International Journal of Medical and Health Research
www.medicalsciencejournal.com
ISSN: 2454-9142
Received: 03-11-2021, Accepted: 19-11-2021, Published: 04-12-2021
Volume 7, Issue 12, 2021, Page No. 18-25

Description of injury pattern of victims died due to traffic accidents based on external examination results of visum ET repertum level i Bhayangkara Hospital raden said sukanto Jakarta 2014-2016

Theza E A Pellondo'u P, Suryo Wijoyo, Irene Sulinsia Napitupulu
Medical Faculty, Universitas Kristen Indonesia, Jakarta, Indonesia

Abstract
On one side, the development of transportation technology increases, causing a range and a cruising range of transport more widely but on the other hand, be a serious cause of death in recent decades. The Indonesian nation is developing into an industrial society that brings new trends in the pattern of disease in the community, and accident is one of them. This research aims to determine the pattern of injuries to fatalities from traffic accidents based on the results of visum et repertum in Forensic Installation of Level I Bhayangkara Hospital Raden Said Sukanto, Jakarta in 2014-2016. This research is a retrospective analysis of the content of the document study using data from the medical records of traffic accidents that met the inclusion criteria. The results showed traffic accident victims who entered as many as 104 victims. Characteristics of victims were male, 80.8%, approximately 15-34 years old and 44.2%, 50% of senior high education, and worked as private employees 35.6%. Type of injury was 87.5% majority blisters. Location of bodily injury is the head of the majority of 86.53%. The cause of death can not be estimated at 44.20%, and the cause of death of severe head injury can be estimated at 30.80%.

Keywords: patterns of injury, traffic accidents, external inquiry, forensic

Introduction

The development of transportation technology increasing has caused the rate of traffic accidents to be higher. As a result of technological advances, on the one hand, causing the reach and cruising range of transportation to be more comprehensive, on the other hand, it has become a severe cause of death in recent decades. This situation is getting worse considering the lack of public awareness of traffic safety and victims' slow or inaccurate handling due to traffic accidents. The Indonesian nation, which is developing towards an industrial society, brings new trends in disease patterns in society [1]. Accidents can happen anytime and anywhere. However, these accidents are more common in people moving or in traffic.

Moreover, that traffic happens almost every second of human life and happens everywhere. Heavy traffic occurs on land, sea and air. Until now, much attention is still focused on traffic on land, although the problem of traffic at sea and air is no less attractive [2]. According to the World Health Organization (WHO), in 2004, traffic accidents were the most common cause of injury worldwide, and the death rate due to traffic accidents is third after heart disease and tuberculosis (TB) in Indonesia. Traffic accidents rank ninth in the Disability Adjusted Life Years (DALYs). It is estimated that it will rank third in 2020, while in developing countries, it is second. Traffic accidents are the tenth cause of death in the world with 1.21 million deaths (2.1%), while in developing countries, it is the seventh leading cause of death in the world with 940,000 deaths (2.4%) [3]. According to WHO, about 1.3 million people die every year due to traffic accidents [4]. Without treatment, traffic accidents are estimated to result in the death of around 1.9 million people per year by 2020 [5]. Traffic accidents can result in various injuries. The head is the most frequently injured body part in traffic accidents.

In the United States in 1990, the incidence of head injuries was 200 per 100,000 population per year. According to Hesketad's research at Stavanger University Hospital Norway, during 2003, the annual incidence rate of head injuries was 207 per 100,000 population [6]. The case fatality rate (CFR) due to traffic accidents is still high. The highest CFRs were found in several countries in Latin America (41.7 per 100,000 population), Asia (21.9 and 21.0 per 100,000 population in South Korea and Thailand) [7]. According to a study by the Bangladesh Accident Research Center of the Technical University of Technology, between 10,000 and 12,000 people die in road accidents in Bangladesh every year [8].

In Beijing, during 2009, based on data from the Emergency Health Center, there were 2,984 traffic accidents, and 921 of them suffered head injuries (30.9%) [9]. In Cambodia, in 2004, as many as 65% of traffic accident victims suffered head injuries [10]. Based on data from the Central Statistics Agency of the Republic of Indonesia, victims of traffic accidents tend to increase from year to year. For example, in 2007 there were 49,553 victims with 16,955 deaths (CFR=34.2%), in 2008 there were 59,164 victims with 20,188 deaths (CFR=34, 2%), and in 2009 there were 62,960 victims. with a death toll of 19,979 (CFR=31.7%) [11]. Based on a report from the Indonesian National Police, in 2010 in Indonesia, the number of deaths due to accidents has reached 31,234 people, which means that every 1 hour, 3-4 people die from traffic accidents on the road [12].

