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Original Research Article

RETROSPECTIVE ANALYSIS OF SUICIDAL HANGING CASES IN A TERTIARY CARE HOSPITAL OF THE WESTERN REGION OF WEST BENGAL:AN AUTOPSY-BASEDSTUDY

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ABSTRACT

Background: Suicidal hanging is a common method of suicide worldwide, necessitating detailed forensic investigation to differentiate it from other forms of asphyxial deaths. **Objective:** To retrospectively analyze the demographic profile, causative factors, ligature patterns, and forensic findings of suicidal hanging cases from three tertiary medical institutions in West Bengal. **Materials and Methods:** A retrospective observational study was conducted using autopsy records from Deben Mahata Government Medical College, Purulia; Sarat Chandra Chattopadhyay Government Medical College, Uluberia; and Murshidabad Medical College, Berhampore, West Bengal, covering a one-year period from August 2022 to July 2023. Data included demographics, ligature material, degree of suspension, presence of classical signs, and autopsy findings. Statistical analysis was performed using SPSS version 26. **Result:** Of 430 cases, males predominated (72.3%), with most victims aged 20–60 years (69.1%). Hanging typically occurred at home (64.4%), primarily due to educational and financial stress (54%). Coir ropes (31.16%) and nylon ropes (23.95%) were the common ligatures, mostly leaving continuous high-neck ligature marks. Classical forensic signs significantly correlated with partial hanging and high ligature placement ($p<0.001$). Internal injuries occurred in 53.7% of cases, with no significant difference between partial and complete hangings ($p=0.68$). **Conclusion:** Educational, financial, and familial stressors significantly contributed to suicidal hangings, predominantly affecting males aged 20–60 years. Comprehensive forensic evaluations are crucial in accurately differentiating hanging from other asphyxial deaths, thereby guiding preventive measures addressing underlying socioeconomic factors.

INTRODUCTION

Hanging is categorised as a violent asphyxial death resulting from body suspension by a ligature encircling the neck, with body weight serving as the constricting force.[1]In hanging incidents, the cause of death is predominantly suicide or accident, with homicide being infrequent.[2]Among the conventional methods of suicide, hanging is the most prevalent, succeeded by falls from height, firearms (predominantly in men), and poisoning (predominantly in women).[3]

The forensic pathologist's job is to figure out how the victim died and rule out or confirm that there were other ways the victim's neck was compressed before it was found suspended. The accuracy of the results depends on the correlation between the markings on the neck and the interior findings. Patterned abrasions or dry skin around the neck with symptoms of hypoxia are classical features that make the evaluation easier.[4] Forensic pathologists may have difficulties when examining cadavers with both standard and unusual ligature markings, calling for comprehensive postmortem examinations.

The markings on a person's neck are greatly affected by the kind of noose used. Soft textiles, such as sarees or scarves, can create nooses that leave little to no visible evidence, making identification more

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difficult.[5] Ropes and cords, on the other hand, tend to abrasion and produce deep furrows. In most circumstances, the mark a suspension leaves is an inverted "V" with a gap at the back. This mark helps to distinguish between hanging and ligature strangulation. However, low-suspension hangings can create horizontal marks on the neck that resemble ligature strangulation.[6]Differentiating between causes of death requires an accurate evaluation of these results.

Hanging is categorised as complete or incomplete. When the body is discovered fully hung from above and entirely suspended, it is termed full hanging; if any part of the body contacts the ground, it is referred to as incomplete or partial hanging.[3]

The most recent statistics from the National Crime Records Bureau (NCRB) indicate that in India, 58.2% of all suicide cases in 2022 used hanging, an increase from 57% in 2021. In 2022, 99,415 individuals committed suicide by hanging, whereas in 2021, the incidence of such suicides was 57%, totalling 93,580 cases.[7]

Forensic pathologists can solve mysteries by analysing the pattern of internal and exterior damage, in addition to other postmortem discoveries related to neck compression. On the other hand, specialists need to be able to spot exceptions to provide well-rounded, evidence-based opinions since unusual findings frequently call into question conventional wisdom.[8]

To gain insight into the typical and atypical findings related to hanging, the present study was planned to analyze the socio-demographic pattern, causes, and precipitating events of hanging, as well as the place of the incidence, ligature material, and post-mortem findings differentiating the cases of hanging from ligature strangulation in suicide Hanging Cases reported to our hospitalin the westernregion of West Bengal during 2022-2023.

