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Epidemiology of homicide: homicide method and demographic status of victim recorded at Sardjito General Hospital

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Abstract

Purpose: The study aims to find out associations between the demographic factors for a person to become a homicide victim in Indonesia and the possible method of homicide-related. We hypothesize that there is an association between the demographic status of the homicide victim and the homicide methods and even between the homicide method and incident time themselves. **Methods:** By using visum et repertum of the homicide victims that were recorded in dr. Sardjito General Hospital, Yogyakarta, Indonesia in 2005-2015. The baseline characteristics are above 15-year-old victims who lived in Bantul District, Sleman District, Yogyakarta City, Kulon Progo District, and Gunungkidul District with identified age, sex, and homicide method and had their incident time recorded in dr. Sardjito General Hospital. The victim's age, sex, occupation, marital status, and socioeconomic were analyzed to determine if there is any association found to the homicide method that includes homicide method and incident time that the homicide occurred. The association within the homicide method was also analyzed using the same method. **Results:** Of the 105 homicide victims who had a Visum et Repertum made at the dr. Sardjito General Hospital, most of the homicide victims were male, 20-40 years old, worked for private, were married, had high socioeconomic status, were murdered by blunt force trauma with bleeding as a mechanism of death, during night time and in outside settings. The result shows that the homicide method is found to be significantly associated with sex, as socioeconomic status only affects females. Meanwhile, the incident time of the homicide is related to the age of the victim. The association between the two variables of the homicide method was only found if the victim is male, where poisoning is more likely to occur during daytime, and sharp object trauma is more likely to occur at night. **Conclusion:** Associations between homicide methods and some of the demographic statuses were found. Male victims with poisoning of homicide method are more likely to occur during the daytime, and sharp object trauma is more likely to occur at night.

Keywords: demographic status; homicide; murder; visum et repertum

INTRODUCTION

Homicide is one of both causes and manner of death that may cause the failure of the central nervous system (CNS), lungs, vascular system, and heart as a mechanism of death [1-4]. “Homicide” meant in this study is criminal homicide. Therefore, it does not include the act of saving oneself from murder. Many factors may affect a homicide, e.g., background, motives, and demographic status, to which cultural background, law, and country development may have a huge contribution.

Various studies of homicide have been carried out, both in terms of background, demographic status, and mental disorders possessed by the perpetrator. From demographic status, most of the homicides were found to be male victims with age around 22-23 years old; 2/3rd of them had prior contact with the perpetrator before the homicide, had social risk factors, street killing, conducted by stranger or friend, living alone, impoverished, and undereducated [5-7]. Previous studies conducted in Indonesia found that in most homicide cases in Indonesia, the victims are male, 18-40 years old, with deaths due to bleeding caused by sharp object trauma, followed by blunt force trauma, and were murdered in outside settings [8-11]. It can be seen clearly that the age range is much broader in Indonesia, affecting other demographic statuses.

There are several methods of homicide, which are usually categorized as a blunt instrument, drowning/suffocation/asphyxiation, kicking/hitting, strangulation, sharp instrument, poisoning, arson/death by fire, and other/unknown [5]. In all cases, the most common method of killing was with a sharp instrument, followed by kicking/hitting and the use of a blunt instrument [5]. It is believed that there are three types of homicide patterns, namely, male conflict homicide pattern, intimate female homicide pattern, and child homicide [9]. Male conflict homicide pattern, wherein cases of homicide with a male victim, it is found that it usually starts as a conflict, accompanied by a method of killing that includes kicking/hitting[3]. It was found that most of the women were killed by those close to them. Meanwhile, in the case of child homicide, it was found that children who were murdered died of asphyxia conditions, which could be due to strangulation, drowning, and other methods. We hypothesize that there is an association between the demographic status of the homicide victim and the homicide form and even between homicide method and incident time themselves.