According to the 2008 Indonesian Health Profile, injury is the fourth leading cause of death (6.5%) for all ages after stroke, TB and hypertension. In the pattern of the ten most common causes of death in hospitals, outpatient injuries rank sixth, while inpatients rank fourth [13]. In Indonesia, head injury ranks first in the sequence of injuries suffered by traffic accident victims, 33.2%. According to Indonesian Basic Health Research (Riskesdas) 2007, as many as 18.9% of victims of traffic accidents suffered head injuries [14]. The

highest prevalence of land traffic accidents is in Bengkulu Province (44.2%), the lowest is in East Nusa Tenggara Province (14.8%), and the highest prevalence of head injuries is in Papua Province (18.0%) [15].

Based on the 2007 Final Report of the Ministry of Transportation in Special Capital Region (DKI) Jakarta, there were 937 accident victims with 822 deaths (CFR=87.7%). In 2006 there were 919 accident victims with 775 deaths (CFR=84.3%) and in 2005 there were 1376 accident victims with 963 deaths (70.0%) [16]. According to Riskesdas 2007 data in DKI Jakarta, there were as many as 43.5% of injuries caused by land traffic accidents, and there were 16.7% of victims of traffic accidents who suffered head injuries [17].

Based on data from the Health Profiles of DKI Jakarta in 2008, traffic accident victims in 2006 reached 35 per 100,000 population, and the incidence in 2007 reached 39 per 100,000 population. In 2008 the incidence of traffic accident victims reached 109.03 per 100,000 population. There were 152 accident victims and 55 deaths (CFR=36.2%) [18]. Given the importance of this problem and the absence of complete data regarding the pattern of injury in traffic accidents, it is necessary to research the injury pattern in traffic accident victims.

Based on the description of the background, the formulation of the problem in this study is: How is the description of the pattern of injury to the victim who died due to a traffic accident that was carried out by an external examination of visum et repertum at the Forensic Installation of Level I Bhayangkara Hospital Raden Said Sukanto (RSS Hospital)? To know the results of external examinations carried out by forensic doctors on victims who died due to traffic accidents at the Forensic Installation of RSS Hospital, Jakarta.

Literature Review

The Highway Traffic and Transportation Law (2009) (UU LLAJ) is a legal product that becomes the primary reference that regulates aspects of road traffic and transportation in Indonesia. Road traffic and transport are the keys to the growth of a community [19]. The community is very dependent on land transportation facilities which are closely related to traffic and road transportation. Regulation is needed to regulate road traffic and transportation [20]. Prior to the 2009, the law that was in effect was the 1992's UU LLAJ, which birth was undoubtedly a step forward at that time. One example of this law was the inclusion of elements of technology to prevent environmental pollution. In Article 50 of the 1992's UU LLAJ motorized vehicle owner was required to maintain their vehicle so that the exhaust system would not produce pollution that could damage the environment or sound that caused disturbance. At that time, of course, this regulation was a breakthrough because the 1965's UU LLAJ had not regulated the problem of pollution. Nevertheless, we live in a dynamic, constantly moving, and changing world. The government sees that the times have made the existing regulations deemed no longer appropriate. If we look at the contents of the articles in the 1992's UU LLAJ, the existing rules are considered less specific, less detailed, and too general. Seeing the reality on the ground and the development of the times, the new UU LLAJ was released in 2009. While the previous traffic laws were more concerned with the skills of road users, the latest traffic law does not only focus on skills but also on the formation of traffic culture. This awareness arises because, recently, motorists are mostly skilled but irresponsible [21].

The percentage of each factor causing traffic accidents in Indonesia is 93.52% human factor, 2.76% vehicle factor, 3.23% road factor, and 0.49% environmental factor. With knowledge of injury identification, a forensic medicine expert can provide a wealth of information, which will help conclude in various circumstances. Not only that, a review of the crime scene by a forensic medical expert, who has examined or will examine the body of a victim or injured victim, can be constructive in reconstructing the situation at the time of the accident [22].

Investigation of traffic accident cases has several objectives, namely [29]: a) to identify the cause of the accident; b) To take into account the appropriate form of compensation for the victim, if alive, or for relatives, if the victim dies; c) To punish violators if there are violations; d) To seek guidelines for preventing future accidents. For this purpose, investigations into traffic accidents should not only be carried out by police officers. However, they should also be assisted by a team whose members come from multidisciplinary fields, such as experts in the medicolegal field and the automobile field. The investigations carried out include [23]: a) Collection of incident history; b) Examination of bodies and injured victims; c) Inspection of the vehicle involved in the accident; d) Inspection of the location or the place where the accident occurred.

