

## ORIGINAL ARTICLE

# Role of Forensic Medicine in the Investigation of Unnatural Deaths – A Medicolegal Perspective

DOI: 10.5281/zenodo.18548480

Kamrun Nahar<sup>1</sup>, S M Yunus Ali<sup>2\*</sup>, Immam Hossain<sup>3</sup>, Saiful Islam<sup>4</sup>, Rasel Ahmad<sup>5</sup>

Received: 26 Jan 2026  
Accepted: 29 Jan 2026  
Published Online: 9 Feb 2026

Published by:  
Gopalganj Medical College, Gopalganj,  
Bangladesh

Correspondence to  
S M Yunus Ali

Copyright © 2025 The Insight



This article is licensed under a Creative Commons Attribution 4.0 International License.



## ABSTRACT

**Background:** Unnatural deaths represent a major medicolegal and public health challenge, particularly in developing countries. Forensic medicine plays a crucial role in determining the cause and manner of death through systematic autopsy and scientific analysis. Accurate medicolegal investigations are essential for delivering justice and reliable mortality statistics. This study aimed to evaluate the sociodemographic profile, manner and causes of unnatural deaths and the medicolegal contributions of forensic medicine in death investigations. **Methods & Materials:** This cross-sectional observational study was conducted at the Department of Forensic Medicine, Bangladesh Medical University, Dhaka, from July 2024 to June 2025. A total of 120 medicolegal autopsy cases of unnatural deaths were included in this study. Data were collected from autopsy findings, police inquiry reports and laboratory investigations. Statistical analysis was performed using SPSS version 25.0. **Results:** Most deaths occurred among individuals aged 21–30 years, with a marked male predominance. Accidental deaths were the most common manner of death, followed by suicidal and homicidal deaths. Road traffic injuries were the leading cause of death, followed by mechanical asphyxia. Forensic medicine established the cause of death in all cases and contributed significantly to the determination of the manner of death, corroboration with police investigations and expert opinions for judicial proceedings. **Conclusion:** Forensic medicine is indispensable in investigating unnatural deaths, providing scientific evidence essential for legal adjudication and public health planning.

**Keywords:** Unnatural death, Forensic medicine, Medicolegal autopsy, Cause of death.

(The Insight 2025; 8(4): 901-904)

1. Professor and Head, Department of Forensic Medicine, International Medical College & Hospital, Gazipur, Bangladesh (ORCID: 0009-0005-9753-5507)
2. Associate Professor, Department of Urology, Bangladesh Medical University, Dhaka, Bangladesh (ORCID: 0009-0002-1176-9926)
3. PhD Fellow, Bangladesh Medical University (OSD), Directorate General of Health Services (DGHS), Mohakhali, Dhaka, Bangladesh (ORCID: 0009-0002-8712-178X)
4. Professor of Female Urology and Andrology Unit, Department of Urology, Bangladesh Medical University, Dhaka, Bangladesh (ORCID: 0000-0003-4919-9404)
5. Assistant Professor, Medical Education, Department of Public Health and Informatics, Bangladesh Medical University, Dhaka, Bangladesh (ORCID: 0009-0009-2936-0169)

## INTRODUCTION

Unnatural deaths constitute a significant public health and legal concern worldwide, particularly in low- and middle-income countries, where rapid urbanization, traffic congestion and social stressors prevail. Forensic medicine plays a central role in the investigation of such deaths by establishing the cause, manner and circumstances through scientific examination [1]. Medicolegal autopsy remains the cornerstone of death investigation systems, ensuring accurate mortality statistics and supporting the justice system [2].

Globally, road traffic injuries, suicides and interpersonal violence are major contributors to unnatural deaths. The World Health Organization identifies road traffic injuries as the leading cause of death among young adults, especially in developing regions [3]. Autopsy-based studies from South Asia have consistently demonstrated a predominance of young male victims among unnatural deaths, reflecting occupational exposure and risk-taking behavior [4,5]. Accurate classification of these deaths is essential for developing effective prevention strategies and policy formulation. Forensic autopsy provides

objective evidence that aids in distinguishing accidental, suicidal and homicidal deaths.

Studies from Pakistan and India report accidental deaths as the most common cause, followed by suicides and homicides [6,7]. Mechanical asphyxia, sharp-force trauma and poisoning frequently emerge as the major causes in autopsy series [8]. Without forensic evaluation, the misclassification of deaths may occur, undermining legal outcomes and public health data.

