

## ORIGINAL ARTICLE

### The pattern of injuries in homicidal deaths: A retrospective study

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#### Abstract

**Introduction:** Homicide is the deliberate act of causing death or injury, leading to the unlawful demise of an individual, with 464,000 homicide cases worldwide in 2017. In Malaysia, there is a lack of information on homicidal statistics and patterns, with most studies focusing on medicolegal autopsy practices. This research aims to study demography and fatal injury patterns. **Materials and Methods:** This study is a retrospective analysis of homicidal deaths occurring in the Forensic Unit of Hospital Canselor Tuanku Muhriz from 2009 to 2018. A descriptive analysis was conducted to outline the patterns of homicidal injury and the sociodemographic characteristics of the cases. **Results:** The findings identified 138 homicidal death cases out of 3468 total autopsied cases. The prevalence of homicides has been decreasing for the past ten years. The male, Chinese and young adults led the number of homicide cases and immigrants account for almost half of the total cases. Most of the homicidal cases were involved with the sharp injury. The head is the most common site for fatal injuries in homicide cases, with blunt and firearm injuries being the most common pattern of injury inflicted by the assailant. Less common sites include the back and extremities. **Conclusion:** This study can provide insights and understanding into homicide within the sociodemographic framework and pattern of injury in homicidal death in Malaysia.

**Keywords:** Forensic medicine, homicide, autopsy, criminology, retrospective study

#### INTRODUCTION

Homicide is the intentional causing of death or injury resulting in the unlawful demise of an individual. This act is also referred to as the taking of another human life, whether through direct action, instigation, or even through failure to act, whether by criminal or non-criminal methods.<sup>1,2</sup> Whereas, according to Section 299 of the Malaysian Penal Code (Act 574), culpable homicide involves either the deliberate intent to cause death, the intention to inflict bodily harm that is likely to result in death, or the awareness that one's actions are likely to cause death.<sup>3</sup>

According to the United Nations Office on Drugs and Crime, it estimated in 2017 that overall, people killed in homicide across the globe were 464,000 cases. Although the number of people killed worldwide was rising, the proportion of homicide cases worldwide showed

reducing trends.<sup>4</sup> In Malaysia, there was a lack of information regarding homicidal statistics and their pattern primarily related to the medicolegal autopsy practice. Few studies on homicidal autopsies have been conducted in Malaysia, each focusing on different regions. Previous studies on homicidal autopsies in Malaysia have focused on various regions, highlighting different demographic and geographical contexts. Bhupinder S. *et al.* conducted a study at Penang Hospital (2007–2009), covering Penang Island as its catchment area.<sup>5</sup> Kumar V. *et al.* and Ong BB carried out studies at the University of Malaya Medical Centre in Kuala Lumpur; however, their cases did not include the southern region of Kuala Lumpur, which is the focus of our study.<sup>6,7</sup> Rahimi R. *et al.* analysed medico-legal autopsies of homicidal deaths over five years in Hospital Sungai Buloh, covering suburban districts in the Selangor area.<sup>8</sup>

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In contrast, our study uniquely focuses on the urban southern region of Kuala Lumpur, encompassing areas such as Cheras, Bandar Tun Razak, Bukit Jalil, Salak Selatan, Sungai Besi, and Ampang. These cases are referred to our facility for postmortem examinations by the Cheras District police as part of their jurisdictional mandate. These research objectives are to study the demography, patterns of homicidal death injury and the site of fatal injury that was brought to Hospital Canselor Tuanku Muhriz (HCTM), Cheras, Kuala Lumpur.

## MATERIALS AND METHODS

The retrospective study of homicidal deaths was brought to the Forensic Unit, HCTM, from January 2009 until December 2018. The number of homicide cases varied yearly throughout the study period, with a total of 3,468 autopsies conducted within the time frame from which the homicide cases were identified and included in this study.

