe the degree of head injury, the lower the patient's level of consciousness. Respondents with mild head injury had the highest FOUR Score range (15.5–16), whereas moderate and severe head injury groups showed a gradual decrease in FOUR Score values. This finding illustrates that an increase in the severity of head injury may lead to more severe neurological impairment, thereby affecting the patient's ability to maintain their level of consciousness.

Characteristics of Respondents Based on Gender

The results of the study in Table 2 showed that the majority of patients were male, with 14 respondents (51.9%), while 13 respondents (48.1%) were female. The FOUR Score values in the male group had a quartile range of 11–16, whereas the female group had a range of 15–16, indicating that the variation in consciousness levels among males was wider compared to females. These findings are consistent with (Giordano et al., 2020), who stated that males have a higher risk of experiencing head injury due to greater exposure to high-risk activities, such as traffic accidents and occupations with potential trauma risks. In addition, Faried et al. (2022) explained that estrogen and progesterone hormones in females have neuroprotective effects that may help reduce inflammatory responses and neuronal damage following head injury, allowing neurological function to be maintained more effectively. According to the researcher, the wider variation in FOUR Score values among male patients may not only be influenced by biological factors but also by the higher exposure to various injury mechanisms. The combination of these factors may contribute to differences in the distribution of FOUR Score values between male and female patients.

Characteristics of Respondents Based on Age

The results of the study in Table 1 showed that the average age of respondents was above 40 years. According to (Smeltzer et al., 2020), age is one of the factors that influences neurological conditions and prognosis in head injury patients. Increasing age is associated with a decreased ability of brain tissue to compensate for injury, resulting in a higher risk of neurological impairment. This opinion is supported by (Potter et al., 2021), who explained

that the aging process causes physiological changes in the nervous system, including decreased blood vessel elasticity, reduced numbers of neurons, and decreased neural tissue regeneration capacity, resulting in slower neurological recovery compared to younger individuals. According to the researcher, the predominance of patients in the adult to elderly age groups may be related to high mobility and daily activities, which contribute to a relatively high risk of experiencing head injury. In addition, physiological changes associated with aging may affect the brain's ability to maintain neurological function after sustaining a head injury.

CONCLUSION

Based on the results of the study regarding the description of consciousness levels in head injury patients using the FOUR Score assessment in the Emergency Department of RSI Sakinah Mojokerto, it was found that among 27 respondents, patients with mild head injury (19 respondents) had FOUR Score values with a Q1 of 15.5, Q3 of 16, and an IQR of 0.5. In patients with moderate head injury (6 respondents), the obtained values were Q1 of 10.25, Q3 of 11.75, and IQR of 1.5. Meanwhile, patients with severe head injury (2 respondents) had FOUR Score values with a Q1 of 7.25, Q3 of 7.75, and an IQR of 0.5. These results indicate that FOUR Score values tend to be higher in mild head injury and decrease in moderate to severe head injury, demonstrating that an increase in the severity of head injury tends to be accompanied by a decrease in the respondents' level of consciousness. Future researchers are expected to develop further studies related to the use of the FOUR Score with a larger number of respondents and to examine neurological, metabolic, pharmacological, and oxygenation factors that may influence the level of consciousness in head injury patients.

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