

ORIGINAL ARTICLE

Psychological markers underlying murder weapon profile: a quantitative study

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Abstract

The horrific nature of murder using different types of weapons has been an important focal point of many criminological studies. Weapons that are used in murders seem to play dominant roles in murder investigations as they may provide information leading to arrest. The established factors for weapon usage include environmental context, demography and availability of weapons. However, there is insufficient research attention on the psychological functioning of murderers for particular weapon usage. In light of this, the current study seeks to narrow this gap of information by identifying the influences of psychological traits on weapon usage among a sample of male murderers. The present cross-sectional study was conducted among 71 male murderers incarcerated in 11 prisons within Peninsular Malaysia. The selection of the sample was based on predetermined selection criteria using a purposive sampling method. A guided self-administered questionnaire comprising socio-demography variables and four Malay validated psychometric instruments: Zuckerman-Kuhlman Personality Questionnaire-40-Cross-Culture, Self-control Scale, "How I Think" Questionnaire and Aggression Questionnaire; was used. Independent sample t-test was performed to establish the mean score differences of psychological traits between the murderers who used single and multiple weapons while Kruskal-Wallis tests were carried out to ascertain the differences between the specific types of weapons used among the murderers. Following this, one-way ANOVA was carried out to ascertain the psychological trait differences among the murderers according to the different sources of weapon. Results indicated specific psychological traits influenced the number(s), source(s) and type(s) of weapon used in committing murder. The findings have implications for the psychological profiling of unknown murderers within the Malaysian context.

Keywords: Malaysia, murder, murderers, psychological markers, weapon profile

INTRODUCTION

Studies on the number and choice of weapon(s) in the event of murder are escalating interest and becoming significant, especially when researchers aim to understand the act and nature of murder. By definition, Brennan and Moore¹ described weapons as a tool that is designed or adapted to cause physical harm including death. In violence and criminological research, weapons used in murder have been an important focal point to address the degree of violent and aggressive

behaviour of murderers. Furthermore, type and source of a weapon that was used to kill someone may reflect the intent of an offender - which is a vital element to classify such killing action as murder or culpable homicide.

Different types of weapons have been recognized in both murder and culpable homicide through a large body of violence related literature. Reviewing the available literature, the typical classification includes 'unarmed' (e.g., hands, fists, or feet), blunt objects, sharp objects, and firearms. Examples of sharp objects include

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items ranging from actual knives to machetes, sickles, chainsaws, ice picks and broken bottles. In the Malaysian context, murder weapons are categorized mainly into one of ten types.² The ten categories are blunt weapons, knives, machetes, firearms, fire/acid, sharp weapons (other than knives and machetes), ligatures, physical force, vehicles, and unidentified.² The reason for separating knives and machetes from sharp objects is mainly due to the higher prevalent rate of these weapons in crimes.

From the criminological point of view, the usage of weapons in murder tends to be the result of several factors. One of the most established factors is the availability of that particular weapon. In countries where firearm legislation is less strict, firearms seems to be the most preferred weapon.³⁻⁵ For instance, murder using firearm is more frequent in countries where firearms are easy to obtain legally, such as in the United States compared to other countries. In contrast, in countries with more stringent laws on firearm ownership such as Malaysia, other murder weapons especially sharp objects are more common.

Blunt and sharp objects are the most common weapon which results in stabbing and cutting injuries in New Zealand.⁶ In Finland, the knife was the preferred murder weapon among drunken men with a history of violent crime.^{7,8} With regards to epidemiological profiles of murder weapon usage in Malaysia, a national retrospective study by Mohammad Rahim *et al*⁹ indicated sharp objects as the most commonly used weapon and only 10.6% of Malaysian homicide incidents involved firearms. Other than sharp objects, blunt objects also seemed to be commonly used in Malaysia. For example, blunt objects appeared to be the weapon of choice in homicide cases in Penang, Malaysia.¹⁰