A careful external examination of the victim must be carried out, and all injuries must be identified. Measurement of the injury with a ruler should be made and recorded carefully. In the form of intradermal abrasions or bruising, Tire marks can be found on both living and deceased victims, and accurate photographs and images are of great value in identifying victims. For pedestrian victims, the distance above the heel and the lower limit of the main injury should be measured because the results of these measurements can correlate with bumper height and other things related to the vehicle that hit [24]. Postmortem examination should involve examining the victim's body, clothing, and other materials that were included with the victim. The doctor who performs the autopsy will look for and identify recent tears, oil stains, bloodstains, dirt or other stains on clothing. Oil stains, blood stains and soil stains, mud, sand, etc., must be noted and identified in number, size, and location. The possibility of alcohol or drug use contributing to the accident should always be considered and blood and urine samples collected at postmortem for laboratory examination [25]. In the science of injury, blunt trauma and sharp trauma are known. Wounds are damage or loss of relationships between tissues (discontinuous tissue) such as skin tissue, soft tissue, muscle tissue, blood vessel tissue, nerve tissue and bone tissue. Blunt trauma is a force that causes injury to the body surface by blunt objects. It is caused by objects that have blunt surfaces, such as stones, wood, hammers, being hit by a ball, being punched, falling from a high place, traffic accidents, and so on [26].

Blunt trauma can cause three types of injuries, namely contusions, abrasions, and lacerations (vulnus laceratum). Sharp trauma is a force that causes injuries to the body surface by sharp objects. Sharp trauma is also known in three forms, namely cuts (vulnus scissum), stab wounds (vulnus punctum), or slash wounds (vulnus caesum). Injury after an accident involving a motor vehicle is a consequence of the vehicle's speed, environment, characteristics, safety devices, protective equipment, and body characteristics.

Injuries caused by sharp or blunt objects in various sizes, numbers, and combinations, ranging from minimal injuries that do not require treatment to severed body parts and fatal injuries, can be encountered. External and internal injuries may not always match. Sometimes extensive findings are found on the body surface, but clinically or at autopsy, internal injuries are limited. On the other hand, lethal injuries such as lacerations and ruptures of internal organs can occur without markings on the body surface [27].

The anatomical consequences of blunt force injuries are abrasions, bruising, contusions, avulsions, lacerations, ruptures, and fractures. Blunt injuries can also affect organ function without leaving anatomical marks. Notable examples include fatal cardiac arrhythmias after trauma to the chest and concussions after head trauma. A concussion can result in unconsciousness and life-threatening secondary consequences such as hypothermia and continuous bleeding from the wound. Chest compressions will cause anatomical injury. Signs that can be observed are on the skin, fractures of the ribs, and bleeding in the lungs. An internal laceration injury occurs when soft tissue or organ receives kinetic energy due to a rapid change in velocity. Differences in the fixation strength of internal organs to surrounding structures contribute to determining the pattern and severity of injury [28]. Blunt injuries to the thighs and buttocks can result in soft tissue cavities. Bleeding from these cavities can be so profuse that it can cause death. Two classic and fatal injuries to the chest and head are common, and the first is aortic rupture due to trauma, which is caused by a significant force deceleration. The other is a hinge fracture of the skull that typically occurs in the petrous and sella turcica bones at the skull base. Sideway-type collisions usually cause such fractures. Extensive abrasion of the skin can be seen if a person decelerates on a rough road surface. Burns from friction can also be seen.

Research Method

The research method used is a retrospective content analysis document. The type of data in this study is secondary data with data collection methods sourced from a collection of postmortem of patients who died due to traffic accidents from January 2014 to December 2016. This research was carried out at RSS Hospital in January 2017. Data collection comes from a postmortem of patients who died due to traffic accidents from January 2014 to December 2016, and data collection was carried out by total sampling. The sample criteria are inclusion and exclusion criteria. Inclusion criteria include a) Victims who died due to the car, motor vehicle, and pedestrian accidents subjected to an external visum et repertum examination at the Forensic Installation of RSS Hospital from 2014 to 2016; b) All age groups of victims died due to car accidents, motor vehicles, and pedestrians who were examined outside at the Forensic Installation of RSS Hospital from 2014 to 2016; and c) All victims' genders died due to the car, motor vehicle, and pedestrian accidents carried out by external examination at the Forensic Installation of RSS Hospital from 2014 to 2016. At the same time, the exclusion criteria included the death toll due to an accident in another vehicle mode which was carried out by external examination at the Forensic Installation of RSS Hospital from 2014 to 2016. Data collection was carried out using an instrument in the form of visum et repertum, and several things were carried out in processing research data, namely data editing, coding, processing, and cleaning. It used univariate analysis to describe the frequency distribution of each research variable. Frequency distribution describes or shows how many times a measurement result value occurs in all sample measurements.

Result and Discussion

The table above describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. In 2014 there were 27 victims (26%). In 2015, there were 40 victims (38.5%); and in 2016, there were 37 victims (35.6%).

Table 1: Number of Victims Died Due to Traffic Accidents in 2014-2016

		Frequency	%	Cumulative %
Valid	2014	27	26.0	26.0
	2015	40	38.5	64.4
	2016	37	35.6	100.0
	Total	104	100.0	

The following table describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. In the male sex group, there were 84 victims (80.8%) and 20 victims (19.2%).

