

**DETERMINATION OF MANNERS OF DEATH: AN ANALYSIS OF 3012 POSTMORTEM CASES**Al-Azad MAS<sup>1</sup>, Ahmad M<sup>2</sup>, Rahman MZ<sup>3</sup>, Uddin MN<sup>4</sup>, Ali M<sup>5</sup>, Islam SMJ<sup>6</sup>**Abstract**

**Introduction:** Forensic Pathologists are often performing autopsies in death investigation. There are five legally-defined manners of death namely natural deaths, accidental deaths, homicidal deaths, suicidal deaths and undetermined deaths. Natural deaths are those that occur from natural causes such as disease or old age rather than from violence or an accident.

**Objectives:** To determine the socio-demographic profile of postmortem cases and to evaluate information regarding manners of deaths as determined by those cases.

**Methods:** This record based cross-sectional study of postmortems performed at the mortuary of the Department of Forensic Medicine; Dhaka Medical College (DMC) was conducted during the period of January 2006 to December 2006. Most of the victims were brought to DMC morgue from south-eastern part of Dhaka district. A total of 3012 autopsies were analyzed during the period. Morgue caters 18 police stations under Dhaka city. Data were collected using a pre-designed schedule from Post mortem registers and reports. All the data were collected in a predefined data collection sheet and necessary statistical analyses were performed by using the computer software SPSS (Statistical Package for Social Science) for window 17.0 and were expressed in frequency and percentage.

**Results:** A total of 3012 postmortems were studied. Of them 1640 (54.45%) cases were of accidents, 722 (23.97%) cases were of suicide, 542 (17.99%) cases were of homicide, 84 (2.79%) cases were of undetermined and 24 (0.80%) cases were of natural deaths. Most of the postmortem cases were in the age group of 20-40 (54.71%) years, which is the most productive period in life cycle followed by 24.90%, 15.50% and 4.89% in the age group of 0-20 years, 41-60 years and 60 years respectively. Of them 2258 (74.97%) were male and rest 754 (25.03%) cases were female.

**Conclusion:** Accidents, mainly Road Traffic Accident (RTA) and railway accidents, comprise a major manner of death which reduces the most productive period in the life cycle causing serious effects in socio-economic development of the country. RTA can be prevented by specific preventive measures and also by taking personal precautions. Suicide is the second commonest manner of unnatural death flanked by accident and homicide. It is not feasible to draw a concrete conclusion. Homicide is a relatively rare offence than accidents or suicides but it is one of the most notifiable crimes in the country as they are widely publicised by the media due to their severity and visibility.

**Key-words:** Autopsy, Manners of death, Accidental death, Suicidal death and homicidal death.

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## Introduction

In death investigations, autopsies are most often performed by forensic pathologist. The term, autopsy, originates from ancient Greek word, 'autopsia' which means to see for oneself ('autos'- oneself and 'opsis' means eye). So autopsy or necropsy or postmortem examination is a medical procedure that consists of a systemic examination of a deceased to determine the cause and manner of death and to evaluate any disease or injury.

An autopsy is frequently performed in case of sudden death where a doctor is not able to write death certificate or when death is believed to be due to an unnatural cause. In academic institutions, autopsies are sometimes also requested for teaching and research purpose. Forensic or medico-legal autopsies are performed where the cause and manners of death are unknown. So autopsies are performed if death was due to an accident, homicide, suicide or a natural event. A postmortem report is the best evidence of an unnatural death. So it is always admissible before the court as an expert opinion. "Unnatural death" means death of a person caused by suicide or by another or by an animal or by machinery or a motor cycle or by an accident, or under circumstances raising a reasonable suspicion that some person has committed an offence or foul play<sup>1</sup>.

The medico-legal autopsy is in many ways different from a clinical autopsy. A medico-legal autopsy is a special type of postmortem examination ordered or authorized by the government or legal authorities in case of unnatural or unexpected deaths. The information so obtained is invaluable in administering justice, in booking criminals and in protecting innocent suspects. The main objectives of a medico-legal autopsy are: to establish the identity of the deceased, to ascertain the cause of death, to find out the nature of death and to determine the time of death<sup>2</sup>. After the autopsy is performed, forensic pathologists provide valuable information about the manner of death. There are five legally-defined manners of death. These include natural deaths, accidental deaths, homicidal deaths, suicidal deaths and deaths of undetermined in nature. Ellis said<sup>3</sup>, "Every death is going to fall into one of those categories".