From another angle, the choice of weapon has been said to be associated with the motive of the murder. Given the characterization of expressive motivation as impulsivity and volatile emotions; weapons that are most likely to be used are predicted to be non-gun weapons such as blunt objects or bare hands, indicating a more spontaneous action.¹¹ When the killing serves an instrumental goal, premeditated weapons like guns and machetes are usually brought to the murder scene. Other factors that have been associated with choice of weapon include murderous relation¹², gender¹³, context of murder¹⁴ and many more. In summary, it appears that instruments which are widely available as

well as normative patterns influences the type of weapon used in homicide.¹⁵

Also relevant to this current study are previous studies focusing on abnormal perpetrators of murder. Several studies had established the relationship between psychopathology and choice of weapon. An empirical study among Scottish offenders supported the relationship between psychopathy and weapon usage.¹⁶ Mental disorders such as delusional disorder and depression were also found to be predictive in the choice of weapon, especially when the disorder is characterized by non-bizarre delusion and no depatterning behaviour.¹⁴ Researchers reported a strong correlation between delusional disorder and the use of sharp instruments with high numbers of strikes and blows, mostly targeted at a vital zone.¹⁴ For example, psychotic offenders were found to use sharp weapons more frequently since these objects were available at the particular moment of killing and had immediate visceral effects, with most injuries inflicted onto the face of the victims.¹⁷

Although much research and evidence have been put forth to explain the potential associated factors related to the weapon profile of murderers, the psychological markers behind the choice of weapon among the 'mentally fit' murderers still remain unexplored. It is essential to shed some statistical perspective on the psychological markers of murderers in the descriptive and inferential framework of number, types, and sources of weapon(s) that they used. In the present study, we elected to focus on the influence of psychological markers of murderers towards particular choice of weapons. The psychological markers include personality traits, self-control level, cognitive distortion level and also the aggression trait of the murderers.

By doing so, we can determine whether and to what extent psychological markers affect weapon usage among murderers within the Malaysian setting. Three research questions were addressed. First, are there any differences in psychological markers in selecting one or more types of weapons to commit murder? Second, are there any differences in psychological markers corresponding to particular types of weapons? Finally, are there any psychological marker differences in terms of sources of weapons? The findings that are generated in this study may provide new insights and inputs to criminologists, investigative psychologists, forensic pathologists and crime scene analysts on 'psychological – weapon' profiling of murderers.

METHODOLOGY

Respondents

The present study recruited 71 murderers incarcerated from 11 prisons within Peninsular Malaysia. The selection of the respondents was based on predetermined selection criteria using a purposive sampling method. All the respondents were Malaysian males aged nineteen years and older. At the start of the study, the sample included 84 respondents, however 13 of them were later deemed ineligible to take part (e.g., because they claimed that they were innocent). The sample size was based on the recent murderers population statistics obtained from the Malaysia Department of Prisons.

Regarding the age of respondents, information on two types of age were collected: age during commission of murder and current age. The age of respondents during commission of murder ranged from 19 to 64 years old with a mean of 29.9 years old (SD = 10.76). The current age of the respondents during the time of data collection ranged between 21 and 67 years old with a mean of 37.2 years old (SD = 10.89).

Their ethnic backgrounds consisted of 40.8% Malay, 33.8% Indian, 23.9% Chinese, and 1.4% of other ethnicities. A high proportion of respondents (46.5%) were single during the commission of murder, 33.8% were married, 15.5% were divorced and separated from their partners and the remaining 4.2% were widowers. Prior to their conviction, most of the respondents were in semiskilled professions (59.2%) such as security guards, lorry drivers, labourers, and odd job workers. 12.7% had worked in clerical or skilled professions. 11.3% were considered as not working (either unemployed or between jobs). The same proportion (11.3%) were self-employed and engaged in business. The rest of 5.5% were former civil servants.

As for highest level of education, 36.6% of the respondents completed lower secondary education and 31.0% of them completed upper secondary education. 25.4% completed primary education and only a small percentage of respondents had pre-university education (2.85), diplomas (2.8%) and one respondent was not formally educated.

Design and procedure

The present study was a cross-sectional study that was carried out in 11 Malaysian prisons. The quantitative research method was applied as it was felt as the most ideal approach to

achieve the aims of this study. The guided self-administered questionnaire – PsychoMechanical Questionnaire (PMQ) was utilized to investigate the influences of psychological markers on weapon usage among male murderers.

