



## Overview of Deaths Due to Head Trauma in Traffic Accident Cases Based on Medical Records at Waled Regional General Hospital, 2021-2023

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### KEYWORDS

Death; Head trauma; Traffic accident.

### ABSTRACT

*Background: Traffic accidents (KLL) are unexpected and accidental events. One of the most common traumas found in traffic accidents is head trauma. The number of accidents continues to increase every year, thereby increasing the number of deaths and morbidity. This study examines the description of head trauma in traffic accident cases. Objective: To find out the description of deaths due to head trauma in traffic accident cases based on medical records at Waled Hospital. Method: This research is a descriptive study with an observational design. Samples were taken from medical records, with a total of 44 samples according to the inclusion criteria. The data collection technique used was total sampling. Results: The results of the study showed that the most cases of death due to head trauma in traffic accidents occurred in males (68.2%), aged 17–25 years (20.5%), blunt trauma (100%), closed head trauma (68.2%), and frontal region (40.9%). Conclusion: Traffic accidents can cause head trauma mostly in males, aged 17–≥65 years, and caused by blunt trauma with closed head trauma in the frontal region.*

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### INTRODUCTION

According to Law No. 22 of 2009, a traffic accident is an event on the road that is unexpected and unintentional, involving vehicles with or without other road users that results in human casualties and/or property losses (Alfanie et al., 2017; Parinduri, 2020; Van Veelen & Brodmann Maeder, 2021). (Saputra, 2018) According to the WHO, death due to road accidents is one of the non-communicable diseases with the highest number of deaths. By 2030, traffic accidents are expected to be the number 5 cause of death in the world. Traffic accidents are a health problem that is the cause of the most injuries worldwide. (Organization, 2018) According to the WHO's Global Status Report on Road Safety in 2021, 1.19 million people died due to traffic accidents. Based on 2019 data, the main cause of death occurs in children and adolescents aged 5–29 years old due to traffic accidents, ranked 1 (Ataya, 2023; Barat, 2024; National Academies of Sciences and Medicine, 2019). In addition to being the main cause of death for children and young adults, deaths due to traffic accidents also impact the productive age (Bushberg, 2022; Iwan et al., 2017; Leiva & Church, 2023; Motalebi Kashani et al., 2013). About 66% of deaths occurred between the ages of 18 and 59 years, and 19% of them were 60 years of age or older. Deaths due to traffic accidents occur more in men than women. (Organization, 2023) If based on the age criteria of the Ministry of Health, the age of early adolescents to late adulthood causes the most traffic accidents (Immelda, 2021).

Based on data from the National Crime Center (PUSIKNAS) of the National Police of the Republic of Indonesia, there were 139,334 cases of traffic accidents in Indonesia in 2022. This number has decreased compared to 2023 data, which recorded 147,629 cases. (Andrian & Wahyuni, 2023; Ansar et al., 2021; Jain & Iverson, 2023; Shaikh & Waseem, 2023; Wibisono et al., 2023) The traffic accident cases in 2023 killed 22,048 people, with material losses reaching Rp. 295 billion. (Polri, 2023) The West Java Police is in the top 10 highest traffic accident police, ranking 4th in 2023 with 9,275 cases of traffic accidents. This can be seen

based on the statistical data of the West Java Police in 2016, where Cirebon Regency was in 10th position and Cirebon City was in 4th position for the most traffic accident cases in West Java Province. The data still needs to be updated regarding the number of accidents (Barat, 2018; Polri, 2023).

The most common trauma that occurs during a traffic accident is head trauma. The head is the part of the body that is most often injured in traffic accidents. Head injuries ranged from 25.5% to 54.9%, followed by injuries to the extremities, which were 17.63%–42.20%, and injuries to the chest and abdomen were around 11.8%. (Zuhroidah et al., 2021) According to the WHO in 2018, every year around 1.2 million people die with a diagnosis of severe head injuries, namely due to traffic accidents (Siahaya et al., 2020).