MATERIALS AND METHODS

This retrospective study comprises hanging cases submitted for postmortem assessment at the Department of Forensic Medicine and Toxicology, DMGMCH, Purulia, West Bengal. The study was conducted from August1 , 2022, until July 31, 2023. Our centre documented 447 instances of hanging from August , 2022, to July, 2023. The inclusion criterion encompassed autopsies conducted on all medicolegal cases of asphyxial fatalities resulting from hanging. The exclusion criteria were all violent asphyxial fatalities except Strangulation, birth asphyxia, unexpected natural deaths, and the presence of advanced decomposition.Considering all the inclusion and exclusion criteria, 430 cases were included. Following an examination of case documents, inquest findings, and autopsy reports, the cases were analysed to ascertain the prevalence of asphyxial fatalities resulting from hanging, including variables such as age group, gender, occupation, month, predisposing factors, and marital status. The acquired data were organised and examined. Data analysis was conducted using SPSS version 27. The obtained data were displayed as frequency and percentage in figures and tables.

Materials and Methods

Study Design: A retrospective, observational study.

Study Setting: The study was conducted collaboratively across multiple centers:

- Department of Forensic Medicine and Toxicology, Deben Mahata Government Medical College, Purulia, West Bengal.
- Sarat Chandra Chattopadhyay Government Medical College and Hospital (SCCGMCH), Uluberia, West Bengal.
- Murshidabad Medical College & Hospital, Berhampore, West Bengal.

Study Duration: Data were retrospectively collected from records spanning one year (August 1, 2022, to July 31, 2023).

Study Population: The study population included all medico-legal autopsy cases of suicidal hanging deaths submitted during the study period at the participating centers.

Inclusion Criteria

- Confirmed cases of suicidal hanging based on police inquests and autopsy findings.

Exclusion Criteria

- Cases involving advanced decomposition compromising forensic examination.
- Hanging cases with unclear or undetermined manner of death.
- All other violent asphyxial deaths apart from hanging (e.g., strangulation, suffocation).

Sample Size: A total of 430 cases met the inclusion criteria after reviewing initial documentation.

Data Collection Procedure

Data were systematically collected from autopsy reports, police inquest reports, and hospital records. Documented variables included demographic characteristics, location of incident, ligature materials, degree of suspension, ligature mark patterns, external and internal injuries, and the presence of classical signs. Collected data were entered into Microsoft Excel and analyzed using SPSS software (version 26). Descriptive statistics, including frequency distributions and percentages, were utilized.

RESULTS

Over one year, there were 430 instances of deaths by suicide by hanging. Among them, 311 (72.3%) were male. The majority, 297 individuals (69.1%), were aged between 20 and 60 (Table 1). The majority, 277 (64.4%), were discovered hanging in their residences, followed by 131 (30.5%) victims retrieved from locations familiar to the deceased. Only 6 (1.4%) victims were discovered hanging at an unidentified location. There were 92 partial suspensions (21.4%) and 338 complete suspensions

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(78.6%). Educational and financial stress was the cause of suicide in 232 (54%) victims. One hundred and twenty-nine individuals (30%) had familial conflicts, while seventeen individuals (4%) took their own lives as a result of failed romantic relationships. Fifty-two individuals (13%) had various additional explanations. A suicide note was discovered in merely 47 (10.9%) instances.