The study was reviewed and approved by the ethical committee of Universiti Sains Malaysia and the Malaysian Department of Prisons. The respondents were assured anonymity and confidentiality of their responses in order to maintain honesty and validity of their responses. The respondents participated on a voluntary basis. All respondents provided written informed consent prior to their participation in the research.

Measures

The PMQ consisted of three sections. The sections and contents of PMQ were as follows:

Socio-demographic section

This section was designed to establish the socio-demographic profiles of the participants. It included items on respondent's age, ethnicity, marital status, occupational status and educational status.

Weapon usage profile

Three pertinent questions were asked in this section. The first was a question on the number of weapons that were used in murder. Respondents were required to select either 'single' or 'multiple' weapon(s). Here, the usage of more than one different weapon was considered as 'multiple' weapons. The second question was naming the specific type of weapon(s) used in murder. The last question was regarding the source of weapon. For this, four responses were provided: from crime scene, from offender, from victim, and own physical strength.

Psychometric instruments

Malay language versions of four psychometric instruments were used in this study. The instruments were: (i) Zuckerman-Kuhlman-personality Questionnaire-40-Cross Culture (ZKPQ-M-40-CC), (ii) Self-Control Scale (SCS-M), (iii) "How I Think" Questionnaire and (iv) Aggression Questionnaire (AQ-M). All the items of these instruments were answered using a five-point Likert scale ranging from 1 (not at all like me) to 5 (completely like me). The following subsections briefly explain the contents and psychometric properties of each psychometric instrument.

- i- ZKPQ-M-40-CC: This instrument was the simplified original version of ZKPQ-50-CC which consisted of 50 items¹⁸ measuring Alternative Five Factor Model (AFFM) personality traits. However, only 40 items were included in the Malay version of ZKPQ as the outcome of the validation study.¹⁹ The ZKPQ-M-40-CC assesses five types of personality traits: Activity (Act), Sociability (Sy), Aggressiveness-Hostility (Agg-Host), Impulsive Sensation Seeking (ImpSS), and Neuroticism-Anxiety (N-Anx). The overall internal consistency of ZKPQ-M-40-CC was 0.75.¹⁹
- ii- SCS-M: SCS-M is a Malay version of the Self-Control Scale which was originally developed by Grasmick *et al.*²⁰ The SCS was developed to operationalize low self-control elements based on the General Theory of Crime by Gottfredson and Hirschi.²¹ In this study, SCS-M was administered as a unidimensional scale which consisted of 18 items. The scale was reverse coded so that high scores indicate low self-control. The internal consistency of SCS-M was 0.80.²²
- iii- AQ-12-M: AQ-12 is the short version of the Aggression Questionnaire by Buss and Perry.²³ The AQ-12 consisted of 12 items²⁴ which measures the self-perceived levels of aggression among respondents. This instrument consisted of four scales: physical aggression (physical expression of anger), verbal aggression (argumentative and hostile language), anger (agitation and sense of control), and hostility (resentment, social isolation and paranoia). Each subscale has three items. The internal consistency of AQ-12-M among the Malaysian criminal population was 0.80.²⁵
- iv- HIT-M: HIT-M is a Malay version of "How I Think: HIT" Questionnaire by Mohammad Rahim Kamaluddin *et al.*²⁶ The original HIT was developed by Barriga *et al.*²⁷ and designed specifically to measure levels of self-serving cognitive distortion as they relate to a wide range of externalizing behaviours including serious offenses like murder. In this current study, HIT-M consisted of items which measure four subscales of self-serving cognitive distortion (SSCD): self-centered, blaming others, minimizing/mislabeling, and assuming the worst. Each subscale had six items respectively. The internal consistency of HIT-M was 0.90 among a sample of violent offenders.²⁶

Analyses

The responses from collected PMQ were compiled into a set of systematic and computerized data. The analysis was performed using IBM Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics were employed to summarize the socio-demographic information of the respondents and murder weapon profile.

In order to achieve the aim of this study, several parametric and non-parametric statistical tests were employed. The determination of either parametric or non-parametric was based on the normality of data. The normality of data was screened using measures of skewness and kurtosis. In addition, Kolmogorov-Smirnov tests were also employed to reaffirm the normality of data.