Unnatural deaths are caused by external factors which include death due to intentional injury such as homicide or suicide, and death caused by unintentional injury of an accidental manner, such as in road traffic accidents.

Natural deaths are those that occur from natural causes such as disease or old age rather than from violence or an accident. Heart attacks, cancers, pneumonias, and strokes are common natural causes of death. It is estimated that of the roughly 1, 50,000 people who die each day across the globe, about two thirds -100000 per day die of age-related causes<sup>4</sup>.

Accidental deaths are unfortunate events resulting from carelessness, unawareness, ignorance or a combination of causes and occur under unforeseen and unplanned event or circumstance. Falls, automobile accidents, and in-home electrocutions are examples of accidental deaths.

Suicidal deaths are the acts or an instance of taking one's own life voluntarily and intentionally especially by a person of years of discretion and of sound mind. Assisting or attempting suicide can be a crime. Suicides are deaths caused by the dead person's own hand. Intentional, self-inflicted gunshot wounds, drug overdoses and self-suspension, poisonings are the causes of suicidal deaths.

Accidents lead causes of death. Suicide is the second commonest manner of unnatural death flanked by accident and homicide. The etiology of suicide still remains unknown. Research to date has neither unearthed nor revealed why such desperate course of action is dictated. All suicidal people are not death seekers. Some attempt suicide to alleviate pain, to reduce isolation, to avoid consequences of social status change, to seek revenge and also to convey a whole lot of other meanings that are essentially individualistic<sup>5,6,7</sup>. Legal definition of homicide is the killing of one human being by another human being. Although the term homicide is sometimes used synonymously with murder, homicide is broader in scope than murder. Murder is a form of criminal homicide. Some common examples of murder include shooting, stabbing, smothering, strangling, hitting with a blunt object and burning.

Other forms of homicide may not constitute criminal acts. These homicides are regarded as justified or excusable. For example, individuals may kill a person who threatens them with death or serious injury or they may be commanded or authorized by law to kill a person who is a member of enemy force or who has committed a serious crime in an act of self-defence. Early English common law divided homicides into two broad categories: Felonious (Murder) and Non-felonious homicide which are justifiable and excusable.

Homicide is a relatively rare offence than accidents or suicides but it can contribute to the public's fear of crime. Homicide is one of the most notifiable crimes in the country as they are widely publicised by the media due to their severity and visibility.

Undetermined deaths are those which do not have enough evidence, yet or ever, to choose the manner of death. At times postmortem examination including gross macroscopic, microscopic examination, laboratory investigation and toxicological analysis fails to elicit the cause of death. This situation is called negative autopsy. Negative autopsy is done to negate the possible suspected cause of death, 2 to 5% of all the autopsies are negative<sup>8</sup>. But, it still has to be conceded that the autopsies are by no means infallible in revealing the definite cause of death. These may be called as cases of obscure autopsy<sup>7</sup>. The distinction between homicide, suicide and accidents can sometimes be extremely difficult<sup>10</sup>. As accidental deaths due to RTA or Railway injuries may be attributed to homicidal deaths or even homicidal deaths are described as accidents. A final conclusion can only be reached after a full medico-legal investigation<sup>10</sup>. While the determination of 'manner of death' usually rests with the appropriate medico-legal authority, an opinion from the forensic pathologist is frequently sought.

### Materials and Methods

A record based cross-sectional study of postmortems performed at the mortuary of the Forensic Medicine Department of Dhaka Medical College (DMC), was conducted during the period of January 2006 to December 2006. Most of the victims were brought to DMC morgue from south-eastern part of Dhaka district.

All postmortems, comprising a total of 3012, performed during the period of January to December 2006 were studied. This morgue caters 18 police stations under Dhaka city. Data were collected using a pre-designed schedule from Post mortem registers and reports, death certificates in case of hospital deaths, inquest reports accompanying the dead bodies maintaining confidentiality. All the data were collected in a predefined data collection sheet and necessary statistical analyses were performed by using the computer software SPSS (Statistical Package for Social Science) for window 17.0 and expressed in frequency and percentage.