Table 1: Age distribution of the study group

Age group	Frequency
<20 years	63 (14.7%)
20 – 40 years	107 (24.9%)
41 – 60 years	204 (47.4%)
>60 years	56 (13%)
Total	430 (100%)

The investigation of ligature patterns in 430 cases found that 22.09% employed soft fabric, 3.49% intermittent, 17.67% continuous, and 0.93% had no markings. Coir rope was the most prevalent material at 31.16%. These showed 3.26% intermittent patterns, 27.67% continuous patterns, and 0.23% no marks. 23.95% was nylon rope, 3.72% intermittent, and 20.23% continuous. No cases were ligature-free. 8.84% of instances had belts, 1.16% intermittent, 7.21% continuous, and 0.47% no marks. Other materials were found in 9.77% of cases: 2.56% intermittent, 6.28% continuous, and 0.93% no marks. Ligature markings were absent in 4.19%, intermittent in 0.93%, continuous in 3.02%, and omitted in 0.23%. Most cases (82.09%) had constant ligature patterns, followed by 15.12% intermittent patterns and 2.79% without. This shows ligature material and pattern variation.There was a significant difference between the groups (p=0.013).

Table 2: The ligature material and pattern of ligature mark

Pattern of ligature mark / Ligature material	Intermittent pattern	Continuous pattern	No ligature mark	Total
Soft fabric	15	76	4	95
Coir rope	14	119	1	134
Nylon rope	16	87	0	103
Belt	5	31	2	38
Other	11	27	4	42
Not present	4	13	1	18
Total	65	353	12	430

Most cases (73.02%) involved ligature placement high on the neck during complete hanging, making it the most prevalent pattern. Partial hanging was less common (20.23%), with most cases showing ligature placement high on the neck. Cases with no ligature marks were rare (4.65%), highlighting the dominance of ligature findings in such investigations.There was a statistically significant difference between the groups (p<0.005).

Table 3: The degree of suspension compared to the placement of the ligature mark

Placement of Ligature/Degree of Hanging	High on the neck	Lower on the neck	No ligature mark	Total
Partial	71	17	4	92
Complete	316	14	8	338
Total	387	31	12	430

Table 4 summarises the presence of classical signs about the degree of hanging among 430 cases. Classical signs were observed in 36.74% of cases (158 out of 430). Among these, partial hangings accounted for 15.12% (65 cases), while complete hangings constituted 21.63% (93 cases). In contrast, 63.26% of cases (272 out of 430) showed an absence of classical signs, with the majority occurring in complete hangings (58.14%, 250 cases), compared to 5.12% (22 cases) in partial hangings. This highlights the higher likelihood of classical signs being present in partial than complete hangings. The presence of classic signs showed a statistically significant association with partial suspension (p<0.001).

Table 4: Presence of classic signs vs degree of suspension

Classical signs/ Degree of hanging	Present	Absent	Total
Partial	65	22	87
Complete	93	250	343
Total	158	272	430

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Table 5 presents the presence or absence of classical signs according to ligature placement in 430 cases. Classical signs were observed in 36.74% of cases (158 out of 430), predominantly associated with high ligature placement on the neck (83.12%, 131 cases). Lower ligature placement constituted 13.29% (21 cases), whereas other placements and instances without ligature marks were infrequent, accounting for 0.63% (1 case) and 3.16% (5 cases), respectively. Classical signs were absent in 63.26% of cases (272 out of 430), primarily in instances of high ligature placement (92.99%, 253 cases), followed by cases with no ligature marks (4.04%, 11 cases), lower placements (2.57%, 7 cases), and other placements (0.37%, 1 case). This highlights the common occurrence of high neck ligature placement in both cases with and without classical signs. The presence of classic signs showed a statistically significant association with partial suspension ($p<0.001$).

Table 5: Placement of ligature mark vs classic signs

Classical signs/Placement of ligature	High on neck	Lower on neck	Other	No ligature mark	Total
Present	131	21	1	5	158
Absent	253	7	1	11	272
Total	384	28	2	16	430

The table highlights external and internal injuries observed in hanging cases. Among external findings, higher ligature marks were most common (387 cases), followed by struggle marks (205 cases), ecchymosis along the edge of the ligature mark (187 cases), dribbling of saliva (161 cases), discharge of urine or faeces (113 cases), and discharge of semen (61 cases). Internal injuries included contusions (139 cases), white glistening subcutaneous tissue (107 cases), cervical vertebrae fractures (121 cases), thyroid fractures (85 cases), intimal tears of the carotid artery (74 cases), neck muscle contusions (76 cases), and strap muscle ruptures (53 cases). These findings emphasise the frequent occurrence of higher ligature marks externally and contusions internally, with varying associated injuries.

