



Original Article

Retrospective Study of Ligature Material on Suicidal Hanging

Akhter SS¹, Salim A², Hossain MM³, Razib SMJU⁴, Karmakar P⁵

Abstract

Background: Hanging is one of the most common methods of suicide. It is always suicidal unless otherwise proved. Recent evidence showed that the incidence of suicide by hanging has increased especially among young adults. Ligature material plays an important role in leading investigation in hanging. The ligature material depends on its accessibility and availability. Various ligature materials are being used like nylon rope, cotton rope, wire, synthetic saree, lungi etc. **Objective:** Present study is a humble effort to find out the choice of ligature material used by the victim at Dhaka Medical College. **Materials and methods:** A retrospective study was conducted at the mortuary of Forensic medicine department, Dhaka Medical College Hospital, Dhaka, Bangladesh from July 2017 to December 2018. During this period data were collected from 112 cases of medicolegal autopsies by purposive sampling. **Result:** A total of 112 medicolegal autopsies were analyzed. In this hanging death, the most common ligature material used was rope in 58% of cases followed by dupatta (13%), lungi (11%) and saree (9%). Electric wire and kamiz were other ligature material used for hanging. The consistency of ligature material observed was hard (71%) & width is narrow width is (71%). Majority of cases (71%) were observed is male. Complete hanging was seen in 67% of cases & among them 85% cases are atypical hanging. **Conclusion:** Hanging is always suicidal unless otherwise proved. It is the form of painless violent asphyxia death that is widely practiced method of suicide. The most used ligature material is rope. Rope is chosen as ligature material due to its availability and accessibility. Young people in the justice system may need personal and psychological support to reduce the incidence of suicide.

Key words: Suicide, ligature material, hanging, typical hanging, complete hanging.

Received: August 19, 2022; **Accepted:** September 12, 2022

Introduction

Hanging is one of the 10-leading causes of death in the world, accounting for more than a million deaths annually¹. In Bangladesh, hanging is one of the common methods of committing suicide alone². Over the past 30 years the incidence of suicide by hanging has increased, especially among young adults³. Most of the time, the ligature mark may be the only evidence available in cases of hanging⁴.

A review of data of 56 countries found that hanging was the most common method in most of the countries, accounting for 53% of the male suicides and 39% of the female suicides. According to WHO, highest incidence of hanging was found to be 90.6% in Kuwait and 83.1% in Lithuania among the total number of suicides cases^{5,6}.

Ligature material plays an important role in causation of death in hanging but the features of the ligature material were not reported for systematic analysis. In this present study, the type of ligature

materials is focused which are mostly neglected area of forensic medicine.

Materials & Methods

The retrospective study was conducted during the period of 1.5 years from July 2017 to December 2018. All the autopsies had been performed in the mortuary of Forensic Medicine Department, Dhaka medical college in Dhaka, Bangladesh. During the study period, 112 cases of hanging were reported in this department which were carried out meticulously in this study.

Results

A total of 112 suicidal hanging cases were reported reference to ligature material, type and position of the knot, and ligature points. In these hanging deaths, as shown in Figure-1, 70% of the victims were male and 30% were female. Age incidence was highest (45%) in between the age of 26-36 years that shown on Table-I. As per Table-II the most common ligature material used was rope (nylon, jute) in 58%

¹Dr Syeda Sharmina Akhter, Assistant Professor, Dept. of Forensic Medicine & Toxicology, Eastern Medical College, Cumilla, Bangladesh.

²Dr Airin Salim, Assistant professor, Department of Community Medicine, Eastern Medical College, Cumilla, Bangladesh.

³Dr Mohammad Monir Hossain, Assistant Professor, Department of Anatomy, Eastern Medical College, Cumilla, Bangladesh.

⁴Dr S M Jashim Uddin Razib, Deputy Clinical Coordinator, Lab Aid Specialized Hospital, Dhaka, Bangladesh.

⁵Dr Pijush Karmakar, Assistant Professor, Department of Biochemistry, Eastern Medical College, Cumilla, Bangladesh.

