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INJURY PATTERN OF BLUNT TRAUMA CASES IN SLEMAN BASED ON HDSS IN 2019

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ABSTRAK

Trauma tumpul adalah jenis cedera yang timbul akibat benturan berkekuatan tinggi pada tubuh manusia dengan benda tumpul. Kejadian trauma tumpul pada berbagai kasus trauma sangatlah tinggi. Health and Demographic Surveillance System (HDSS) Sleman merupakan sistem surveilans yang menyimpan pemetaan demografi khususnya di bidang kesehatan. Tujuan penelitian ini adalah untuk mengetahui pola cedera benda tumpul di Sleman berdasarkan data HDSS tahun 2019. Penelitian deskriptif dilaksanakan dengan total sampel sebanyak 612 responden, kelompok usia 19 hingga 59 tahun muncul dengan 312 kasus (50,9%). Responden laki-laki keluar sebanyak 53,1% dari total kasus. Kejadian terbanyak terjadi pada responden dengan tingkat pendidikan dasar sebanyak 236 kasus (38,5%). Cedera punggung berkorelasi dengan hilangnya sensorik dengan nilai p 0,024, dan ekstremitas bawah berkorelasi dengan luka permanen dengan nilai p 0,042. Kecelakaan terbanyak terjadi pada kecelakaan sepeda motor dengan jumlah 294 kasus dari total 612 kasus. Ditemukan korelasi yang signifikan antara lokasi dan jenis cedera seperti cedera kepala dengan laserasi (p <0,001) dan cedera dada dengan patah tulang (p=0,040). Pada studi ini, paling banyak terjadi trauma tumpul pada kelompok dewasa usia produktif dan laki-laki. Orang dengan tingkat pendidikan yang lebih rendah memiliki risiko cedera yang lebih tinggi. Kecelakaan lalu lintas sepeda motor menjadi penyebab utama cedera berdasarkan mekanismenya. Cedera kepala sering disertai laserasi, cedera dada umumnya disertai patah tulang, cedera ekstremitas atas berkorelasi dengan laserasi dan patah tulang, dan cedera ekstremitas bawah sebagian besar berakhir dengan patah tulang dan memar/abrasi.

Kata kunci : Pola Kecelakaan, Trauma Tumpul, HDSS, 2019

ABSTRACT

Blunt trauma is a type of injury resulting from high-impact force to the human body caused by blunt objects. The incidence of blunt trauma is relatively high across various trauma cases. The *Health and Demographic Surveillance System* (HDSS) Sleman is a surveillance system that records demographic data, particularly in the health sector.This study aims to identify the injury patterns of blunt trauma in Sleman based on HDSS data from 2019. A descriptive study was conducted involving 612 respondents. The 19–59 years age group accounted for the highest number of cases, with 312 cases (50.9%). Male respondents made up 53.1% of the cases, and the primary education level was the most common among victims, with 236 cases (38.5%). A significant correlation was found between injury location and type of damage. Back injuries were associated with sensory loss ($p = 0.024$), while lower extremity injuries were linked to permanent disability ($p = 0.042$). Motorcycle accidents were the most frequent cause of trauma, accounting for 294 out of 612 cases. Statistically significant correlations were identified between: head injuries and lacerations ($p < 0.001$), chest injuries and fractures ($p = 0.040$), upper extremity

injuries and lacerations/fractures, lower extremity injuries, which were commonly associated with fractures and bruises/abrasions. Conclusion: Blunt trauma predominantly affects productive age adults and males. Individuals with lower educational attainment are at higher risk of injury. Motorcycle accidents are the primary mechanism of blunt trauma. Specific injury types are strongly associated with the anatomical location of impact.

Keywords: Injury Pattern, Blunt Trauma, HDSS, 2019

INTRODUCTION

WHO data shows that injury combined with violence is responsible for 4.4 million deaths each year and contributes to 8% of all causes of death worldwide[1]. It also causes tens of millions of people to have a non-fatal injury that sometimes results in temporary, even permanent disability that requires long-term care. There are around 5340 people die due to various injuries in the South-East Asia region which appears as a region with 11 member states that contribute to the largest proportion of global injury-related deaths and disabilities[1]. The WHO's Regional Director for South-East Asia, Dr Samlee Plianbangchang also released a statement that 222 people in the region die every hour from injuries with road traffic injuries as the top contributor to the incidences[2]. In Indonesia itself, Injury, especially road injury seems to be the top 5 contributor on the top 10 cause of death list made by WHO in 2019 with 17.01 death/100,000 population in the age range of 15 to 19 years old[1]. Besides road injury, there are also Interpersonal violence and self-harm that are categorized as an injury caused death[2]. Based on a study conducted in 2014 by Medical Forensic Installation RSUP Dr. Sardjito's data throughout 2011-2013, there are 296 recorded cases of death incidence related to blunt trauma injury which was topped by accidental death as the highest percentage distributor with 73% from all cases[2].

