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TYPE OF TRAUMA CAUSING DEATH IN THE FORENSIC DEPARTMENT DR. MOEWARDI HOSPITAL

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ABSTRACT

Trauma means violence against living tissue which can have physical or psychological effects, where trauma is the third largest cause of death and disability worldwide. Trauma can be classifed into sharp trauma and blunt trauma. This study aims to describe the types of trauma that cause death and the sosciodemographic characteristics of trauma victims at the Forensix Department of Dr. Moewardi Hospital in 2017-2021. This study uses a descriptive observational method. The data comes from the *Visum et Repertum* file in the Forensic Department of Dr. Moewardi Hospital in 2017-2021. The research sample totaled 193 cases using the total sampling technique. The data analysis technique used is descriptive analysis. The results of the study were the most common type of trauma causing death was blunt trauma with a percentage of 88.6%, the most common sex was male at 81.35%, the most common age level was found in adults (26-65 years) at 57%, the type of forensic examination the most frequently carried out were external examinations of 77.72%, and most of the crime scenes occurred outdoors at 91.2%. The type of trauma that causes the most deaths in the Forensic Department of Dr. Moewardi Hospitl in 2017-2021 was blunt trauma, with the most cases being male, the most ages at the adult, the most types of forensic examinations external examinations, and the most crime scenes outside buildings.

Keywords: Type of Trauma, Death, VeR, Blunt Force Trauma, Sharp Force Trauma

1. INTRODUCTION

Traumatology comes from the words trauma and logos. Trauma refers to violence or injury to living tissue that can affect both the physical and psychological state. In forensic medicine, the physical effects are the injuries found on the body or physical state of the victim. Meanwhile, logos means knowledge or study (Ritongga, 2017). Trauma is the third leading cause of death and disability worldwide, especially in the last ten years, and ranks fourth in developing countries from 2000 to 2020. It is estimated that in 2002, there was an 83% increase, with 5 million people dying as a result of trauma (Marissha & Ismurizal, 2022).

Trauma can be classified into sharp trauma and blunt trauma. Sharp trauma is caused by violence to the body using sharp objects, such as razors, knives, axes, glass shards, etc. Identified sharp traumas include slash wounds, stab wounds, and incised wounds (Karwur, 2019). Sharp trauma will cause abnormalities in the anatomical structure of organs, the cardiovascular system, and increase the incidence of infection and shock due to bleeding, eventually leading to death(Amelia, 2021). Blunt trauma describes a condition caused by mechanical violence from objects with blunt/rough/hard surfaces (fists, hammers, stones, wood, nails, etc.) hitting body tissues, causing bruises, abrasions, lacerations, or a combination of all three (Parinduri, 2021).

In addition to the two types of trauma mentioned above, there are also gunshot wounds, burns, hypothermia, electric shocks, lightning strikes, barotrauma, and injuries from strong acids/bases. A gunshot wound is an injury caused by a high-velocity bullet from a firearm penetrating the body(6). Meanwhile, a burn is an injury caused by contact with high temperatures on the body or skin, with the severity of the burn depending on the type of object, duration of contact with the skin, and heat intensity (Aflanie et al., 2020).

The creation of Visum et Repertum is usually done when an investigator requests assistance from a doctor in analyzing the trauma found on the victim. Visum et Repertum functions as valid evidence used in court or judicial proceedings, which must be followed by medical records and indications in the judicial system (Afandi, 2017). One of the things that must be disclosed in the conclusion of a medical record or VeR of a living or deceased victim is the qualification of the type of injury or trauma. The type of trauma is important to determine the type of violence committed by the perpetrator, the severity of the injury, and the severity of the maximum sentence that can be given to the perpetrator(Arsyadi, 2014).