The data were selectively collected from autopsy reports and the death registry of homicide cases, including details such as the cause of death, injury patterns, site of injury and demographic details such as age, sex, ethnicity and nationality. Ethics approval was approved by the Universiti Kebangsaan Malaysia Research Ethics Committee (approval code: JEP-2022-463).

Collected data were analysed by using the IBM SPSS software (Version 28.0) (SPSS Inc.,

Chicago, Illinois, USA). Descriptive analyses are performed according to their demographic status, injury patterns, and injury site.

## RESULT

138 cases of homicidal death cases were identified out of 3,468 cases of total autopsied cases in HCTM within the time frame. Generally, the prevalence of homicidal deaths over the autopsy cases shown over the ten years was 4.0%. The prevalence of homicide cases varied annually between 1.3% and 7.9% (Table 1). Overall, the prevalence of homicide cases has been decreasing, with the lowest incidence in 2018.

### *Demographic profile*

The demographic profile for age, age group, sex and nationality/ethnicity are shown in Table 2. The median age for the homicide cases was 32 years, and males had a slightly lower median age of 31.5 years compared to females at 36 years old. In addition, the cases were categorised into five age groups based on their age range. Most cases involved the young adult group, followed by the adult age group. The minority of the cases involved the children and adolescent age group, which account for 2.2% and 1.4% of homicidal deaths, respectively. Male sex outnumbered the female by 6.1 times for most homicidal death cases, which are 85.5% against 13.8%, respectively.

**TABLE 1: Prevalence and rate of homicide cases**

Year	Homicide cases	Autopsy cases	Prevalence over autopsy cases (%)
2009	22	277	7.9
2010	16	263	6.1
2011	12	284	4.2
2012	18	331	5.4
2013	21	333	6.3
2014	10	370	2.7
2015	13	392	3.3
2016	12	360	3.3
2017	8	412	1.9
2018	6	446	1.3
<b>Total</b>	138	3468	4.0

Malaysian citizens collectively accounted for 72 cases (56.7%) of the total, while non-citizens contributed to 55 cases (43.3%). The Chinese led the number of homicide cases by 31 cases (22.5%), followed by Malay and Indian, which account for 24 cases (17.4%) and 17 cases (12.3%), respectively, among the local citizens. Immigrants account for almost 40% of the homicide cases. Among the immigrants, Indonesians were involved in almost half of the cases, followed by the Myanmarese, which accounted for one-third. Interestingly, Indonesian immigrants surpass the Malay and Indian in total number of homicide cases. Additionally, 11 cases (8%) involved individuals of unknown ethnicity and nationality.

*Patterns of injury*

This study categorised the injury patterns into five groups: sharp injury, blunt injury, firearm injury, asphyxia and multiple injuries (Fig.1). Sharp injury accounts for the most observed injury patterns with 57 cases, followed by

blunt trauma with 45 cases. The least injury patterns were asphyxia and multiple injuries, which consisted of at least two different types of injuries, contributing to only one case. Crosstabulation of the age group and type of fatal injury showed exciting findings, and only 123 cases were analysed in this case, as 15 cases had unknown age groups. (Table 3). Overall, young adults accounted for the majority of fatal injuries across various patterns (53.7% of total cases), emphasizing their significant representation in homicide-related fatalities. Adults followed, contributing to 35% of the total cases, while children, adolescents, and the elderly collectively represented a smaller proportion of the analysed cases.

Firearm injuries were exclusively observed in young adults and adults, with young adults accounting for 17 cases (60.7% within the firearm injury population) and adults for 11 cases (39.3%). This pattern highlights a significant involvement of these age groups in firearm-related fatalities, contributing to 22.8% of the