Table 6: External and internal injuries in autopsy

External injuries		Internal injuries	
Ligature mark higher	387	**Subcutaneous tissue white glistening**	107
Ligature mark lower	31	**Contused**	139
Dribbling of saliva	161	**Fracture of thyroid**	85
Ecchymosis along edge of mark	187	**Neck muscle contusion**	76
Discharge of semen	61	**Strap muscle rupture**	53
Discharge of urine/faeces	113	**Intimal tear of carotid artery**	74
Struggle marks	205	**Cervical vertebrae**	121

Table 7 summarises the relationship between the degree of hanging (partial or complete) and the presence or absence of internal injuries. Among the 430 cases, 231 (53.7%) showed internal injuries, while 199 (46.3%) did not. For partial hanging, 45 cases (51.7%) had internal injuries, and 42 cases (48.3%) did not. For complete hanging, 186 cases (54.2%) had internal injuries, and 157 cases (45.8%) did not. There is no significant difference between the two groups;
partial and complete suspension concerning the presence of internal injuries. ($p = 0.68$)

Table 7: Partial or complete vs internal injuries

Degree of hanging/Internal injury	Present	Absent	Total
Partial	45	42	87
Complete	186	157	343
Total	231	199	430

DISCUSSION

In addition to standard postmortem observations, numerous atypical findings are often documented in fatalities resulting from hanging. Various factors can influence the manifestation of ligature marks and other findings observed during an autopsy. This study revealed that the majority of individuals executed by hanging were males of young to middle age, a trend well-documented in other studies.[9] In our study, approximately sixty-five percent of hanging incidents occurred indoors, perhaps because of the privacy and accessibility provided by such environments. Several further studies have revealed findings analogous to these.[10,11] This study concludes that hanging is perceived as an uncomplicated and direct method due to the availability of materials and its inherent simplicity. Survivors of near-fatal suicide attempts have indicated that hanging is regarded as an exceedingly simple approach.[12] Furthermore, seventy-eight percent of our cases exhibited complete suspension,

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aligning with findings from other studies conducted in India; nevertheless, some research has indicated that partial suspension is a more common manifestation.[10,13,14,15]

Educational and financial stress contributed to the suicides of 232 (54%) individuals. One hundred twenty-nine individuals (30%) experienced familial issues, and seventeen individuals (4%) committed suicide due to unsuccessful love relationships. Fifty-two participants (13%) provided diverse further explanations. A distinct set of data was observed in a study conducted by Waghmare et al,[16]indicating that poor health resulting from chronic disease contributes to the incidence of suicide. Sharija et al. [17] identified persistent alcoholism as a predisposing factor in 76.1% of males. This disparity in findings may indicate the socio-demographic variations among the different regions of these investigations.

Over half (53%) of the victims used coir or nylon rope as the ligature material, whereas 41% used soft fabric. This is probably attributable to the readily accessible nylon and coir ropes, frequently utilised for household uses in India. A study by Vipul and Namdeorao Ambade indicated that 62% of victims employed nylon rope in hanging fatalities. Another survey by Kitulwatte et al. had similar findings.[10,18] Additional research from Asia likewise identified rope as the most prevalent ligature material.However, some indicate that soft fabric is prominent, implying cultural variations.[19,20]

Ligature marks were identified in 97% of instances. Mohammed Musaib M. Shaikh observed peri-ligature injuries, including abrasions, bruising, and rope burns, in 16.28% of hanging incidents.[21] Nail imprints on the neck, frequently suggestive of manual strangling, may occasionally confuse forensic doctors. Nevertheless, similar markings may also be self-inflicted by victims striving to liberate themselves in their final moments.[22]

In 82% of cases, the ligature mark pattern was continuous, even in delicate cloth cases. Ligature markings were absent in merely twelve instances. Although research relating ligature mark patterns to the materials employed is few, our results indicate a substantial association between the two, which was contrary to the findings by Kitulwatte et al.[18,19]