Address of Correspondence: Dr Syeda Sharmina Akhter, Assistant Professor, Department of Forensic Medicine & Toxicology, Eastern Medical College, Cumilla, Bangladesh. Mobile: +8801670289458, Email: anahf6@gmail.com

of cases followed by dupatta (13%), lungi (11%) and sari (9%). Electric wire, kamiz were other ligature materials used for hanging and in 3 (3%) cases ligature materials were unknown. The consistency of the ligature material most used for hanging was hard like nylon rope, jute rope that was used in 71% cases (Table-III). It was also followed by soft material like dupatta in 12% and firm material in 14% of the cases.

In this study the width of the ligature material was sorted into three groups. The most common width used in hanging in this study was the narrow width ligature materials in 71% of the cases, whereas the broad width ligature was used in 18% and medium width in 11% of the cases as per Table-IV.

According to Table-V complete hanging was seen in 67% of the cases and partial (incomplete) hanging in 33% of the cases based on body suspension. However, depending on the position of the knot, typical hanging was noted in only 15% of the hanging cases and atypical was 85% of cases.

Table-I: Distribution of suicidal hanging among the study population.

Age (In year)	Frequency	Percentage
15-25	20	18%
26-36	50	45%
37-47	15	13%
47-55	10	09%
55-60	12	10%
>60	05	01%

Table-II: Percentage of ligature material used in this study cases.

Ligature material	Frequency	Percentage
Rope	65	58%
Dupatta	15	13%
Lungi	12	11%
Sari	10	09%
Electric wire	07	06%

Table-III: Nature of ligature material used in this study cases.

Nature of Ligature material	Frequency	Percentage
Hard	80	71%
Firm	15	14%
Soft	12	11%
Unknown	5	5%

Table-IV: Width of ligature material used in this study cases.

Width of Ligature material	Frequency	Percentage
Narrow (>1cm)	80	71%
Medium (1-2cm)	12	11%
Broad (>2cm)	20	18%

Table-V: Distribution of type of hanging

Hanging type distribution	Frequency	Percentage
Depending on suspension of body		
Complete hanging	75	67%
Incomplete hanging	37	33%
Depending on position of knot		
Typical	17	15%
Atypical	95	85%

Gender distribution of suicidal hanging

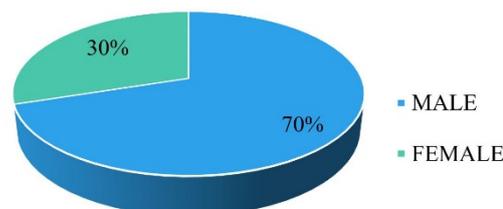


Figure-1: Gender distribution of suicidal hanging.

Discussion

The present study revealed that the commonest type of ligature material used for hanging was synthetic and jute rope in 65 (58%) cases. Similar findings were reported by Pradhan et al⁷, Bhosle et al⁸, Rawat & Rodrigues⁹ and Ahmad & Hossain¹⁰. The results of the present study were contrary to the observations made by Nowers¹¹ who reported scarf, shoelaces, and electric cable as ligature material. In relation to the features of the ligature material, the hard ligature material 80 (71%) was commonly used for hanging followed by soft material and firm material. 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^{12,13}. Studies also reported that mental illness and other disease conditions were important predisposing factors of hanging¹⁴.

It is suggested in different studies that increase in financial and educational level correlated with the lower incidence of suicidal ideation¹⁵. In the present study narrow width ligature material was commonly used for ligation. In hanging deaths, complete hanging predominates over the partial (incomplete) hanging^{16,17} and this finding is parallel with the present study. Saisudheer and Nagaraja¹² also reported in their study that complete hanging in 64% and 62.4% deaths respectively and feet touching the ground in most of the cases of partial hanging. Ahmad and Hossain¹⁰ found 97.2% complete hanging, whereas Sharma et al¹⁸ found 46% complete and 54% partial hangings.

But depending on the position of the knot, typical hanging was noted in only 15% of the cases in the present study. Present study revealed that majority

of hanging deaths were among males with a male: female ratio of nearly 2:1, which was consistent with observations made by a good number of studies^{7, 19,20}.

Conclusion

Hanging is the most common suicidal death in Bangladesh. The most common ligature material used for hanging is rope followed by orna / dupatta. Most dead in hanging used rope as a ligature material due to its easy availability and accessibility. To prevent suicidal hanging, we need to understand more about the difficulties experienced by some young men who are living in rural areas. We need more information about the cultural and mental problems experienced by indigenous youths in their teenage years. Young people in the justice system may need personal and psychological support to reduce the incidence of suicide.