In Bangladesh, medicolegal death investigation systems are confronted with significant challenges, including heavy workloads, inconsistent documentation quality and constrained resources. Investigations in Dhaka, the capital, have previously documented a notable prevalence of road traffic fatalities and asphyxial deaths among autopsied cases, reflecting critical issues impacting forensic practice locally [4]. However, there is a paucity of recent data that explores the wider medicolegal contributions of forensic medicine beyond cause of death determination. Modern forensic practice encompasses comprehensive approaches, including injury

reconstruction, weapon identification and the provision of expert testimony, which are integral to supporting police investigations and judicial processes. International frameworks advocate for the conscious integration of forensic evidence into legal systems to protect human rights and ensure accountability. Autopsy findings play a pivotal role by corroborating or refuting police inquests, thereby directly affecting case outcomes. Despite this, empirical research focusing on these forensic contributions remains limited within the South Asian context, underscoring a critical gap in the literature and practice evaluation in Bangladesh [9,10]. This study aimed to evaluate the sociodemographic characteristics, manner and causes of death and the medicolegal role of forensic medicine in unnatural death investigations at a tertiary medical university in Bangladesh. By analyzing autopsy-based data, this study aims to provide evidence that may inform policy, improve investigative practices and strengthen the medicolegal system.

**OBJECTIVES**

The objective of this study was to assess the role of forensic medicine in medicolegal death investigation.

**METHODS & MATERIALS**

This was a cross-sectional observational study conducted in the Department of Forensic Medicine, Bangladesh Medical University (BMU), Dhaka, Bangladesh. The study period extended from July 2024 to June 2025. A total of 120 medicolegal autopsy cases of unnatural deaths received during the study period were included in this study.

**Sample Selection**

**Inclusion Criteria**

- Cases subjected to complete medicolegal autopsy.
- Deaths classified as unnatural by legal authority.
- Both sexes and all age groups.
- Cases with adequate documentation and preserved specimens.

**Exclusion Criteria**

- Decomposed bodies obscuring the cause of death.
- Incomplete autopsy or missing records.
- Deaths of natural origin.
- Cases without legal authorization for examination.

**Data Collection Procedure**

Data collection was performed systematically using a pre-structured and pre-tested data collection sheet. Information was obtained from police inquest reports, hospital records, autopsy findings and laboratory reports. Socio-demographic variables included age, sex, marital status and residence. Autopsy examinations were conducted following standard forensic protocols, including external and internal examinations. Injury patterns, organ findings and toxicological evidence were documented meticulously. Cause and manner of death were determined based on autopsy findings, scene information and ancillary investigations. All examinations were conducted by qualified forensic medicine specialists to ensure consistency and accuracy. Data reliability was maintained through cross-verification with official records. Informed consent was ensured through legal custodians as per national medicolegal regulations. Confidentiality of personal and legal information was strictly maintained throughout the study.

**Statistical Analysis**

Data were entered and analyzed using SPSS version 25.0. Descriptive statistics were used to summarize frequencies and percentages. Results were presented in tabular form for clarity and interpretation.

**RESULTS**

Table I presents the socio-demographic profile of the study population (n = 120). The majority of deaths occurred in the 21–30-year age group (30.0%), followed by 31–40 years (23.3%). Males constituted 70.0% of cases, indicating a clear male predominance. Married individuals accounted for 56.7% of deaths. Urban residents represented 61.7% of cases, exceeding rural counterparts.

**Table - I: Socio-Demographic Profile of Unnatural Deaths (n = 120)**

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	≤20	14	11.7
	21-30	36	30.0
	31-40	28	23.3
	41-50	22	18.3
	>50	20	16.7
Sex	Male	84	70.0
	Female	36	30.0
Marital status	Married	68	56.7
	Unmarried	52	43.3
Residence	Urban	74	61.7
	Rural	46	38.3

Table II shows the distribution of the manner of death as determined by medicolegal autopsy. Accidental deaths were the most frequent (43.3%). Suicidal deaths accounted for 31.7% of cases. Homicidal deaths comprised 20.0%, while 5.0% remained undetermined.

**Table - II: Manner of Death as Determined by Medicolegal Autopsy (n = 120)**

Manner of Death	Frequency (n)	Percentage (%)
Accidental	52	43.3
Suicidal	38	31.7
Homicidal	24	20.0
Undetermined	6	5.0
Total	120	100.0

Table III describes the causes of death identified through forensic examination. Road traffic injuries were the leading cause (28.3%). Mechanical asphyxia, including hanging and drowning, constituted 25.0%. Sharp force injuries accounted for 15.0%, followed by blunt force injuries (13.3%). Poisoning and burns represented 11.7% and 6.7%, respectively.