**TABLE 2.** Demographic background of homicide victims

Variables	Frequency (%)	Median (IQR)
Age (years)		32 (17)*
Male		31.5 (15)*
Female		36.0 (30)*
Age group (years)		
Children (< 13)	3 (2.2)	
Adolescent (13-17)	2 (1.4)	
Young adult (18-35)	66 (47.8)	
Adult (36-65)	43 (31.2)	
Elderly (>65)	9 (6.5)	
Unknown	15 (10.9)	
Sex		
Male	118 (85.5)	
Female	19 (13.8)	
Unknown	1 (0.7)	
Nationality/Ethnicity		
Malaysia - Malay	24 (17.4)	
Malaysia - Chinese	31 (22.5)	
Malaysia - Indian	17 (12.3)	
Indonesia	26 (18.8)	
Myanmar	17 (12.3)	
Bangladesh	4 (2.9)	
Others	8 (5.8)	
Unknown	11 (8.0)	

\*Skewed to the right

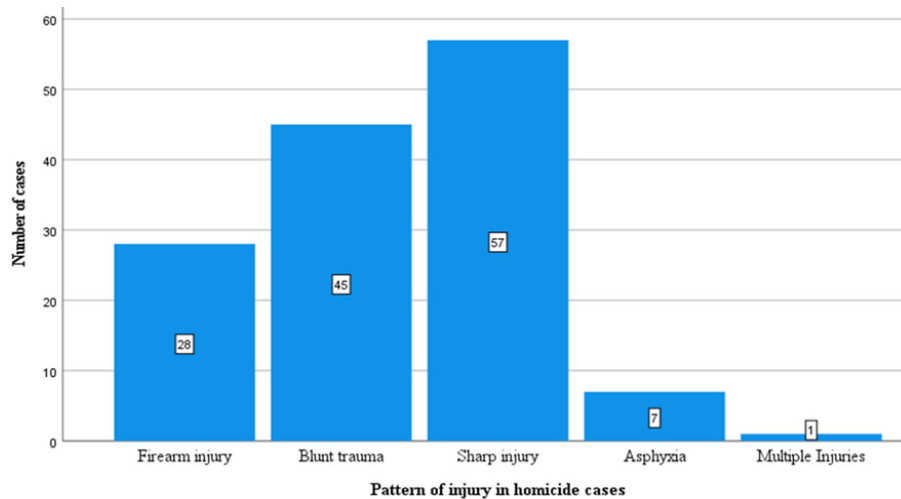


FIG 1. Number of cases according to the pattern of fatal injury

total cases. Blunt injuries were distributed across all age groups, with adults contributing the highest number of cases (15 cases, 41.7% of the blunt injury population), followed by young adults (10 cases, 27.8%), elderly (6 cases, 16.7%), children (3 cases, 8.3%), and adolescents (2 cases, 5.6%). Overall, blunt injuries accounted for 29.3% of the total cases.

Sharp injuries were predominantly observed in young adults, with 35 cases (67.3% within the sharp injury population), followed by adults with 15 cases (28.8%). This injury pattern contributed to the largest proportion of fatalities, comprising 42.3% of the total cases. Asphyxia-related deaths were observed in young adults (4 cases), with adults and the elderly contributing one case each. Asphyxia accounted for 4.9% of the total cases. The multiple types of injuries were rare, with only one case recorded in the adult age group, representing 0.8% of the total cases.

The adult age group predominated for blunt injuries, with 41.7% of cases of the blunt injury pattern, followed by young adults accounting for 27.8%. For the elderly age group, most of the homicide case patterns were due to blunt injury followed by sharp injury.

#### *Site of fatal injury*

According to our findings, the head is the most common site to be involved in fatal injury in homicide cases, regardless of the injury type, followed by the chest area (Table 4). The highest number of the injury to the head was caused by blunt injury, followed by firearm injury, which accounts for 22.9% and 9.4%, respectively, of

the total fatal injuries. The less common sites involved are the back and the extremities, which account for less than 3% of the total injuries. For sharp injury, the typical site involvement was the chest and neck. In contrast, the head and abdomen were more preferred sites for the assailant in the blunt injury. For firearm injury, the head and chest were the preferred sites for the shooter.

