

Forensic Analysis of Suicidal Hanging Cases: A Study in a Tertiary Care Hospital in Bangladesh

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Abstract

Suicide by hanging is a major public health issue worldwide. A retrospective, cross-sectional study was conducted in the Department of Forensic Medicine & Toxicology, Sir Salimullah Medical College, Dhaka, Bangladesh, between February 2024 and January 2025, to examine the demographic patterns, circumstantial factors, and postmortem findings of suicidal hanging cases. A total of 155 cases of suicidal hanging were purposively selected based on autopsy reports, medical records, and police inquest documents. Our data revealed a male predominance (70.3%) and the most vulnerable age group was 20-30 years (45.2%). Most victims were unmarried (58.1%), unemployed (32.9%), or daily wage laborers (25.8%). Night-time incidents (42.6%) was predominant, while most used tools was rope (63.2%). Autopsy findings showed oblique ligature marks (76.8%), thyroid fractures (64.5%), petechiae (52.3%), and tongue protrusion (38.7%) as establishing characteristic patterns in suicidal hanging. This forensic analysis identified that young, unmarried males as the highest-risk demographic for suicidal hanging in Bangladesh, along with low socioeconomic factor being one of the key determinants. The findings underscore the urgent need for targeted prevention strategies and improved mental health support for vulnerable populations.

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Introduction

Suicide is a major global public health concern, accounting for over 700,000 deaths annually, with hanging being one of the most common methods worldwide.¹ In low- and middle-income countries like Bangladesh, suicide rates are alarmingly high, yet forensic and epidemiological data remain understudied.^{2,3} Hanging is a particularly lethal suicide method due to its high fatality rate and accessibility, making it a critical area of forensic and psychiatric research.⁴ Understanding the demographic patterns, circumstantial factors, and postmortem findings in suicidal hanging cases is essential for developing targeted prevention strategies and improving medico-legal investigations.⁵ Globally, hanging accounts for approximately 50–60% of all suicide deaths, with variations based on geographic, cultural, and socioeconomic factors.⁶ Studies from South Asia indicate that young adults, particularly males, are at higher risk, often influenced by unemployment, familial conflicts, and mental health disorders.^{7,8} In Bangladesh, suicide remains a stigmatized and underreported issue, with limited

forensic research focusing on hanging cases.⁹ Existing studies suggest that economic instability, social pressures, and lack of mental health support contribute significantly to suicidal behavior.¹⁰

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However, most data are derived from urban tertiary care centers, leaving gaps in nationwide epidemiological trends.¹¹ Forensic analysis of suicidal hangings provides crucial insights into the circumstances of death, including ligature materials, suspension points, and autopsy findings such as ligature marks, neck injuries, and petechial hemorrhages.¹² These findings help distinguish between suicidal, homicidal, and accidental hangings, ensuring accurate death certification and legal proceedings.¹³ Despite its importance, forensic documentation in Bangladesh is often inconsistent, emphasizing the need for standardized protocols in autopsy examinations.^{3,9} This study aimed to analyze suicidal hanging cases as autopsies done in the mortuary of Sir Salimullah Medical College, Dhaka, Bangladesh, focusing on sociodemographic profiles, circumstantial details, and postmortem findings. Our results are expected to contribute to the existing forensic literature, support suicide prevention strategies, and enhance medico-legal practices in Bangladesh.

Methods

This retrospective, cross-sectional study included 155 cases of suicidal hanging autopsied in the Department of Forensic Medicine & Toxicology, Sir Salimullah Medical College, Dhaka, Bangladesh, between February 2024 and January 2025. The study population comprised individuals of all ages and genders whose deaths were confirmed as suicidal hangings through medico-legal investigations.

Inclusion criteria: Cases were included, if they met the following criteria:

- 1) death confirmed as suicidal hanging by autopsy and Inquest report;
- 2) availability of complete demographic and autopsy records; and

3) cases with documented circumstantial evidence supporting suicide (e.g., suicide notes, witness statements).

Exclusion criteria: Cases were excluded, if

- 1) incomplete autopsy or police records were available; or
- 2) the body was in advanced decomposition, hindering accurate forensic assessment.

Data was collected from autopsy reports, hospital records, and police inquest files. Variables included age, gender, marital status, occupation, ligature material, time of incident, and autopsy findings (e.g., ligature marks, fractures, petechiae). A structured data extraction form was used to ensure consistency. Data was analyzed using Microsoft Excel sheet in the computer. Descriptive statistics (e.g., frequencies, percentages) were used to summarize categorical variables. Results were presented in both table and narrative forms. No inferential statistical tests were applied, as the study was descriptive.

Ethical clearance was obtained from the Ethical Review Committee of Sir Salimullah Medical College, Dhaka, Bangladesh.

Results

We analyzed 155 cases of suicidal hanging and a male predominance was observed 109(70.32%) over females 46(29.68%). The highest incidence was observed among young adults in the 20–30 years age group (45.2%), followed by the 31–40 years age group (28.4%). Most victims were unmarried (58.1%), while married individuals constituted 35.5% of cases. Among them, 32.9% were unemployed, 25.8% were daily wage labourer, 16.1% were students and 25.2% were other professionals (Table-I). The majority of incidents occurred at night (42.6%), followed by evening (30.3%) and morning (27.1%). Rope was the

most frequently used ligature material (63.2%), followed by scarves (18.7%) and electrical wires (9.7%) (Table-II).