Corresponding to the normality of data and number of groups, independent sample T-tests were conducted to identify the mean difference of psychological scores between respondents who used single and multiple weapons. Following this, Kruskal-Wallis tests were used to identify the median differences of the psychological scores across specific types of weapon. One-way ANOVA was employed to establish the mean difference of psychological scores for sources of weapon. If one-way ANOVA detected statistically significant differences, post-hoc analyses were carried out. Independent sample T-tests and one-way ANOVA were carried out when there were no apparent violations of the normality assumptions.

RESULTS

Murder weapon profile

Nearly 90.1% of the respondents used a single weapon and the rest used multiple weapons. Knives (26.8%) seemed to be the most preferred weapon. Usage of blunt weapons and machetes were noted among 14 (19.7%) and 13 (18.3%) respondents respectively. Usage of other weapons such as firearms, ligatures, or fire was uncommon.

In the majority (45.1%), of murder cases, weapons were brought along by the respondents to a crime scene. This compares to 42.3% of murderers who obtained a weapon that was readily available at the scene of crime. Table 1 depicts the murder weapon profile of the respondents.

Associated psychological markers

The potential psychological markers that underlie the murderer's decision in choosing a single or multiple weapons were analysed using an

TABLE 1: Murder weapon profile of Malaysian male murderers (*n* = 71)

Variables	n (%)
Number of weapons	
Single	64 (90.1)
Multiple	7 (9.9)
Type of weapons	
Knives	19 (26.8)
Machetes	13 (18.3)
Sharp weapon	4 (5.6)
Blunt weapon	14 (19.7)
Firearms	3 (4.2)
Ligatures	3 (4.2)
Physical strength	6 (8.5)
Fire	2 (2.8)
Multiple	7 (9.9)
Availability of weapons	
Crime scene	30 (42.3)
From offender	32 (45.1)
From victim	3 (8.5)
Physical strength	6 (8.5)

independent sample t-test. The independent sample t-test resulted in several statistically significant results: Agg-Host ($t(69) = -2.57$, $p = 0.01$), overall aggression ($t(69) = -2.67$, $p = 0.01$), physical aggression ($t(69) = -3.11$, $p = 0.03$), verbal aggression ($t(69) = -3.17$, $p = 0.02$), overall self-serving cognitive distortion ($t(69) = -2.32$, $p = 0.02$), self-centered ($t(69) = -2.32$, $p = 0.020$), and blaming others ($t(69) = -1.19$, $p = 0.02$). Significant differences in mean score for other psychological measures were not observed. Findings are displayed in Table 2 below.

Next, the distributions of psychological markers across specific types of weapons were tested using a non-parametric analysis. For this, the Kruskal-Wallis test was employed. The Kruskal-Wallis test revealed statistically significant difference in physical aggression across categories of types of weapons used. Otherwise, no other statistically significant differences were observed for any psychological variables. The output of the Kruskal-Wallis test is presented in Table 3 below.

In order to compare the median of physical aggression across nine groups of types of weapons, the descriptive statistics was used. Based on Table 4, the Kruskal-Wallis test for comparison of physical aggression indicates that there is a statistically significant difference in the distribution of types of weapons, $\chi^2(8) = 16.50$,

$p = 0.036$. Based on the statistically significant result, it can be safely concluded that the median of multiple types of weapons (11.00, IqR 3.00) and firearms (11.00) is higher than other types of weapon.

Following this, a one-way ANOVA was performed to examine the mean differences in psychological markers among the groups of weapon availability. Based on the output, it can be concluded that a statistically significant difference was observed for only physical aggression on the sources of weapon at the level of $p = 0.004$. The summary of one way ANOVA is presented in Table 5.

Due to this initial statistically significant finding on physical aggression, Scheffe's multiple comparison was performed. As displayed in Table 6, it was found that the mean score for weapon originally brought to the crime scene by the offender ($M = 9.09$, $SD = 3.42$, $n = 32$) is significantly higher compared to the weapon that was readily available at the crime scene itself ($M = 6.33$, $SD = 3.51$, $n = 30$). Otherwise, no statistically significant differences were noted for any other pairs.

