

Pattern of Unnatural Deaths in the Geriatric Population: A Retrospective Autopsy Study at a Tertiary Care Centre, Lakhimpur in Assam

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ABSTRACT

Background: The geriatric population is particularly vulnerable to morbidity and mortality following trauma and other external causes due to age-related physiological changes, comorbidities, impaired sensory functions, reduced mobility, and increased susceptibility to complications. Unnatural deaths among elderly individuals are an important medico-legal and public health concern. Autopsy examination provides valuable information on the cause and manner of death and the circumstances and patterns of fatal injuries. However, data on unnatural deaths among geriatric individuals in the North Lakhimpur region of Assam remain limited.

Methods: A retrospective study was conducted over 1 year (January 2025 to December 2025) at Lakhimpur Medical College and Hospital. Data were collected from 63 (12.57%) geriatric autopsy cases of unnatural deaths using a structured proforma. Information regarding age, sex, manner, and cause of death was obtained from police records and relatives. Descriptive statistical analysis was performed.

Results: Out of a total of 501 autopsies, 63 cases (11.97%) were geriatric unnatural deaths. Males accounted for 68.25% and females 31.75% (male-to-female ratio of approximately 2.15:1.). The majority of cases (58.73%) belonged to the 60–69 years age group. Deaths with Hanging were most common 27 cases (42.85%), followed by accidental (36.50%).

Conclusion: Unnatural deaths among geriatric individuals are an important medicolegal and public-health concern. In the present study, hanging was the most common cause of unnatural death. The study aims to identify common patterns, causes, and medico-legal characteristics of these deaths and help identify preventable risk factors for appropriate preventive strategies.

Key-words: Geriatric population; Unnatural death; Medico-legal autopsy; Elderly; Trauma; Forensic medicine; Assam

INTRODUCTION

Population ageing is associated with an increased vulnerability to accidental injuries and other external causes of death^[1].

Elderly individuals frequently have reduced physical strength, impaired balance, visual and auditory impairment, slower reaction time, and multiple underlying diseases. These factors may increase the risk of falls, road traffic accidents, burns, poisoning and other forms of accidental or unnatural death^[2].

The medico-legal investigation of deaths in elderly individuals is particularly important because the circumstances surrounding death may be complex^[3,4]. A relatively minor traumatic event may result in fatal consequences in an elderly person because of osteoporosis, vascular fragility, neurological disorders or

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pre-existing systemic disease. In addition, determination of the precise cause and manner of death may have legal and social implications ^[5,6].

A medico-legal autopsy provides an opportunity to establish the cause of death, document injuries, identify associated pathological conditions and correlate autopsy findings with the available history and circumstances. Analysis of autopsy data can therefore provide useful epidemiological information regarding patterns of unnatural deaths in a particular geographical region ^[7,8].

Considering the limited region-specific literature on geriatric unnatural deaths in Assam, the present study was undertaken to analyse the pattern of unnatural deaths among individuals aged 60 years and above undergoing medico-legal autopsy at Lakhimpur Medical College & Hospital (LMCH), North Lakhimpur, Assam, during 2025. The study aimed to study the pattern of unnatural deaths among the geriatric population subjected to medico-legal autopsy at Lakhimpur Medical College & Hospital, North Lakhimpur, Assam, from 1 January 2025 to 31 December 2025.

MATERIALS AND METHODS

Study Design and Period- A retrospective descriptive observational study will be conducted based on medico-legal autopsy records and will include medico-legal autopsies conducted during a period of one year, from 1 January 2025 to 31 December 2025.

Study Setting- The study will be conducted in the Department of Forensic Medicine and Toxicology, Lakhimpur Medical College & Hospital, North Lakhimpur, Assam. LMCH is a tertiary-level multispecialty hospital and teaching institute in Lakhimpur district. Lakhimpur Medical College

Study Population- The study population were comprise all individuals aged 60 years and above who underwent medico-legal autopsy for suspected unnatural death at Lakhimpur Medical College & Hospital during the study period.

