



Age-Wise Patterns of Unnatural Deaths in Reproductive-Age Women: A Cross-Sectional Analysis of Manner and Cause

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ABSTRACT:

Background:

Unnatural deaths among reproductive age group females (15–49 years) are of significant public health concern. This study aims to evaluate the correlation between age and the manner and cause of such deaths to identify vulnerable subgroups and trends.

Objectives:

To determine the association between different age brackets within the reproductive age group and the manner (homicidal, suicidal, accidental) and cause (burns, poisoning, hanging, etc.) of unnatural deaths.

Methods:

This prospective cross-sectional study was conducted in the Department of Forensic Medicine and Toxicology at tertiary care center over a period of five months, from September 2024 to January 2025. A total of 128 cases of unnatural deaths in reproductive-age females brought for medico-legal autopsy were included. Data were collected on demographic details, age, cause, and manner of death, and statistical analysis was performed to find significant correlations.

Results:

Most unnatural deaths occurred in the 21–30 years age group. Suicide was the most common manner of death, particularly due to hanging and poisoning, while accidental deaths were more prevalent in the 15–20 years group, mainly due to burns. A statistically significant correlation was observed between age and both the manner and cause of death ($p < 0.05$).

Conclusion:

The findings suggest a strong age-related trend in unnatural deaths among reproductive-age females. Early adult women (21–30 years) are particularly vulnerable to suicidal deaths, calling for targeted mental health interventions and preventive strategies.

Introduction

Unnatural deaths among women of reproductive age (15–49 years) constitute a major medico-legal and public

health concern in developing countries like India. This age group represents a crucial phase in a woman's life, often involving significant social, economic, and



emotional transitions including education, marriage, motherhood, and employment [1]. The abrupt and untimely nature of these deaths not only results in significant family and societal trauma but also poses a challenge for public health policymakers aiming to reduce preventable mortality [2]. Globally, unnatural deaths in women especially in low and middle income countries are often linked to a spectrum of socio-cultural factors such as domestic violence, dowry-related harassment, mental health issues, substance abuse, and lack of access to healthcare [3]. In India, the National Crime Records Bureau (NCRB) consistently reports high numbers of female suicides, accidents, and homicides, particularly in the 20–30 years age bracket, which coincides with marriage and early motherhood [4]. The underlying causes and manner of such deaths vary significantly with age, geography, and socio-economic status. Understanding these patterns is essential for effective prevention, early intervention, and strengthening the medico-legal investigative process [5].

Suicidal deaths among reproductive-age women are commonly due to hanging, poisoning, and self-immolation. On the other hand, accidental deaths are frequently associated with burns, road traffic accidents, and drowning. Homicidal deaths in this age group often reflect gender-based violence, intimate partner violence, and honor-related crimes. In many cases, distinguishing between suicidal, accidental, and homicidal deaths requires thorough forensic and investigative collaboration [6,7].

Several studies have highlighted the vulnerability of young adult females, especially those between 21 and 30 years, to suicide and domestic violence, often exacerbated by dowry harassment, emotional distress, and postpartum depression [8]. However, limited research exists focusing specifically on the correlation between age and the manner and cause of unnatural deaths in this demographic, particularly through forensic autopsy-based cross-sectional studies.

This study seeks to fill that gap by systematically analysing unnatural deaths in females aged 15–49 years during a five-month period. By examining autopsy findings in relation to age, manner, and cause of death, the research aims to identify high-risk age groups and predominant causes, thus contributing valuable insights

for forensic experts, law enforcement, mental health professionals, and policymakers.

Methods

This prospective cross-sectional study was conducted in the Department of Forensic Medicine and Toxicology at tertiary care center over a period of five months, from September 2024 to January 2025. The study focused on females within the reproductive age group, defined as 15 to 49 years, who had died from unnatural causes and were subjected to medico-legal autopsy during the study period. The cases were selected consecutively based on inclusion and exclusion criteria, resulting in a final sample size of 128 cases.

Inclusion criteria encompassed all female deceased aged between 15 and 49 years who died due to unnatural causes categorized as suicide, homicide, or accident and were brought for post-mortem examination with a properly documented police inquest report. Cases were excluded if the death was found to be natural, if the body was extensively decomposed or skeletonized making assessment of cause or manner of death impossible, or if the age of the deceased fell outside the predefined range. For each included case, relevant socio-demographic details such as age, marital status, occupation, and residential status were recorded. The manner of death (suicidal, homicidal, or accidental) and the specific cause of death (e.g., hanging, poisoning, burns, drowning, firearm injury, etc.) were determined through meticulous examination of autopsy findings, supported by scene investigation details and inquest reports provided by law enforcement authorities. Each autopsy was performed in accordance with standard forensic protocols, and findings were documented systematically.

Data were entered and analysed using statistical software. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables. The age of the deceased was divided into subgroups (15–20 years, 21–30 years, 31–40 years, and 41–49 years) for detailed analysis. Chi-square test was employed to evaluate associations between age groups and both the manner and cause of death. Pearson's correlation coefficient was also calculated to determine the strength and direction of the relationship between age and the variables of interest. A p-value of less than 0.05 was considered statistically significant.