DISCUSSION

The use of weapons in a murder scene reflects the 'intent' of the murderer as it authorises a

TABLE 2: Comparison of psychological mean scores between single and multiple murder weapon usage

Measure	Mean (SD)	Mean difference (95% CI)	t-statistic ^a (df)	p-value
Activity	29.20 (5.75) ¹ 30.71 (4.86) ²	-1.51 (-6.02, 3.00)	-0.67 (69)	0.510
Sociability	26.52 (4.66) ¹ 26.71 (8.60) ²	-0.20 (-4.26, 3.87)	-0.10 (69)	0.920
Agg-Host	20.09 (7.16) ¹ 27.29 (5.44) ²	-7.19 (-12.78, -1.61)	-2.57 (69)	0.010*
ImpSS	21.39 (6.67) ¹ 24.00 (3.96) ²	-2.61 (-7.75, 2.54)	-1.01 (69)	0.320
N-Anx	17.97 (5.62) ¹ 17.86 (4.74) ²	0.11 (-4.29, 4.52)	0.05 (69)	0.960
Self-control	49.09 (8.03) ¹ 51.00 (7.44) ²	-1.91 (-8.24, 4.43)	-0.60 (69)	0.550
Overall aggression	28.69 (8.14) ¹ 37.43 (9.14) ²	-8.74 (-15.28, -2.20)	-2.67 (69)	0.010*
Physical aggression	7.41 (3.08) ¹ 11.14 (2.19) ²	-3.74 (-6.13, -1.34)	-3.11 (69)	0.030*
Verbal aggression	5.95 (2.24) ¹ 8.86 (2.85) ²	-2.90 (-4.73, -1.08)	-3.17 (69)	0.020*
Anger	8.05 (2.95) ¹ 8.57 (2.88) ²	-0.52 (-2.86, 1.81)	-0.45 (69)	0.660
Hostility	7.28 (2.85) ¹ 8.86 (3.39) ²	-1.58 (-3.88, 0.73)	-1.37 (69)	0.180
Overall SSCD	52.00 (15.70) ¹ 66.57 (9.03) ²	-14.57 (-26.67, -2.47)	-2.40 (69)	0.020*
Self-centered	12.09 (5.36) ¹ 17.00 (4.76) ²	-4.91 (-9.12, -0.69)	-2.32 (69)	0.020*
Blaming others	14.30 (5.78) ¹ 17.00 (5.07) ²	-2.70 (-7.25, 1.81)	-1.19 (69)	0.020*
Minimisations	13.77 (5.09) ¹ 17.71 (3.68) ²	-3.95 (-7.91, 0.01)	-1.99 (69)	0.050
Assuming worst	11.84 (4.57) ¹ 14.86 (5.61) ²	-3.01 (-6.72, 0.70)	-1.62 (69)	0.110

Note: ^aIndependent t-test was applied, ¹Single murder weapon, ²Multiple murder weapon, Number of subjects for single murder weapon = 64, multiple murder weapons = 7, *Statistically significant variable

permissive inference regarding the intent to cause harm and kill the victim. Indeed a weapon that was used in murder would be one of the first evidence examined by forensic scientists and investigating officers as it helps to predict and direct the murder investigation. Moreover, a murder weapon tends to provide many clues associated with murder viz. apparent motive, degree of intent, murderous relations, degree and modus operandi of murder.

Based on the murder weapon profile that emerged in this study, killing using knives and machetes seemed to be the most preferred weapon among the murderers in Malaysia. The present findings are similar to previous national

studies by Bhupinder *et al*¹⁰ and Kumar *et al*²⁸ and are in line with the findings of other studies in India^{29,30} and Hong Kong³¹. As pointed out earlier, the prevalence of sharp weapons as murder weapons in Malaysia can be explained by the easy availability of such instruments. In countries with more restrictive gun ownership, such as Malaysia, knives showed prominent dominance compared to firearms as the tool of violence.³²

In regards to the number of weapons, it was noted that the majority of murderers used a single weapon in order to kill their respective victim. The number of weapons that was used by murderers may reflect the ‘planned’ element

TABLE 3: Distribution of psychological variables across types of weapons used (n = 71)