They are no research has yet discussed the types of trauma cause death in the Forensic Department of Dr. Moewardi Hospital, prompting the author to conduct this

research. Dr. Moewardi Hospital in Surakarta in 2017-2021. This is the reason for conducting this research. This study aims to determine the number of death cases due to trauma and provide an overview of the types of trauma causing death, including data on gender, age, type of forensic examination, and location of the incident based on the Visum et Repertum files in the Forensic Section of Dr. Moewardi Hospital from 2017 to 2021

2. FOCUS AND SCOPE

This study covers the analysis of trauma-related death cases at the Forensic Department of Dr. Moewardi Hospital from 2017 to 2021. The scope includes identifying the types of trauma causing death, the sociodemographic characteristics of the victims, the types of forensic examinations conducted, and the locations where the incidents occurred. The analysis is based on data from Visum et Repertum files.

This study also limited to the Forensic Department of Dr. Moewardi Hospital in Surakarta, covering data from 2017 to 2021. The data utilized in this research is sourced from the Visum et Repertum files maintained by the Forensic Department of the hospital. The study specifically focuses on cases of blunt and sharp trauma, with a minor inclusion of gunshot and burn trauma cases. Employing a descriptive observational method, the research does not involve inferential analysis. The sample comprises 193 cases, selected using a total sampling technique. The data is analyzed descriptively, without investigating causal relationships between the variables.

The study aims to identify the most common types of trauma leading to death, particularly focusing on blunt and sharp trauma. It seeks to understand the sociodemographic characteristics of the victims, including factors such as gender and age. The research will also identify the types of forensic examinations most frequently conducted, comparing external examinations with autopsies. Additionally, the study will determine the most common locations where trauma-related deaths occur, whether outside or inside buildings. It aims to establish patterns of trauma-related deaths within the Forensic Department of Dr. Moewardi Hospital from 2017 to 2021. Based on these findings, the study will provide recommendations for managing trauma cases and preventive measures.

3. METHODS AND RESULT

This study utilized a descriptive observational method at Dr. Moewardi Hospital, Surakarta, from December 2022 to January 2023. The data were sourced from Visum et Repertum records dated between 2017 and 2021. Variables included in the research were trauma type, gender, age, type of forensic examination, and incident location. Total sampling was used, yielding a sample size of 193 cases. Data analysis was performed using descriptive analysis. The study received ethical approval from the Health Research Ethics Committee of Dr. Moewardi Hospital, with the approval number: 1.720 / XII / HREC / 2022.

3.1 Number of Trauma-Related Death Cases

Based on Table 1, the study results show a total of 193 trauma-related death cases from 2017 to 2021. The breakdown is as follows: 38 cases in 2017, 48 cases in 2018, 40 cases in 2019, 24 cases in 2020, and 43 cases in 2021. This data indicates that the lowest number of trauma-related deaths occurred in 2020, while the highest number was in 2018. Additionally, the total number of forensic pathology cases recorded in the Visum et Repertum files at the Forensic Department of Dr. Moewardi Hospital during this period was 426 cases.

Table 1. Comparison of the Number of Trauma-Related Death Cases with the Total Number of Forensic Pathology Cases

No.	Year	Trauma-Related Death Cases (n)	Total Forensic Cases	Percentage (%)
1.	2017	38	105	36.2%
2.	2018	48	85	56.5%
3.	2019	40	85	47.1%
4.	2020	24	74	32.4%
5.	2021	43	77	55.8%
	Total	**193**	**426**	**45.3%**

3.2 Distribution of Cases Based on Type of Trauma

Based on the Visum et Repertum files examined from trauma-related death cases for the years 2017-2021, it was found that the majority of deaths were due to blunt trauma, with a total of 171 cases (88.6%). This was followed by sharp trauma with 16 cases (8.3%), and gunshot and burn trauma, each with 3 cases (1.55%). No cases of death due to hypothermia, electrical trauma, lightning strikes, barotrauma, or strong acids/bases were found in the VeR files for the given period. The frequency distribution of cases by type of trauma is presented in Table 2 as follows:

Table 2. Frequency Distribution of Cases Based on Type of Trauma

Type of Trauma	Amount	Percentage
Sharp	16	8.3%
Blunt	171	88.6%
Gunshot	3	1.55%
Burn	3	1.55%
Hypothermia	0	0%
Electrical	0	0%
Lightning	0	0%
Barotrauma	0	0%
Strong Acid/Base	0	0%
Total		
	193	**100%**

3.3 Distribution of Cases Based on Gender

According to Table 3, the data for the years 2017-2021 shows that the victims who died as a result of trauma were predominantly male, with a total of 157 individuals

(81.35%), and female victims numbered 36 individuals (18.65%).