Most victims did not exhibit classic signs (63%). The frequently noted “classic sign” was congestion, which was subsequently accompanied by petechial haemorrhages. Classic signs were absent in most complete suspensions, whereas they were commonly noted in partial suspensions, showing a statistically significant association ($p<0.001$). Classic signs arise from purely mechanical vascular phenomena or obstructed venous return while arterial input continues. As pressure increases in venules and capillaries, especially in areas with minimal surrounding connective tissue support, like the conjunctivae and eyelids, vascular rupture forms petechiae.[23]

Partial suspension effectively obstructs the veins while allowing arterial supply to continue. Consequently, classic signs are more frequently observed in cases of partial suspension, although there are only a limited number of scientific studies to substantiate this observation.[24] The majority of cases exhibited no internal damage. When present, they were predominantly located just behind the ligature mark. The most prevalent type of internal damage was contusion and fractures, specifically involving the thyroid cartilage, cervical vertebrae and hyoid bone.

This contrasts with other studies in which internal injuries characterized by soft tissue contusions were frequently observed.[25] Our study's retrospective nature limits the assurance of proper documentation and discrimination, as well as the potential for handling artifacts during evisceration. This indicates the necessity for a prospective study. We have found out that no significant statistical association between the presence or absence of internal injuries and the type of suspension—whether partial or complete. Findings by Worawat et al. supported our conclusion.[26]

CONCLUSION

Worldwide, there has been an increase in hanging cases, predominantly attributed to suicides. Research indicates that the principal causes of suicide by hanging include poverty, unemployment, familial troubles, defamation, social isolation, and alcoholism. Nevertheless, the thorough screening of vulnerable persons, diligent surveillance and monitoring of their conduct, and mental intervention can significantly reduce the incidence of suicides by hanging. Hanging is a method of suicide that is challenging to avert. A wider array of measures exists for suicide prevention in controlled environments. A well-designed and thorough program is essential for identifying the elements that contribute to suicidal behaviours and for preventing their occurrence. In the future, the incidence of suicide deaths by hanging may decline if enough education is implemented, media representations of suicidal events are modified, and effective reporting techniques are employed. Younger generations participate in suicide prevention initiatives.

REFERENCES

1. Reddy NKS. The Essentials of Forensic Medicine & Toxicology. India: Jaypee Brothers Medical Publishers Pvt. Limited; 2017.https://www.google.com/books/edition/Essentials_of_Forensic_Medicine_and_Toxi/DW_3xQEACAAJ?hl=en
2. Nandy A. Principle Of Forensic Medicine Including Toxicology. Kolkata: NewCentral Book Agency (P) Limited; 2007.https://www.google.com/books/edition/Principles_Of_Forensic_Medicine_Includin/_dAKd3b6pUgC?hl=en
3. Biradar G, Shetty CK, Shetty PH, Yogiraj V. Retrospective Analysis of Hanging Cases Between 2016 and 2020 in Urban India. International Journal of Medical Toxicology and Forensic Medicine. 2021; 11(4):33924. https://doi.org/10.32598/ijmtfm.v11i4.33924

