

RESEARCH ARTICLE

An Analysis of Suicidal Deaths (Hanging and Poisoning): A Cross-Sectional Examination

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Abstract

Background: Suicidal deaths, a global public health concern, demand detailed analysis considering biological, psychological, and sociocultural factors. The World Health Organization estimates nearly 700,000 suicides annually, with Bangladesh experiencing 10,000 deaths, notably affecting young adult females. Adolescents, mainly aged 15 to 18, face higher suicide rates influenced by individual predispositions and environmental factors. Hanging and poisoning are prevalent methods, with hanging, especially suspension hanging, being a leading global cause of death. Research highlights the evolving nature of suicide methods in Asia, posing challenges for universal prevention strategies.

Aim of the Study: The study aimed to examine incidents of suicide death related to Hanging and Poisoning in Dhaka, Bangladesh.

Methods: This cross-sectional study at Dhaka Medical College, Bangladesh, spanning a year from January 2022 to December 2022, focused on 350 autopsies investigating suicide-related deaths (hanging and poisoning). Data collected retrospectively from hospital records adhered to legal and ethical guidelines. Participants included adults over 18, with both genders considered, meeting the inclusion criteria. Exclusion criteria involved cases under 18 and natural deaths. The study emphasized informed consent and the right to withdraw. Systematic organization of information, including tables and graphs, explained in detail. Statistical analysis using SPSS on Windows presented mean values for continuous parameters and frequency/percentage for categorical parameters, ensuring a comprehensive overview.

Results: This study on 204 suicidal deaths by hanging and poisoning reveals a concentration among individuals aged 11-30, with the 21-30 age group contributing the highest percentage at 35.29%. Males account for 53.92%, and most victims are married (61.27%). Muslims constitute 92.16%, and students comprise the largest profession (38.73%). Suicides peak in summer (37.14%) and are attributed to family disharmony (28.43%) and unexplained reasons (33.33%). Hanging is the more prevalent method (54.41%), showing characteristics like parchmentation (93.69%) and a single ligature mark (96.40%), while poisoning cases exhibit distinct features like stomach content (26.88%) and signs of previous attempts (15.05%).

Conclusion: This study on suicidal deaths in Dhaka, Bangladesh, reveals patterns, triggers, and methods, emphasizing concentration among young adults. Family disharmony and unexplained reasons are prominent triggers, with notable gender differences favouring males. Hanging and poisoning are primary methods, each with unique autopsy findings. The study calls for targeted suicide prevention strategies, including comprehensive mental health initiatives, addressing familial conflicts, and tailored interventions for high-risk groups. Ongoing research and collaborative efforts involving healthcare professionals, policymakers, and communities are recommended to address this complex issue effectively.

Keywords: Suicidal Deaths, Hanging, Poisoning and Cross-Sectional Examination.

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1. Introduction

Suicidal deaths represent a significant public health concern globally, demanding meticulous scrutiny to comprehend the multifaceted factors that contribute to this devastating phenomenon [1]. Suicidal deaths present a complex puzzle influenced by a myriad of biological, psychological, and sociocultural factors [2]. The World Health Organization (WHO) estimates that close to 700,000 people die by suicide every year, making it a leading cause of death suicide claims approximately 10,000 lives each year, emerging as a major cause of death among young adult females in Bangladesh [3]. Although the overall estimated average suicide rate is 7.3 per 100,000 of the population annually, adolescents aged 15 to 18 experience significantly higher rates, with 17.1 in males and 22.7 per 100,000 in females [3, 4]. The prevalence of suicide attempts among adolescents is estimated to range from 100 to 200 for each completed suicide [5]. Notably, a prior suicide attempt is identified as a significant risk factor for subsequent instances of death by suicide [6]. The choice of suicide methods varies widely, reflecting the intricate interplay of individual predispositions and environmental influences [7]. Among the methods employed, hanging and poisoning emerge as particularly noteworthy due to their prevalence and potential for lethality. Hanging, a form of violent asphyxia resulting from the suspension of the body, is a leading global cause of death, claiming over a million lives annually [7]. Also known as self-suspension, this act involves using a ligature around the neck, with the body's weight serving as the constricting force [8]. Complete or partial hanging may occur, depending on whether the force affects the entire body or just the head [8]. Potentially fatal outcomes include spinal cord injuries (in judicial hanging), vagal inhibition, and mechanical constriction of neck structures. Generally presumed to be a suicide method, hanging warrants consideration unless compelling evidence suggests otherwise [10]. Research reveals that common suicide methods in Asia evolve with technological and societal changes, exhibiting distinct age and gender characteristics. This variability poses challenges in developing universally effective suicide prevention strategies across diverse sex and age groups [10]. Suspension hanging and drop hanging are the two basic types of hanging. Other than hypoxia, a drop hanging can kill, and in situations when someone survives, it can leave long-term effects such as cerebral anoxia, laryngeal fracture, cervical spine fracture, tracheal fracture, and carotid artery damage. However, suspension hanging