METHODS

The independent variable in this study consisted of five variables: age, sex, occupation, marital status, and socioeconomic status. The age of the victim is based on the chronological age of the victim, which is categorized into adolescents (15-19 years old), adults (20 – 40 years old; 41 – 60 years old), and elderly (60+ years old). Occupation is categorized into unemployment, student, civil servant, private, and unknown. Marital status is categorized into married, divorced, single, and unknown. Socioeconomic status is determined based on the poverty line in four areas of Yogyakarta. An area will be considered to have a higher socioeconomic condition if the poverty line of the area is higher than the average poverty line of the four areas, dividing the socioeconomic categories into two, namely higher socioeconomic status (Bantul district, Sleman district, Yogyakarta city) and lower socioeconomic status (Kulon Progo district, Gunungkidul district).

The dependent variable in this study consisted of four variables, namely homicide method, mechanism of death, incident location, and incident time. Homicide method is categorized into blunt force trauma, sharp object trauma, death by fire, and poisoning; mechanism of death is categorized into bleeding, asphyxiation, vital organ failure, and undetermined; incident location is categorized into indoor, outdoor, and undetermined [4]; while incident time is categorized as daytime (6 am – 6 pm) and night-time (6 pm – 6 am) [12].

Subjects taken were 105 out of 130 homicide victims who had their Visum et Repertum results recorded in the forensic installation of dr. Sardjito General and Educational Hospital, Yogyakarta from 2005-2015 as the subjects that were found to have any of these criteria were excluded from the study: suspected homicide case with an unidentified age, sex, method of death, and time of the incident in the Visum et Repertum; victims who are under 15 years old; victims who live in other than Bantul district, Sleman district, Yogyakarta city, Kulon Progo district, and Gunungkidul district were excluded from the study. The sampling method used in this

research is consecutive sampling, in which all data are taken simultaneously.

The association between variables will first be analyzed using the Chi-Square method. Suppose the association between two variables is significant with a P value significance level of less than 0.05 or with the same two decimal places. In that case, it will be further analyzed using multinomial logistic regression to find the direction of the correlation, whether it is positive or negative. The Ethical Committee of Universitas Gadjah Mada, Yogyakarta, Indonesia, reviewed and approved this study protocol.

RESULTS

Baseline characteristics

From all of the data recorded during the forensic installation of dr. Sardjito General Hospital in 2005-2015, it was found that the Visum et Repertum almost fulfilled all the inclusion and exclusion criteria: 130 data. 25 data were excluded as 17 had unknown incident time, 5 had unknown place of residence, and 3 were found to be under 15 years old. In total, 105 homicide cases, 60 male and 45 female, were used in the study (Table 1).

Table 1. Distribution frequency on the Visum et Repertum(s) of the homicide victims handled in the forensic installation at Dr. Sardjito General Hospital, Yogyakarta, from 2005-2015 (n=105)

Year	n (%)
2005	14 (13.33)
2006	9 (8.57)
2007	10 (9.52)
2008	9 (8.57)
2009	10 (9.52)
2010	11 (10.49)
2011	5 (4.76)
2012	6 (5.71)
2013	7 (6.67)
2014	15 (14.29)
2015	9 (8.57)

The study used 105 data. Data were mostly found in 2014 and least in 2011. Data obtained each year is approximately 10, with a standard deviation ± 5. From Table 2, it can be found that the demographic statuses that were found in homicide victims, both male and female, are mostly 20-40 years old, work for private, married, and have high socioeconomic status. More male were found as homicide victims compared to females. The median age of homicide victims, if combined, male and female in this study are 33.5 years old, 33.5 years old, and 35 years old, respectively.

Most of the homicide victims, both male and female, were murdered using blunt force trauma and during nighttime. It was also found that most of the homicide victims had bleeding as a mechanism of death and were indoors at the location of the incident. However, female homicide victims were found to have asphyxiation as a mechanism of death, while male homicide victims were found to be more likely to be murdered outdoors.

The odds ratios that were found and able to be interpreted in the table were between sex - incident time and between socioeconomic status - incident time. Regarding the odds ratio between sex and incident time, it was found that if compared to females, male are 0.61 times more likely to be murdered during daytime and 1.65 times more likely to be murdered during nighttime. The calculation in the table is the odds ratio if the outcome is daytime.

However, sex is found not to have a significant association with the incident time of the homicide. On the other side, regarding the odds ratio between socioeconomic status and incident time, the odds ratio was calculated with murdered during night time as the outcome, it is found that victims with higher socioeconomic status are 1.52 times more likely to be murdered during night time, 2 times more likely if the victim is male and 1.06 times if the victim is female. However, socioeconomic status is found not to have a significant association with the incident time of the homicide.

