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Medicolegal Autopsy in Forensic Practice: Determining Cause and Manner of Death

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Abstract

Background: Medicolegal autopsy is a vital component of forensic practice, undertaken to investigate sudden, suspicious, or unnatural deaths. Accurate determination of the cause and manner of death is essential for the administration of justice, reliable mortality statistics, and public health planning.

Objective: To analyze medicolegal autopsy cases to determine the pattern of deaths and to assess the role of medicolegal autopsy in establishing the cause and manner of death.

Methods: A cross-sectional descriptive study was conducted in the Department of Forensic Medicine, International Medical College, Gushulia, Sataish, Tongi, Gazipur, from June 2023 to July 2024. A total of 382 medicolegal autopsy cases were included. Data were collected from police inquest reports, postmortem examination findings, and ancillary investigation reports using a structured data collection form.

Results: Males constituted 68.6% of cases, with a male-to-female ratio of approximately 2.2:1. The highest number of cases occurred in the 21–30 years age group (26.2%), followed by the 31–40 years group (22.0%). Suicidal deaths were the most common manner of death (44.0%), followed by accidental (32.5%), homicidal (14.1%), and natural deaths (9.4%). Asphyxia, mainly due to hanging, was the leading cause of death (30.4%), followed by poisoning (25.7%) and road traffic accidents (22.0%).

Conclusion: Unnatural deaths, particularly suicide, constituted the majority of medicolegal autopsy cases, predominantly affecting young and middle-aged adults. Medicolegal autopsy plays an indispensable role in accurately determining the cause and manner of death and remains essential for justice delivery and effective public health interventions.

Keywords: Medicolegal autopsy; Forensic medicine; Cause of death; Manner of death; Unnatural deaths; Forensic pathology.

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Introduction

Medicolegal autopsy is a cornerstone of forensic medicine, performed to investigate deaths that are sudden, suspicious, unnatural, or legally contentious. Unlike clinical autopsies, which are undertaken primarily for diagnostic, educational, or research purposes with consent, medicolegal autopsies are conducted under statutory authority to assist the justice system. Their principal objective is to determine the cause and manner of death in a scientifically sound and legally defensible manner, thereby supporting criminal investigations, judicial proceedings, and public health documentation [1,2].

Accurate determination of cause of death involves identifying the disease, injury, or physiological disturbance that initiated the fatal sequence of events, while the manner of death explains how that cause arose—whether natural, accidental, suicidal, homicidal, or undetermined [3]. These determinations have far-reaching implications, influencing legal responsibility, insurance claims, civil disputes, and the reliability of national mortality statistics. In many cases, particularly those involving trauma, poisoning, or sudden unexplained death, external examination alone is insufficient, making a complete autopsy essential [4].

Medicolegal autopsy practice requires a systematic approach that integrates thorough external and internal examinations with ancillary investigations such as histopathology, toxicology, radiology, and serology. Equally important is the correlation of autopsy findings with scene investigation, police reports, and relevant medical history [5]. Despite challenges including decomposition, limited contextual information, and resource constraints, the medicolegal autopsy remains indispensable. Its role in uncovering hidden pathology, reconstructing events surrounding death, and ensuring transparency and justice underscores its enduring importance in modern forensic practice [6].

Methodology

This study was conducted as a cross-sectional descriptive study to evaluate medicolegal autopsy findings with respect to determination of cause and manner of death. The study was carried out in the Department of Forensic Medicine at International Medical College, Gushulia, Sataish, Tongi, Gazipur, Bangladesh, over a period of thirteen months from June 2023 to July 2024. All medicolegal autopsies performed during the study period constituted the study population. A total of 382 cases were included, selected based on availability during the study period and completeness of relevant records. Bodies brought for medicolegal autopsy with proper inquest reports and accompanying documents were included in the study, while cases showing advanced decomposition that hindered determination of cause or manner of death, as well as cases with incomplete documentation, were excluded.

Data were collected using a pre-designed structured data collection form. Relevant information such as age, sex, alleged history, circumstances of death, place of occurrence, external and internal autopsy findings, cause of death, and manner of death was recorded. Information was obtained from police inquest reports, postmortem examination findings, hospital records where available, and ancillary investigation reports, including toxicological and histopathological

examinations. The collected data were checked for accuracy and completeness, then entered into a computerized database for analysis. Descriptive statistical analysis was performed, and findings were expressed as frequencies and percentages using tables and charts. Ethical approval for the study was obtained from the institutional ethics review committee of the International Medical College, and the confidentiality of all cases was strictly maintained throughout the study period.

Results:

A total of 382 medicolegal autopsy cases were analyzed during the study period from June 2023 to July 2024.