Table 3. Frequency Distribution of Cases Based on Gender

Gender	Amount	Percentage
Male	157	81.35%
Female	36	18.65%
Total	**193**	**100%**

3.4 Distribution of Cases Based on Age

According to Table 4, the highest number of cases occurred in the adult age group, with a total of 110 cases (57%), followed by the adolescent age group with 49 cases (25.39%). This is followed by the elderly with 24 cases (12.43%), children with 5 cases (2.6%), infants with 4 cases (2.07%), and finally, cases with an unknown age accounted for 1 case (0.51%).

Table 4. Frequency Distribution of Cases Based on Age

Age	Amount	Percentage
Infant	4	2.07%
Child	5	2.60%
Adolescent	49	25.39%
Adult	110	57.00%
Elderly	24	12.43%
No Data	1	0.51%
Total	**193**	**100%**

Infant (0-5 years), Child (6-11 years), Adolescent (12-25 years), Adult (26-65 years), Elderly (>65 years)

3.5 Distribution of Cases Based on Type of Forensic Examination

Tabel 5. Distribution of Cases Based on Type of Forensic Examination

Type of Forensic Examination	Amount	Percentage
External Examination	150	77.72%
Internal Examination (Autopsi)	43	22.28%
Total	**193**	**100%**

Table 5 observed that cases of death due to trauma with only external forensic examination are more common than those with both external and internal examinations (Autopsi). The number of cases with external examination only is 150 (77.72%), whereas cases with both external and internal examinations total 43 (22.28%).

3.6 Distribution of Cases Based on Crime Scene

Table 6 is data that obtained from the VeR files for the years 2017-2021, it was found that the majority of trauma-related deaths occurred outside buildings, totaling 176 cases (91.2%). These locations included areas such as streets, gardens, porches, railway tracks, in front of stores, inside vehicles, and others. In contrast, cases that occurred inside buildings, such as inside homes or rooms, totaled 15 cases (7.77%).

Tabel 6. Distribution of Cases Based on Crime Scene

Crime Scene	Amount	Percentage
Outside Building	176	91.2%
Inside Building	15	7.77%%
No Data	2	1.03%
Total	**193**	**100%**

4. DISCUSSION

The study on trauma-related deaths at RSUD Dr. Moewardi from 2017 to 2021 shows that the majority of cases were due to blunt trauma, with a total of 171 cases, representing 88.6% of the cases. The highest number of these cases occurred in 2018, with 45 cases. The second most common cause of death was sharp trauma, with 16 cases (8.3%) within the same period. This finding is consistent with a previous study conducted at Rumah Sakit Bhayangkara Medan in 2021, which found that blunt trauma was the leading cause of death, accounting for 46 cases (63.01%), while sharp trauma was responsible for 27 cases (36.99%) out of a total of 73 samples examined(Marissha & Ismurizal, 2022).

Deaths due to blunt trauma at RSUD Dr. Moewardi are predominantly caused by traffic accidents. This finding is consistent with research conducted at Karolinska Hospital in Stockholm, Sweden, from 2007 to 2011, which found that blunt trauma deaths were most commonly associated with motor vehicle accidents, accounting for 92 cases (32.4%) out of a total of 284 cases(Ghorbani et al., 2014). Blunt trauma is the most frequent cause of death in traffic accidents, often leading to head injuries, spinal injuries, chest injuries, and abdominal injuries. These incidents can result in skull fractures, rib fractures, contusions, and massive hemorrhage, which can be life-threatening(O'Donovan et al., 2022).

