Original Article

Journal of Brahmanbaria Medical College
Volume 08 Issue 01 January 2026 ; 37-40
DOI: https://doi.org/10.3329/jbrmc.v8i1.89143

A Forensic Evaluation of Ligature Implements in Suicidal Hanging Death

Marina Haque[1*] Md. Shyful Islam Rony[2]

ABSTRACT

Background: Suicide is one of the commonest causes of death worldwide and has a great public health effect. Hanging is the most preferred method of suicide. The choice of method depends on the accessibility and availability of the means on the spot at the time of act. However, the type of materials used and position of the knot plays an important role in the mechanism of the death and autopsy findings in hanging. The present study was conducted with objective to study the choice of ligature material preferred for hanging and the type of hanging in relation to point of suspension and others associated factors.

Materials and methods: The present study is a retrospective analysis of 159 post mortem cases of suicidal hanging at Dhaka Medical College over a period of January 2018-December 2019. To understand suicidal hanging by studying different parameters involved in it like ligature materials, sex and age and position of knot and ligature marks. The results are analyzed on the basis of history, postmortem findings and results laboratory investigations.

Results: The age group 21-30 was found to be the most prevalent (37.10 %) for suicidal hanging. The majority of the victims were male contributing to (59.75%) of the death. Most commonly used ligature material was Rope (61.00%) followed by Orna (15.72%). The nature of ligature material was soft in (66.04%) cases. Most victims had complete suspension (72.33%). The ligature mark was oblique shaped in (97.48%) cases.

Conclusions: The commonly used ligature was a rope. Rope is easily available in almost every hanging. The different parameters of suicidal hanging are necessary to understand the suicidal nature of hanging.

KEY WORDS

Complete hanging; Ligature marks; Ligature material; Suicidal hanging.

INTRODUCTION

Hanging is a form of mechanical asphyxia, wherein the constriction of the neck is from a ligature encircling the neck, the constricting force being the weight of the body [Whole Body weight or Mere Weight of the Head].[1]

Despite the evolution of sophisticated methods of commit suicide, hanging still remains one of the commonest method of commit suicides across the world.[2]

1. Assistant Professor of Forensic Medicine & Toxicology
Kumudini Women's Medical College, Tangail.
2. Associate Professor (C.C) of Forensic Medicine & Toxicology
Brahmanbaria Medical College, Brahmanbaria.
*Correspondence : Dr. Marina Haque
Email: marinahaque19@gmail.com
Cell : +88 01715 70 06 91

Date of Submission : 03.11.2025
Date of Acceptance : 09.12.2025

Hanging is one of the common methods committing suicide along with poisoning, burning and drowning.[3] Over the past 30 years the incidence of suicide by hanging has increased, especially among young adults.[4]

Asphyxia in hanging results from compression or constriction of the neck structures by a noose or other kind of structure around the neck tightened by the weight of the body.[5]

In a hanging from high point of suspension when the body completely suspends above without touching the ground is called complete while in a hanging from low point of suspension sometimes some part of the body touches the ground is called incomplete or partial hanging. The type and position of knot play an important role in the causation of death in hanging.[6]

Most of the times, ligature mark may be only evidence available in case of hanging.[7]

The type and position of knot play an important role in the causation of death in hanging. It is represented by an inverted 'V' shaped mark.[8,9]

Regarding the influence exerted by social and financial factors, mental illness and physiological changes during menstruation on suicidal hanging are scant at present psychological upset may be the usual predisposing factors.[4,10]

Journal of Brahmanbaria Medical College
Volume 08 Issue 01 January 2026 ; 37-40
DOI: https://doi.org/10.3329/jbrmc.v8i1.89143

In Bangladesh, rope, orna, share, gamcha, electric wire, belt, are commonly available at home which can be used to hang themselves at any place and any time and table, stool, chair and cot were commonly used to reach the site of suspension.[11] In western countries, dog chain, belt, electric cable, scarf, tie, dressing gown cord, Shoe lace, etc. are used as ligature materials, which are not usually used in our country.[11]

The present study was conducted with objective to study the choice of ligature material preferred for hanging and the type of hanging in relation to point of suspension and others associated factors.

MATERIALS AND METHODS

The present study is a retrospective analysis of 159 postmortem cases of suicidal hanging at Dhaka Medical College, Bangladesh over a period of January 2018 to December 2019. All the autopsies had been performed in the mortuary of Forensic Department, Dhaka medical College. To understand suicidal hanging by studying different parameters involved in it like ligature materials, age and sex, position of knot and ligature marks. The results are analyzed on the basis of history, postmortem findings and results of laboratory investigations.