**Table III: Cause of Death Identified Through Forensic Examination (n = 120)**

Cause of Death	Frequency (n)	Percentage (%)
Road traffic injuries	34	28.3
Mechanical asphyxia (hanging/drowning)	30	25.0
Sharp force injuries	18	15.0
Blunt force injuries	16	13.3
Poisoning	14	11.7
Burns	8	6.7
Total	120	100.0

Table IV outlines the medicolegal contributions of forensic medicine in unnatural death investigations. Establishment of cause of death was achieved in all cases (100%). Determination of the manner of death was possible in 85.0% of cases. Forensic findings corroborated police inquests in 80.0% of investigations. Identification of injury mechanisms or weapons occurred in 65.0%. Expert opinions supported judicial proceedings in 73.3% of cases.

**Table – IV: Medicolegal Contribution of Forensic Medicine in Unnatural Death Investigation (n = 120)**

Forensic Contribution	Frequency (n)	Percentage (%)
Establishment of cause of death	120	100.0
Determination of manner of death	102	85.0
Corroboration with police inquest	96	80.0
Identification of weapon/injury mechanism	78	65.0
Expert opinion for judicial proceedings	88	73.3

**DISCUSSION**

The present study provides an autopsy-based evaluation of unnatural deaths and highlights the multidimensional role of forensic medicine within the medicolegal framework of Bangladesh. The predominance of deaths among young adults, particularly those aged 21–30 years, aligns with findings reported by Rahim and Das, who documented a similar age distribution in mortuary-based studies from Dhaka [4]. This age group represents the most socioeconomically active segment of the population, which may explain their increased exposure to occupational hazards, road traffic incidents and psychosocial stressors. Male predominance observed in this study is consistent with regional and international literature, where males are disproportionately affected by unnatural deaths due to greater involvement in outdoor activities and risk-taking behaviors, as shown by Marri et al. and Malik et al. [5,6].

Accidental deaths emerged as the leading manner of death, followed by suicidal and homicidal deaths. This pattern closely resembles observations from South Asian autopsy series, where accidents, particularly road traffic incidents, account for the majority of medicolegal autopsies [7]. He et al. also reported accidental deaths as the most frequent manner in a large retrospective study from Shanghai, emphasizing the global relevance of accidental mortality in urban settings [11]. The proportion of suicidal deaths in the present study remains substantial and mirrors trends reported by Malik et al., who highlighted suicide as a major public health issue in the region [6]. The lower proportion of undetermined deaths suggests effective integration of autopsy findings with investigative information.

Road traffic injuries constituted the most common cause of death in this study, reinforcing the ongoing burden of traffic-related mortality in developing countries. The World Health Organization consistently identifies road traffic injuries as a leading cause of death among young adults, particularly in low- and middle-income nations [3]. Similar autopsy-based studies from Ethiopia and India have documented comparable patterns, where blunt force trauma and polytrauma predominate in traffic fatalities [12,13]. The high frequency of mechanical asphyxia, including hanging and drowning, is also in agreement with findings reported by Barek and Haque, who noted asphyxial deaths as a major category of unnatural

mortality in Bangladesh [1]. Sacco and Aquila emphasized that asphyxial deaths often require meticulous forensic examination to establish the mechanism and timing of hypoxia, underscoring the importance of expert forensic evaluation [8].

Sharp force and blunt force injuries together represented a significant proportion of deaths, reflecting interpersonal violence and assault-related fatalities. Studies from Pakistan and Indonesia have similarly reported sharp force trauma as a common cause of homicidal deaths identified at autopsy [5]. The identification of such injuries through systematic forensic examination plays a crucial role in reconstructing events and supporting criminal investigations. Poisoning-related deaths, although lower in proportion, remain a relevant concern, as highlighted by Miščikienė et al., who demonstrated a notable prevalence of toxicological findings in autopsy cases across Europe [14].

An important contribution of this study lies in documenting the broader medicolegal role of forensic medicine beyond cause of death determination. Establishment of cause of death in all cases underscores the centrality of autopsy in death investigation systems. Determination of the manner of death in the majority of cases is comparable to findings reported by Ranson and Bugeja, who emphasized that forensic pathology is fundamental to accurate classification of deaths within legal frameworks [2]. Corroboration with police inquest findings in a high proportion of cases highlights effective interdisciplinary collaboration, which is essential for ensuring consistency between medical and legal conclusions.

The provision of expert opinion for judicial proceedings in over two-thirds of cases reflects the reliance of courts on forensic expertise. Singh highlighted that forensic medicine professionals play a critical advisory role in assisting legal authorities and clinicians in medicolegal matters, particularly in complex cases of violence and suspected foul play [15]. The identification of injury mechanisms and weapons further demonstrates the investigative value of forensic examinations, supporting conclusions drawn by Joos et al. regarding the importance of robust medicolegal systems for justice and human rights protection [16].