#### **DISCUSSION**

The overall decrement in the prevalence of homicide cases in our setting was in line with what happened in Europe, Asia and Australia.<sup>4,9</sup> The neighbouring country, Thailand, also showed a decrease in overall incidents.<sup>9,10</sup> Potential reasons behind the decrease in incidents include shifts in lifestyle, such as increased time spent at home, alterations in alcohol consumption patterns, and a reduction in the young population<sup>11</sup> Interestingly, in England and Wales, the homicide death rate was four times higher in 2018 than deaths resulting from terrorism since 1980, yet the drivers of homicide trends remain unclear.<sup>12</sup>

Studies indicate that the age group most susceptible to homicide victimisation is young adults for both sexes, which also showed a decline in homicide rates in the elderly.<sup>13</sup> The median age in our study was not distributed as the data, so the median was used instead of the mean value. Studies by the Thai showed that the median age for females is also higher than that of males by ten years.<sup>10</sup> The adult age group in our study was in the range of 18 to 35 years old, predominantly involved in homicidal death,

**TABLE 3: Age group according to the pattern of injury**

		Age group				Total	
		Children	Adolescent	Young Adult	Adult		Elderly
Firearm injury	Frequency (n)	0	0	17	11	0	28
	Percentage within this fatal injury population (%)	0.0%	0.0%	60.7%	39.3%	0.0%	100.0%
	Percentage within total cases (%)	0.0%	0.0%	13.8%	8.9%	0.0%	22.8%
Blunt injury	Frequency (n)	3	2	10	15	6	36
	Percentage within this fatal injury population (%)	8.3%	5.6%	27.8%	41.7%	16.7%	100.0%
	Percentage within total cases (%)	2.4%	1.6%	8.1%	12.2%	4.9%	29.3%
Sharp injury	Frequency (n)	0	0	35	15	2	52
	Percentage within this fatal injury population (%)	0.0%	0.0%	67.3%	28.8%	3.8%	100.0%
	Percentage within total cases (%)	0.0%	0.0%	28.5%	12.2%	1.6%	42.3%
Aphyxia	Frequency (n)	0	0	4	1	1	6
	Percentage within this fatal injury population (%)	0.0%	0.0%	66.7%	16.7%	16.7%	100.0%
	Percentage within total cases (%)	0.0%	0.0%	3.3%	0.8%	0.8%	4.9%
Multiple injuries	Frequency (n)	0	0	0	1	0	1
	Percentage within this fatal injury population (%)	0.0%	0.0%	0.0%	100.0%	0.0%	100.0%
	Percentage within total cases (%)	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%
Total	Frequency (n)	3	2	66	43	9	123
	Total percentage according to age group (%)	2.4%	1.6%	53.7%	35.0%	7.3%	100.0%

which is consistent with the study by Rahimi *et al.* at Hospital Sungai Buloh, in which their young adult groups were about 45% involved in homicidal death.<sup>8</sup>

Males were predominant in this study, which concurred with the findings from other parts of the globe.<sup>4</sup> Our findings showed that femicide accounts for only a fraction of 15% of the total homicides, which is slightly lower than the global percentage of femicide, which was about one-fifth of the total homicide cases.<sup>14</sup> Femicide is usually associated with gender-based violence with an underlying history of abuse before the homicide.<sup>15</sup>

The population of Kuala Lumpur in 2020 was estimated at approximately 1.98 million, as reported by the Department of Statistics Malaysia. Kuala Lumpur is characterised by its diverse multi-racial and multi-national population, with Malays constituting the largest demographic group at approximately 824,000 individuals (41.6%), followed by the Chinese at 737,000 (37.2%) and Indians at 178,100 (9.0%). Furthermore, 1.77 million individuals (89.4%) were Malaysian citizens, while 201,000 (10.2%) were non-citizens.<sup>16</sup> It is important to note that these figures exclude undocumented immigrants.

The calculated homicide rates over a 10-year period highlight significant variations across racial and citizenship groups in Kuala Lumpur, as derived from a comparison of our findings with

data provided by the Department of Statistics Malaysia. The Malay population recorded a homicide rate of 2.91 per 100,000 individuals, while the Chinese population showed a slightly higher rate of 4.21 per 100,000. The Indian population exhibited a significantly elevated homicide rate of 9.55 per 100,000.