Table 2: Characteristics of Respondents by Gender

		Frequency	%	Cumulative %
Valid	Male	84	80.8	80.8
	Female	20	19.2	100.0
	Total	104	100.0	

The following table describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. In the 15-24 year age group, there were 25 victims (24%), the 25-34 year age group had 21 victims (20.2%), the 35-44-year-old group had 21 victims (20.2%), the 45-year-old group -54 years old there are 21 victims (20.2%), age group 55-64 years old there are seven victims (6.7%), age group <15 years old there are four victims (3.8%), age group >65 years old there is one victim (1%), and the age group is unknown there are four victims (3.8%).

Table 3: Characteristics of Respondents by Age Group

		Frequency	%	Cumulative %
Valid	<15	4	3.8	3.8
	15-24	25	24.0	27.9
	25-34	21	20.2	48.1
	35-44	21	20.2	68.3
	45-54	21	20.2	88.5
	55-64	7	6.7	95.2
	>64	1	1.0	96.2
	Unknown	4	3.8	100.0
	Total	104	100.0	

The table below describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. In the moderate education group, there were 37 victims (35.6%), the low education group had

28 victims (26.9%), the higher education group had 22 victims (21.2%), the non-school group had two victims (1.9 %), and the education group is not known to have 15 victims (14.4%).

Table 4: Characteristics of Respondents Based on Education Level

		Frequency	%	Cumulative %
Valid	No school	2	1.9	1.9
	Lower Level (Primary and Junior High School)	28	26.9	28.8
	Medium (Senior High School)	37	35.6	64.4
	Higher Level (College and University)	22	21.2	85.6
	Unknown	15	14.4	100.0
	Total	104	100.0	

The following table describes the external examination report of dead victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. In the self-employed group, there were 52 victims (50%), the students' group had 19 victims (18.3%), the housewives group had eight victims (7.7%), the civil servant/army/police group had five victims (4. 8%), and the group whose work is unknown there are 14 victims (13.5%).

Table 5: Characteristics of Respondents by Occupation

		Frequency	%	Cumulative %
Valid	Students	19	18.3	18.3
	Police/Armed Forces	5	4.8	23.1
	Entrepreneur	52	50.0	73.1
	Driver	6	5.8	78.8
	Housewife	8	7.7	86.5
	Unknown	14	13.5	100.0
	Total	104	100.0	

The following table describes the external examination report of dead victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. In the motorcycle road user group, there were 67 victims (64.4%), the car road user group was 24 victims (23.1%), and the pedestrian group was 13 victims (12.5%).

Table 6: Characteristics of Respondents by Category of Road Users

		Frequency	%	Cumulative %
Valid	Motorcycle	67	64.4	64.4
	Car	24	23.1	87.5
	Pedestrian	13	12.5	100.0
	Total	104	100.0	

The table below describes the external examination report of the death victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital, Jakarta from 2014 to 2016 with a total of 104 victims. The most common types of injuries were abrasions found in 91 victims (87.5%), lacerations in 75 victims (72.11%), and bruises in 55 victims (52.88%). Types of wounds are classified into three types of wounds, namely contusions, abrasions, and lacerated wounds (vulnus laceratum).

Table 7: Characteristics of Respondents by Type of Wound

		Responses		% of Cases
		N	%	
Wound Type	Blisters	91	41.2%	87.5%
	Bruises	55	24.9%	52.88%
	Abraded	75	33.9%	72.11%
Total		221	100.0%	212.49%

Based on the International Code of Diseases (ICD)-10, the classification of injuries to areas or body parts that are injured is divided into ten categories, namely (1) head, (2) neck, (3) chest, (4) abdomen, back, waist and neck hips, (5) shoulders and upper arms, (6) elbows and forearms, (7) wrists, (8) joints, hips, upper limbs, (9) knees and lower legs and (10) ankles.

Table 8: Characteristics of Respondents by Location of Injury

		Responses		% of Cases
		N	%	
Injury Location	Head injury	90	24.3%	86.53%
	Neck Injury	20	5.4%	19.23%
	Thoracic Injury	39	10.5%	37.5%
	Abdominal & Pelvic Injury	46	12.4%	44.2%
	Back Injury	23	6.2%	22.1%
	Upper Extremity Injury	78	21.1%	75%
	Lower Extremity Injury	74	20.0%	71.2%
Total		370	100.0%	355.76%

The table above describes the external examination report of the death victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The most locations of body injuries were the head which was found in 90 victims (86.53%), the upper extremities were found in 78 victims (75%), the lower extremities were found in 74 victims (71.2%), the abdomen and pelvis were found in 46 victims (44.2%), thorax found in 39 victims (37.5%), back found in 23 victims (22.1%), and neck found in 20 victims (19.23%). The category of types of injury according to the ICD-10 classification is divided into 17 types, namely (1) superficial (abrasions), (2) open wounds, (3) fractures (including teeth), (4) dislocations, sprains and strains, (5) nerve (spinal cord) injury, (6) vascular injury, (7) muscle and tendon injury, (8) eye injury, (9) heart injury (intra-abdominal organ), (10) other thoracic (pelvis) organ injury, (11) cerebral commotion, (12) contusion, laceration and cerebral haemorrhage, (13) epidural haemorrhage, (14) subdural haemorrhage, (15) crushing, (16) amputation, and (17) others.

