**ABSTRACT**

Homicide represents one of the leading causes of death, and the head is the target in the majority of cases. The objective of the present study was to analyze the pattern of head injury among homicidal death victims. Information was obtained by interviewing the accompanying persons, post-mortem examination and perusal of hospital records. Most of the victims were predominantly male and belonged in the age group 21-30 years. Blunt weapons caused the majority of the injuries. Defence wounds were present in 48% of the victims. The street was the place of crime in the majority of cases (46.7%) and in most of the cases there was more than one offender. Multiple assaults were seen on the body in 70% of cases. The skull was fractured in more than 80% of victims and intracranial haemorrhages were seen in 47 victims. Out of 77 cases, 55 victims showed intracranial lesions along with injuries to the skull and scalp. Associated fatal injuries were most commonly present on the neck and chest. The majority of the victims died instantly or within 24 hours. Blunt force is commonly used when the head is the target. Defence wounds, when present, are indicative of the homicidal nature of the attack, and multiple strokes present over the body indicate determination on the part of the accused to end the life of the victim.

**INTRODUCTION**

The head is a vital organ and the most vulnerable part of body to receive injuries. Injuries to the head are accidental, mostly vehicular or homicidal. Patterns of fatal injury vary with the type of object, nature of force, manner of application, and gravity of involvement of the head, with or without protective measures. A cranio-cerebral injury due to blunt trauma causes more homicidal deaths as compared with blunt trauma injury to other areas of the body.

A homicide is usually well-planned and therefore not normally witnessed. It is natural for an accused to try to escape detection and, given time, he can make a homicide look like a death from suicide or an accident. It is obvious that a thorough medical and scientific investigation is necessary in every suspicious death due to cranio-cerebral injury. The aim of the present study is to identify risk factors such as the age and sex of the victims, the method used to kill, the number of offenders involved and the location of the crime. In addition, the pattern of head injury and any additional fatal injury, the presence or not of defence wounds, the number of strokes applied to the body and survival time are also noted. The data collected is compared with previously published literature.

**MATERIALS AND METHOD**

The study was undertaken prospectively in the Department of Forensic Medicine and Toxicol-
ogy, MKCG Medical College, Berhampur, Orissa, India, from January 1998 to December 2001. This centre receives cadavers from the whole of Berhampur city and the adjacent rural areas of the southern part of the Orissa. Out of 162 of the total homicidal deaths during the above-mentioned period, 77 cases that died from head injuries form the cohort of the study.

Each homicidal case showing a fatal head injury was examined and evaluated at autopsy, both externally and internally, and analyzed for the weapon which caused it. In cases where multiple weapons were used, causing a variety of wounds, the injuries were evaluated accordingly. Further emphasis was also given to establishing any associated fatal injuries, apart from head injuries, to evaluate homicidal patterns. Simultaneously, information regarding the location of the crime, the number of offenders and the survival time was collected by examining the police inquest reports, hospital records and also interviewing the relatives, eyewitnesses and other persons accompanying the corpse. Interpretation of defence wounds was done only after careful and complete consideration of all circumstances surrounding the trauma and death.

RESULTS
Eighty-eight per cent of the victims were male and most of them belonged in the age group of 21-40 years (Table I). In more than half of the victims a blunt weapon was used for killing (Figure 1) and defence wounds were present in 37 cases (48%). Defence wounds were absent in the remaining 40 cases. The majority (46.7%) of the homicides took place in the streets or outdoors (Table II) and in 48 cases more than one offender was involved. Multiple transactions were common in the study and present in 70.1% of the victims. In the remaining 29.9% (23 cases), a single transaction was present over the head, which caused death. Considering the patterns of injury, skull fracture was found in about 80% of cases (Figure 2). All three head structures, i.e. scalp, skull and meninges and/or brain were injured in 55 (71.4%) of victims. Forty-seven (61%) victims had an intracranial haemorrhage, most of them subdural (Figure 3). In 18 cases (23.4%), associated fatal injuries were found, most of them either on the neck or chest (six cases each) (Table III). In two cases, fatal injuries were present in both the chest and abdomen. The majority of the victims died either instantly (45.4%) or within 24 hours (29.2%) (Table IV).

DISCUSSION
The head is the target of choice in the great majority of fatal and non-fatal assaults. Out of 162 homicidal deaths, 47.5% victims showed fatal injuries over the head. Similar findings

<table>
<thead>
<tr>
<th>Age group (in years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>6.5</td>
</tr>
<tr>
<td>21-40</td>
<td>42</td>
<td>5</td>
<td>47</td>
<td>61.0</td>
</tr>
<tr>
<td>41-60</td>
<td>17</td>
<td>2</td>
<td>19</td>
<td>24.7</td>
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<tr>
<td>&gt;60</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>7.8</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>9</td>
<td>77</td>
<td>100</td>
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</table>

<table>
<thead>
<tr>
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<th>Number</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Street</td>
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<td>46.7</td>
</tr>
<tr>
<td>Home</td>
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<td>25.9</td>
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<tr>
<td>Work place</td>
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<td>9.1</td>
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<td>12</td>
<td>15.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Table I. Age and sex distribution.