Overall, the findings of this study are consistent with existing literature and reaffirm the indispensable role of forensic medicine in the investigation of unnatural deaths. By providing objective, scientific evidence, forensic practitioners contribute not only to accurate death certification but also to the integrity of criminal justice processes and public health surveillance.

**CONCLUSION**

This study demonstrates that forensic medicine plays a pivotal role in the investigation of unnatural deaths by accurately establishing the cause and manner of death and supporting legal proceedings. Young adult males were the most affected group, with road traffic injuries and mechanical asphyxia being the leading causes of death. The findings underscore the importance of systematic medicolegal autopsies in strengthening justice delivery and improving mortality data for public health planning.

**Acknowledgment:** *I would like to express my sincere gratitude for the invaluable support and cooperation provided by the staff, participants and my co-authors/colleagues who contributed to this study.*

**Conflicts of interest:** *There are no conflicts of interest.*

**REFERENCES**

1. Barek A, Haque SM. Investigation of unnatural death. *Anwer Khan Modern Medical College Journal*. 2014 Dec 3;5(2):34-8.
2. Ranson DL, Bugeja L. Medicolegal death investigation: coroner and forensic pathology functions and processes in Victoria, Australia. *Academic Forensic Pathology*. 2017 Dec;7(4):567-81.
3. World Health Organization. Road traffic injuries [Fact Sheet]. 2023 Dec 13. Accessed: 2025 Feb 14.
4. 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.
5. Marri MZ, Qayyum SA, Iqbal S, Zainab S, Yousuf K. Study on Unnatural Death Pattern in Mardan, Pakistan. *JMMC*. 2020;11(2):118-23.
6. Malik AR, Ayub F, Ayub M, Eddleston M, Imran N. A retrospective five-year autopsy-based study of suicide in Punjab province of Pakistan. *BMC public health*. 2025 Feb 11;25(1):563.
7. Yadav A, Kumar A, Swain R, Gupta SK. Five-year study of unidentified/unclaimed and unknown deaths brought for medicolegal autopsy at Premier Hospital in New Delhi, India. *Medicine, Science and the Law*. 2017 Jan;57(1):33-8.
8. Sacco MA, Aquila I. Post mortem molecular biomarkers of asphyxia: a literature review. *International Journal of Molecular Sciences*. 2024 Oct 29;25(21):11607.
9. Pooryousef V, Cordeil M, Besançon L, Bassed R, Dwyer T. Collaborative forensic autopsy documentation and supervised report generation using a hybrid mixed-reality environment and generative ai. *IEEE Transactions on Visualization and Computer Graphics*. 2024 Sep 9.
10. Sessa F, Esposito M, Messina G, Di Mizio G, Di Nunno N, Salerno M. Sudden death in adults: a practical flow chart for pathologist guidance. *InHealthcare* 2021 Jul 9 (Vol. 9, No. 7, p. 870). MDPI.
11. He M, Fang YX, Lin JY, Ma KJ, Li BX. Unnatural deaths in Shanghai from 2000 to 2009: a retrospective study of forensic autopsy cases at the Shanghai Public Security Bureau. *PLoS One*. 2015 Jun 25;10(6): e0131309.
12. Sete G, Alemu ST. Distribution of causes of death and associated organ injuries in road traffic accident-related fatalities: a postmortem study in Addis Ababa, Ethiopia. *BMC Public Health*. 2025 Jan 6;25(1):38.
13. Sartori A, Russo A, Sardo A, Raniero D. Fatal road traffic accidents and injuries: a preliminary study. *International Journal of Legal Medicine*. 2025 Jan;139(1):375-81.
14. Miščikienė L, Štelemėkas M, Petkevičienė J, Rehm J, Lange S, Trišauskė J. The prevalence of alcohol-related deaths in autopsies performed in Lithuania between 2017 and 2020: a cross-sectional study. *European journal of public health*. 2024 Oct;34(5):979-85.
15. Singh G. Role of Forensic Medicine Doctors in Assisting Non-Forensic Clinicians with Medico legal Cases: Should it be considered Formal Work? *International Journal of Medical Justice*. 2025 Jun 30;3(1):65-70.
16. Joos O, Mrkic S, Sferrazza L. Legal frameworks: A starting point for strengthening medicolegal death investigation systems and improving cause and manner of death statistics in civil registration and vital statistics systems. *Academic forensic pathology*. 2021 Jun;11(2):103-11.