The distribution of samples indicates that sharp trauma deaths at RSUD Dr. Moewardi Surakarta from 2017 to 2021 are fewer compared to blunt trauma, with a total of 16 cases (8.3%). Data from RSUD Dr. Soetomo shows that only 5% of the autopsied cases were due to sharp trauma throughout 2016. Sharp trauma is less likely to result in death compared to blunt trauma. The CDC (Centers for Disease Control and Prevention) recorded that sharp trauma accounted for 12.1% of all homicide cases and 1.7% of all suicide cases in the United States in 2016 (Putri & Kusuma, 2017). The

cases of death due to gunshot wounds and burns at RSUD Dr. Moewardi from 2017 to 2021 were equal, with each accounting for 3 cases (1.55%). Research conducted at the IKF-ML Department of RSUD Prof. Dr. R.D. Kandou Manado found 2 (18.8%) deaths from a total of 11 gunshot wound cases between 2013 and 2017. Gunshot wounds are more frequently inflicted by security forces in response to violent and resistant criminals. The low number of gunshot deaths is attributed to the fact that many people still prefer using traditional weapons or sharp weapons for acts of violence (Pabur et al., 2018).

All cases of death due to burns at RSUD Dr. Moewardi from 2017 to 2021 involved female victims. Research by El-Menya et al. in 2017 explained that women are more likely to be in close proximity to items related to fire, such as gas stoves, kerosene, matches, or firewood for cooking, which increases their risk of death from burns (Ango et al., 2019).

The research on trauma-related deaths based on gender at RSUD Dr. Moewardi from 2017 to 2021 shows that the number of male victims is higher than female victims, with 157 males (81.35%) and 36 females (18.65%). This finding is supported by research on the VeR files from RSUP Prof. Dr. R.D. Kandou and RS Bhayangkara for 2017-2018, which revealed that 68 (88%) of the deceased were male and 9 (12%) were female in cases of unnatural death. This disparity is attributed to the fact that women are generally more calm and less engaged in outdoor activities or extreme hobbies that carry a high risk of injury or death(Ango et al., 2019).

The age group most frequently found in trauma-related deaths is adults (26-65 years), with 110 cases (57%). This is followed by adolescents (12-25 years) with 49 cases (25.39%) and the elderly (>65 years) with 24 cases (12.43%). The number of child victims (6-11 years) is 5 cases (2.6%), infants (0-5 years) account for 4 cases (2.07%), and there is 1 case (0.51%) with no data. This finding is consistent with research conducted by Marissha (2022) at RS Bhayangkara Medan in 2021, which showed that deaths due to sharp and blunt trauma were most common in the late adolescent to adult age range (24-59 years), comprising 60.27% of all cases examined. Additionally, a study at the RSUD Gambiran Inpatient Room from 2017-2018 found that most thoracic trauma victims were in the productive age range of 46-60 years (35.5%), with a high proportion of traffic accident cases (80.6%). This age group tends to have high mobility and activity levels related to their work(Handoyo, 2018).

The forensic examination type most commonly performed in trauma-related deaths is the external examination, with a total of 150 cases (77.72%). Both external and internal examinations were conducted in 43 cases (22.28%). The lower number of cases with both external and internal examinations is related to religious or cultural reasons, as well as a lack of public knowledge about autopsies, which leads many family members to object to and refuse autopsies on the deceased (Kristanto, 2019).

Trauma-related deaths predominantly occur outside buildings, with a total of 176 cases (91.2%). In contrast, cases occurring inside buildings amount to 15 cases (7.77%), and there are 2 cases (1.03%) with no data, where the location of the incident is not specified in the VeR files. The high number of cases occurring outside buildings is related to the significant number of traffic accidents and railway accidents among trauma victims

5. CONCLUSION

The total number of trauma-related deaths within the specified period is 193 cases, representing 45.3%. The most frequently encountered type of trauma in these cases is blunt trauma, with 171 cases (88.6%). The majority of trauma-related deaths occur in males, with a total of 157 cases (81.35%). The highest number of trauma-related deaths is observed in the age range of 26-65 years, or the adult category, with 110 cases (57%). The most commonly performed forensic examination for trauma-related deaths is the external examination, with 150 cases (77.2%). The location where trauma-related deaths most frequently occur is outside buildings, with a total of 176 cases (91.2%).