is the more prevalent of the two hanging methods. When using the suspension method, the body can occasionally be suspended from above, which is referred to as complete hanging. Partial hanging occurs when a portion of the body contacts the ground, also known as incomplete hanging [12]. Hanging requires no complicated preparation and simply the expense of ligature material. A small rope around the neck may render a person unconscious in 15 seconds, making it a painless and quick death option [8]. However, Poisoning, a method of self-harm through the intentional ingestion of toxic substances, has emerged as a significant and complex public health concern with implications reaching across demographic boundaries.[13]. Poisoning accounts for a notable proportion of self-harm incidents globally and poses a unique set of challenges for both medical practitioners and public health researchers [14]. The intentional ingestion of substances, ranging from pharmaceuticals and household chemicals to pesticides, creates a complex landscape for understanding the motives and circumstances surrounding suicidal acts [14]. The choice of poisoning as a method reflects not only the accessibility of potential agents but also the intricate interplay of cultural, social, and psychological factors [15]. The study aimed to examine incidents of suicide death related to Hanging and Poisoning in Dhaka, Bangladesh.

2. Methodology and Materials

This descriptive cross-sectional study was conducted at the Department of Forensic Medicine & Toxicology, Dhaka Medical College, Dhaka, Bangladesh. The research spanned one year, commencing from January 2022 to December 2022, adhering strictly to legal and ethical guidelines. The investigative team gathered retrospective data from Department of Forensic Medicine & Toxicology. A total of 350 autopsies were conducted to investigate deaths attributed to suicide (Hanging and Poisoning). Opinions were formulated based on autopsy findings, supplemented by additional investigations when deemed necessary. Before data collection, a comprehensive overview of the study was provided, and informed consent was obtained from the legal guardians of the study participants. Participants were also informed of their right to withdraw from the study at any point.

2.1 Inclusion Criteria

- Aged more than 11 years.
- Both male and female.
- Cases including Hanging and Poisoning.

2.2 Exclusion Criteria

- Death cases under 11 years.
- Natural death cases.
- Others suicidal cases.

The information was organized systematically, utilizing appropriate tables or graphs based on their relevance. Detailed explanations accompanied each table and graph to ensure a comprehensive understanding. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) program on the Windows platform. Mean values with standard deviations represented continuous parameters, while frequency and percentage were used for categorical parameters.

3. Results

The age distribution of 204 suicidal deaths by hanging and poisoning reveals a notable concentration among individuals aged 11-30, constituting approximately two-thirds of the cases. Specifically, the 21-30 age group contributes the highest percentage at 35.29%. The mean age of 28.84 suggests a relatively young demographic (Table 1). Figure 1 reveals a predominance of male cases, accounting for 53.92%, compared to female subjects at 46.08%. Table 2 provides a comprehensive overview of the socio-demographic characteristics of the study population.

Table 1. Age distribution of the study cases (N=204).

| Age groups (in the year) | Frequency (n) | Percentage (%) |
|--------------------------|---------------|----------------|
| 11-20 | 66 | 32.35 |
| 21-30 | 72 | 35.29 |
| 31-40 | 30 | 14.71 |
| 41-50 | 22 | 10.78 |
| ≥60 | 14 | 6.86 |
| Total | 204 | 100.00 |
| Mean±SD | 28.84±12.76 | |

Most individuals were married (61.27%), while singles constituted 35.29%. Notably, Muslims comprised 92.16% of the cases. The most prevalent profession was students (38.73%), and a substantial portion had completed 7-12th grade (34.31%). Figure 2 illustrates the suicides across different seasons, with the highest incidence during summer at 37.14%, followed by monsoon at 32.29%, winter at 26.86%, and post-monsoon or autumn at 3.71%. Table 3 delineates the reasons for suicide; family disharmony emerges as the most prevalent reason (28.43%), followed by unexplained reasons at 33.33%. Emotional conflicts with parents (15.69%) and failure of the love affair (10.78%) also feature prominently. Among the study cases, 54.41% of subjects had died by hanging, and 45.59% of subjects had died by poisoning (Figure 3). Table 4 outlines the autopsy findings among the study cases, distinguishing between hanging (N=111) and poisoning (N=93) as suicide methods. For hanging patients, parchmentation is highly prevalent (93.69%), along with common indicators like a single ligature mark (96.40%) and Previous suicide attempt history (9.91%). Interestingly, no instances of hyoid bone or thyroid cartilage fractures were observed. In contrast, poisoning cases exhibit distinctive features, including stomach content (26.88%) and signs of previous suicide attempts (15.05%).