According to Basic Health Research (RISKESDAS) data in 2018, the prevalence of head injuries is 11.9%. Meanwhile, in West Java Province, the number of head injury cases was 12.3%. The characteristics of head injuries are most often experienced in the male sex (11.0%), while in the female sex it is 7.4%. (Indonesia, 2013, 2018) The prevalence of Cirebon with cases of head injuries due to traffic accidents in 2011 was 19.2% (Wahyuni & Indahsari, 2020).

In one of the studies conducted by Arrasyid, Susanti, and Mulyana in 2021, it was shown that the incidence of head injuries based on the maximum age was 15–19 years old (35.2%), and at least 70 years and older (4.8%). The characteristics of head injury patients based on gender were more in men (70.5%) than in women (29.5%). Meanwhile, the head region most affected by head injuries was the frontal region (26.8%), followed by the orbital region (19.9%), then the temporal region (13.8%), and the least in the zygomatic region (0.8%) (Arrasyid et al., 2021).

These findings indicate that head trauma continues to be a major cause of mortality in traffic accidents and requires closer attention, particularly at the regional hospital level. Waled Regional General Hospital, as one of the referral hospitals in Cirebon Regency, plays an important role in managing traffic accident victims. However, data specifically describing deaths due to head trauma based on medical records at this hospital have not been systematically reported. This creates an important gap in local evidence that could support prevention strategies, clinical management, and medico-legal documentation.

Therefore, this study aims to describe deaths due to head trauma in traffic accident cases based on medical records at Waled Regional General Hospital during the period 2021–2023. Specifically, this study seeks to identify the characteristics of the cases based on sex, age, type of trauma, form of head injury, and affected head region. The findings of this study are expected to provide both theoretical and practical benefits. Theoretically, this research may contribute to the scientific literature on forensic medicine, trauma epidemiology, and traffic accident mortality. Practically, the results may serve as a reference for hospitals, health professionals, and policymakers in improving preventive measures, trauma management, and traffic safety awareness, particularly in the Cirebon region.

## **METHOD**

### **Research Design**

This research was held at Waled Cirebon Hospital from May 13, 2024, to June 28, 2024. The research began after obtaining ethical clearance from the Ethics Committee of Waled Hospital.

This study is research with a qualitative method. The research design used is observational with a descriptive model to determine the picture of death due to head trauma in traffic accident cases at Waled Hospital in 2021–2023.

Samples were taken using the total sampling technique, and a sample of 44 patients was obtained. The sample has met the inclusion criteria, namely patients who have died due to head trauma in a traffic accident case and who came to the emergency room of Waled Hospital in 2021–2023 and are recorded in the medical records of Waled Hospital.

### Measurement

The data collection technique was carried out using secondary data obtained from the medical records of patients who died in trauma cases due to traffic accidents at Waled Hospital. The sample size in this study is 44 samples, taken from all medical record data that meet the inclusion criteria at Waled Hospital from 2021 to 2023.

### Statistical Analysis

Univariate analysis is a type of analysis used on one variable to find out the picture of the frequency distribution in a study. In this study, the research was conducted to find out the picture of death due to head trauma in traffic accident victims.

### Ethical Clearance

This research has obtained approval from the Ethics Committee for Health Research and Development of Waled Regional Hospital with the letter number No.000.9.2/024/KEPK/V/2024.

## RESULT AND DISCUSSION

### Univariate Analysis

#### 1. Gender

**Table 1.** Frequency distribution by gender

Gender	Frequency (n)	Presentase
Male	30	68.2
Women	14	31.8
Total	44	100

Source: Data processed by the authors from medical records of Waled Regional General Hospital (2021–2023)

Based on the results of table 1, it shows that the majority of patients with head trauma due to traffic accidents are male, 30 (68.2%), while female patients are 14 (31.8%).

