

Profile of unnatural mortality at tertiary hospital

Perfil de mortalidad no natural en un hospital terciario

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SUMMARY

Introduction: Unnatural deaths are deaths that can be prevented, the frequency of which reflects the quality of public health services. Unnatural deaths occur due to external causes such as suicide, homicide, and accidents. This study aims to analyze the profile of cases of unnatural death at Dr. Soetomo General Hospital, Surabaya, Indonesia.

Methods: This research was a descriptive-analytic study with a cross-sectional study approach. The secondary data was collected using an autopsy profile instrument from the medical record for unnatural death cases.

Results: The results showed that out of 2 277 corpses

from January 2014 to December 2016, 70 corpses were cases of unnatural death. Most corpses who experience unnatural deaths were male (62.9 %). The highest number of unnatural deaths occurred due to homicide (54.3 %). The most cause of unnatural death was blunt violence (48.6 %). The most mechanism of unnatural death occurred by asphyxia (71.4 %). Meanwhile, most corpses were injured in the front of the neck, chest, and abdomen (40 %). There was a significant relationship between the type of injury and unnatural death ($p = 0.001$), however, no relationship was found between wound region and unnatural death ($p = 0.217$). There were significant differences between the type of injury in unnatural death cases ($p = 0.037$). **Conclusion:** There was a relationship and differences in the types of corpse injuries with unnatural deaths.

Keywords: Unnatural death, injury, autopsy

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RESUMEN

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Introducción: Las muertes no naturales son aquellas que se pueden prevenir y cuya frecuencia refleja la calidad de los servicios de salud pública. Las muertes no naturales ocurren por causas externas como suicidio, homicidio y accidentes. Este estudio tiene como objetivo analizar el perfil de casos de muerte no natural en el Hospital General Dr. Soetomo, Surabaya, Indonesia. **Métodos:** esta investigación fue un estudio descriptivo-analítico con enfoque de estudio transversal. Los datos secundarios se recopilaron utilizando un instrumento de perfil de autopsia del registro médico para casos de muerte no natural.

Resultados: Los resultados mostraron que de los 2 277 cadáveres de enero de 2014 a diciembre de 2016, 70

fueron casos de muerte no natural. La mayoría de los cadáveres que experimentaron muertes no naturales eran hombres (62,9 %). El mayor número de muertes no naturales ocurrió por homicidio (54,3 %). La mayor causa de muerte no natural fue la violencia contundente (48,6 %). El mayor mecanismo de muerte no natural ocurrió por asfixia (71,4 %). Mientras que en los cadáveres la zona que resultó mayormente con heridas fue la región frontal del cuello, pecho y abdomen (40 %). Hubo relación estadísticamente significativa entre el tipo de lesión y la muerte no natural ($p= 0,001$), sin embargo, no se encontró relación entre la región de la herida y la muerte no natural ($p= 0,217$). Hubo diferencias significativas en el tipo de lesión en los casos de muerte no natural ($p= 0,037$).

Conclusión: *Hubo una relación y diferencias en los tipos de lesiones de cadáveres con muertes no naturales.*

Palabras clave: *Muerte antinatural, lesión, autopsia.*

INTRODUCTION

Every year, about 800 000 people die due to suicide. In other words, every 40 people deliberately kill themselves so that the number of deaths due to suicide increases more than deaths due to homicide (1). Each year, the suicide rate is increasing all over the world. The global annual mortality rate has been estimated by the World Health Organization (WHO) to be 10.7 per 100 000 people, with variations across age groups and countries (2). The Birth and Death Registration Act No. 51 of 1992 requires doctors to issue a death certificate and a death notification form stating the cause of death, which may be natural or unnatural (3).

The contribution of specific causes of death to excess mortality has not been widely studied because of the difficulty of reaching this vulnerable population. Numerous studies in several countries have shown an increasing proportion of deaths from substance abuse, accidents, suicide and homicides, mental disorders, infectious diseases, and ischemic heart disease (4-6). In comparison, natural death occurs through disease progression, and unnatural deaths occur due to external or morbid causes, including suicide, homicide, and accidents. The cause of unnatural death is because most of the homicides are asphyxia accompanied by blunt force violence and mainly occur in child homicide (7).