The demographic status that was found to have a significant association with the homicide method is sex, followed by socioeconomic status if the victim is female; the incident time of the homicide is age despite the sex of the homicide victim. From the table, a significant association between the homicide method and incident time can also be found. Regarding the chi-square test results, two things should be noted.

Table 2. The baseline characteristics of homicide victims handled in the forensic installation at Dr. Sardjito General Hospital, Yogyakarta, from 2005-2015 and the association to the homicide form (homicide method and incident time)

	All		Homicide Methods	Incident Time	Male		Homicide Method	Incident Time	Female		Homicide Method	Incident Time
	n	%			n	%			n	%		
Age												
15-19 y.o	11	10.5			7	11.7			4	8.9		
20-40 y.o	54	51.4	0.569	0.002	32	53.3	0.313	0.027	22	48.9	0.32	0.018
41-60 y.o	21	20			13	21.7			8	17.8		
60+	19	18.1			8	13.3			11	24.4		
Sex												
Male	60	57.1	0.001	0.145 (OR=0.61)								
Female	45	42.9										
Occupation												
Unemployed	13	12.4			2	3.3			11	24.4		
Student	12	11.4			7	11.7			5	11.1		
Civil servant	2	1.9			2	3.3			-	-		
Private	64	61	0.942	0.716	40	66.7	0.065	0.838	24	53.5	0.832	0.366
Unknown	14	13.4			9	15			5	5		
Marital status												
Single	11	10.5			2	3.3			9	20		
Divorced	1	1			1	1.7			-	-		
Married	26	24.8	0.232	0.305	9	15	0.18	0.735	17	37.8	0.112	0.127
Unknown	67	63.8			48	80			19	42.2		
Socioeconomic status												
Higher	83	79	0.31	0.387 (OR-1.52)	48	80	0.665	0.284 (OR=2)	35	77.8	0.007	0.936 (OR=1.06)
Lower	22	21			12	20			10	22.2		
Homicide method												
Blunt trauma	62	59		0.159	32	53.3		0.046	30	66.7		0.881
Sharp trauma	29	27.6			22	36.7			7	15.6		
Death by fire	5	4.8			5	8.3			-	-		
Poisoning	9	8.6			1	1.7			8	17.8		
Incident Time												
Daytime	44	41.9			22	36.7			22	48.9		
Night time	61	58.1			38	63.3			23	51.1		
Mechanism of death												
Bleeding	46	43.8			28	46.7			18	40		
Asphyxiation	37	35.2			15	25			22	48.9		
Vital organ value	11	10.5			9	15			2	4.4		
Undetermined	11	10.5			8	13.3			3	6.7		
Location of incident												
Indoor	42	40			11	18.3			31	68.9		
Outdoor	40	38.1			36	60			4	8.9		
Undetermined	23	21.9			13	21.7			10	22.2		

First, for the category for occupation, the categories that were used in the analysis only consist of unemployed (consists of “unemployed” and “student”) and employed (consists of “civil servant” and “private” categories); second is related to the category for marital status, the category used in the analysis only consists of “single” (consists of “single” and “divorced”) and married. The reduction of categories in analyzing the existence of a significant association is intended because, first, the explanation to be sought regarding occupation is exposure to the outside world. After all, the work will increase a person's tendency to become a victim of homicide. On the other hand, from marital status, the explanation to be sought is whether the person is married or not has an association with the possibility of someone being killed.

From Table 3, it can be found that regarding sex, it was predicted that the homicide method most likely to occur in male homicide victims is death by fire, followed by sharp object trauma, blunt force trauma, and poisoning, respectively. Whereas for female homicide victims, the order is reversed, respectively.

As for the socioeconomic status, it was only analyzed if the homicide victim was female. As in Table 2, it can be seen that the significant association between socioeconomic status and homicide method was only found in female homicide victims. According to Table 3, it was predicted that the homicide method most likely to occur in female homicide victims with lower socioeconomic status is poisoning, followed by blunt force trauma and sharp object trauma, respectively. As for females with higher socioeconomic status, the homicide methods that are most likely to occur are sharp object trauma, blunt force trauma, and poisoning, respectively.