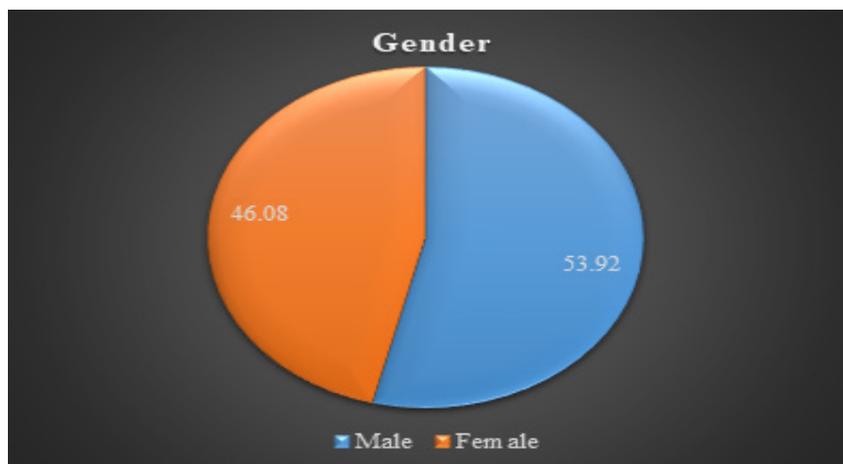


Figure 1. Gender distribution of the study case (N=204).

Table 2. Socio-demographical characteristics of the study case (N=204).

| Variables | Frequency (n) | Percentage (%) |
|--------------------|---------------|----------------|
| Marital status | | |
| Married | 125 | 61.27 |
| Single | 72 | 35.29 |
| Divorced | 4 | 1.96 |
| Widowed | 2 | 0.98 |
| Unmarried couples | 1 | 0.49 |
| Religion | | |
| Muslim | 188 | 92.16 |
| Hindu | 16 | 7.84 |
| Christian | 0 | 0.00 |
| Educational status | | |
| College and above | 54 | 26.47 |
| 7-12th grade | 70 | 34.31 |
| 1-6th grade | 41 | 20.10 |
| Read and write | 26 | 12.75 |
| Illiterate | 13 | 6.37 |
| Profession | | |
| Student | 79 | 38.73 |
| Housewife | 21 | 10.29 |
| Unemployed | 63 | 30.88 |
| Employed | 41 | 20.1 |

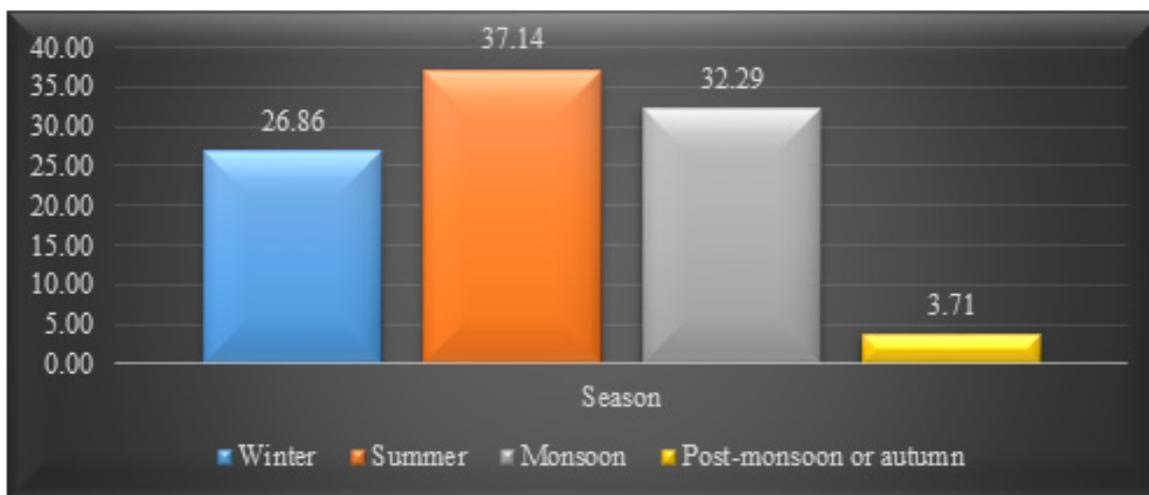


Figure 2. Suicidal season.