Table 1: Distribution of Cases According to Age and Sex (n = 382)

Age group (years)	Male n (%)	Female n (%)	Total n (%)
≤10	10 (2.6)	6 (1.6)	16 (4.2)
11–20	34 (8.9)	18 (4.7)	52 (13.6)
21–30	72 (18.8)	28 (7.4)	100 (26.2)
31–40	60 (15.7)	24 (6.3)	84 (22.0)
41–50	44 (11.5)	20 (5.2)	64 (16.7)
51–60	26 (6.8)	16 (4.2)	42 (11.0)
>60	16 (4.2)	8 (2.1)	24 (6.3)
Total	**262 (68.6)**	**120 (31.4)**	**382 (100)**

Table 1 demonstrates a male predominance among medicolegal autopsy cases, with males constituting 68.6% and females 31.4%. The highest number of cases occurred in the 21–30 years age group (26.2%), followed by 31–40 years (22.0%). Nearly half of the cases involved individuals aged 21–40 years. Male cases exceeded female cases in all age groups, particularly among young and middle-aged adults.

Table 2: Distribution of Cases According to Manner of Death (n = 382)

Manner of death	Number of cases	Percentage (%)
Suicidal	168	44.0
Accidental	124	32.5
Homicidal	54	14.1
Natural	36	9.4
Total	**382**	**100**

Table 2 shows that suicidal deaths constituted the highest proportion of cases (44.0%), followed by accidental deaths (32.5%). Homicidal deaths accounted for 14.1% of cases, while natural deaths formed the smallest group (9.4%).

Table 3: Distribution of Cases According to Cause of Death (n = 382)

Cause of death	Number of cases	Percentage (%)
Asphyxia (mainly hanging)	116	30.4
Poisoning	98	25.7
Road traffic accidents	84	22.0
Blunt force injuries	38	9.9
Burns	22	5.8
Firearm injuries	12	3.1
Natural diseases	12	3.1
Total	**382**	**100**

Table 3 illustrates the distribution of medicolegal autopsy cases according to cause of death. Asphyxial deaths were the most common, accounting for 30.4% of cases, predominantly due to hanging. Poisoning was the second most frequent cause (25.7%), followed by road traffic accidents (22.0%). Other causes included blunt force injuries (9.9%), burns (5.8%), firearm injuries (3.1%), and natural diseases (3.1%).

Table 4: Age Group Distribution According to Manner of Death (n = 382)

Age group (years)	Suicidal	Accidental	Homicidal	Natural	Total
≤10	2	10	2	2	16
11–20	18	20	8	6	52
21–30	56	28	12	4	100
31–40	42	32	6	4	84
41–50	26	20	10	8	64
51–60	16	8	8	10	42
>60	8	6	8	2	24
Total	**168**	**124**	**54**	**36**	**382**

Table 4 shows the distribution of manner of death across different age groups. Suicidal deaths were most frequent in the 21–30 years age group, while accidental deaths predominated in the 31–40 years age group. Homicidal deaths were more commonly observed among younger and middle-aged adults, whereas natural deaths were relatively more frequent in the older age groups. Overall, younger adults contributed the majority of suicidal and accidental deaths.

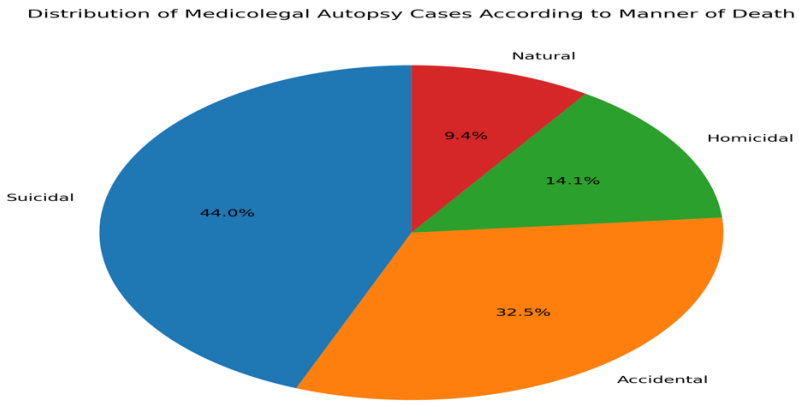

Figure 1: Distribution of Medicolegal Autopsy Cases According to Manner of Death

The pie chart demonstrates that suicidal deaths constitute the largest proportion of cases (44.0%), followed by accidental deaths (32.5%). Homicidal deaths account for 14.1%, while natural deaths represent the smallest share (9.4%).