#### 2. Age

**Table 2.** Frequency distribution by age

Age	Frequency (n)	Presentase
5-11 Years	3	6.8
12-16 Years	2	4.5
17-25 Years	9	20.5
26-35 Years	8	18.2
36-45 Years	3	6.8
46-55 Years	5	11.4

Age	Frequency (n)	Presentase
56-65 Years	5	11.4
≥65 Years	9	20.5
Total	44	100

Source: Data processed by the authors from medical records of Waled Regional General Hospital (2021–2023)

Based on the results of table 2, it can be seen that the picture of deaths due to head trauma in traffic accident patients based on age is the most 17-25 years old as many as 9 patients (20.5%), and ≥65 years old as many as 9 patients (20.5%), 26-35 years old as many as 8 patients (18.2%), 46-55 years old as many as 5 patients (11.4%), 5 patients 56-65 years old (11.4%), 5-11 years old as 3 patients (6.8%), 36-45 years old as 3 patients (6.8%), 12-16 years old as many as 2 patients (4.5%).

### 3. Types of Head Trauma

**Table 3.** Frequency distribution by type of head trauma

Types of Head Trauma	Frequency (n)	Presentase
Blunt Trauma	44	100
Sharp Trauma	0	0.00
Total	44	100

Source: Data processed by the authors from medical records of Waled Regional General Hospital (2021–2023)

Based on the results of table 3, it can be seen that the picture of death due to head trauma in traffic accident patients Based on the type of head trauma, the most is blunt trauma as much as 44 (100%), while in sharp trauma as much as 0 (0.00%).

### 4. Forms of Damage Due to Head Trauma

**Table 4.** The frequency distribution is based on the form of damage due to head

Forms of Damage Due to Head Trauma	Frequency (n)	Presentase
Closed Head Trauma	30	68.2
Open Head Trauma	14	31.8
Total	44	100

Source: Data processed by the authors from medical records of Waled Regional General Hospital (2021–2023)

Based on the results of table 4, it can be seen that the picture of deaths due to head trauma in traffic accident patients based on the form of damage due to head trauma is the most 30 (68.2%) closed head trauma, while 14 (31.8%) open head trauma occurs.

## Discussion

### Characteristics of Patients in Cases of Head Trauma Due to Traffic Accidents.

#### Gender

Based on the research that has been carried out, the number of genders in traffic accident patients is the most male as many as 30 patients (68.2%), then the female gender is 14 (31.8%). This is in accordance with the research of (Siahaya N et al., 2020) and (Arrasyid Imam A et

al., 2021) that the majority of genders in traffic accident victims are male compared to female gender. This is because the male population is larger than women, and men are required to earn a living at home, so men are the most object in using highways, especially in traffic (Aditya Kemal & Laila, 2021).

Based on data according to the Central Statistics Agency (BPS), the number of people in 2023 will be 140,786.8 male population, while the female gender will be 137,909.4. Therefore, the ratio between the male sexes is greater than the female sex (Marissha, 2022).

### **Age**

Based on research that has been carried out, the age of the most traffic accident patients is 17-25 years old as many as 9 patients (20.5%), followed by the age of 65 years as many as 9 patients (20.5%). This is in line with the research of Siahaya N, et al (2021) which stated that the most age group was the age group of 15-24 years, which was as many as 12 patients.

This can be because the age group of 15-24 years is a productive age group, as workers and students who have activities outside and have a greater risk of being exposed to injuries and several risk factors that affect as well, such as lifestyle where in adolescence to young adulthood usually carries more motor vehicles at high vehicle speeds, lack of alertness, lack of caution or drunkenness (Undang-Undang Republik Indonesia Nomor 22 Tahun 2009 Tentang Lalu Lintas Dan Angkutan Jalan, 2009).