Table 3. Reason for suicide (N=204).

| Reason for suicide | Frequency (n) | Percentage (%) |
|---------------------------------|---------------|----------------|
| Failure of the love affair | 22 | 10.78 |
| Sexually harassed | 2 | 0.98 |
| Family disharmony with partners | 58 | 28.43 |
| Prolonged illness | 4 | 1.96 |
| Verbal abuse | 9 | 4.41 |
| Depression | 3 | 1.47 |
| Failure in exam | 6 | 2.94 |
| Emotional conflict with parents | 32 | 15.69 |
| Unexplained | 68 | 33.33 |

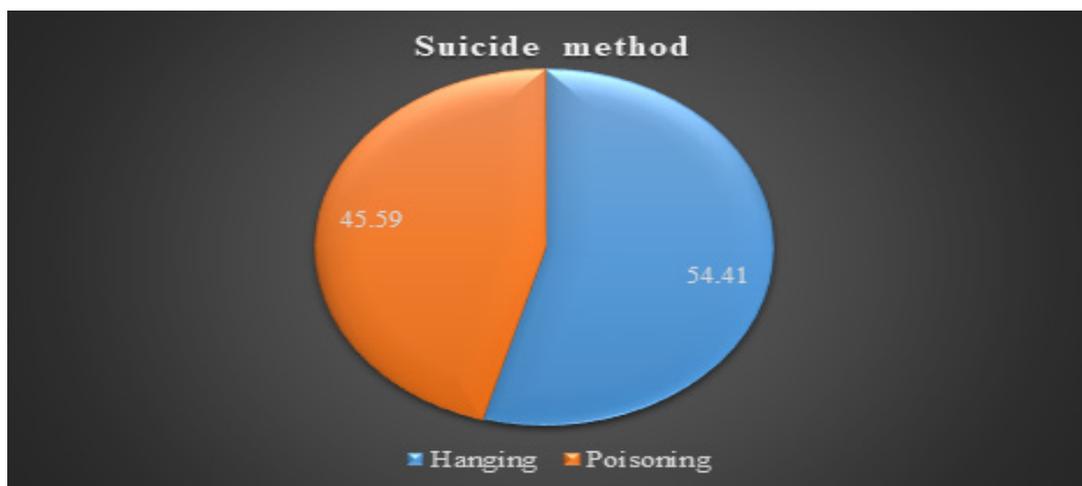


Figure 3. Suicide method of the study case (N=204).

Table 4. Autopsy finding of the study cases (N=204).

| Autopsy Finding | Frequency | Percentage (%) |
|----------------------------------|-----------|----------------|
| Hanging (N=111) | | |
| Parchmentization | 104 | 93.69 |
| Dribbling of saliva | 18 | 16.22 |
| Tongue bite | 21 | 18.92 |
| Single ligature mark | 107 | 96.40 |
| Double ligature mark | 4 | 3.60 |
| Carotid artery intimal tear | 3 | 2.70 |
| Previous suicide attempt history | 11 | 9.91 |
| Poisoning (N=93) | | |
| Oral cavity corrosion | 2 | 2.15 |
| Stomach content | 25 | 26.88 |
| Smell | 12 | 12.90 |
| Perforation | 1 | 1.08 |
| Previous suicide attempt history | 14 | 15.05 |

4. Discussion

The current research elucidates techniques, demographic profiles, and rationales for suicides subjected to autopsy at Dhaka Medical College and Hospital, Dhaka, Bangladesh, without altering the numbers. Suicidality is a significant healthcare challenge, particularly in low and middle-income nations [16]. As a developing country, Bangladesh grapples with this issue, actively working to address it. The age range of individuals committing suicide falls between 21-30 years. Numerous findings indicate that young individuals in their second and third decades of life contribute significantly to overall suicidal deaths [16]. Nunez-Samudio V et al. identified the most affected age group as 20-29 years [17]. A systematic review revealed a high prevalence of suicide rates in the 20-29 age group, with females predominating in suicides under 30 years, while males were more prominent in the 30 years or older age group. Shabnam et al. reported 46.9% of death cases aged