Table 9: Characteristics of Respondents by Type of Head Injury

		Responses		% of Cases
		N	%	
Head injury	Superficial Wound	55	16.7%	52.88%
	Contusion	33	10.0%	31.73%
	Laceration	52	15.8%	50%
	Cranial Open Fracture	17	5.16%	16.34%
	Cranial Closed Fracture	11	3.34%	10.57%
	Cranial Base Fracture	40	12.2%	38.46%
	Nasal Fracture	20	6.1%	19.23%
	Maxillary & Zygomatic Fracture	16	4.9%	15.38%
	Dental Fracture	31	9.4%	29.80%
	Mandibular Fracture	19	5.8%	18.26%
	Crush Injury	14	4.3%	13.46%
	Amputation	2	0.6%	1.92%
Total		329	100.0%	298.03%

The table above describes the external examination report of the death victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The most common types of head injuries were abrasions/superficial wounds found in 55 victims (52.88%); lacerations/open wounds found in 52 victims (50%); skull base fractures found in 40 victims (38.46%); head contusion found in 33 victims (31.73%). Then, tooth fracture was found in 31 victims (29.8%), mandibular bone fracture found in 19 victims (18.26%), open fracture of the calvarial bone, which was found in 17 victims (16.34%), fractures of the maxillary and zygomatic bones found in 16 victims (15.38%), crushing of the head found in 14 victims (13.46%), closed fractures of the calvaria bone found in 11 victims (10.57%). Head amputations were found in 2 victims (1.92%).

Table 10: Characteristics of Respondents by Type of Neck Injury

		Responses		% of Cases
		N	%	
Neck Injury	Superficial Wound	17	77.3%	16.35%
	Contusion	1	4.5%	0.9%
	Closed Fracture	3	13.6%	2.9%
	Crush Injury	1	4.5%	0.9%
Total		22	100.0%	21.05%

The table above describes the external examination report of the death victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The most common types of neck injuries were abrasions/superficial wounds found in 17 victims (16.35%), closed fractures found in 3 victims (2.9%), crushed neck found in 1 victim (0.9%), and bruises were found in 1 victim (0.9%).

Table 11: Characteristics of Respondents by Type of Thoracic Injury

		Responses		% of Cases
		N	%	
Thorax Injury	Superficial Wound	40	51.9%	38.46%
	Contusions	15	19.5%	14.42%
	Laceration	4	5.2%	3.8%
	Close Fractures	15	19.5%	14.42%
	Crush Injury	3	3.9%	2.88%
Total		77	100.0%	73.98%

The table above describes the external examination report of the death victims due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The most common types of thoracic injuries were abrasions/superficial wounds found in 40 victims (38.46%), closed fractures found in 15 victims (14.42%), contusions found in 15 victims (14.42%), wounds tearing/opening was found in 4 victims (3.8%), and thoracic crush injury was found in 3 victims (2.88%).

Table 12: Characteristics of Respondents by Type of Abdominal and Pelvic Injury

		Responses		% of Cases
		N	%	
Abdominal and Pelvic Injury	Superficial Wound	41	66.1%	39.42%
	Contusions	9	14.5%	8.65%
	Laceration	5	8.1%	4.8%
	Close Fractures	5	8.1%	4.8%
	Crush Injury	2	3.2%	1.92%
Total		62	100.0%	59.59%

The table above describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The most common types of abdominal and pelvic injuries were abrasions/superficial wounds found in 41 victims (39.42%), bruises found in 9 victims (8.65%), lacerations/open wounds found in 5 victims (4.8 %), closed fractures were found in 5 victims (4.8%), and crushed abdomen was found in 2 victims (1.92%).

Table 13: Characteristics of Respondents by Type of Back Injury

		Responses		% of Cases
		N	%	
Back Injury	Superficial Wound	17	47.2%	16.34%
	Contusion	8	22.2%	7.69%
	Laceration	5	13.9%	4.8%
	Open Fracture	1	2.8%	0.96%
	Closed Fracture	2	5.6%	1.92%
	Dislocation	1	2.8%	0.96%
	Crush Injury	1	2.8%	0.96%
	Amputation	1	2.8%	0.96%
Total		36	100.0%	34.59%

The table above describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims.

The most common types of back injuries were abrasions/superficial wounds found in 17 victims (16.34%), bruises found in 8 victims (7.69%), lacerations/open wounds found in 5 victims (4.8%), closed fracture found in 2 victims (1.92%), open fracture found in 1 victim (0.96%), back crush found in 1 victim (0.96%), back amputation found in 1 victim (0.96%), and back dislocation was found in 1 victim (0.96%).