Table 3. The multinomial logistic regression tests result in significant associations between the homicide method that occurred and the demographic status of the homicide victims handled in a forensic installation at dr. Sardjito General Hospital, Yogyakarta from 2005-2015

	Sex			Socioeconomic status (female)		
	β estimate	OR	p	β estimate	OR	p
Blunt force (reference category)						
Sharp trauma	-1.36	0.26	0.016	-17.51		
Death by fire	-17.33	-	0.997			
Poisoning	2.14	8.49	0.055	2.12	8.33	0.016
Sharp object						
Blunt force	1.36	3.9	0.016	16.51		0.000
Death by fire	-16	-	0.997			
Poisoning	3.5	33.09	0.003	18.63		0.000
Death by fire						
Blunt force	16.33	12317502.8	0.000			
Sharp trauma	14.97	3160859.26	0.000			
Poisoning	18.47	104581999				
Poisoning						
Blunt force	-2.14	0.12	0.055	-2.12	0.12	0.16
Sharp trauma	-3.5	0.31	0.003	-19.63		
Death by fire	-19.47	-	0.996			

Table 4. The multinomial logistic regression tests result in significant associations between the incident time that the homicide occurred and the age of the homicide victims handled in a forensic installation at dr. Sardjito General Hospital, Yogyakarta from 2005-2015

	Age (All)			Age (male)			Age (female)		
	β estimate	OR	p	β estimate	OR	p	β estimate	OR	p
Nighttime (daytime as reference category)									
15-19 y.o	0.878	2.406	0.26	2.303	10	0.077	-0.916	0.4	0.482
10-40 y.o	1.368	1.368	0.014	1.609	5	0.054	1.163	3.2	0.132
41-60 y.o	-0.598	-0.598	0.372	0.041	1.042	0.965	-1.764	0.171	0.151
60+ y.o									

From Table 4, cases with homicide victims in general and male victims, it was predicted that 20-40-year-old victims are more likely to be murdered during nighttime.

According to Table 5, it is predicted that during nighttime, the homicide method that most likely occurs is sharp object trauma, followed by blunt force trauma and poisoning, respectively. During the daytime, it is predicted that poisoning is most likely to happen, followed by blunt force trauma and sharp object trauma, respectively.

Table 5. The multinomial logistic regression tests result on the association between method and incident time of the homicide that occurred with method of homicide as the dependent variable and male as sex

	Incident time		
	estimate	**OR**	**p**
Blunt force (Reference category)			
Sharp trauma	-1.504	0.22	0.022
Death by fire	-1.386	0.25	0.237
Poisoning	18.497	107942343	.
Sharp trauma			
Blunt force	1.504	4.5	0.022
Death by fire	0.118	1.13	0.925
Poisoning	20.001	485740541	.
Death by fire			
Blunt force	1.386	4	0.237
Sharp trauma	-0.118	0.89	0.925
Poisoning	19.883	431769369	.
Poisoning			
Blunt force	-18.497	-	0.000
Sharp trauma	-20.001	-	0.000
Death by fire	-19.883	-	

DISCUSSION

The homicide victims handled a forensic installation at dr. Sardjito General Hospital, Yogyakarta, from 2005-2015 was excluded from the study if the victim had a suspected homicide case with an unidentified age, sex, method of death, and time of the incident in the Visum et Repertum; under 15 years old; live in other than Bantul district, Sleman district, Yogyakarta city, Kulon Progo district, and Gunungkidul district. Fetal victims of homicide, unknown homicide victims, and victims who come from areas other than those included in the inclusion criteria are not included in the study, considering that this study aims to determine the demographic status of homicide victims who are specific people who live in Yogyakarta. Victims under 15 were excluded because child homicide required a complex discussion and separate study. From 130 data, there were 17 data with unknown incident time, 5 with unknown/ excluded place of residence, and 3 with victims under 15 years old. Therefore, the data used in this study are 105, 60 male homicide victims and 45 female homicide victims. Data taken from each year, in the period 2005-2015, is 10 data each year, with a standard deviation of ± 5. The statistical analysis used in this study, chi-square tests and multinomial logistic regression tests, were conducted to find association and predict the association between the demographic status of the homicide victim and the form of homicide that occurred, between method and incident time of the homicide. The form of homicide only includes the method and incident time of the homicide. However, in the study's logistic regression test, related to the odds ratio, it could only be determined as far as if β estimate is negative, the OR is < 1, explaining the odds of the particular homicide method occurring if compared to other methods as the categories of the variable is larger than 2x2.