### Results

A total of 3012 postmortems, performed at the mortuary of the Dept of Forensic Medicine, DMC during the period of January to December 2006, were studied. Of them 1640 (54.45%) cases were of accidents, 722 (23.97%) cases were suicide, 542 (17.99%) cases homicide, 84 (2.79%) cases undetermined and 24 (0.80%) cases were of natural deaths. Most of the postmortem cases were in the age group of 20-40 (54.71%) years, which is the most productive period in the life cycle followed by 24.90%, 15.50% and 4.89% in the age group of 0-20 years, 41-60 years and 60 years respectively. Of them 2258 (74.97%) were male and rest 754 (25.03%) cases were female. About 75% were males who are more exposed to the risk of unnatural deaths as in most of the cases they are the alone earning member of the family as in the male dominated society.

A total of 1640 accidental deaths were brought at DMC mortuary in the study period. Of them 1122 (68.42%) cases were due to RTA, 169 (10.30%) cases were from railway accidents, 146 (8.90%) were burn injuries, 97 (5.92%) cases were due to fall from the heights and others were from electrocution injuries (4.82%), drowning (1.16%), poisoning (0.18%) and firearm injuries 0.30% (Table-I).

**Table-I:** Various methods of Accidents causing deaths spanning January 2006 to December 2006 (n=1640)

Methods of Accidents	Frequency	Percentage
RTA	1122	68.42%
Railway accident	169	10.30%
Burn injuries	146	08.90%
Fall from the Height	97	05.92%
Electrocution	79	04.82%
Drowning	19	01.16%
Firearm injuries	05	00.30%
Poisoning	03	00.18%
<b>Total</b>	<b>1640</b>	<b>100</b>

A total of 722 persons in the part of Dhaka city lost their lives by committing suicides during the year 2006. Amongst them unnatural deaths comprises 24.16%. of them 280 cases (38.78%) committed suicides by hanging, 214 cases (29.64%) were of organophosphorus (OPC) poisoning, other poisoning and drug abuse like heroine, pathedine, morphine, cannabis indica, endrine, barbiturates and 205 cases (28.39%) were recorded as cases of deaths due to unknown causes, burn victims were 1.66% and 1.52% were recorded as alcohol abusers (Table-II).

**Table-II:** Various methods adopted for Suicides of the studied period (n=722)

Methods adopted for Suicides	Frequency	Percentage
Hanging	280	38.78%
OPC	214	29.64%
Undetermined poison	205	28.39%
Burn	012	01.66%
Alcohol	011	01.52%
<b>Total</b>	<b>722</b>	<b>100</b>

In this study a total of 542 (18.14%) deaths were found to be homicidal in nature, of them in 141 cases (26.01%) firearms were used as the method of homicide. Other methods used for homicide were injuries caused by blunt weapons (24.17%), injuries from sharp cutting weapons (16.14%), strangulation (13.65%), cut throat injury by using sharp cutting weapon were found in 3.70% victims. Amongst homicide issues 4.06% were burnt victims. Of 542 homicides, 25 infanticide cases

were received. The methods used for infanticide were by strangling, poisoning, blunt injuries on the head. The causes behind the infanticides were unwanted birth by unmarried women or widows and poverty of the parents (Table-III).

**Table-III:** Various methods used for committing Homicides (n=542)

Methods used for Homicides	Frequency	Percentage
Firearm injury	141	26.01%
Blunt force injury	131	24.17%
Injury with sharp-cutting weapon	088	16.24%
Strangulation	074	13.65%
Stab injury	041	07.56%
Burn injury	022	04.06%
Cut-throat injury	020	03.70%
Miscellaneous	025	04.61%
<b>Total</b>	<b>542</b>	<b>100</b>

During analyses of 2988 of unnatural deaths, 84 (2.81%) cases were found to be of incidental natural deaths Viscera were sent for histo-pathological analyses, of them 56 (66.67%) were cases of tuberculosis, 22 (26.19%) cases were of cardiovascular diseases and other diseases like kidney diseases, cirrhosis of liver etc were found in 7.14% of cases.

**Table-IV:** The frequency pattern of incidental natural deaths during the period of January 2006 to December 2006 (n=84)

Causes of death	Frequency	Percentage
Tuberculosis	56	66.67%
Cardiovascular diseases	22	26.19%
Kidney disease & Chronic Liver Disease	06	7.14%
<b>Total</b>	<b>84</b>	<b>100</b>

## Discussion

A total of 3012 postmortems were studied. In our study, out of 3012 post mortem cases the manner of death was found to be natural in 24 (0.80%) cases, whereas in 2988 cases (99.20%) was unnatural. Of them 54.45% cases were of accidents, 23.97% cases were suicide, 17.99% cases were homicide, 2.79% cases were of undetermined in nature.