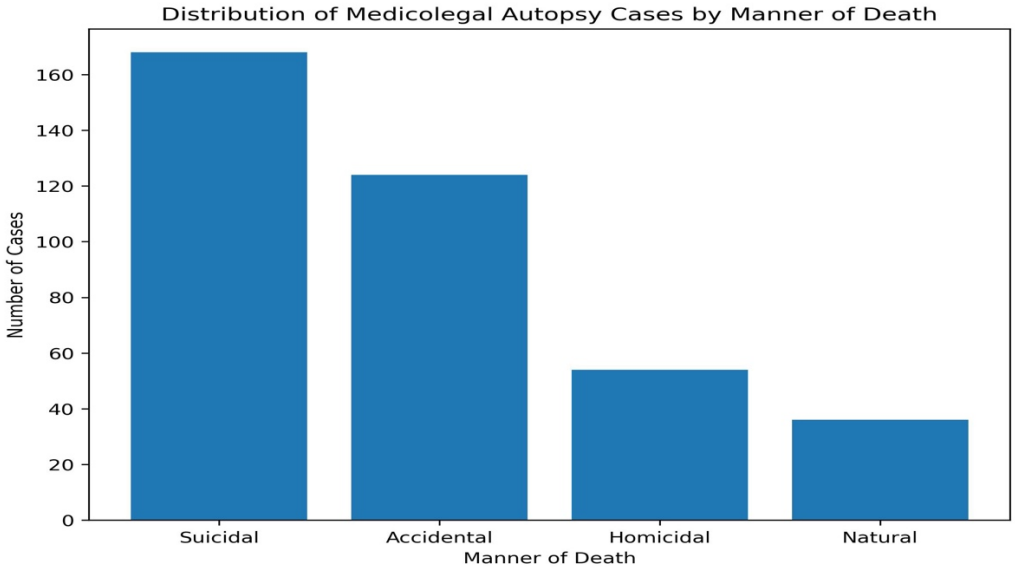

Figure 2: Distribution of medicolegal autopsy cases according to manner of death (n = 382).

The bar chart illustrates the distribution of medicolegal autopsy cases according to manner of death. Suicidal deaths constitute the highest number of cases (168), followed by accidental deaths (124). Homicidal deaths account for 54 cases, while natural deaths represent the lowest number with 36 cases. The chart clearly demonstrates that unnatural deaths, particularly suicides and accidents, form the majority of medicolegal autopsy cases.

Discussion

The present cross-sectional study analyzed 382 medicolegal autopsy cases to evaluate the pattern of deaths and to emphasize the role of medicolegal autopsy in determining the cause and manner of death. The findings reveal a predominance of unnatural deaths, with suicidal deaths constituting the largest proportion (44.0%), followed by accidental deaths (32.5%). This distribution is comparable with several studies from Bangladesh and other South Asian

countries, where suicide has been reported as the leading manner of death among medicolegal autopsy cases [1–3]. The rising trend of suicide reflects underlying psychosocial stressors, mental health issues, and socioeconomic pressures prevalent in developing countries.

A marked male predominance (68.6%) was observed in the present study, with a male-to-female ratio of approximately 2.2:1. Similar male predominance has been consistently reported in forensic autopsy studies, which may be attributed to greater exposure of males to occupational hazards, road traffic incidents, interpersonal violence, and higher risk-taking behavior [4,5]. The majority of cases belonged to the 21–40 years age group, accounting for nearly half of the total cases. This finding is in agreement with previous studies that identify young and middle-aged adults as the most vulnerable group for unnatural deaths, particularly suicide and accidents, resulting in significant social and economic consequences [6,7].

With regard to cause of death, asphyxial deaths, mainly due to hanging, were the most common (30.4%), followed by poisoning (25.7%) and road traffic accidents (22.0%). Hanging has been reported as the most frequently used method of suicide in many autopsy-based studies because of its easy accessibility and high fatality rate [2,8]. Poisoning remains a major cause of death, reflecting the widespread availability of pesticides and other toxic substances, along with inadequate regulatory control [9]. Road traffic accidents also constituted a substantial proportion, highlighting ongoing issues related to traffic safety and enforcement of road laws.

The age-wise analysis of manner of death showed that suicidal deaths were most frequent in the 21–30 years age group, while accidental deaths predominated in the 31–40 years group. These patterns are consistent with earlier findings, suggesting that emotional stress, unemployment, marital discord, and financial instability may contribute to higher suicide rates among younger adults, whereas occupational and commuting risks increase accidental deaths among slightly older age groups [6,10].

Overall, the study underscores the indispensable role of medicolegal autopsy in accurately determining the cause and manner of death through systematic examination and correlation with circumstantial evidence. Despite challenges such as incomplete histories and decomposition, medicolegal autopsy remains crucial for ensuring justice, preventing misclassification of deaths, and contributing to reliable mortality data essential for public health planning [11].

Conclusion

The present study highlights the crucial role of medicolegal autopsy in determining the cause and manner of death in cases of medicolegal importance. Analysis of 382 autopsy cases revealed a predominance of unnatural deaths, with suicide emerging as the most common manner of death, particularly among young and middle-aged adults. Asphyxia due to hanging was the leading cause of death, followed by poisoning and road traffic accidents. A clear male predominance was observed across all age groups. These findings underscore the importance of meticulous autopsy examination and careful correlation with circumstantial evidence and ancillary investigations to ensure accurate death certification. Medicolegal autopsy remains indispensable for the administration of justice, prevention of misclassification of deaths, and generation of reliable mortality data. Strengthening forensic services, improving documentation, and integrating autopsy findings with public health and preventive strategies may contribute to reducing preventable deaths and enhancing the overall effectiveness of

forensic death investigation.

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