For the purpose of this study, geriatric age was defined as 60 years and above.

Inclusion Criteria- The following cases will be included:

- ❖ All medico-legal autopsy cases aged 60 years or above.
- ❖ Cases brought to or referred to Lakhimpur Medical College & Hospital for medico-legal autopsy between 1 January 2025 and 31 December 2025.
- ❖ Deaths classified as or suspected to be unnatural, including accidental, suicidal and homicidal deaths.
- ❖ Cases in which adequate autopsy and medico-legal records are available for analysis.

Exclusion Criteria- The following cases were excluded:

- ❖ Cases of natural death where no unnatural or medico-legal component is established.
- ❖ Cases in which the age cannot be reliably determined from available records.
- ❖ Cases with incomplete or insufficient medico-legal/autopsy records that prevent meaningful analysis.
- ❖ Unidentified bodies where essential demographic information required for the study cannot be established, unless sufficient information becomes available through subsequent identification.

Data Collection- Data were collected retrospectively from the following sources:

- ✓ Medico-legal autopsy reports.
- ✓ Post-mortem registers.
- ✓ Inquest reports.
- ✓ Police requisitions and related medico-legal documents.
- ✓ Hospital case records, where applicable.
- ✓ Histopathology and toxicology reports, when available.
- ✓ Other relevant records available in the Department of Forensic Medicine and Toxicology.

Statistical Analysis- Data collected from the medico-legal autopsy records were entered into Microsoft Excel and analysed using descriptive statistics. Categorical variables such as age group, sex, and cause of death were expressed as frequencies and percentages. The distribution of unnatural deaths was assessed according to demographic characteristics and cause of death, and the findings were presented using tables and figures.

RESULTS

Fig. 1 shows the gender-wise distribution of the 63 geriatric unnatural death cases. Males constituted 43 (68.25%) cases, whereas females accounted for 20 (31.75%) cases, demonstrating a male predominance.

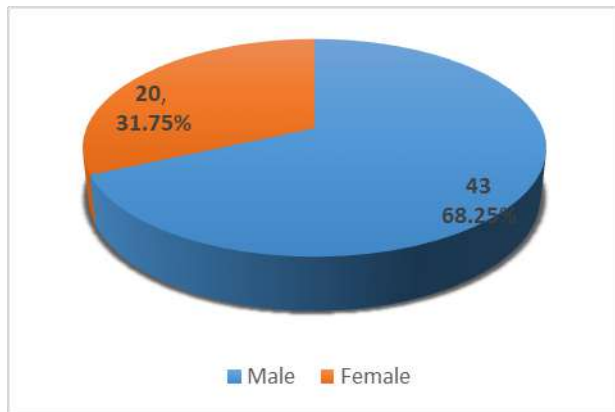


Fig. 1: Gender distribution of geriatric unnatural death cases

Fig. 2 illustrates the age-wise distribution of the study population. The majority of cases belonged to the 60–69 years age group (37; 58.73%), followed by 70–79 years (17; 26.98%), 80–89 years (6; 9.52%), and 90 years or above (3; 4.76%).