Limitations

1. The comparatively shorter period for conducting this study and smaller sample size might not represent the whole community
2. In most cases, the ligature material was not available during the forensic examination of hanging. Either it was brought separately along with the body or sent later for the examination if required by the investigating officer, or the relatives attempted to rescue the victim by removing the ligature from the neck. This study has methodically analyzed the feature of ligature material in hanging.

References

1. Mohanty S, Sahu G, Mohanty MK. Suicide in India - a four-year retrospective study. *J Forensic Leg Med.* 2007; 14 (2): 185-9.
2. Arafat SMY, Mali B, Akter H. Demography and risk factors of suicidal behavior in Bangladesh: A retrospective online news content analysis. *Asian J Psychiatry.* 2018; 36: 96-9.
3. 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): 433-42.
4. Tumram NK, Ambade VN, Bardale RJ, Dixit PG. Injuries over neck in hanging deaths and its relation with ligature material: is it vital? *J Forensic Leg Med.* 2014; 22: 81-4.
5. Ajdacic-Gross V, Weiss MG, Ring M, Hepp U, Bopp M, Gutzwiller F, et al. Methods of Suicide: International Suicide Patterns Derived from the WHO Mortality Database. *Bull World Health Organ.* 2008; 86 (9): 726-32.
6. O'Connor RC, Stephen P, Jacki G. *International Handbook of Suicide Prevention: Research,*

Policy and Practice. New York: John Wiley and Sons; 2011.

7. Pradhan A, Mandal BK, Triatic CB. Hanging: Nature of Ligature Material Applied and Type of Hanging According to Point of Suspension. *Nepal Med Coll J.* 2012; 14 (2): 103-6.
8. 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.
9. Rawat V, Rodrigues EJ. Medico-Legal Study of Hanging Cases in North Goa. *Int J Med Toxicol Legal Med.* 2014; 16 (3-4): 57-64.
10. Ahmad M, Hossain MZ. Hanging as a Method of Suicide: Retrospective Analysis of Postmortem Cases. *JAFMC Bangladesh.* 2010; 6 (2): 37-9.
11. Nowers M. *Violent suicide: Pathways to Prevention.* Bristol: University of Bristol; 2001.
12. Saisudheer T, Nagaraja TV. A study of ligature mark in cases of hanging deaths. *Int J Pharm Biomed.* 2012; 3 (3): 80-4.
13. Patel AP, Bansal A, Sheikh IV, Sheikh KA. Study of hanging cases in Ahmedabad region. *J Indian Acad Forensic Med.* 2012; 34: 342-5.
14. Zachariah T, John JT. Major Predisposing Factors Influencing the Suicide by Hanging: A Retrospective Study from a Tertiary Care Government Hospital in Kerala State, South India. *Int J Contemp Med Res.* 2019; 6 (1): A5-A7.
15. Sueki H. Relationship between annual household income and suicidal ideation: a cross-sectional study. *Psychol Health Med.* 2019; 24 (1): 76-82.
16. Elfawal MA, Awad OA. Deaths from Hanging in the Eastern Province of Saudi Arabia. *Med Sci Law.* 1994; 34 (4): 307-12.
17. Lester D. Suicide and homicide in Costa Rica. *Med Sci Law.* 1995; 35 (4): 316-8.
18. Sharma BR, Harish D, Singh VP, Singh P. Ligature mark on neck: how informative? *J Indian Acad Forensic Med.* 2005; 27 (1): 10-3.
19. Ambade VN, Keoliya AN, Wankhede AG. Availability of means of suicides. *Int J Med toxicology Leg Med.* 2012; 14: 83-9.
20. James R, Silcocks P. Suicidal Hanging in Cardiff a 15 Year Retrospective Study. *Forensic Sci Int.* 1992; 56 (2): 167-75.

Citation of this article

Akhter SS, Salim A, Hossain MM, Razib SMJU, Karmakar P. Retrospective Study of Ligature Material on Suicidal Hanging. *Eastern Med Coll J.* 2023; 8 (1): 12-4.