Based on the study results, most homicide victims are 20-40 years old, male, working for private, married, have high socioeconomic, and murdered by blunt force trauma during night time, indoors, with bleeding as a mechanism of death. Both male and female victims have the same demographic status and form of murder. However, male homicide victims were found to be more likely to be murdered outdoors, and female homicide victims were found to be more likely to have asphyxiation as a mechanism of death.

Age. Homicide victims were found to be mostly 20-40 years old, with a median of 33.5 years old, to be specific 33.5 years for male victims and 35 years for female victims. The ages of 33.5 - 35 years are the productive age, whereas, in Indonesia, the productive age is the age range considered capable of producing goods and services in the production process. The findings of the study were found to have similar results with previous studies that found that in Indonesia, the average age of homicide victims is 18-40 years old [8,10], while in other countries, such as the United States, it was found that the average age of homicide victims are 22-23 years old [6,7]. This difference may occur due to different explanatory, behavioral, and offense predictors [7] as the culture and living conditions differ. The exact reason why the highest number of murder victims aged 20-40 years is still unknown, it is suspected that at the productive age range, exposure to the social world is highest, and

their living conditions may not yet be stable both in financial and family life aspects, considering a study in Yogyakarta where it was found that most of the motives for homicide are revenge [9]. The age of the homicide victim only had a significant association with the time incident of the homicide and predicts that 20-40-year-old homicide victims, especially male victims, are more likely to be murdered during nighttime. This may occur because young adults usually work and attend school during the day, given that most homicides are committed in indoor settings where young people are most likely to be at home at night.

Sex. Male was found to be more likely to be murdered in this study, the same result as the previous study that found that most of the homicide victims are male [5,6,8,10]. A study stated that friends or strangers usually murder male homicide victims, while female homicide victims are more likely to be murdered by those close to them [5]. These may explain why male are more likely to be murdered, as murder committed by strangers is usually a murder that was unplanned and caused by emotional or unexpected events, which increases the probability of a murder occurring. Sex has a significant association with the method of homicide, and it is predicted that the homicide method that is most likely to occur in male homicide victims is death by fire, followed by sharp object trauma, blunt force trauma, and poisoning, respectively. Whereas for female homicide victims, the most likely homicide method is poisoning, followed by blunt force trauma, sharp object trauma, and death by fire, respectively. In its association to incident time, it was found in the study that if compared to females, male are 0.61 times more likely to be murdered during day time and 1.65 times more likely to be murdered during night time.

The reasons for this kind of result can be justified by a study conducted by Minero [5], which found that some of the patterns of murder were male conflict homicide patterns and intimate female homicide, where in male homicide victims, it was found that the execution of murder usually started with conflict and usually the perpetrator of the murder was a friend or stranger. In contrast, in female homicide victims, it was found that females are more likely to be murdered by those who are close to them. A quarrel conflict incident that leads to murder is more likely to occur at night because if it occurs during the day, the masses will likely gather, and the conflict is rushed up before the murder occurs. As for female cases, murder cases do not need to wait at night it is easier to do during the day, considering that the perpetrators and victims generally live close to each other or even share a house.

Occupation. This study found that most of the homicide victims worked privately. This could be due to the wider available private employment fields than civil servants, not students, because the median age of the victim's murder was around 33.5-35 years old. Most of the homicide victims are employed as the median age of homicide victims is included in the productive age range. The other studies that were done for this particular topic analyzed the workplace location and community characteristics, employer characteristics, and workforce characteristics and found that a populated area with a high crime rate, businesses a short time, a residential location, and only white employees, were associated with increased risk of homicide [13]. As the study points differed, it is hard to determine the similarities.