Unnatural death is the leading cause of death in the homeless cohort in Rotterdam. As many as 26 % of morbid deaths are a much greater cause of death in homeless people than in the general Rotterdam population (4 %). Compared to the general population of the city, the homeless in Rotterdam have a 15 times higher risk of dying from unnatural causes. Half of all unnatural deaths in this group are due to intentional injuries, such as suicide and homicide (4,5). A study comparing mortality ratios and estimated years of death in two cohorts — opioid-dependent subjects from the United States (US) and Taiwan — showed that half the subjects died of morbid causes in both cohorts, with overdose being the most common cause of death in the US, cohort (US: 80.6 %, Taiwan: 25 %) compared to suicides in the Taiwan cohort (Taiwan: 51.9 %, US: 2.8 %) (8). In Singapore, 51.07 % of the cases between 2009 and 2010 reported were unnatural deaths that included drug toxicity/adverse reactions (6.93 %). Drops from height (35.86 %), accidents (17.6 %), and drowning (5 %) were also reported. However, the number of drug users among cases was unknown (8).

A retrospective study of tourist deaths over 46 years at Lake Powell in the US reveals that 73 % of deaths at this popular reservoir were due to accidental injury (9). Drowning was the second leading cause of accidental death among American travelers abroad in 1975 and 1984, accounting for 16 % of all travel deaths. It was also the cause of death for 9 % of Peace Corps Volunteers during their service period between January 1984 and December 2003 (9). This study aims to analyze the autopsy profile of cases of unnatural death.

METHODS

This was a descriptive-analytic study with a cross-sectional approach, namely an epidemiological research design that studies the prevalence, distribution, and the relationship between disease and exposure (research factors) by observing the disease exposure status or characteristics. The research was carried out at the Forensic and Medicolegal Medical Installation of Dr. Soetomo Hospital, Surabaya, Indonesia, from January 2014 to December 2016. The

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population of the study was all corpses in the Forensic Medicine and Medicolegal Installation of Dr. Soetomo Hospital, Surabaya, Indonesia. The sample in this study were corpses with cases of unnatural death, which were taken using simple random sampling. The data in this study were secondary data collected by using an autopsy profile instrument for abnormal death cases by observing medical record data. The data were analyzed using the Chi-square test. The degree of confidence used is 95 %. A value of $p < 0.05$ was considered as a significant relationship between the two variables studied.

RESULTS

From January 2014 to 2016, the number of deaths recorded was 2 277, with a total number of natural deaths of 72 and unnatural deaths of 70. Table 1 shows that most corpses who experience unnatural deaths were males (62.9 %). Of the total 70 unnatural deaths, 17 corpses (24.3 %) were aged 36-45 years. The lowest incidence of unnatural death occurred at ages 5-11 and ages 12-16 years. The highest cause of death was blunt violence (48.6 %).

Most of the mechanisms of unnatural death occurred with asphyxia (71.4 %). The number of wounds on the corpse with an unnatural death was at most ≤ 3 (68.6 %) and the type of injury that often occurred was fracture (24.3 %). Meanwhile, the majority region indicated the corpses were injured in the front of the neck and chest, abdomen (40 %). The majority of unnatural deaths occurred due to homicide (54.3 %).

Based on the results of the Chi-square test, there was a significant relationship between the type of injury on the corpse and the unnatural death ($p=0.001$). However, there was no relationship between the wound region and the unnatural death ($p=0.217$).

There was a difference between types of injuries and cases of unnatural death on the corpse ($p < 0.037$). However, the difference between the wound region of the corpse and the case of unnatural death showed no statistical difference ($p=0.843$).

Table 1

Frequency distribution of corpses at unreasonable deaths

Characteristics		Frequency	Percentage	
Sex	Male	44	62.9	
	Female	26	37.1	
Age	0 - 5 years	8	11.4	
	5 - 11 years	1	1.4	
	12 - 16 years	1	1.4	
	17-25 years	10	14.3	
	26 - 35 years	8	11.4	
	36 - 45 years	17	24.3	
	46 - 55 years	11	15.7	
	56 - 65 years	8	11.4	
Cause of death	> 65 years	6	8.6	
	Sharp Violence	16	22.9	
	Blunt Violence	34	48.6	
	Chemistry	2	2.9	
	Electricity	2	2.9	
	Entry of Water	13	18.6	
	Poison	3	4.3	
	Death mechanism	Asphyxia	50	71.4
Bleeding		20	28.6	
Number of wounds	≤ 3	48	68.6	
	> 3	22	31.4	
Types of injury	Fracture	17	24.3	
	Laceration	3	4.3	
	No Abnormalities	9	12.9	
	Torn	3	4.3	
	Blisters Pressed	3	4.3	
	Valid Bruises	16	22.9	
	Punctured	12	17.1	
	Sliced	1	1.4	
	Burn it	4	5.7	
	Blisters	2	2.9	
Region of wounds	Head, Back Neck,	25	35.7	
	Back, Upper Limbs, Hands			
	Front Neck, Chest, Abdominal	28	40.0	
	Forearm	3	4.3	
	Combinations of 2 & 3	3	4.3	
	Combinations 1 & 2	11	15.7	
	Death	Murder	38	54.3
		Suicide	3	4.3
		Accident	29	41.4

DISCUSSION

The average autopsy performed at the Forensic Medicine and Medicolegal Installation of Dr.