Table 14: Characteristics of Respondents by Type of Upper Extremity Injury

		Responses		% of Cases
		N	%	
Upper Extremity Injuries	Superficial Wound	76	50.7%	73.08%
	Contusion	21	14.0%	20.19%
	Laceration	23	15.3%	22.16%
	Open Fracture	2	1.3%	1.92%
	Closed Fracture	22	14.7%	21.15%
	Dislocation	2	1.3%	1.92%
	Crush Injury	1	0.7%	0.96%
	Amputation	3	2.0%	2.88%
Total		150	100.0%	144.26%

The table above describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims.

The most common types of upper extremity injuries were abrasions/superficial wounds found in 76 victims (73.08%), lacerations found in 23 victims (22.16%), closed fractures found in 22 victims (21.15%). Contusions were found in 21 victims (20.19%), upper extremity amputations found in 3 victims (2.88%), open fractures found in 2 victims (1.92%), upper limb dislocations found in 2 victims (1.92), and crushing of the upper extremity was found in 1 victim (0.96%).

Table 15: Characteristics of Respondents by Type of Lower Extremity Injury

		Responses		% of Cases
		N	%	
Lower Extremity Injuries	Superficial Wound	73	49.3%	70.19%
	Contusion	14	9.5%	13.46%
	Laceration	32	21.6%	30.77%
	Open Fracture	3	2.0%	2.88%
	Closed Fracture	22	14.9%	21.15%
	Dislocation	1	0.7%	0.96%
	Crush Injury	1	0.7%	0.96%
	Amputation	2	1.4%	1.92%
Total		148	100.0%	142.29%

The table above describes the external examination report of victims who died due to traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The most common types of lower extremity injuries were abrasions/superficial wounds found in 73 victims (70.19%), lacerations found in 32 victims (30.77%), closed fractures found in 22 victims (21.15%). Then, contusions were found in 14 victims (13.46%), open fractures found in 3 victims (2.88%), lower extremity amputations found in 2 victims (1.92%), lower limb dislocations found in 1 victim (0.96), and crushing of the lower extremity was found in 1 victim (0.96%).

Table 16: Characteristics of Respondents Based on Estimated Causes of Death

		Frequency	%	Cumulative %
Valid	Severe Head Trauma	32	30.8	30.8
	Multiple Traumas	12	11.5	42.3
	Extensive Burn	6	5.8	48.1
	Massive Haemorrhage	5	4.8	52.9
	Asphyxia	3	2.9	55.8
	Unknown	46	44.2	100.0
	Total	104	100.0	

The table and figure above describe the external examination report of the victims who died from traffic accidents obtained from the Forensic Installation of RSS Hospital from 2014 to 2016 with a total of 104 victims. The cause of death could not be estimated for 46 victims (44.2%), a severe head injury could be estimated as the cause of death for 32 victims (30.80%), multiple trauma could be estimated as the cause of death for 12 victims (11.50%). Then, extensive burns could be estimated as the cause of death for six victims (5.8%), severe bleeding can be estimated as the cause of death for five victims (4.8%), and suffocation/asphyxia can be estimated as the cause of death for three victims (2.9%). During the period from 2014 to 2016 at the Forensic Installation of RSS Hospital, Jakarta, it was found that the number of deaths due to traffic accidents which were carried out by external examination was 104 people.

Based on gender, there were 32 male victims (80.8%) and 20 female victims (19.2%). The results of this study follow the results of Adianti's research (2011), where the highest gender group who died due to traffic accidents was male, namely 79 victims (87.8%) compared to women who only 11 victims (12.2%) [29]. Based on age, the results of this study indicate that the majority of victims who died in traffic accidents were aged between 15-24 years (24%). It follows the results of Adianti's research (2011), where the highest age group is 15-25 years, as many as 42 victims (46.7%) [29]. These results follow WHO data; namely, the group at risk for accidents is 15-25 years, and more than half of deaths due to traffic accidents occur in the age group of young adults aged 15-44 years [30]. The survey results in the city of Semarang also showed that the largest traffic accident victims were in the 15-21 years age group, namely 38.18% [32].

Based on the level of education, the most deaths were in the medium education group or at the high school level, namely 37 victims (35.6%). This result follows the results of research from Suwandono in 2001 that most victims of traffic accidents are educated at the high school level [33]. Then based on occupation, the highest incidence of traffic accidents occurred in private employees, namely 52 victims (50%). These results follow the results of research from Djaja *et al*, (2016) [34].

The research conducted shows that based on the category of road users, the highest frequency was found in the motorcycle rider group as many as 67 victims (64.4%). The results of this study follow the results of Ridayina's research. *et al*., (2009), namely in Indonesia, most traffic accidents, namely 70 per cent are motorcycle riders [34]. The results of this study also follow the results of Muharsanto's (2008) research, namely, the highest number of victims of traffic accidents based on the category of road users are motorcyclists namely 93 victims (88.57%) [35].