Based on the chi-square method statistical analysis performed, the occupation has a significant association with the homicide method. In the statistical regression analysis between homicide method and occupation, it is significantly predicted that in occupations with the early categories (unemployed, student, civil servant, private), it can only be predicted that all homicide method categories other than death by fire will be more likely to be found compared to death by fire as a method of homicide. In comparison, occupations with the final category (private and unknown) predicted that death by fire is the most likely homicide method to occur. This early analytical evidence can be found in the appendix. Then, several categories were combined, leaving two categories, unemployed (unemployed and student) and employed (civil servant and private). These are the ones that were put on the table. The new chi-square analysis shows no association between the homicide method and the occupation of the homicide victim. In contrast, the statistical regression analysis results can only predict that death by fire is the most likely to occur in the homicide method.

Marital status. 63.8% of the marital status of homicide victims was unknown. However, it was found that from 36.2% of known marital status, homicide victims mainly were married. The result was different from the prior study [6], which found that more single people were murdered. The result of this study may be due to a higher population of

married people than those who are single in Yogyakarta, according to IDMC statistical data of the Special Region of Yogyakarta (2021). Based on the chi-square method statistical analysis performed, marital status has a significant association with homicide methods. In the statistical regression analysis between the homicide method and marital status, it is significantly predicted that all homicide method categories other than death by fire will be more likely to be found than death by fire as a method of homicide. At the same time, occupations with the final category (unknown) predicted that death by fire is the most likely homicide method to occur.

Therefore, the statistical regression analysis between the homicide method and the marital status of the homicide victim was repeated, with the category of marital status consisting only of single (single and divorced) and married. This early analytical evidence can be found in the appendix. The categories were chosen as the prior study found that people have a higher risk of being murdered if the guardianship of their residence is low. They usually live alone [6], which can be roughly assumed that the homicide victims were divorced or single. Further analyses were done and found that there is no association between the homicide method and the marital status of the homicide victim, supported by the statistical regression analysis, which shows that there is no association between the homicide method and the marital status of the homicide victim.

Socioeconomic status. Based on the study results, most homicide victims have high socioeconomic status. This is very likely to happen, considering the three most significant motives of murder are revenge, robbery, and jealousy [9]. Robbery and jealousy usually occur against people whose lives are considered better, one of which is higher socioeconomic status. Prior studies about the socioeconomic status of the homicide victim found that low socioeconomic status may increase someone's chance of becoming a homicide victim [6,7]. However, Loeber found that the socioeconomic status of the victim did not significantly increase the likelihood [7]. According to the chi-square statistical analysis performed, socioeconomic status was only found to be substantially associated with homicide if the homicide victim is female. In the statistical regression analysis between the homicide method and the socioeconomic status of women, it is predicted that women who have a lower socioeconomic status will be more likely to experience a homicide method in the form of poisoning, followed by blunt force trauma, and sharp object trauma, respectively. This applies the opposite in women with higher socioeconomic status.

In its association with the incident time of the homicide, it is found that victims with higher socioeconomic status are 1.52 times more likely to be murdered during nighttime, two times more likely if the victim is male, and 1.06 times if the victim is female. There were no reliable sources about the incident time of the homicide, however, logically, victims with higher socioeconomic status may be more likely to be murdered during the nighttime if the motive is robbery or revenge, while victims with lower socioeconomic status may be more likely to experience unplanned murder that may be started by simple conflict. According to the analytical tests performed, socioeconomic status is found not to have a significant association with the incident time of the homicide.

Homicide method. The homicide method found in this study to be most likely to occur blunt force trauma. The study results are different from prior studies' results that found sharp object trauma as the most common homicide method [5,9,10] but had the same result as the study conducted by Pidada [9]. The different result is considered justifiable, as the blunt force trauma meant in this study includes the result of kicking/ hitting, strangulation, and use of blunt instruments. The similar result with Pidada is likely because both data were taken from forensic installation at Dr. Sardjito General Hospital, Yogyakarta [9]. Through chi-square statistical analysis, the homicide method was found to have a significant association with the sex, occupation, and marital status of the homicide victims. A significant association between the homicide method and the socioeconomic status of the victim is found only if the homicide victim is female.