Soetomo General Hospital, Surabaya, Indonesia, experienced a downward trend during the period January 2014 to December 2016. Statistically, it shows a relationship between the type of injury and the unnatural death (homicide, suicide, accident), and there is a significant difference between the types of injuries in homicide, suicide, and accident cases. Statistically, it also shows no relationship between the wound area and morbid mortality, and there is no difference between the regions in homicide, suicide, or accident cases.

The types of stab wounds and bruises are primarily found in homicides than in suicides and accidents. Perpetrators of murder cases often use sharp weapons, such as knives. Meanwhile, bruises are often found as resistance wounds from the victim to the perpetrator and cases of murder by maltreatment. Blunt force trauma also causes fractures resulting in internal or external bleeding (10). Types of fracture wounds (fractures) are most often found in accident cases than in cases of homicide or suicide. Fractures in accidents are often found in cases of falls from a height or traffic accidents and work accidents, types of fractures that are fatal, especially head fractures, and often occur in men of productive age (11).

The wound region is also one of the parameters used to determine the mode of death. Suicide perpetrators find it challenging to reach the back region of the corpse (back, back neck). The most common injuries to the head region were those who committed suicide with a firearm rather than a sharp weapon. The hand and upper arm regions are the regions that occur most frequently in cases of murder as a form of resistance injury. Meanwhile, the forearm is the region most frequently used by suicides as a form of resistance injury. The front region of the neck, chest, and abdomen are the most challenging regions to estimate the mode of death. However, other research states that the neck region is the main target of murder because it is easily reached by hand (12).

The sex distribution of the corpses was 62.9 % male and 37.1 % female, the same result as other studies, which state that male corpses experienced more unnatural deaths than women (13). Men are more dominant victims of homicide/suicide/accident because men interact

more with the environment outside the home, both socio-economically as workers, while women mostly stay indoors. Men have a higher risk of experiencing sudden death than women, and the incidence rate will increase with age (14).

The age distribution of the corpses shows that most of the victims are in the age range of 36 - 45 years. Several studies have also stated that the age of corpses who die unnaturally occurs mainly at productive age (1). This age range is the productive age for work, so that they interact a lot with the environment and other people, especially in big cities, for example, Surabaya, which is a destination city to find a job or a more decent living from the surrounding areas.

The cause of most deaths in cases of unnatural death obtained from this study's results is blunt violence. The cause of death is unnatural because most homicides are asphyxia accompanied by violence with blunt objects (7). Intense violence also occurs more in cases of homicide than in suicide. This statement is the same as the results obtained in this study because the tool that is often used in homicide cases is a sharp weapon to produce deadly wounds.

The most common mechanism of death is asphyxia. The mechanism of asphyxia death occurs more in accidents and suicides than in homicides (12). The mechanism of death asphyxia in accident cases often occurs due to skull fracture or drowning. Meanwhile, in cases of suicide occur due to hanging (1).

The number of wounds is divided into two: the number of wounds less and equal to 3 and the number of wounds more than three. The assumption is that a higher number of wounds is associated with a higher likelihood of homicide. A large number of wounds (more than 3) is found more in cases of homicides and accidents than in cases of suicide. In the homicide case, the victim's resistance against the perpetrator is found. For example, wounds in the upper limb area are also an essential parameter for investigators and doctors in examining cases of suspected murder. Whereas in the case of accidents, a large number of injuries can be found in all parts of the body accompanied by several types of injuries at once (15).

CONCLUSION

Unnatural deaths in Dr. Soetomo Hospital, Surabaya, Indonesia, showed as many as 70 corpses with cases of homicide, suicide, and accidents. This study proves a relationship and differences in the types of corpse injuries with morbid deaths based on an autopsy at the Forensic Medicine and Medicolegal Installation of Dr. Soetomo Hospital, Surabaya, Indonesia, for the period January 2014 - December 2016. This study also concluded that there was no relationship and difference between the regions of corpse wounds and unnatural deaths based on autopsy.

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Conflicts of Interest

The authors have no conflict of interest to declare.

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