RESULTS

A total of 159 suicidal hanging cases were reported references to ligature material type and position of knots. In these suicidal hanging age of the victims were highest 59 (37.10%) in 21- 30 yrs. age group (Table-I). In (Table-II) sex distribution revealed male 95 (59.75%) and female 64(40.25%). Rope (Nylon, Jute) was the most ligature material used in hanging 97 (61%) (Table-III). In (Table-IV) soft ligature materials were mostly used in 105(66.04%), hard materials were least 7 (4.40%). The ligature marks were observed around the neck in 155 (97.48%) cases (Table-V). The position of ligature marks were mostly above the thyroid cartilage 153 (96.23%). Fracture of hyoid bone was seen only 1 (0.63%).

The width of ligature materials were narrow in 100 (62.89%) highest and lowest in medium 12(7.55%). In complete hanging was seen 115 (72.33%) andpartial 44(27.67%) in Table VI. The position of knot was mostly atypical 107(67.30%) and typical 52 (32.7%) cases.

Table I Distribution of age (n-159)

Range	Frequency	%
0-10	0	0 %
11-20	13	8.18%
21-30	59	37.10%
31-40	42	26.42%
41-50	29	18.24%
51-60	13	8.18%
>61	3	1.89%

Table II Sex distribution (n-159)

Gender	Frequency	%
Male	95	59.75%
Female	64	40.25%

Table III Ligature materials used (n-159)

Ligature materials	Frequency	%
Rope	97	61.00%
Orna	25	15.72%
Sharee	22	13.83%
Gamcha	11	6.92%
Electric wire	2	1.26%
Unknown	2	1.26%

Table IV Nature of material used (n-159)

	Frequency	%
Soft	105	66.04%
Firm	47	29.56%
Hard	7	4.40%

Table V Direction of ligature materials **(n-159)**

	Frequency	%
Oblique	155	97.48%
Horizontal	4	2.52%

Table VI Types of hanging (n-159)

	Frequency	%
Complete	115	72.33%
Partial	44	27.67%

DISCUSSION

A total of 159 of hanging were studied in detail regarding history, autopsy findings, laboratory investigations and chemical analysis. The lowest age of the deceased in the study was (0-10 years) and highest 21-30 years 59 (37.10%) while the age group above 60 yrs. (1.89%) and age group below 10 yrs. were unaffected Table I. Among the genders males were dominant. Male contributed to 95 (59.75%) of cases and female 64 (40.25%) Table II. This was consistent with the report by Uzun et al.[12] Recent study from Bangladesh population also revealed that hanging was the commonest mode of suicide among the early and unmarried people.[13]

Journal of Brahmanbaria Medical College
Volume 08 Issue 01 January 2026 ; 37-40
DOI: https://doi.org/10.3329/jbrmc.v8i1.89143

The present study revealed that commonest type of ligature material used for hanging was synthetic and jute rope in 97 (61.00%) cases. Other materials Orna 25 (15.72%) share 22 (13.83%) Table III. Similar findings were reported by Pradhan et al. Bike hosle et al. In relation to the features of the ligature material, the hard ligature material 105 (66.04%) were commonly used for hanging followed by soft material and firm material Table IV.[5,14] In other studies, reported that a soft material like cloth followed by a firm material like rope as the preferred choice of ligature material for hanging.[15]

In western countries belt, electric cable, scarf, tie, dressing gown cord, shoe lace Curtain cord, telephone cord, shower lead etc. are used as ligature materials, which are not used in our country andthis, may be due to socio-cultural and geographic factors.[11]

Ligature mark mostly either simple or grooved incomplete abrasion directed obliquely upward and backward 155 (97.48 %) Table-V. In majority of cases ligature mark placed above the thyroid cartilage153 (96.23%) Table V, soft tissues underneath the ligature mark were found pale, firm and glistening.

Fracture of hyoid bone was extremely rare and found only 01(0.63%) case.[16]

The present study regarding hyoid bone were in concordance with the observations made by several previous studies.[17,14] According to Modi33 fracture of hyoid bone was rare.[18]

The present study narrow width ligature material was commonly used for ligation 100 (62%). In hanging deaths, complete 115 (72.33%) hanging predominates over partial 44 (27.67%) hanging.[19,20]

But depending on the position of knot, typical hanging was 52 (32%) of cases in present study. The knot was observed on left side of neck in majority of cases and position of the marks was on above thyroid cartilage in the most cases.[19,20] The cyanosis and congestion of visceral organ were found in most of the cases.