Null hypothesis (H ₀)	p-value
1 The distribution of Activity is the same across categories of types of weapons used	0.251
2 The distribution of Sociability is the same across categories of types of weapons used	0.573
3 The distribution of Agg-Host is the same across categories of types of weapons used	0.119
4 The distribution of ImpSS is the same across categories of types of weapons used	0.405
5 The distribution of N-Anx is the same across categories of types of weapons used	0.306
6 The distribution of low self-control is the same across categories of types of weapons used	0.296
7 The distribution of overall Aggression is the same across categories of types of weapons used	0.093
8 The distribution of physical aggression is the same across categories of types of weapons used	0.036*
9 The distribution of verbal aggression is the same across categories of types of weapons used	0.110
10 The distribution of anger is the same across categories of types of weapons used	0.346
11 The distribution of hostility is the same across categories of types of weapons used	0.320
12 The distribution of overall SSCD is the same across categories of types of weapons used	0.291
13 The distribution of self-centered is the same across categories of types of weapons used	0.264
14 The distribution of blaming others is the same across categories of types of weapons used	0.975
15 The distribution of minimisations is the same across categories of types of weapons used	0.115
16 The distribution of assuming the worst is the same across categories of types of weapons used	0.534

Note: *Statistically significant at p < 0.05 (null hypothesis is rejected)

TABLE 4: Median comparison of physical aggression among types of weapons used

Groups	n	Median (IqR)	χ ² - statistics ^a (df)	p-value
Knives	19	7.00 (6.00)	16.50 (8)	0.036
Parang	13	9.00 (5.00)		
Sharp object	4	4.50 (5.25)		
Blunt object	14	7.00 (4.75)		
Firearms	3	11.00 (-)		
Ligature	3	3.00 (-)		
Fire	2	6.00 (-)		
Physical strength	6	9.00 (2.50)		
Multiple weapons	7	11.00 (3.00)		

Note: ^aKruskal-Wallis test

TABLE 5: One-way ANOVA of psychological measures for sources of weapon

Psychological variables	Mean square	F	p-value
Activity	33.80	1.06	0.373
Sociability	23.61	0.91	0.442
Agg-Host	108.90	2.14	0.103
ImpSS	42.62	1.02	0.391
N-Anx	54.90	1.88	0.142
Self-control	55.82	0.88	0.456
Overall aggression	126.90	1.78	0.160
Physical aggression	43.00	4.91	0.004*
Verbal aggression	5.86	0.98	0.408
Anger	8.01	0.93	0.430
Hostility	11.15	1.33	0.272

Note: *Significant at level p < 0.05

TABLE 6: Comparison of physical aggression’s mean score among four types of weapon sources

Comparison	Mean difference (95% CI)	p-value
Crime scene vs from offender	-2.72 (-4.92, -0.60)	0.006*
Crime scene vs from victim	0.00 (-5.14, 5.14)	1.000
Crime scene vs physical strength	-2.33 (-6.13, 1.46)	0.383
From offender vs from victim	1.79 (-2.37, 7.89)	0.501
From offender vs physical strength	0.43 (-3.35, 4.20)	0.991
From victim vs physical strength	-2.33 (-8.34, 3.67)	0.743

Note: One-way ANOVA test was applied followed by post-hoc multiple comparison test Scheffe’ procedures, F(df) = 4.91 (3), p = 0.004

of murder. Most notably, the usage of multiple weapons is highly associated with premeditated murder. This is in order to facilitate and ensure that the murder is successful. Combinations of sharp and blunt weapons were often used.

The above finding contradicts when planned murder is committed with a firearm in which there was no other weapon selected. In addition, the usage of a single weapon, especially a firearm; can also be observed in instrumental murder which is performed for some form of benefit like financial gain. In terms of sources of weapon, the weapon from the murderers indicates a strong element of premeditation. In contrast, weapon from the crime scene indicates a spontaneous action of murderers due to its immediate availability at a particular moment of time. Common weapons that were obtained from crime scenes include blunt objects such as sticks, wood, and iron rods. In a small number of cases, some weapons were actually from the victims themselves, which likely reflect the ‘provocation’ element shown by the victim toward his or her murderer.

In terms of differences among respondents who used a single murder weapon and multiple murder weapons, there were statistically significant differences in Agg-Host, overall aggression, physical aggression, verbal aggression, overall self-serving cognitive distortion, self-centered, and blaming others (Table 2). Deliberating on these findings, the existence of high aggression levels among respondents plays important roles in selecting more than one weapon to kill their respective victim as the aggression levels were found to be higher for those respondents who chose multiple weapons.