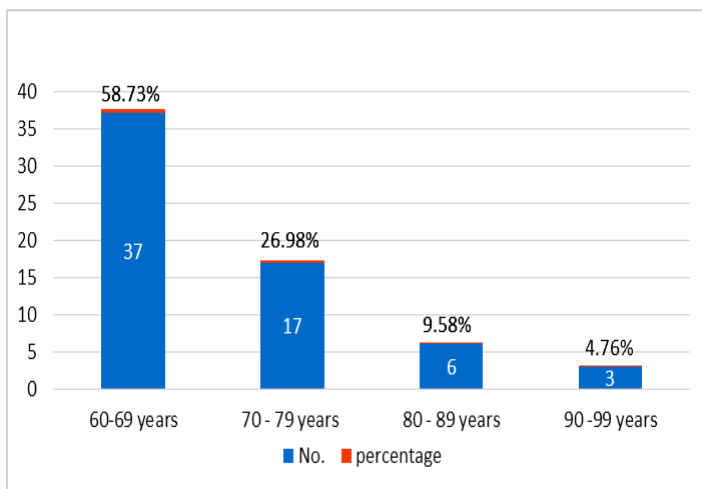


Fig. 2: Age-wise distribution of geriatric unnatural death cases

Fig. 3 depicts the distribution of cases according to the cause of death. Hanging was the most common cause, accounting for 27 (42.86%) cases, followed by road traffic accidents (23; 36.51%), drowning (9; 14.29%), and poisoning (4; 6.35%).

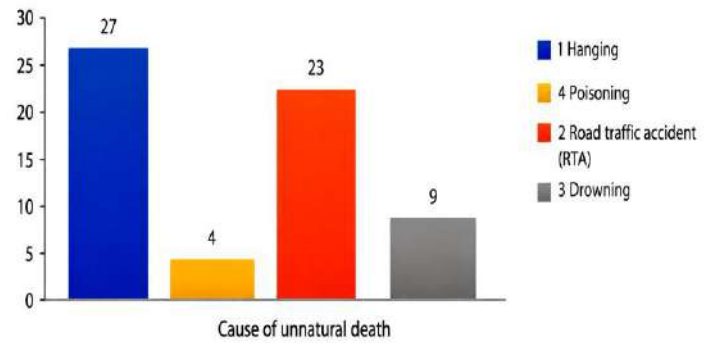


Fig. 3: Distribution of geriatric unnatural deaths according to cause of death

Among suicidal deaths, hanging was the predominant method and among accidental deaths, the commonest mechanisms were road traffic incidents.

DISCUSSION

The present retrospective autopsy study was conducted to evaluate the pattern of unnatural deaths among the geriatric population at Lakhimpur Medical College & Hospital, Assam, during the year 2025. During the study period, 501 medico-legal autopsies were conducted, of which 63 cases (12.57%) involved geriatric individuals aged 60 years and above. The proportion of geriatric cases in the present study indicates that unnatural deaths constitute an important component of medico-legal mortality among the elderly and warrant specific attention because of their increased vulnerability to trauma and other external causes.

In the present study, males predominated over females, with 43 males (68.25%) and 20 females (31.75%), giving a male-to-female ratio of approximately 2.15:1. Male predominance among unnatural deaths has been reported in several Indian autopsy-based studies. Vijay Balaji and Janani, in their study of elderly unnatural deaths at a government medical college in Chennai, also reported a predominance of males among medico-legal autopsy cases in the elderly population ^[9]. Similarly, Singh *et al.*, in a large 25-year autopsy study from Chandigarh, reported male predominance among unnatural deaths, with males constituting 73.4% of cases ^[10]. The male predominance observed in the present study may be related to greater exposure of elderly males to outdoor activities, transportation and environmental hazards, although social and behavioural factors may also contribute ^[11].



With regard to age distribution, the 60–69-year age group constituted the majority of cases, comprising 37 cases (58.73%), followed by the 70–79-year group with 17 cases (26.98%). Six cases (9.52%) were in the 80–89-year group, while only three cases (4.76%) were aged 90 years or above. Thus, there was a progressive decline in the number of unnatural deaths with increasing age. A similar predominance of the younger elderly age group has been described in previous autopsy studies. Balaji and Janani observed that the 60–70-year age group constituted the largest proportion of elderly medico-legal autopsy cases ^[9]. The higher frequency in the younger geriatric group may be explained by their relatively greater mobility and continued participation in outdoor, social and household activities, leading to greater exposure to potentially hazardous circumstances.