CONCLUSION

This study has systematically highlighted the choice of ligature material used for hanging and type hanging in relation to point of suspension. A careful examination of ligature mark caused by ligature material is very important while formulating opinion regarding hanging deaths. The most common ligature material used by victim for hanging found in this study was rope followed by `Orna`/`Dopatta`.The ligature material used in is the most cases is the easily available material found by decreased in the vicinity of the scene of crime.

RECOMMENDATION

The prevalence of hanging deaths is alarming therefore stringent measures should be taken for its prevention and control. Public education campaigns should be evaluated to increase the public awareness and change attitudes to reduce suicidal behaviors.

DISCLOSURE

Both the authors declared no competing interest.

REFERENCES

1. Rao D. An autopsy of suicidal hanging. IP Int J Foresic Med Toxocol Sci. 2021; 6(3): 108-112.

2. Ajdacic-Gross, Vladeta, Weiss MG, Ring M, Hepp U, Bopp M, Gutzwiller F,Rossler W. Methods of suicide: International suicide patterns derived from the WHO mortality database. Bulletin of the world health Organization. 2008:726-732.

3. Ambade VN, Keoliya AN, Wankhede AG. Availabiliy of means of suicides. Int J Med Toxicol Leg Med. 2012; 14:83-89.

4. Gunnell D, Bennewith O, Hawton K, Simkin S, Kapur N. The epidemiology and prevention of suicide by hanging : A systematic review. Int J Epidemiol. 2006; 34(2):433-442.

5. Pradhan A, Mandal BK, Tripathi CB(2012). Hanging : Nature of ligature material applied and type of hanging according to point of suspention. Nepal Med Coll J. 14(2):103-106.

6. Badkur DS, Yadav J, Arora A, Bajpayee R, Dubey BP. Nomenclature for knot position in hanging- a study of 200 cases. J Indian Acad Forensic Med. 2012;34(1):34-36.

7. Tumram NK, Ambade VN, Bardale RJ, Dixit PG. Injuries over neck in hanging death and its relation with ligature material: Is it vital? J Forensic Leg Med. 2014; 22:82-83.

8. Reddy KSN. The essential of forensic medicine and toxicology.31st ed.Hydrabad: Om Sai Graphics. 2012;314-322.

9. Dikshit PC. Text book of forensic medicine and toxicology. 2nd ed. New Delhi: Peepee Publisher and Distributors (P) Ltd. 2014;294-304.

10. Biddle L, Donovan J, Owen-Smith A , Potokar J, Longson D, Hawton K, Kapur N, Gunnell D. Factors influencing the decision to use hanging as a method of suicide. Qualitative study. Br J Psychiatry. 2010; 197:320-325.

Journal of Brahmanbaria Medical College
Volume 08 Issue 01 January 2026 ; 37-40
DOI: https://doi.org/10.3329/jbrmc.v8i1.89143

11. Benne With O, Gunnell D, Kapur N,Turnbull P, Simkin S et al. Suicide by hanging : Multicenter study based on coronrs record in England. BMJ. 2005;186:260-261.

12. Uzün I, Buyuk Y, Gürpinar K. Suicidal hanging: fatalities in Istanbul retrospective analysis of 761 autopsy cases. J Forensic Leg Med. 2007;14:406-409.

13. Arafat SMY, Mali B, Akter H. Demography and risk factors of suicidal behavior in Bangladesh. A retrospective online news content analysis. Asian J Psychiatr. 2018;18(36):96-99.

14. Bhosle SH, Batra AK, Kuchewaar SV. Violent asphyxia Death due to hanging. A prospective study . J Forensic Med Sci Law. 2014; 23(1):1-8.

15. Saishudeer T, Nagaraja TV. A study of ligature mark in case of hanging deaths. Int J Pharm Biomed. 2012; 3(3):80-84.

16. Zàtopková L, Janik M, Urbanová P, Mpttlová J, Hejina P. Laryngohyoid fracture in suicidal hanging. A prospective autopsy study with an update review and critical appraisal . Forensic Sci Int. 2018; 290:70-84.

17. Mukharjee AA, Dhawane SG,Dhoble SV. Medico-legal study of drowning Deaths. A Forensic Perspective. J Res Forensic Med Toxicol. 2016; 2(1):1-4.

18. Franklin CA. Modi's Medical Jurisprudence and Toxicology. 21st ed. N M tripahty Pvt. Ltd. Bombay. 1988;192.

19. Elfawal MA, Awad OA. Deaths from Hanging in the Eastern Province of Saudi Arabia. Med Sci Law.1994;34(4):307-312.

20. Lester D. Suicide and homicide in Costa Rica. Med Sci Law. 1995; 35(4):316-318.