ISSN (O): 2687-5365; ISSN (P): 2753-6556

4. Meera, M, Singh BK. Pattern of Neck Findings in Suicidal Hanging. A Study in Manipur. J Indian Acad Forensic Med. 2011 Oct;33(4):352-354.
5. Sharma BR, Harish D, Pal Singh V, Singh P. Ligature mark on neck: how informative?. JIAFM, 2005;27(1):10-15.
6. Rao D. An autopsy study of death due to suicidalhanging—264 cases, Egypt J Forensic Sci; c2015.http://dx.doi.org/10.1016/j.ejfs.2015.01.004.
7. National Crime Records Bureau. Accidental deaths & suicides in India—2022; 2022. https://ncrb.gov.in/uploads/nationalcrimerecordsbureau/custom/adsiyearwise2022/170161093707Chapter-2Suicides.pdf
8. Cooke CT, Cadden GA, Hilton JM. Unusual Hanging Deaths. Am J Forensic Med Pathol. 1988 Dec;9(4):277-365.
9. Chandegara P, Patel J, Zanzrukiya K, Patel U, Parkhe S, Gajera C, et al. Socio-demographic profile of hanging cases at New Civil Hospital, Surat.Int J Med Sci Public Health. 2014; 3(12): 1474-1477.doi: 10.5455/ijmsph.2014.130920141.
10. Ambade V N, Tumram N, Meshram S, Borkar J. Ligature material in hanging deaths: The neglected area in forensic examination. Egypt J Forensic Sci. Volume 5, Issue 3, Sep 2015, Pages 109–11.
11. Ahmad M, Hossain M. Z. Hanging as a method of suicide: Retrospective analysis of postmortem cases. J AFMC, Bangladesh, 6 (2) (2010), pp. 37–3.
12. Biddle L, Donovan J, Owen-Smith A, Potokar J, Longson D, Hawton K, et al. Factors influencing the decision to use hanging as a method of suicide: qualitative study. Br J Psychiatry. Sep 2010;197 (4):320-325.
13. Sharma BR, Harish D, Sharma A, Sharma S, Singh H. Injuries to neck structures in deaths due to constriction of neck, with a special reference to hanging. J Forensic Legal Med 2008 Jul;15(5): 298–305.
14. Saisudheer T, Nagaraja TV. A study of ligature mark in cases of hanging deaths. Int J Pharm Biomed Sci 2012;3(3):80–4.
15. Dean DE, Kohler LJ, Sterbenz GC, Gillespie PJ, Gonzaga NS, Bauer LJ, et al. Observed characteristics of suicidal hangings: an11-year retrospective review. J Forensic Sci 2012 Sep;57(5):1226-30.
16. Waghmare PB, Chikhalkar BG, Nanandkar SD. Analysis of asphyxial deaths due to hanging. J Indian Acad Forensic Med. 2014; 36(4):343-5.
17. Sharija S, Sreekumari K, Geetha O. Epidemiological profile of suicide by hanging in southern parts of Kerala: An autopsy-based study. J Indian Acad Forensic Med. 2011; 33(3):237-40.
18. Kitulwatte IG, Edirisinghe PA, Senarathne UD, Mendis HP, Wijesinghe PR, Fernando A. Profile of suicidal hanging presented to a tertiary care hospital: a descriptive study. Sri Lanka Journal of Forensic Medicine, Science & Law. 2019 Dec 5;10(2).
19. Momin S G., Mangal H M, Kyada H C., Vijapura M.T., BhuvaS.D.. Pattern of Ligature Mark in Cases of Compressed Neck in Rajkot Region: A Prospective Study. J Indian Acad Forensic Med. Jan-Mar 2012; 34 (1):40-43.
20. Pradhan A, Mandal BK, Tripathi CB. Hanging: nature of ligature material applied and type of hanging according to point of suspension. Nepal Med Coll J. 2012 Jun;14(2):103-6.
21. Shaikh M MM, Chotaliya H. J., Modi A.D., Parmar A. P., Kalele S. D. A Study of Gross Postmortem Findings in Cases of Hanging and Ligature Strangulation. J Indian Acad Forensic Med. Jan-Mar 2013;35(1): 63-65.
22. Mohanty MK, Rastogi P, Kumar GP, Kumar V, Manipady. Periligature injuries in hanging. SJ Clin Forensic Med. 2003 Dec;10(4):255-8.
23. Ely SF, Hirsch CS. Asphyxial deaths and petechiae: a review. J Forensic Sci 2000;45(6):1274–1277.
24. Clément R, Guay JP, Redpath M, Sauvageau A. Petechiae in hanging: a retrospective study of contributing variables. Am J Forensic Med Pathol. 2011 Dec;32(4):378-82.
25. Vinita VE, Paul PM, Janani, Kumar PS. Pattern of neck tissue injuries in hanging -a prospective study. J Punjab Acad Forensic Med Toxicol 2014;14(2). 1-1-104.
26. Worawat A, Wongchanapai W, Thamtakerngkit S. Factors affecting neck injuries in hanging deaths. J Forensic Phys Assoc. 2008; 2:23–32.

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