The findings of our study indicate that among Malaysian citizens, the Chinese predominated as victims of homicide, followed closely by Malays and Indians. This aligns with the results of Bhupinder *et al.*, which also identified Chinese as the majority of victims, followed by Indians and Malays.<sup>5</sup> However, our findings contrast with those reported by Rahimi *et al.* in Sungai Buloh, where Indians were the predominant victims, followed by Malays and Chinese, as well as a recent study conducted in a university hospital in Kuala Lumpur, which showed a higher representation of Indians among victims.<sup>7,8</sup>

These differences could stem from several factors, including variations in the demographic composition of the catchment areas studied.<sup>16</sup> Furthermore, Rahimi *et al.* suggested that the higher incidence of homicides in the Sungai Buloh area among Indians could be linked to their significant representation in gang-related activities, citing statistics from the Royal Malaysia Police indicating that 70% of gang members are Indian.<sup>8</sup> This association between gang involvement and homicide rates may

**TABLE 4: Site of the body involved according to the pattern of injury**

		Pattern of injury			Total
		Sharp injury	Blunt injury	Firearm injury	
<b>Head</b>	Frequency ( <i>n</i> )	9	39	16	66
	Percentage within similar site (%)	13.6%	59.1%	24.2%	100.0%
	Percentage within total injuries (%)	5.3%	22.9%	9.4%	38.8%
<b>Neck</b>	Frequency ( <i>n</i> )	23	0	1	29
	Percentage within similar site (%)	79.3%	0.0%	3.4%	100.0%
	Percentage within total injuries (%)	13.5%	0.0%	0.6%	17.1%
<b>Chest</b>	Frequency ( <i>n</i> )	24	3	17	44
	Percentage within similar site (%)	54.5%	6.8%	38.6%	100.0%
	Percentage within total injuries (%)	14.1%	1.8%	10.0%	25.9%
<b>Abdomen</b>	Frequency ( <i>n</i> )	12	6	6	24
	Percentage within similar site (%)	50.0%	25.0%	25.0%	100.0%
	Percentage within total injuries (%)	7.1%	3.5%	3.5%	14.1%
<b>Back</b>	Frequency ( <i>n</i> )	2	0	0	2
	Percentage within similar site (%)	100.0%	0.0%	0.0%	100.0%
	Percentage within total injuries (%)	1.2%	0.0%	0.0%	1.2%
<b>Extremity</b>	Frequency ( <i>n</i> )	5	0	0	5
	Percentage within similar site (%)	100.0%	0.0%	0.0%	100.0%
	Percentage within total injuries (%)	2.9%	0.0%	0.0%	2.9%
<b>Total</b>	Frequency ( <i>n</i> )	75	48	40	170
	Total percentage according pattern of injury (%)	44.1%	28.2%	23.5%	100.0%

**Note:** The total number of injuries is more than the total number of cases because certain cases had multiple fatal injuries.

explain the disparities observed between the other studies.

Among non-citizens, the homicide rate was markedly the highest at 27.36 per 100,000 individuals. These findings highlight variations in the distribution of homicide rates across different demographic groups, with non-citizens experiencing a disproportionately higher rate compared to Malaysian citizens. Even though the immigrants account for less than 10% of the Kuala Lumpur population, the homicidal deaths involving the immigrants were about 40%. Indonesians predominate among the immigrants probably because the immigrant influx was higher than that of other immigrants from other countries. After all, Indonesia is just beside Malaysia because the migration costs are only about USD 134-400 from Indonesia to Malaysia.<sup>17</sup> The number of Myanmar immigrants involved in homicidal deaths is second after Indonesian, probably because the number of Myanmar refugees is increasing in Malaysia, as Malaysia is the preferred destination for refugees seeking asylum.<sup>18</sup>