Table II. Place of occurrence of crime.
were seen by others (Dikshit et al., 1986; Pal et al., 1994) But our study is in contrast to that of Scott (1990), in the West Midlands, in which only 27.1% of cases showed fatal head injuries. Males outnumbered females, indicating that males by nature indulge in more violent activities. Our finding is consistent with the study of others (Das Gupta et al., 1983; Dikshit et al., 1986; Rogde et al., 2003) The highest recorded incidences were amongst the 21-30 years age groups because they are commonly involved in family disputes and other arguments. Moreover these groups are more exposed to the outside environment by nature of their life style. This finding is consistent with the study in Malawi (Adaloya et al., 1997), Nagpur, India (Ghangale et al., 2003) and Newfoundland (Avis, 1996).

Method of homicide

Injuries due to blunt force trauma were the most common, which was also reported by other authors (Strom et al., 1991; Pal et al., 1994; Ghangale et al., 2003). Among the blunt objects, wooden planks, lathi and agricultural instruments are most commonly used. It is probably thought by the assailants that blunt trauma to the head and penetrating trauma to the chest and abdomen is always fatal (Ghangale et al., 2003) Another reason why blunt weapons are commonly used is that they are cheap, easily available, and when discovered afterwards can be claimed to be household tools.

Firearm injuries were present in only four cases because in India there is strict legislation regarding the possession of firearms. Defence wounds were present in about 50% of the victims. It is the instinctive behaviour of the victim to raise his/her arm to ward off an attack and to protect vital organs such as the brain. The presence of such injuries indicates an assault by some other person or persons. However, the absence of defence wounds does...
not exclude homicide, since the victim may be incapable of effective defence for reasons such as surprise, being unconscious or under the influence of alcohol.

**Location of the crime**

In the present study most of the homicides took place outdoors in areas such as streets or open places. Our study matches with the finding of others (Shepherd et al., 1988; Mohanty et al., 2004) But our findings contrast with the study in Malawi (Adaloya et al., 1997), where only a quarter of assault-related head injuries occurred in the street. In 48 cases more then one assailant was involved. This finding could not be compared with other studies, as no similar analyses have been conducted in this part of the world. In the present study most of the victims were male, killed outdoors by multiple persons indicating revenge and planning behind the crime. In 54 cases the victim showed multiple transactions. The reason for this may be determination on the part of the assailants to make sure that victim is dead and will not recover. Another reason may be because the victim goes on fighting despite having received multiple wounds (Hunt et al., 1991).

**Pattern of head injury**

Skull fracture was identified in about 80% of victims. Similar findings were also observed in a study in Nigeria (Elesha et al., 2002) and Delhi (Dikshit et al., 2002). But a study in Ibadan (Akang et al., 2002) showed skull fractures in only 38.2% of victims. All three head structures, i.e. scalp, skull and intracranial structure (brain and or meninges) are involved in most of the cases. This indicates that the application of force by the assailant/s is highest during the material moment to make certainty of the death of the victims.

**Pattern of intracranial haemorrhage**

Intracranial haemorrhages were observed in 47 cases. Our findings are similar to others (Scott, 1990; Elesha et al., 2002). A higher number of victims (86%) having suffered an intracranial haemorrhage were observed in the study at Delhi (Dikshit et al., 2002). Subdural haemorrhage was common amongst all types of intracranial haemorrhage. This finding is consistent with the study in Ibadan (Akang et al., 2002)

**Associated fatal injuries**

Associated fatal injuries were present in only 18 cases. Amongst these, in two-thirds of cases the injuries were present on the neck and chest, which are more proximal to the head. The reason for this may be that during an attack, if the weapon misses the primary target i.e. the head, or the victim tilts his or her head, it usually hits the neck or chest.

**Survival time of victims**

In 57.1% of cases, victims died instantly or were found dead at the scene of crime. Amongst the victims who survived, eight died on the way to hospital and 25 were hospitalized but succumbed to their injuries while undergoing treatment. Similar findings are also observed in the study at Kaohsiung City of Taiwan (Chen and Howng, 1995), where 61% of all deaths occurred prior to hospitalization. Out of those who survived, the majority of victims died during the first 24 hours. Our findings are consistent with that of another study (Dikshit et al., 2002).

**CONCLUSION**

The present study has shown that victims in younger age groups, predominantly males, are vulnerable to homicidal head injuries. Attacks by multiple offenders using more than one stroke over the body are seen in most of the victims. The most common place of crime is the street followed by the home. In the majority of cases injuries were severe in nature, involving all the structures of the head (scalp, skull, brain and/or dura). Defence wounds, when present, indicate the homicidal nature of the attack. Further study is required to compare fatal homicidal head injury with fatal non-homicidal head injury, particularly in blunt force trauma.

**REFERENCES**