6. SUGGESTION

It is recommended to expand data sources to include multiple hospitals and forensic departments, enabling more robust and generalizable analysis. Utilizing advanced analytical methods can uncover deeper insights and potential causal relationships. Focusing on preventive measures and collaborating with public health agencies can lead to targeted programs addressing common trauma types and high-risk demographics. Integrating modern forensic technology and data analytics tools can improve accuracy and efficiency in data management.

Conducting longitudinal studies can provide insights into trends and the effectiveness of interventions over time. Engaging in community outreach can raise awareness and implement community-based strategies to reduce trauma-related deaths. Optimizing resource allocation in forensic departments through regular reviews and focusing on high-impact areas can enhance the quality and efficiency of investigations. Collaborating with multidisciplinary teams can lead to more comprehensive solutions. Finally, widely disseminating research results through various platforms can stimulate further research and prompt actions from policymakers and healthcare providers

7. REFERENCES

Afandi, D. (2017). Management and Techniques for Creating Visum et Repertum. In University of Riau Press (Vol. 2).

Aflanie, I., Nirmalasari, N., & Arizal, M. (2020). Forensic Medicine and Medicolegal. In Narratives of Therapists' Lives (3rd ed., Issue Maret). PT Rajagrafindo Persada.

Amelia, D. (2021). Wound Patterns in Deaths Caused by Sharp Violence at Bhayangkara Hospital Medan. Universitas Muhammadiyah Sumatera Utara.

Ango, C. P., Tomuka, D., & Kristanto, E. (2019). Description of Causes of Death in Unnatural Death Cases Autopsied at RS Bhayangkara Level III Manado and RSUP Prof. Dr. R.D. Kandou Manado from 2017-2018. E-CliniC, 8(1). https://doi.org/10.35790/ecl.v8i1.26928

Arsyadi. (2014). The Function and Role of Visum et Repertum in Criminal Cases. Legal Science Opinion, 2(2), 56–65.

Ghorbani, P., Falkén, M., Riddez, L., Sundelöf, M., Oldner, A., & Strömmer, L. (2014). Clinical review is essential to evaluate 30-day mortality after trauma. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 22(1). https://doi.org/10.1186/1757-7241-22-18

Handoyo, C. N. (2018). Profile of Thoracic Trauma in the Surgical Inpatient Ward at RSUD Gambiran from March 2017 to March 2018. Jurnal Ilmiah Kedokteran Wijaya Kusuma, 7(2), 178. https://doi.org/10.30742/jikw.v7i2.440

Karwur, B., Siwu, J., & Mallo, J.F. (2019). Wound Patterns in Victims of Sharp Violence Autopsied at RSUP Prof. Dr. R. D. Kandou in 2014. Med Scope Journal, 1(1), 39–43

Kristanto, E. (2019). Forensic Medical Examination After Exhumation in North Sulawesi: Contributions and Challenges. Jurnal Biomedik: JBM, 11(3).

Marissha, E. D., & Ismurizal. (2022). Description of Trauma Types Causing Death at the Forensic Department of Bhayangkara Hospital Medan 2021. Jurnal Kedokteran STM, V(II), 165.

O'Donovan, S., van den Heuvel, C., Baldock, M., & Byard, R. W. (2022). Causes of fatalities in motor vehicle occupants: an overview. Forensic Science, Medicine, and Pathology, 18(4), 511–515. https://doi.org/10.1007/S12024-022-00503-3

Pabur, M., Tomuka, D., & Mallo, J. F. (2018). Description of Gunshot Wound Cases in Manado City. Jurnal Biomedik (Jbm), 10(3), 190. https://doi.org/10.35790/jbm.10.3.2018.21986

Parinduri, A. G. (2021). Blunt Trauma. Forensic Medicine and Medical Science, 1(2).

Putri, D.F.A., & Kusuma, S.E. (2017). Sharp Trauma to the Abdomen Resulting in Death. Proceedings of the 2017 Scientific Meeting. pp. 107–11

Ritongga, F. J. dan M. (2017). Assessment of Wound Patterns to Determine Cause of Death. Medan: Department of Forensic Medicine and Medicolegal, Faculty of Medicine, University of North Sumatra, H. Adam Malik General Hospital Medan.