A study conducted at a morgue of a tertiary care hospital in Kolkata showed that out of 1872 post mortem cases the manner of death was natural in 325 (17.4%) cases, whereas in 1547 cases (82.6%) it was unnatural. Accidents, suicides, homicides and undetermined deaths were of 63.1%, 29.8%, 2.8% and 4.3% respectively<sup>11</sup>. Another study in Dhaka Medical College Mortuary in 1996 showed that the frequency pattern of unnatural deaths was 68.92% RTAs, 11.69% homicides, 08.00% suicides and 2.8% natural deaths<sup>12</sup>. Other study conducted by Biswas DK, Biswas A, Das DK, Bhunia R and Ghosh D showed among the total 2581 unnatural deaths during the period of 33 months, highest number was suicidal deaths (45%) followed by accidental (35%) and homicidal 6% which contradict our study<sup>13</sup>.

A total of 1640 accidental deaths were studied during the study period. Of them 68.42% deaths were due to RTA (Road Traffic Accidents), 10.30% cases were due to railway accidents, 8.90% were from burn injuries, 5.92% cases were due to fall from the heights and rest 4.82%, 1.16%, 0.18% and 0.30% deaths were due to electrocution injuries, drowning, poisoning and firearm injuries respectively. In the year of 2007 a total of 3,40,794 accidental deaths were reported in India in which 33.6% were due to RTA and 6.9% were from railway track injuries<sup>14</sup>. Most of the victims of postmortem cases (54.71%) were in the age group of 20-40 years, which is the most productive period in the life cycle followed by 24.90%, 15.50% and 4.89% in the age group of 0-20 years, 41-60 years and 60 years respectively. Of the cases 74.97% were men and 25.03% cases were women. About 75% cases were men who are more exposed to the risk of unnatural deaths as in most of the cases they are the lone earning member of the family as happens in the male dominated society. A total of 722 people in the south-eastern part of Dhaka city lost their lives by committing suicide during the year 2006. Amongst unnatural deaths suicidal-death comprises 24.16%. of them 280 cases (38.78%) committed suicide by hanging, 214 cases (29.64%) by taking organophosphorus (OPC) poisoning or other poisons and others drug

by abuse like heroine, pathedine, morphine, cannabis indica, endrine, barbiturates and unknown cause was recorded in 205 cases (28.39%); burn victims comprise 1.66% and 1.52% were recorded as alcohol abusers. Methods of suicide employed generally reflect the availability and access to the methods and also the socio-economic status of the individual in the community.

According to the study of Bhatia et al and Agarwal et.al, the common methods used for suicide are poisoning, hanging, drowning and burning<sup>15,16</sup>. Firearms remain the most commonly utilized method for committing suicide by essentially all groups in the United States. More than half (52.1%) of the individuals who took their own lives in 2005 used this method<sup>17</sup>. Males (58% firearms; 42% other methods) used firearms more often than their female counterparts (33% firearms; 67% other methods)<sup>18</sup>.

The most common method adopted for committing suicide for all females was poisoning. In fact, poisoning has surpassed firearms for female suicides since 2001 in the United States<sup>19</sup>. About 400,000 people commit suicide every year throughout the world. Suicide is among the ten leading causes of death for all ages in most of the countries<sup>6</sup>. In some countries, it is among the top three causes of death for people between 15 to 34 years<sup>20</sup>. According to the National Crime Records Bureau, suicide is among the top ten causes of death in India<sup>21</sup>.

In this study a total of 542 (18.14%) deaths were found to be homicidal in nature. Of them in 141 cases (26.01%) firearms were used as the method of homicide. Other methods used for homicide were injury from blunt weapons (24.17%) and sharp cutting weapons (16.14%). Strangulation (13.65%) and cut throat injury by using sharp cutting weapon were found in 3.70% victims. Amongst homicides, 4.06% were burnt victims. A total of 542 homicides, 25 cases of infanticides were received. The methods applied for infanticide were by strangling, poisoning and inflicting blunt

injuries on the head of unwanted babies given birth by unmarried women or widows other cause of infanticide was poverty of the parents. In a study by the United Nations released in 2009, it was found that worldwide firearms were used in an average of 60% cases of all homicides<sup>22</sup>. In 2010 USA homicides, guns were the weapon of choice, especially for multiple homicides<sup>23</sup>.