21-30 years [18]. The study indicated that men were more susceptible to suicide than women (53.92% vs. 46.08%). Nunez et al. found similar results, with 86% of the total victims being men and a male-to-female ratio of 6:1 [17]. Another study by Palash reported 48.71% male and 51.28% female [19]. While suicidal attempts were higher in females, complete suicides occurred more frequently in males [20]. Conversely, suicide was more common among males, but suicidal behavior was more prevalent in females [21]. A retrospective study in Kuwait from 2014-2018 revealed that 81.1% of cases were males, with 60.2% being Indians and only 7.4% Kuwaitis [22]. The study found that family disputes and financial problems were the leading causes of suicide. Another study showed that 33.7% of people committed suicide for personal reasons and 24.4% for unknown reasons [23]. A strong association was observed between suicide, comorbid physical or psychiatric ailments, and substance abuse, especially alcohol [24].

Suicides were mostly linked to psychiatric issues like depression, as demonstrated in another study [16]. In the country's low socio-economic strata, mental illness, alcohol abuse, and interpersonal difficulties were predominant [25]. The most preferred method of suicide in the study, regardless of gender, was poisoning (54.41%), followed by hanging (45.59%). Many studies have reported similar results regarding poisoning and hanging as the most common suicide methods in Bangladesh, while in other countries, firearms are also significant [26,27]. Dandona R et al. identified poisoning as the leading method of suicide, followed by hanging, mirroring our study [23]. Similarly, Rane A. et al. found hanging as a leading method, followed by poisoning. Self-immolation was also common among women, as seen in dowry deaths [25]. Hanging typically involves using household materials as a ligature, often committed when alone. In our study, postmortem examinations revealed dribbling of saliva (16.22%) followed by tongue bite (18.92%). Dribbling of saliva was found in 29.49% and 39.6% of studies by Begum A et al. in Bangladesh and Baral MP in Nepal, respectively [28,29]. In our study, parchmentation was observed in 93.63% of cases, compared to 87.49% in the study by Begum et al. [28]. Baral MP's study in Nepal showed face congestion in 35.35% of cases, with hyoid bone and thyroid cartilage fractures in 15.15% and 2%, respectively [29]. Sumon MS et al.'s study in Bangladesh found a 5% fracture in the hyoid bone. In our study, no fractures were observed in the hyoid and thyroid cartilage, possibly due to a limited number of cases and a higher proportion of older age victims. Internal findings revealed that the stomach's content (26.88%) was the most common internal finding. In Awasthi et al.'s study, external examination of the deceased revealed a characteristic odour in 175 cases, frothing at the mouth and nose in 162 cases, and cyanosis of extremities in 145 cases. On internal autopsy examination, congestion of the gastrointestinal tract with submucous petechial hemorrhage and generalized visceral congestion was present in all cases [31].

Limitations of the Study

Despite the comprehensive examination of suicide-related deaths in Dhaka, Bangladesh, this study has certain limitations. Firstly, the data are confined to cases handled by the Department of Forensic Medicine & Toxicology at Dhaka Medical College, potentially excluding suicides investigated by other institutions. The focus on autopsy cases may

introduce selection bias, as not all suicides undergo an autopsy. Additionally, the study's retrospective nature relies heavily on available records, limiting the depth of information on psychological and social factors contributing to suicide. The geographical and institutional specificity of the study may restrict the generalizability of findings beyond the Dhaka Medical College context.

5. Conclusion and Recommendations

In conclusion, this study sheds light on the patterns and characteristics of suicidal deaths in Dhaka, Bangladesh, mainly focusing on hanging and poisoning. The findings highlight a concentration of suicidal cases among young adults, with family disharmony and unexplained reasons emerging as predominant triggers. Gender differences are notable, with males being more susceptible to suicide. Hanging and poisoning are the primary methods, with unique autopsy findings distinguishing each. These insights underscore the need for targeted suicide prevention strategies tailored to diverse age and gender groups. Recommendations include the development of comprehensive mental health initiatives, addressing familial conflicts, and fostering awareness campaigns. Tailored interventions for high-risk groups, especially young adults, should be prioritized. Additionally, ongoing research and data collection can inform evolving prevention strategies in response to changing societal and technological landscapes. The study advocates for collaborative efforts involving healthcare professionals, policymakers, and communities to tackle the complex issue of suicidal deaths effectively.

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6. References

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