Injury arises as a leading cause of morbidity and death in people in the age of under 35 years old and stands on the top 6 charts of global causes of death. Most of the trauma that may lead to death is a trauma that appears as the result of blunt trauma injury, especially vehicle crashes and pedestrian injuries. Blunt trauma to the body may lead to different kinds of injury depending on the mechanism and how the victim's body responds to the trauma itself [3].

A pattern of injury can be defined as the type of combination of the injury itself that creates consistent characteristics across populations. Injuries may happen due to identical mechanisms and circumstances that lead to noticeable patterns in several variables such as gender, age, severity, mechanism, and type of the injury itself. These kinds of patterns appear due to various factors such as demographic variation, behavioral factors, and environmental conditions. For example, a young person is more likely to be involved in a vehicle or a transportation-related accident, while the older person may experience more falls creates an incidence pattern based on age[4].

The study will be using the data obtained from an institution called HDSS Sleman in 2019. HDSS which stands for Health and Demographic Surveillance System Sleman takes the role of as surveillance institution that collects data periodically from 5.147 household respondents across the Sleman region in order to build a surveillance site to collect data, create a connection and partnership for sustainable and independent research, formulating a health demographic and data, also providing a population-based research teaching[1].

Due to the global pandemic caused by COVID-19 in 2020, which has had a significant impact and changes in the scope of the healthcare system, available cases, and the number of data availability itself may disrupt the pattern quality and might

compromise the study result. Focusing on the data from the previous year ensures a more reliable data set with minimum intervention from global events that affect every aspect of human life at that time. In the context of this study, learning and understanding the pattern of the injury itself, especially blunt trauma injury is significant so people can identify the mechanism and the reason for blunt trauma injury incidents within the community. Understanding the pattern also helps people to assess the existing methods and efforts in order to reduce the incidence of blunt trauma injuries.

METHOD

This study will be carried out using a cross-sectional design, which involves collecting data in a certain range of time to examine the picture of a population. This study will be presented as an analytic descriptive study, focusing on pattern analysis within the chosen population. The data also will be analyzed through SPSS using both univariate and bivariate analysis.

The data for this study were obtained from the Health and Demographic Surveillance System (HDSS) in Sleman, which is an institution that specializes in collecting surveillance data in certain periods of time. Specifically the data about the incidence of injury caused by blunt force trauma that happened in the year of 2019.

The subject for this study is a respondent who reported a blunt trauma injury to HDSS Sleman in 2019. There are some criteria in order to qualify the study subject using the inclusion which are respondents on HDSS Sleman data in 2019 with blunt trauma injury and complete respondent record. And for the exclusion criteria are the respondents from HDSS Sleman data in 2019 without any correlation with blunt trauma injury and incomplete respondent record.

To ensure the ethical conduct as a standard for the integrity and validity of the study, the proposal has been reviewed by the Ethical Committee for Health and Medical Research of the Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada with ref. number KE/0709/05/2024.

RESULT AND DISCUSSION

Injury Pattern Based on Age

The Indonesian Ministry of Health divided a person's age group into 5 groups. Infant group in the age below 5 years old, the child group in the age of 5 to 9 years old, teenagers in the age of 10 to 18 years old, adults from 19 to 59 years old, and adolescents over 60 years old