Ethical clearance for the study was obtained from the Institutional Ethics Committee prior to data collection. Confidentiality and anonymity of all cases were strictly maintained throughout the research process.

Results

A total of 128 cases of unnatural deaths in reproductive-age females (15–49 years) were studied. The highest incidence was observed in the 21–30 years age group. Suicide emerged as the most common manner of death, with hanging and poisoning being the predominant causes. Significant correlations were observed between age and both the manner and cause of death.

Table 1 shows most deaths occurred in the 21–30 years group, followed by 15–20 years. The lowest incidence was seen in women aged 41–49 years.

Table 1: Distribution of Cases According to Age Groups

Age Group (Years)	Number of Cases	Percentage (%)
15–20	31	24.2
21–30	54	42.2
31–40	28	21.9
41–49	15	11.7
Total	128	100

Table 2 highlights majority of the victims were married, indicating possible sociocultural stressors related to marriage and family life.

Table 2: Distribution of Cases According to Marital Status

Marital Status	Number of Cases	Percentage (%)
Married	81	63.3
Unmarried	41	32.0
Divorced	6	4.7
Total	128	100

Table 3 shows most unnatural deaths occurred in urban populations, possibly reflecting increased stressors or better reporting in urban settings.

Table 3: Distribution According to Place of Residence

Residence	Number of Cases	Percentage (%)
Urban	73	57.0



Rural	55	43.0
Total	128	100

Table 4 depicts that Suicide was the most common manner of death, followed by accidental and homicidal deaths.

Table 4: Distribution of Cases According to Manner of Death

Manner of Death	Number of Cases	Percentage (%)
Suicidal	69	53.9
Accidental	43	33.6
Homicidal	16	12.5
Total	128	100

Table 5 compares that Hanging was the most common cause of death, followed by burns and poisoning.

Table 5: Distribution of Cases According to Cause of Death

Cause of Death	Number of Cases	Percentage (%)
Hanging	39	30.5
Burns	32	25.0
Poisoning	26	20.3
Drowning	10	7.8
Blunt Force Injury	9	7.0
Firearm Injury	5	3.9
Strangulation	4	3.1
Others	3	2.4
Total	128	100

Table 6 shows that the highest number of suicidal deaths occurred in the 21–30 years age group.

Table 6: Age-Wise Distribution of Suicidal Deaths

Age Group (Years)	Suicidal Deaths	Percentage within Age Group (%)
15–20	17	54.8



21–30	34	63.0
31–40	12	42.9
41–49	6	40.0
Total	69	53.9

Table 7 shows Accidental deaths were most common in the 15–20 years group, largely due to burns.

Table 7: Age-Wise Distribution of Accidental Deaths

Age Group (Years)	Accidental Deaths	Percentage within Age Group (%)
15–20	12	38.7
21–30	14	25.9
31–40	10	35.7
41–49	7	46.7
Total	43	33.6

Table 8 compares those Homicidal deaths showed a slightly higher trend in older subgroups, particularly 31–49 years.

Table 8: Age-Wise Distribution of Homicidal Deaths

Age Group (Years)	Homicidal Deaths	Percentage within Age Group (%)
15–20	2	6.5
21–30	6	11.1



31–40	6	21.4
41–49	2	13.3
Total	16	12.5

Table 9 indicates that the Hanging was the most frequent method of suicide, followed by poisoning.

Table 9: Mode of Suicide

Method	Number of Cases	Percentage (%)
Hanging	27	39.1
Poisoning	22	31.9
Burns	9	13.0
Drowning	6	8.7
Others	5	7.3
Total	69	100

Table 10 confirms that the Burns were the predominant cause of accidental death, especially in younger women.

Table 10: Mode of Accidental Deaths

Cause	Number of Cases	Percentage (%)
Burns	21	48.8
Road Accidents	10	23.3
Drowning	4	9.3
Electrocution	3	7.0
Others	5	11.6
Total	43	100

Discussion

This study aimed to investigate the correlation between age and the manner and cause of unnatural deaths among reproductive-age females. The findings shed light on a highly vulnerable demographic group and reinforce the need for multidimensional strategies to address both preventable mortality and underlying socio-cultural

triggers [9]. A majority of the cases in our study belonged to the 21–30 years age group, accounting for over 42% of all unnatural deaths. This age range is typically associated with major life transitions, including marriage, childbirth, and early career stages, which may increase psychosocial stress. Similar trends have been reported in previous Indian and international studies,



wherein young adult females bear a disproportionate burden of stress, domestic violence, and emotional turmoil, often culminating in suicide or other forms of unnatural death [10]. Suicide was the leading manner of death in our study, comprising 53.9% of cases. Hanging was the most frequently used method, followed by poisoning and burns [11]. This aligns with the patterns observed in NCRB reports and other forensic research, where suicide by hanging and ingestion of pesticides or household chemicals is commonly documented among women in India [12]. The predominance of hanging suggests not only easy accessibility but also the influence of impulsivity in suicidal behavior [13]. Moreover, poisoning particularly with agricultural or organophosphate compounds remains an endemic public health challenge in rural and semi-urban areas. Married women were more frequently represented in the dataset, forming 63.3% of the total cases. This is particularly concerning given that marriage is conventionally regarded as a stabilizing social institution [14]. However, our findings and those of similar studies point toward the darker side of matrimony dowry harassment, spousal abuse, and emotional neglect—all of which may culminate in suicidal ideation or even homicide. The relatively high incidence of homicide in the 31–40 years age group suggests that domestic abuse can be long-standing and escalate with time [15].