The most common injuries found in traffic accident victims were abrasions suffered by 91 victims (87.5%). It follows Riyadina's research (2009) which found that the highest proportion of injuries due to traffic accidents in Indonesia was abrasions as much as 65.9%. It is also, as written by Lulie (2006), that in traffic accidents there are often abrasions because when they fall, the driver will usually be dragged by the repulsion force, the friction between asphalt, clothes and skin will produce abrasions on the parts that are in direct contact [36].

Based on age, the results of this study indicate that the majority of victims who died in traffic accidents were aged between 15-24 years (24%). It follows the results of Adianti's research (2011), where the highest age group is 15-25 years, as many as 42 victims (46.7%) [29]. These results follow WHO data; namely, the group at risk for accidents is 15-25 years, and more than half of deaths due to traffic accidents occur in the age group of young adults aged 15-44 years [30].

Based on the level of education, the most deaths were in the medium education group or at the high school level, namely 37 victims (35.6%). This result follows the results of research from Suwandono in 2001 that most victims of traffic accidents are educated at the high school level [31]. Then based on occupation, the highest incidence of traffic accidents occurred in private employees, namely 52 victims (50%). These results follow the results of research from Djaja. *et al*, (2016) [33].

The research conducted shows that based on the category of road users, the highest frequency was found in the motorcycle rider group as many as 67 victims (64.4%). The results of this study follow the results of Ridayina's research. *et al*., (2009), namely in Indonesia, most traffic accidents, namely 70 per cent are motorcycle riders [47] The results of this study also follow the results of Muharsanto's (2008) research, namely, the highest number of victims of traffic accidents based on the category of road users are

motorcyclists. namely 93 victims (88.57%) [35].

The most common injuries found in traffic accident victims were abrasions suffered by 91 victims (87.5%). It follows Riyadina's research (2009) which found that the highest proportion of injuries due to traffic accidents in Indonesia was abrasions as much as 65.9% [34]. It is also, as written by Lulie (2006), that in traffic accidents there are often abrasions because when they fall, the driver will usually be dragged by the repulsion force, the friction between asphalt, clothes and skin will produce abrasions on the parts that are in direct contact [36].

Conclusion

From the research results and a description of the discussion, the following conclusions can be drawn: during 2014-2016, 104 traffic accidents caused the victim to die based on the results of visum et repertum external examination report at RSS Hospital. Victims age 15-34 years were in the highest rank, namely 46 victims (44.2%). A total of 37 victims (35.6%) were private employees, and 52 victims (50%) were from moderate education levels (SMP & SMA).

The number of victims who died experienced by men was 84 victims (80.8%). The number of victims who died came from motorcycle road users as many as 67 victims (64.4%). The most common type of wound was abrasions which were found in 91 victims (87.5%). The location of the most body injuries was the head found in 90 victims (86.53%). Cause of death cannot be estimated for 46 victims (44.20%), and cause of death for severe head injury can be estimated for 32 victims (30.80%).