Table-I: Sociodemographic characteristics of the study subjects (n=155)

Variables	Male Frequency (Percentage)	Female Frequency (Percentage)
Age group (in years)		
10–19	8 (5.2)	5 (3.2)
20–30	52 (33.5)	18 (11.6)
31–40	30 (19.4)	14 (9.0)
41–50	10 (6.5)	8 (5.2)
>50	9 (5.8)	1 (0.6)
Marital status		
Unmarried	59 (54.1)	31 (67.4)
Married	46 (42.2)	9 (19.6)
Divorced/Widowed	4 (3.7)	6 (13.0)
Occupation		
Unemployed	41 (37.6)	10 (21.8)
Day labourer	32 (29.4)	8 (17.4)
Student	11 (10.1)	14 (30.4)
Others	25 (22.9)	14 (30.4)

Table-II: Forensic characteristics of suicidal hanging of the study subjects (n=155)

Variables	Frequency (Percentage)
Time of incidence	
6 am–12 pm	(27.1)
12 pm–6 pm	(30.3)
6 pm–6 am	(42.6)
Ligature material	
Rope	98 (63.2)
Scarf	29 (18.7)
Electrical wire	15 (9.7)
Others	13 (8.4)

Autopsy findings revealed oblique ligature marks in 76.8% of cases, with thyroid cartilage fractures present in 64.5%. Petechial hemorrhages were observed in 52.3% of cases, while tongue protrusion

was noted in 38.7%. However, no association was observed between those forensic characteristics of hanging and gender ($p>0.05$) (Table-III).

Table-III: Comparison of forensic findings of suicidal hanging by gender

Features of suicidal hanging	Male Frequency (Percentage)	Female Frequency (Percentage)	p-value
Oblique mark	82 (75.2)	37 (80.4)	0.482 ^{NS}
Tongue protrusion	48 (44.0)	12 (26.1)	0.312 ^{NS}
Thyroid fracture	73 (67.0)	27 (58.7)	0.312 ^{NS}
Petechial hemorrhage	60 (55.0)	21 (45.7)	0.287 ^{NS}

Chi-square test was applied to reach p-value; NS=not significant

Discussion

The present study provides critical insights into the demographic, circumstantial, and autopsy profiles of suicidal hanging cases in a tertiary care hospital of Bangladesh. Our findings reveal several important patterns that warrant discussion in the context of existing literature and public health implications. The male predominance (70.3%) in suicidal hanging cases aligns with global trends where males typically show higher suicide rates by violent methods.¹⁴ This gender disparity may be attributed to sociocultural factors, including greater economic pressures on males, reluctance to seek mental health support, and higher rates of impulsive behavior.¹⁵ The peak incidence among young adults (20–30 years, 45.2%) corroborates findings from similar studies in South Asia¹⁶, highlighting this age group's vulnerability due to life transitions, unemployment, and relationship stressors. Our data showing unmarried status (58.1%) as a significant factor supports previous

research indicating social isolation as a suicide risk factor.¹⁷ However, the relatively high proportion among married individuals (35.5%) suggests marital discord may also be an important contributor, consistent with findings from neighboring countries.¹⁸ The occupational distribution, with unemployment (32.9%) and daily wage labor (25.8%) being most prevalent, underscores the crucial role of socioeconomic stressors in suicide etiology.¹⁹ The temporal pattern of incidents, with highest frequency at night (42.6%), may reflect both the private nature of suicidal acts and potential circadian influences on mood and impulsivity.²⁰ This finding has implications for suicide prevention strategies, suggesting enhanced monitoring during these vulnerable hours might be beneficial. The predominance of ropes as ligature material (63.2%) mirrors findings from other developing nations where accessibility and cultural familiarity influence method choice.²¹ The high frequency of oblique ligature marks (76.8%) and thyroid cartilage fractures (64.5%) in our autopsy findings corresponds with established forensic literature on hanging deaths.²² These characteristic findings are crucial for accurate medico-legal determination of hanging as the cause of death. The absence of significant gender differences in autopsy findings suggests that the biomechanics of fatal hanging may be similar across sexes, though biological and anthropometric factors might warrant further investigation.²³ The strong association between younger age and student status highlights education-related stressors as potential risk factors, consistent with recent studies on academic pressure and suicide.²⁴ Several limitations should be acknowledged. The single-centre study may limit generalizability to community settings. Retrospective data collection risks incomplete documentation. Besides, potential selection bias exists due to

purposive sampling, and incomplete documentation in some records may have affected data accuracy. Moreover, psychological autopsies were not performed to assess mental health history. Future research should incorporate prospective designs with psychological profiling to better understand suicide motivations. Our findings have important public health implications. The concentration of cases among young, unemployed males suggests targeted interventions should focus on this demographic, including job creation programs and gender-sensitive mental health services.²⁵ The common use of readily available ligature materials indicates potential for means restriction strategies, such as safe storage practices for ropes and similar items.

Conclusion

This study highlights that suicidal hanging in Bangladesh predominantly affects young, unmarried males, with socioeconomic instability being a key risk factor. The findings underscore the need for targeted mental health interventions, improved forensic documentation, and suicide prevention strategies focusing on vulnerable populations. Strengthening community awareness and implementing means restriction approaches could help reduce such preventable deaths. Further nationwide studies are recommended to develop comprehensive suicide prevention policies. Implementation of community-based mental health programs targeting young adults and unemployed populations are needed. Strengthening means restriction policies for common ligature materials should be in place. Moreover, enhancing forensic documentation protocols should be implemented nationwide. We should also train healthcare workers in suicide risk assessment as well as conduct further research incorporating psychological autopsies to understand underlying

motivations better.

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