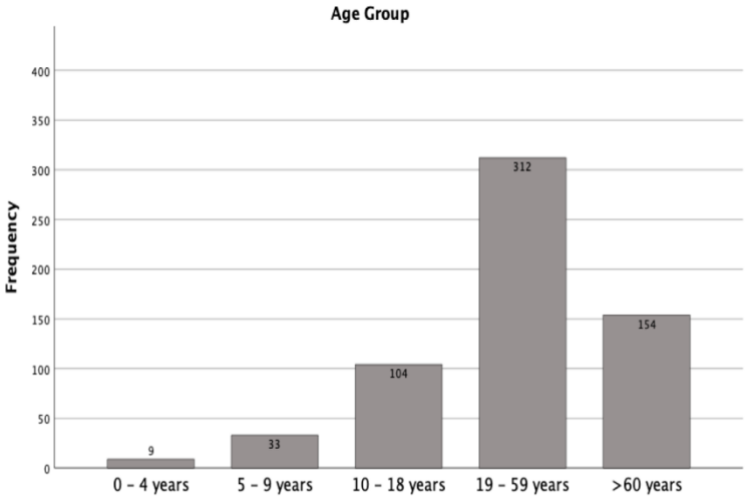

Figure 1. Age Distribution

Based on the data collected by HDSS Sleman in 2019, the adult group appears to have the most common incidence rate with 312 cases recorded, followed by adolescents with 154 cases, teenagers with 104 cases, children with 33 cases, and infants with only 9 cases recorded. Surveillance data collected by HDSS Sleman in 2019 reveals a variations in incidence rates across different age groups as defined by the Indonesian Ministry of Health. Male tends to had 1.4 times higher risk of injury compared to female due to several factors such as differences in occupational exposure, risk taking behaviors, also involvement of hazardous activities[5]. Respondent that comes with the age of 10 to 18 years old accounted for 104 cases, that can be correlated with high amount of activity

level and the behaviour of the person within the group age.

Injury Pattern Based on Gender

According to data collected by HDSS Sleman in 2019, the demographic distribution in terms of gender involved in an accident related to blunt trauma injuries appears to be presented as follows.

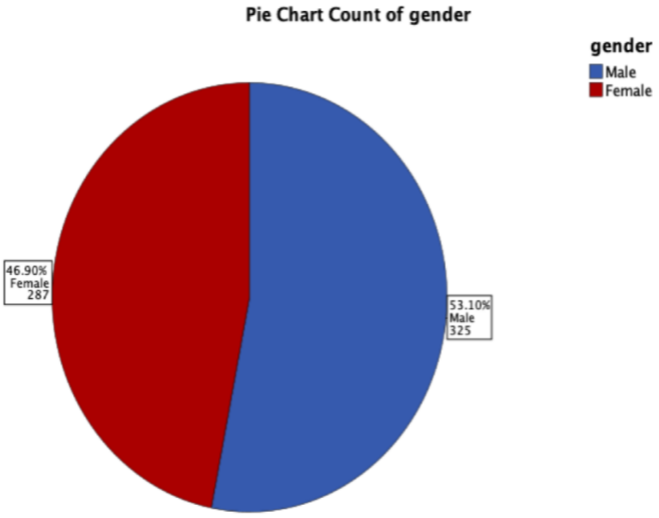

Figure 2. Gender

Figure 2 presents the result of the analysis of blunt trauma injury cases based on the HDSS Sleman data collected in 2019. The results came out that from the total of 612 qualified respondents, 46.90% of them which consists of 287 respondents were female, and 53.10% distribution which consists of 325 respondents were male. It indicates that there is a slightly higher incidence number related to blunt trauma injury involving male victim. Male tend to have a higher incidence rate due to the combination of higher exposure to high physical related activity such as in sports or daily movements[6]. The other previous research suggest there are at least several key points that may become the reason why men has a higher probability to suffer an injury than women. The first one is male reported to have a higher frequencies and longer duration of vigorous physical activity that obviously increase the risk of injury. Second, male usually get a higher participation number in sports team that needs higher intensity and physical contact. Third, in the activity preferences, male tended to participate in more contact and high impact activity, either is it about sports, or daily occupation[7].

Injury Pattern Based on Level of Education

Educational levels in Indonesia are regulated by the law in order to ensure that every citizens able to receive their right of adequate education. Undang – Undang Republik Indonesia number 20 of 2003, defines education as an effort to creates an environment where the students are able to develop their potential. It is stated that there are 3 main educational categories: basic education consist of elementary and junior high, secondary education consists of high school and vocational school, and higher education including diploma, bachelor, master, specialist, also doctorate.