The association between the two variables that comprise the homicide form, homicide method, and incident time was analyzed. Only an association was found between the homicide method and incident time of homicide if the victim of the homicide was male. It was predicted that in male victim homicide cases, poisoning is the most likely homicide method to occur during the daytime, followed by blunt force trauma and sharp object trauma. During nighttime, sharp object trauma is the most likely homicide

method to occur, followed by blunt force trauma and poisoning, respectively.

Incident time. Most of the homicide victims in this study were found to be murdered during nighttime. On the homicide time and demographic status, only the association between the time of the homicide and the age of the homicide victim is found. Younger homicide victims are predicted to be more likely to be murdered during night time, while older homicide victims are more likely to be murdered during day time.

Mechanism of death. The result of this study is found to have the same result as prior studies, where bleeding is the most common mechanism of death in male homicide cases and asphyxiation in female homicide cases [8,10].

Location of incident. Homicide victims in this study were primarily found to be murdered in indoor settings. However, male homicide victims were primarily found to be murdered in outdoor settings. Loeber found that street killing or outdoor killing is more likely to occur [7]. Another study specifically found that male homicide victims are more familiar with being murdered in outside settings [9]. The result may be different in this study due to the numbers of male and female victims who met all the inclusion and exclusion criteria being more or less the same. In contrast, male victims were significantly higher than female victims.

REFERENCES

1. Parish D, Goyal H, Dane F. Mechanism of death: there's more to it than sudden cardiac arrest. Journal of Thoracic Disease. 2018 [cited 25 October 2020];10(5):3081-3087. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6006107/pdf/jtd-10-05-3081.pdf
2. Central of Disease Control (CDC). Leading Causes Of Death. [cited 25 October 2020]. Available from:https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm
3. Snohomish County Government. Cause & Manner Of Death. [cited 25 October 2020]. Available from: https://snohomishcountywa.gov/806/Cause-Manner-of-Death
4. Crime Museum. Cause, Mechanism, and Manner of Death. [cited 25 October 2020]. Available from: https://www.crimemuseum.org/crime-library/forensic-investigation/cause-mechanism-and-manner-of-death/
5. Abreu Minero V, Dickson H, Barker E, Flynn S, Ibrahim S, Shaw J. The patterns of homicide offense characteristics and their associations with offender psychopathology. Journal of Investigative Psychology and Offender Profiling. 2018;15(3):304-318. doi: 10.1002/jip.1514
6. Broidy L, Daday J, Crandall C, Sklar D, Jost P. Exploring Demographic, Structural, and Behavioral Overlap Among Homicide Offenders and Victims. Homicide Studies. 2006;10(3):155-180. doi: 10.1177/1088767906288577
7. Loeber R, Ahonen L. Invited Address: Street Killings: Prediction of Homicide Offenders and Their Victims. Journal of Youth and Adolescence. 2013;42(11):1640-1650.
8. Alim D, Budiningsih Y. Karakteristik Demografi Kasus Pembunuhan yang Diperiksa di Departemen Forensik dan Medikolegal RSUPN Cipto Mangunkusumo Tahun 2014-2016. The Indonesian Association of Forensic Medicine. 2017;91-97.
9. Pidada I, Sista K. Proporsi dan Karakteristik Korban dengan Pelaku Pembunuhan yang ditangani di Instalasi Kedokteran Forensik RSUP Dr Sardjito tahun 2003-2013. Mutiara Medika. 2014;14(2).
10. Wicaksono R, Yulianti K. Karakteristik sebab dan mekanisme kematian pada korban yang diduga dibunuh yang diotopsi di Instalasi Kedokteran Forensik RSUP Sanglah Tahun 2011-2012. E-journal Medika Udayana. 2014;3(5).
11. Knoema. Indonesia Homicide rate, 1990-2020. [cited 25 October 2020]. Available from: https://knoema.com/atlas/Indonesia/Homicide-rate
12. Agrawijaya R. Profile of Rape Victim Cases in Unit Pelayanan Krisis Terpadu dr. Sardjito Hospital from Year 2012-2015 [Skripsi]. Yogyakarta: Fakultas Kedokteran, Universitas Gadjah Mada; 2016.
13. Loomis D, Wolf SH, Runyan CW, Marshall SW, Butts JD. Homicide on the job: workplace and community determinants. Am J Epidemiol. 2001;154(5):410-7. doi: 10.1093/aje/154.5.410