In a previous study in Malaysia, sharp injury is the most common injury compared to the other fatal injuries in homicide.<sup>6-8</sup> In a recent study in Malaysia, the analysis of sharp injury showed that the neck and chest are the common sites for sharp injury.<sup>19</sup> Blunt trauma was the second, followed by firearm injury on the third, which opposes the findings in the Americas. In the Americas, about 70% of homicidal deaths are due to gunshot injuries, followed by sharp injuries, which account for about 20% of deaths.<sup>4,20</sup> During the age group analysis against the injury pattern, 15 cases had unknown age groups due to advanced decomposition and skeletonisation, as this hindered the finding of the correct age as the age was only available in estimations. A few studies showed that the injury inflicted on the young adult was sharp, similar to our study.<sup>6,21</sup>

In our study, firearm injury involved victims of young adults slightly more than adults, in contrast with the study by Rahimi *et al.*, which shows adults had higher cases compared to young adults. In certain American cities, it is alarming to note that the population of young adult males is associated with firearm-related higher fatalities compared to those encountered by the American army serving in war zones.<sup>22</sup> Occurrences of homicidal firearm injuries in the United States are approximately 25 times higher than those in other high-income countries, likely due to the permissive firearm laws implemented in many states.<sup>23</sup>

Malaysia has highly stringent gun laws; however, homicidal shootings still occur, often linked to gang-related conflicts. These incidents frequently involve illegally obtained firearms and arise from disputes within criminal organizations. Additionally, incidents involving police engagements with suspects, as well as property crimes such as gang robberies and armed robberies, have also been observed. Despite strict regulations, illegal gun trafficking and the accessibility of firearms from neighbouring countries undermine these efforts, contributing to fatal shootings, particularly among young adults.<sup>24,25</sup> The other probable explanation of the involvement of young adults compared to adults in fatal shootings may be attributed to a higher propensity for violent behaviour, which is often linked to a combination of biological and developmental factors, as well as social and situational influences that are more prevalent in this age group.<sup>26</sup>

Blunt for trauma only contributed about 22% of total homicide cases in Denmark, with the majority of the victims being adults, similar to our findings.<sup>22</sup> In asphyxia death, the victim usually happens to be a female adult and is rarely involved in children. However, in our study, only one case involved a female adult in a homicidal asphyxia-related case, which was due to manual strangulation.<sup>27</sup>

The site of the fatal injury was more pronounced in the head and chest area in our study, regardless of the type of injury. The details of the fatally injured location can vary according to the type of injury itself per se. Blunt trauma favoured the head area, which accounts for almost 90% of the cases, whereas about 93% of cases involved the anterior aspect of the body, and our study shows a slightly lower percentage of 81.2% involvement of the head in blunt injury cases.<sup>11,28</sup> The leading cause of death in gunshot cases is the penetrating trauma involving the head or chest to injure the brain and thoracic structure, which is a similar finding to our study.<sup>29</sup> For sharp injuries, it varies from one article to another as the particular study showed that the chest and back were the common sites, whereas another study showed that the head and neck or neck and chest are the predilected places when involved in homicidal death.<sup>6,19,30</sup>

#### *Study limitation*

The limitations include its retrospective nature, where specific data, such as the type of weapon used, may not have been updated in the autopsy

records even after the cases were resolved in court. Additionally, some cases involved advanced stages of skeletonisation, making it difficult to determine the biological profile and identity accurately, which could impact the analysis. Furthermore, this study is based on data from a single teaching hospital and primarily represents homicidal deaths in the southern region of Kuala Lumpur, limiting the generalisability of the findings to the entirety of Malaysia.

## CONCLUSION

Homicidal deaths are prevalent among Chinese individuals, particularly males in the young adult age range and immigrants also account for almost half of the cases. The most common cause of death is due to sharp injuries, with the head being the most prevalent site of injury in our study, regardless of the type of injury inflicted by the assailant. The findings suggest legislative, police, and ministerial interventions to prevent more homicidal deaths, particularly among vulnerable demographics and immigrants.

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