The most striking finding of the present study was the predominance of hanging as the cause of death, accounting for 27 cases (42.86%), followed by road traffic accidents (RTA) in 23 cases (36.51%). Drowning accounted for 9 cases (14.29%), while poisoning was responsible for 4 cases (6.35%). Therefore, hanging and RTA together accounted for 50 of the 63 cases (79.37%), demonstrating that these two mechanisms constituted the major contributors to geriatric unnatural mortality in the present study.

Among suicidal deaths, hanging was the predominant method. This finding is consistent with the observations of Balaji and Janani, who reported hanging as the commonest method of suicide among elderly medico-legal cases in their study from Chennai ^[9]. Similar findings have been documented in elderly autopsy populations outside India. In an autopsy study of elderly individuals from Erzurum, Turkey, hanging was the most common method of suicide, accounting for 60% of suicidal deaths ^[3]. The predominance of hanging may be related to the widespread availability of ligature materials and the fact that the method can be carried out without requiring specialised equipment. The high proportion of hanging in the present study may also reflect local sociocultural and psychosocial factors; however, these factors cannot be established from autopsy records alone.

Road traffic accidents constituted the second most common cause of death, accounting for 23 cases (36.51%), and were the predominant mechanism among accidental deaths. The finding is consistent with

observations from several studies showing that traffic-related trauma represents an important cause of unnatural mortality in older individuals. In a study of the 50-plus population in New Delhi, transport accidents constituted the largest category of unnatural deaths ^[12]. Similarly, Singh *et al.* reported road traffic accidents as one of the major contributors to unnatural mortality in their large autopsy series ^[10]. In the elderly, age-related deterioration in vision, hearing, balance, mobility and reaction time can increase the risk of road traffic injuries. Furthermore, physiological ageing and associated comorbidities may increase the severity of trauma and reduce the ability to withstand significant injury.

The relatively high proportion of RTA deaths in the present study is particularly relevant from a preventive public-health perspective. Elderly individuals may be vulnerable not only as drivers or passengers but also as pedestrians and other vulnerable road users. Previous research on road traffic fatalities has also demonstrated a significant male predominance and substantial contribution of road traffic trauma to medico-legal mortality in India ^[13]. The present finding therefore emphasises the need for improved road-safety measures, pedestrian facilities and greater awareness regarding the vulnerability of elderly road users.

CONCLUSIONS

Unnatural deaths among geriatric individuals constitute an important medicolegal and public-health concern. In the present study, hanging was identified as the most common cause of unnatural death among the geriatric population, highlighting its significant contribution to mortality in this vulnerable age group. The predominance of hanging underscores the need for greater attention to the circumstances and contributing factors associated with such deaths among the elderly. A better understanding of the patterns, circumstances, and mechanisms of these deaths may aid in the development of targeted preventive strategies, early identification of vulnerable individuals, improvement of elderly safety, and strengthening of family- and community-based support systems. Such measures may contribute to reducing preventable unnatural deaths and improving the overall safety and well-being of the geriatric population.

**CONTRIBUTION OF AUTHORS****Research concept-** Gurjeet Singh Juneja, Nandini Pegu**Research design-** Gurjeet Singh Juneja, Atiqul Hassan, Nandini Pegu**Supervision-** Debarshee Chakraborty, Rajkumari Preety Devi**Materials-** Gurjeet Singh Juneja, Atiqul Hassan**Data collection-** Gurjeet Singh Juneja, Atiqul Hassan, Nandini Pegu**Data analysis and interpretation-** Debarshee Chakraborty, Rajkumari Preety Devi**Literature search-** Gurjeet Singh Juneja, Atiqul Hassan, Rajkumari Preety Devi**Writing article-** Gurjeet Singh Juneja, Nandini Pegu**Critical review-** Debarshee Chakraborty, Rajkumari Preety Devi**Article editing-** Atiqul Hassan, Nandini Pegu**Final approval-** Debarshee Chakraborty, Rajkumari Preety Devi**REFERENCES**

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