

Original article

A Study: Pattern of Ligature Material Used in Suicidal Hanging

Dr. Mustafa Sumon Al Rashid,¹ Dr. Md. Syedur Rahaman Sumon,² Dr. Mohammad Mazharul Islam,³
Dr. Rifat Naoreen Islam,⁴ Dr. Rowshon Ara Begum,⁵ Dr. Sohel Mahmud⁶

¹Associate Professor, Department of Forensic Medicine & Toxicology, East West medical college.

²Professor (CC) & Head, Department of Forensic Medicine & Toxicology, Bashundhara Ad-din Medical College, Dhaka.

³Associate Professor, Department of Community Medicine, Bashundhara Ad-din Medical College, Dhaka.

⁴Professor (CC), Department of Forensic Medicine & Toxicology, Medical College for Women and Hospital, Dhaka.

⁵Assistant Professor, Department of Forensic Medicine & Toxicology, Bashundhara Ad-din Medical College, Dhaka.

⁶Professor, Department of Forensic Medicine & Toxicology, Sir Salimullah Medical College, Dhaka


Abstract

Background: Suicide is a major public health issue and one of the most common causes of death worldwide. The reasons behind suicide are complex and involve a combination of biological, psychological, social, and environmental factors. The choice of method used in suicide often depends on the accessibility and availability of means at the time of the act. To find out the choice of ligature material used by the victims, the type of hanging in relation to the point of suspension and other related factors. **Methodology:** This retrospective observational study summarizes the post mortem examinations on 100 cases of death due to suspension received in the Department of Forensic Medicine, Sir Salimullah Medical College, and Dhaka for postmortem examinations during the span of the period July 2019-June 2020. **Results:** Among 100 cases 43 (43%) cases hanged by rope, 62 (62%) used a slip knot where as only 11 (11%) used a fixed knot. The suspension point used was a tree in of 61% cases. Rope is frequently used for domestic purposes and thus it is also the most commonly used ligature material. **Conclusion:** Social, cultural and economic values must be strengthened to reduce the incidence of suicide.

Key words: Suicide; hanging; ligature mark; ligature material.

Correspondence: Dr. Mustafa Sumon Al Rashid, Associate Professor, Department of Forensic Medicine & Toxicology, East West medical college. E-mail: dr.schumon@gmail.com

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Hanging is one of the top ten causes of death worldwide, accounting for over a million deaths annually. It is a form of violent mechanical asphyxial death that occurs when a person suspends themselves or is suspended against their will from an object using a ligature around their neck. The

force applied to the neck is derived from a gravitational drag of the body or part of the body.³ In India, hanging is one of the common methods of committing suicide along with poisoning, burning and drowning and constituted 41.8% of cases of suicides in 2014.^{4,5}

A study of data from 56 countries found that hanging was the most common method of suicide in most of these countries, accounting for 53% of male suicides and 39% of female suicides. According to WHO, Kuwait and Lithuania have the highest incidence of hanging, with 90.6% and 83.1% respectively, among all suicide cases.^{6,7}

Asphyxia in hanging occurs when neck structures are compressed or constricted by a noose or other structure around the neck that is tightened by the weight of the body.⁸

The position of the body at the time of hanging determines whether it is complete or partial. Complete hanging occurs when the body completely suspends above without touching the ground, while incomplete or partial hanging occurs when some part of the body touches the ground during hanging. The type and position of knot used are important factors in causing death in hanging.⁹

The causation of hangings worldwide can be attributed to biological, psychological, socio-cultural, economic, and environmental factors. These factors contribute to the opportunities and limitations of choice of ligature material used by individuals for committing suicide. Social upheaval and distress resulting from rapid urbanization, industrialization, and emerging nuclear family systems are also contributing factors.¹⁰