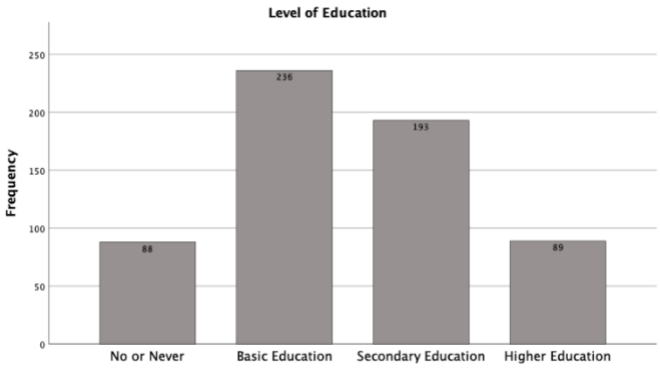

Figure 3. Level of Education

The figures above show that in this study, most of the respondents who experienced blunt trauma injury are those inside the group of people whose highest education is basic education with 236 cases, followed with the secondary education group with 193 cases, 89 cases of higher education group, and 88 cases of the group of people that never had a formal educational process. Based on the previous research, a higher education level usually means a lower risk of injury incidence due to several key factors. The first

one is knowledge and awareness about safety practices and health information. It also often correlates with healthier lifestyles and better access to healthcare that allow them to have a better incidence prevention act. People educate themselves to upgrade their skills by education to gain the economic stability that often correlates with higher education. It leads to the ability to maintain a safer living environment[8].

a. Pattern of The Severity Based on Injury Location

The study about the correlations between injury location and the type of injury on the traffic accident case result shows that there are several correlations between both variables. Out of 380 respondents that experienced traffic accidents, 294 of them appeared as a motorcycle injury, in line with the fact of high number of motorcycles in Sleman that reaches 735.734 based on census in 2016, just 3 years before the study.

There is a correlation between head injuries and lacerations ($p < 0.001$). The previous study also shows that the injury cases with head injuries have a higher incidence of lacerations due to the exposed nature of the head during trauma[9]. There is also a correlation between chest injuries and fractures ($p = 0.040$). For the upper extremity injury with laceration ($p < 0.001$), it is the same mechanism as the head trauma with laceration and upper extremity injuries with contusion/abrasion ($p = 0.012$) due to the exposure during the incidence. The impact forces due to the trauma occur on the upper extremity usually leads to the bone fracture resulting in the upper extremity correlation with fracture ($p = 0.010$). Also lower extremity injury with fractures and contusion/abrasion with both of p-values of 0.001 that in line with previous study that indicates the correlation happens due to high impact forces and stress sustained in traumatic events[6].

Based on 293 motorcycle accident case recorded in HDSS Sleman's data from 2019, the chi-square analysis result shows that there is a clear correlation between the site of injury and the type of blunt trauma itself. Head injury significantly correlated with a laceration with the p-value below 0.001. Chest injury incidence most likely to results in a fracture due to strong correlation proven with the p-value of 0.007. The upper extremity is significantly correlated with both laceration and fracture with the p-value of 0.001 and 0.031 that usually happens due to respondents nature for a protective reflex in an accidents[10]. And there is also a strong correlation between lower extremity injury with fracture ($p = 0.001$), also the contusion or abrasion ($p < 0.001$). Such things happens due to the straight exposure of the lower extremity towards the ground or other objects that leads to a high impact forces[11].

The result of the test about the correlation between the injury location and type of injury on the respondents who experienced falls accident shows that there is a correlation between head injury and laceration with the p-value of 0.002. The back injury also correlate with contusion or abrasion with p-value of 0.123. And There is also a correlation of lower extremity injury with contusion/abrasion with p-value of 0.039.

Among the 17 cases of blunt object impact recorded in the data provided by HDSS Sleman in 2019, most of the injury occur in the lower extremity injury with 10 cases, while all of the p-value from the injury locations and injury types doesn't shows any significance due to the number that appears above 0.05 as the baseline indicating there is no statistically significant relationship between any types of injury in the blunt object cases.

CONCLUSION AND RECOMMENDATION

Study conducted based on HDSS Sleman data in 2019 shows a pattern of blunt trauma injury cases. Mostly occurs in people aged 19 to 59 (312 cases) and males with 325 (53.1%) cases. People with lower education levels have higher injury risk. Traffic

motorcycle accidents (48%) are leading the cause based on mechanism. Back injuries highly correlates with the loss of sensory and lower extremity injury correlates with permanent wound. Head injuries often involve lacerations, chest injuries commonly involve fractures, upper extremity injuries correlates with lacerations and fractures, and lower extremity injuries mostly end with fractures and contusions/abrasions. After conducting the study, there are several recommendation that could be given from the author, separate the questionnaire between blunt trauma and sharp trauma into different variable in order to distinguish the blunt trauma injury incidence with other type of trauma injury. Separate the blunt trauma injury type in HDSS data from contusion or abrasion into contusion and abrasion to provide more detailed results of the study. Add the explanation of how stomach or internal injury could be identified on the location variable and add the supporting examination explanation for better accuracy of the surveillance data.

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