In general, aggression can be described as an overt behaviour carried out intentionally to harm another person who is motivated to avoid the harm.^{33,34} A study by Warren *et al*³⁵ established a significant relationship between

aggression and antisocial behaviour, which may lead a person to be involved in violent activities, including murder. Based on the current findings, it can be concluded that murderers who used multiple murder weapons are more aggressive than those who used a single murder weapon. The current findings further support the general characterization of aggressive individuals who have been described as violent in nature and exhibit antisocial behaviour.^{35,36}

Besides aggression, self-serving cognitive distortion is also another psychological trait that showed a statistically significant difference between murderers who used a single and multiple weapons. In general, self-serving cognitive distortion can be defined as biased thinking or error in thinking.^{26,27} The criminological literature have extensively reported that cognitive distortion contribute to problematic emotional and behavioural responses which eventually lead to criminal and deviant behaviour.

Theoretically, individuals with higher level of cognitive distortion are able to block moral judgments when performing an act.²⁷ This indicates higher level of cognitive distortion allow a person to use multiple weapons in order to cause maximum harm (death) to the victim. Besides that, cognitive distortion traits such as self-centeredness and blaming others may act as catalysts for a wide range of externalizing behaviour such as aggressive and antisocial behaviour.^{27,37}

The two traits under cognitive distortion that significantly differ between murderers who used a single and multiple weapons are self-centered and blaming others. Self-centeredness is a primary form of cognitive distortion which is reinforced by secondary cognitive distortion such as blaming others trait. Secondary cognitive distortion such as blaming others is perceived as pre or post-transgression rationalizations that

neutralize conscience, reduce stress, empathy, and guilty feelings.^{26,27,38} Thus, higher level of cognitive distortion like blaming others reduce empathy and guilty feelings which eventually allow the murderers to use multiple weapons when committing a murder.

The findings of this present study also suggest that there is a statistically significant difference in physical aggression across specific types of weapons used in murder (Table 3). Respondents who used firearm and multiple weapons are more physically aggressive than respondents who used other types of weapons. In contrast, respondents who used a ligature as a weapon tend to be the least physically aggressive. According to Buss and Perry,²³ physical aggression represents instrumental or the motor component of behavior which involves harming and hurting others.

Furthermore, this instrumental component of aggression may influence the respondents in terms of carrying a weapon to kill their respective victim. Some evidence of this is supported in the present findings in which respondents who brought a weapon to kill the victim is characterized as being more physically aggressive compared to respondents who obtained the weapon from the crime scene itself (Table 6). Elaborating more on this, those with physically aggressive traits are likely to involve in “premeditated” murder by carrying the weapon to confront the victim compared to those who reached for an available weapon at the crime scene which reflects the “passion and spontaneous” element of murder.

Limitations

The present study is the first of its kind in Malaysia as it explores the underlying psychological markers of murder weapon profile among Malaysian male murderers. A similar study was conducted by Mohammad Rahim Kamaluddin *et al*³⁸ which shed some information on the influences of psychological traits on different killing methods among Malaysian male murderers. In this current study, a number of limitations need to be acknowledged. First is the number of samples which were recruited in a non-probability sampling manner. Limited sample size with purposive sampling limit the generalizability of current findings to the entire population of murderers. The second limitation that needs to be highlighted in this current study is the influences of other external factors i.e., the failed outcome (death) of first weapon, availability of number of weapons, familiarization of weapon and many more; that

may influence the usage and number of weapons. Despite these limitations, the present study successfully provided some statistical input on the influence of psychological markers towards weapon profile among murderers.

Conclusion

In conclusion, the present study achieved the aim of reporting several psychological markers that are likely to influence the number and type of weapons used by murderers. Most notably, individuals with high aggression markers tend to use multiple weapons, and ‘physical aggression’ seemed to be most associated psychological marker that influences the respondents to carry the weapon to the murder scene. Hence, the findings derived in this study may be useful in the psychological profiling of unknown murderers. This research adds substantial knowledge to the field of criminology and investigative psychology.

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