References

1. Dye, Christopher. "After 2015: infectious diseases in a new era of health and development." *Philosophical* Transactions of the Royal Society B: Biological Sciences,2014:369:1645:20130426.
2. Koetse, Mark J. Piet Rietveld. "The impact of climate change and weather on transport: An overview of empirical findings." Transportation Research Part D: Transport and Environment,2009:14(3):205-221.
3. Huang, Ling, Amod K, Poudyal, Nanping Wang, Ramesh K *et al*. "Burden of road traffic accidents in Nepal by calculating disability-adjusted life years." Family medicine and community health,2017:5(3):179-187.
4. WHO. Road Traffic Injuries. 2011.
5. Herman, Josephine. "Road Traffic Injuries in the Pacific: The epidemiology of road traffic injuries in Fiji and the role of driver sleepiness.", 2013.
6. Heskestad, Ben, Roald Baardsen, Eirik Helseth, Bertil Romner, and Tor Ingebrigtsen. "Incidence of hospital referred head injuries in Norway: a population based survey from the Stavanger region." Scandinavian journal of trauma, resuscitation and emergency medicine,2009:17(1):1-5.
7. Riyadina, Woro, and Ita Puspitasari Subik. "Profil keparahan cedera pada korban kecelakaan sepeda motor di Instalasi Gawat Darurat RSUP Fatmawati." Universa Medicina,2007:26(2):64-72.
8. ANJUMAN, Tahera, KAWSAR C, AREFIN SIDDIQUI. "Heavy vehicle driver involvement in road safety and multiple vehicle accidents in Bangladesh." In International Conference on Heavy Vehicles HVParis, 2008, 257-267. Wiley-Blackwell, 2009.
9. Bao B. Characteristics analyses of road traffic injury in Beijing in 2009. 2011. http://www.ncbi.nlm.nih.gov/pubmed/22008686
10. Thol SC. Cambodia Road Traffic Accident and Victim Information System. Annual Report 2004. 2004.
11. BPS. Jumlah Kecelakaan, Korban Mati, Luka Berat, Luka Ringan, dan Kerugian Materi yang Diderita Tahun 1992-2009. 2011.
12. Asuransi Kecelakaan Lalu Lintas-Keselamatan Berkendara Indonesia. The World Day of Rememberance for Road Traffic Victims I Wanna Get Home Safely. 2011. http://gethomesafely.co.id/the-world-day-of-remembrance-for-road- traffic-victims-%E2%80%93-i-wanna-get-home-safely-komitmen-bersama-selamatkan-puluhan-ribu-nyawa/
13. Depkes RI. Profil Kesehatan Indonesia Tahun 2008. 2009.
14. Riyadina W, dkk.. Pola Determinan Sosiodemografi Cedera Akibat Kecelakaan Lalu Lintas di Indonesia. Vol. 59 No 10. Jakarta: Majalah Kedokteran Indonesia, 2009.
15. Balitbang Kesehatan RI. Hasil Riset Kesehatan Dasar (RISKESDAS) Indonesia Tahun 2007. Jakarta: CV Kiat Nusa, 2010.
16. Dephub RI. Laporan Akhir Kajian Manajemen dan Rekayasa Lalu Lintas Jalan Nasional di Kota Metropolitan, 2007.
17. Balitbang Kesehatan RI. Hasil Riset Kesehatan Dasar (RISKESDAS) DKI Jakarta Tahun 2007. Jakarta: CV Kiat Nusa, 2008.
18. Balitbang Kesehatan RI. Hasil Riset Kesehatan Dasar (RISKESDAS) DKI Jakarta Tahun 2007. Jakarta: CV Kiat Nusa, 2008.
19. Dinkes DKI Jakarta,. Profil Kesehatan Kota DKI Jakarta Tahun 2008. 2009.
20. Oakley JS. Accident Investigation Techniques. USA: American Society of Safety Engineers, 2012.
21. Republik Indonesia. Undang-Undang No. 14 Tahun 1992 tentang Lalu Litas dan Angkutan Jalan. Lembaran Negara RI Tahun 1992. Jakarta: Sekretariat Negara, 1992.
22. Republik Indonesia. Undang-Undang No. 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan. Lembaran Negara RI Tahun 2009. Sekretariat Negara. Jakarta. 2009.
23. Nandy A. Principles of Forensic Medicine. Calcutta: New Central Book Agency (P) Ltd, 2001.
24. Dudley, Mary H. "Motor Vehicle Accidents." In Forensic Medicolegal Injury and Death Investigation. CRC Press, 2016, 131-148.
25. Kugelberg, Fredrik C, Alan Wayne Jones. "Interpreting results of ethanol analysis in postmortem specimens: a review of the literature." Forensic science international,2007:165(1): 0-29.
26. Morton, Timothy. Dark ecology. Columbia University Press, 2016.
27. Ressel L, Udo Hetzel, and E. Ricci. "Blunt force trauma in veterinary forensic pathology." Veterinary pathology,2016:53(5):941-961.
28. Calori GM, Albisetti W, Agus A, Iori S, and L. Tagliabue. "Risk factors contributing to fracture non-unions." Injury,2007:38:S11-S18.
29. Adianti LS. 2011. Visum et Repertum berdasarkan ciri-

ciri korban kecelakaan lalu lintas yang dikeluarkan oleh Departemen Ilmu Kedokteran Forensik dan Medikolegal RSMH. Palembang: Fakultas Kedokteran Universitas Sriwijaya, 2009, 19-21.
30. World Health Organization. World report on road traffic injury prevention. WHO; 2004. Available at http://www.who.int/violence-injury-prevention. Accessed December 2, 2016.
31. Samekto AA. Studi tentang karakteristik korban kecelakaan lalu lintas di kota Semarang. Jurnal Sains dan Teknik Maritim,2009:7(2):78-86.
32. Suwandono A. Road traffic collision in urban Indonesia, epidemiology and policy opportunities. Jakarta: Badan penelitian dan Pengembangan Kesehatan, Departemen Kesehatan RI, 2002.
33. Djaja S, dkk. Gambaran Kecelakaan Lalu Lintas Di Indonesia Tahun, 2010-2014. Jakarta: Puslitbang Humaniora dan Manajemen Kesehatan FK UI, 2016.
34. Riyadina W, dkk. Pola Determinan Sosiodemografi Cedera akibat Kecelakaan Lalu Lintas di Indonesia. Jakarta: Majalah Kedokteran Indonesia, volume 59, 2009, Hal: 465-469.
35. Muharsanto P. Gambaran Hasil Pemeriksaan Luar Jenazah Pada Korban Kecelakaan Lalu Lintas di RSUD Arifin Achmad Provinsi Riau Periode 1 Jan 2005–31 Des 2007. Riau: Fakultas Kedokteran Universitas Riau, 2008. Hal: 23-24.
36. Lulie Y, Hatmoko JT. Analisis hubungan kecepatan dengan tebal helm yang direkomendasikan. Jurnal Teknik Sipil,2006:6(2):171-84.