### **Types of Head Trauma**

Based on research that has been carried out, the causes of head trauma in traffic accident patients are most caused by blunt trauma as much as 44 (100%), while in sharp trauma as much as 0 (0.00%). This is in accordance with the results of research by Eka Dina M, et al (2021) that the majority of traffic accident victims died due to blunt object trauma, namely 44 patients (63.01%) while sharp trauma was 27 people (36.99%) (Iwan et al., 2017).

In traffic accident victims, blunt trauma is more common than sharp trauma, because blunt trauma can be caused by objects that have a blunt surface such as stones, wood, hammers, fist fists and so on, which also includes falling from high places, traffic accidents, gunshot wounds with rubber bullets or not sharp bullets and so on (Parinduri, 2020).

### **Forms of Trauma Damage Head**

Based on research that has been carried out, the most forms of damage due to head trauma in traffic accident patients are 30 (68.2%) closed head trauma, while 14 (31.8%) open head trauma occur. However, in contrast to the research of Oshanda S (2023), the most common form of damage was 81 cases of open head trauma (66.9%) while 40 cases (33.1%) of closed head trauma occurred.

This is a direct result of trauma because traffic accidents are more likely to occur with impact, friction, scratching mechanisms and so on which increases the risk of open wounds or fractures in head trauma patients (Ariani et al., 2019).

### **Head Region**

The most traumatized head regions in traffic accident patients were obtained from this study were 18 (40.9%), Occipitalis Region 9 (20.5%), Temporal Region 7 (15.9%), Parietalis Region 6 (13.6%), Orbitalis Region 3 (6.8%), Oralis Region 1 (2.3%), Nasalis Region 0 (0%), Mentalis Region 0 (0%), Mentalis Region 0 (0%), Buccalis Region as much as 0 (0%), Zygomatical Region as much as 0 (0%). This is in line with the research of Arrasyid Imam M,

et al. (2021) that in the study the most were obtained, namely the Frontal Region as many as 66 patients (26.8%) and the least in the Zygomatical Region as many as 2 patients (0.8%).

The Frontal Region and Parietal Region are considered to be the most common head anatomy of the skin lacerations and hematomas. This is suspected to be due to the degree of deformation of the skull bones so that it facilitates skin injuries due to trauma. In the study, it was explained that motorized vehicle passengers, did not use seat belts, resulting in forward jerks during collisions and higher injury rates (James et al., 2011).

Epidural hematoma (EDH) most commonly occurs in the frontal, temporal or temporoparietal, occipital and posterior cerebral fossa. Because it is caused by bleeding between the skull bone and the duramater layer, causing damage or rupture of the meningeal artery media (Pal et al., 2019).

### **Year of Death**

Based on research that has been carried out, the year of death due to trauma to traffic accident patients by year is 21 (47.7%), 2021 (29.5%), 2023 (22.7%).

In general, traffic accidents are highly dependent on various factors that cause traffic accidents, one of the causes is because there is still a low level of traffic discipline for motorists, 90% of traffic accidents are caused by human factors (human behavior) as motorists and pedestrians, the rest are due to road or environmental conditions and vehicle factors.

### **CONCLUSION**

Based on the results of this study, it can be concluded that deaths due to head trauma in traffic accident cases at Waled Regional General Hospital during the period 2021–2023 were predominantly found in male patients. The most affected age groups were 17–25 years and  $\geq 65$  years. All cases were caused by blunt trauma, with the majority presenting as closed head trauma, and the frontal region being the most frequently injured area. These findings indicate that head trauma remains a significant cause of mortality in traffic accident cases and predominantly affects males in productive age groups.

Based on these findings, it is recommended that efforts to prevent traffic accidents and head injuries be strengthened through increased public awareness regarding traffic safety and compliance with road regulations, including the use of protective equipment such as helmets and seat belts. In addition, hospitals are encouraged to improve the documentation and management of trauma cases to support better medical records and epidemiological monitoring. Future research is also recommended to involve larger samples and additional variables to obtain a more comprehensive understanding of mortality patterns due to head trauma in traffic accidents.

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