Burns emerged as the second most common cause of death and were notably predominant in accidental deaths. In India, accidental burns often result from unsafe cooking practices, loose clothing catching fire, or kerosene stove bursts. However, it is important to acknowledge the blurred line between accidental and suicidal or homicidal burns, especially in the context of dowry deaths [16]. A number of studies have documented misclassification of homicides as accidents due to family or societal pressure, highlighting the need for thorough forensic evaluation and unbiased investigation. Accidental deaths were more common in the younger age brackets, particularly among those aged 15–20 years. This could be attributed to risk-taking behavior, lack of supervision, and unawareness of potential hazards. Road traffic accidents and electrocution were also noted, but burns constituted nearly half of all accidental deaths. These findings underscore the importance of domestic safety education,

particularly for young women in both rural and urban settings [17].

Homicidal deaths accounted for 12.5% of all cases. While lower in percentage, their implications are significant. Most homicides were related to domestic violence and dowry disputes, reflecting persistent gender-based violence and social inequities. The 21–40 years age group was most affected, again pointing toward vulnerabilities that span early to mid-reproductive years. Strangulation, blunt force trauma, and firearm injuries were the key homicidal mechanisms, necessitating both legal and social reforms to protect women in domestic environments [18].

A statistically significant correlation was found between age and both the manner and cause of death. This finding supports the hypothesis that different age groups exhibit distinct patterns of vulnerability and mortality mechanisms. The Pearson correlation coefficients, although moderate, suggest that as women age within the reproductive span, the risk of certain types of unnatural deaths, such as homicide, may increase, while others like accidental deaths may decline. The urban-rural divide in this study was not stark, but urban residents formed a slight majority. This could reflect better death reporting and access to medico-legal services in urban settings [19]. However, it is equally plausible that urban life brings with it a different set of stressors—social isolation, professional competition, and strained family relationships—which may contribute to unnatural deaths, particularly suicides.

The study is not without limitations. The findings are based on cases brought for medico-legal autopsy and may not represent all unnatural deaths in the community, particularly those that go unreported or are misclassified. Additionally, while inquest reports and police data were used to assist in determining manner and cause of death, they are sometimes incomplete or biased. Nevertheless, the strength of this study lies in its prospective design, comprehensive autopsy evaluations, and the focus on an often-neglected yet high-risk demographic group.

In conclusion, this study reinforces the grim reality that reproductive-age women in India are highly susceptible to unnatural deaths, particularly suicides and domestic violence-related fatalities. The strong correlation between age and manner/cause of death highlights the need for targeted interventions legal safeguards, mental



health support, community awareness, and empowerment programs for women to prevent such tragic losses. Forensic experts, policymakers, and healthcare professionals must work in synergy to detect, investigate, and mitigate the root causes of unnatural deaths among women during their most socially and biologically active years.

Conclusion

The present study provides crucial insights into the pattern, manner, and cause of unnatural deaths among females in the reproductive age group, emphasizing the deep-rooted sociocultural and psychological challenges that confront women during these years. A significant number of deaths were concentrated in the 21–30 years age group, a period marked by intense social, familial, and occupational transitions. Suicide emerged as the most common manner of death, with hanging and poisoning as the predominant methods, reflecting a combination of emotional distress, impulsivity, and accessibility of lethal means.

The study also highlights the alarming persistence of homicidal deaths, primarily linked to domestic violence and dowry-related issues, indicating that despite legal reforms, gender-based violence continues to claim lives in silence. Accidental deaths, especially from burns and electrocution, further underscore the need for improving household safety and increasing public awareness in both urban and rural settings.

The statistical correlation between age and both the manner and cause of death confirms that vulnerability is not uniformly distributed across the reproductive span. Instead, distinct age-specific patterns exist, suggesting the need for tailored preventive strategies. Early adulthood appears to be the most fragile period, requiring focused mental health interventions, socio-legal support, and family counseling.

In sum, unnatural deaths among reproductive-age women remain a major medico-social concern. The findings of this study underscore the urgent need for a multidisciplinary approach involving forensic experts, law enforcement, public health authorities, mental health professionals, and social workers to develop comprehensive policies and community-based interventions. Only through sustained awareness, gender equity, and accessible mental health services can we

hope to curb this silent epidemic and safeguard the lives of women in their most productive years.

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