## Conclusion

Accidental deaths contribute to highest numbers of unnatural deaths followed by suicides and homicides. It is not feasible to draw a concrete conclusion. But on the basis of this study finding, it may be stated that a great number of Road Traffic Accidents (RTA) can be prevented by specific preventive measures and also taking personal precautions. Countrywide mass scale study should be carried out in this specific emerging field to combat road traffic accidents as it is a major public health issue. Suicide rate also contributed second highest cause of unnatural deaths. To prevent suicide, promoting research, public awareness programs, education and training for professionals, survivors and all interested persons are badly needed. Homicide is a relatively rare offence than accidents or suicides but it can contribute to the public's fear of crime. Homicide is one of the most notifiable crimes in country as they are widely publicized by the media due to their severity and visibility; creating social awareness and promoting preventing measures are also needed to curb this crime.

## References

1. The Karnataka (Investigation of unnatural deaths & Conduct of Inquests) Rules; 2004.
2. Knight B. Forensic Pathology. 2nd ed. London: Arnold; 1996.p.1.
3. M. Silvaggio; A Journal special Report on the leading causes of death in Greenville county: March 15, 2010

4. Aubrey D. N. J, de Grey "Life span extension Research and Public Debate: Societal Consideration Studies in Ethics, Law and Technology, August 7, 2011.

5. Kreitman N. Suicide & Parasuicide in. Companion to psychiatric studies Edited by Kendell RE, Zeally AK. Churchill Livingstone, London. 1988; 459-75.

6. Unni KES, Rotti SB, Chandrashekharan R. An exploratory study of motivation in suicide attempters; Indian Journal of Psychiatry.1995; 37: 169-75.

7. Trivedi JK. Punishing attempted suicide. Anachronism of 20th Century. Editorial. Indian Journal of Psychiatry. 1997; 39: 87-9.

8. R.N Karmakar. Forensic Medicine and Toxicology: 1st ed. India. Academic Publishers; 2006.p.380.

9. Vij K. Textbook of Forensic Medicine and Toxicology: Principles and Practice. 4th ed. New Delhi, India: Elsevier; 2008.p.38.

10. Shepherd R. Simpson's Forensic Medicine. 13th ed. London: Arnold; 2011.p.117.

11. Shrivastava P, Som D, Nandy S et al. Profile of postmortem cases conducted at a morgue of a tertiary care hospital in Kolkata. J Indian Med Assoc. 2010 Nov;108 (11):730-3.

12. Rahim M, Das TC. Mortuary Profile for Unnatural Deaths at Forensic Medicine Department of Dhaka Medical College. Bangladesh Medical Journal 2009; 38(2):44-7.

13. Biswas DK, Biswas A, Das DK, Bhunia R, Ghosh D. Socio-demographic Profiles of Post Mortem Cases in a Sub-district, West Bengal, India. Medico-Legal Update. 2013; 13(2): 32-7.

14. National Crime Record Bureau, Ministry of Home Affairs-Accidental Deaths and Suicides in India. New Delhi: Government of India, 2007.

15. Aggarwal NK, Bhatia MS, Aggarwal BBL. Pattern of suicide in North East Delhi. Indian Journal of Social Psychiatry. 1994;10:20-2.

16. Bhatia MS, Aggarwal NK, Aggarwal BBL. Pattern of suicide ideators, attempted suicide and completed suicide in a tertiary care teaching hospital; Indian Practitioner. 1998; 51: 776-80.

17. A"Twenty Leading Causes of Death Among Persons Ages 10 Years and Older, United States". "National Suicide Statistics at a Glance". Centers for Disease Control. 2009. Retrieved 2013-02-17.

18. Chang, B; Gitlin, D; Patel, R. "The depressed patient and suicidal patient in the emergency department: evidence-based management and treatment strategies". Emergency medicine practice 13 (9): Sep 2011;1-23.

19. Information about Suicide in the USA (Based on Current (2005) Statistics).

20. World Health Organization. Figures and Facts about Suicide WHO, Geneva, 1999.

21. National Crime Record Bureau, Ministry of Home Affairs-Accidental Deaths and Suicides in India. New Delhi: Government of India, 2007.

22. United Nations Office of Drugs and Crime. "Global Burden of Armed Violence".

23. Federal Bureau of Investigation, "Guns are the weapon of choice", Associated Press, 2011.