The modern period has been characterized by significant development and gradual changes in societies worldwide. Traditional methods of suicide have not changed with the introduction of new technologies and advancements in India, and vary across countries. In the modern era, internet usage is growing exponentially, shaping our lives and altering our brains. Applications such as Wikipedia, blogs, and social networking are being used extensively, and web postings have become an interactive and self-initiated medium for acquiring information about changing suicide trends in relation to the methods used. In Bangladesh 'Shari', 'orna' ('dupatta'), 'lungi', nylon rope, belts, mufflers and ropes are commonly available at home and can be used to hang themselves at any place and at any time and table, stool, chair and cot are commonly used to reach the site of suspension. There are unique patterns of suicide methods in India that differ markedly from those of Western countries, possibly due to cross-cultural differences. In Western countries, dog chains, belts, electric cables, scarves, ties, dressing gown cords, shoe laces, etc., are used as ligature materials, which are not usually used in India. The present study aimed to investigate the choice of ligature material preferred for hanging and the type of hanging in relation to the point of suspension and other associated factors.

Materials and methods

Data were collected in the department of forensic medicine, Sir Salimullah Medical College, from the victim brought for postmortem examinations during the period July 2019-June, 2020. During this period total of 869 autopsies were conducted. Out of these 100 cases of hanging took place.

Results

All 100 hanging cases were suicidal. Table-1 shows the ligature used by the victims out of total of 100 cases 43 cases (43%) use rope as a ligature material. In 62(62%) the victim used as slip knot and in 11(11%) case fixed knot was found (fig-1). Among the clothing, the orna was used by the majority of the victims (table-2). The victim used the tree as a suspension point in 61(61%) cases (table-3).

Table-1: Materials of ligature

Ligature material	Percentage
Rope	43%
Clothing	33%
Sheet	05%
Cable	04%
Others	08%
Unknown	07%
Total	100%

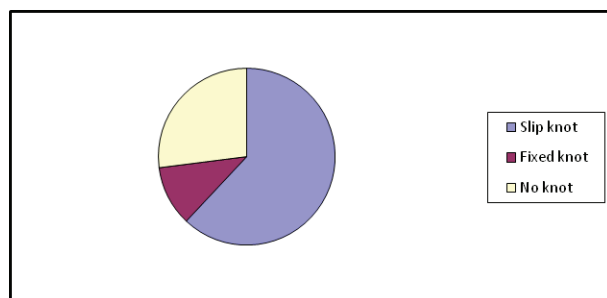
Table-2: Deferent types clothing were used. In 33 clothings used as follows-

Types of clothing	Number
Orna	12
Lungi	03
Gamchha	05
Dhuti	01
Shirt	01
Pyajama	02
Belt	01
Sharee	05
Others	03
Total	33

Table-3: Suspension points

Types	Number
Tree	61
Hook	07
Beam	11
Ceiling	01
Ladder steps	01
Windows frame	01
Others	14
Unknown	04
Total	100

Fig-1: Types of knots



Discussion

This study revealed the different hanging materials, types of knots and suspension points of hanging present at one tertiary center of Bangladesh. The ligature usually consists of anything that is immediately available near by hand. The most common materials in all hanging are ropes, clothes and even belts of electric wires, which are readily found in most houses. This was reflected in this investigation. Rope was by far the most useful form of ligature with clothing being the next most common. The wide range of ligatures reflects the fact that anything available can and is used in hanging.¹¹ The category of 'other' included one each of the following: phone wire, steel rope, bicycle chain and iron chain. There have also been cases reported where different materials have been tied together supposedly to make them longer to increase their strength. In suicides, the ligature is tied into a

noose which is passed over the head. Some are tied with a fixed knot. But most usually involve a slip knot. Which will tighten quickly around the neck so is the most efficient in occluding blood vessels and air passages. The survey found 62% use a slip knot. Whereas only 11% use a fixed knot. Interestingly 27% use no knot but loop the ligature around the neck. Although the ligature usually passes once around the neck, a proportion wraps it found two or more times. In an unusual case, the loop was not around the neck but was placed under the jaw but behind the ear. The suspension points depend on what is available in the scene of death. If death occurs outside, a tree was the commonest suspension point but others included bridges and even climbing frames. There was a very large range of suspension points inside the house showing almost any secure object rose off the ground and are used in hanging cases. Many low suspension points were found as the weight of the chest and arms are enough to provide fatal pressure on the structures in the neck.¹² The proportions are different from those found in the survey which may be the availability of loci as follows: this survey on hanging involves suspension from hook and other features found. In suicide when the point of suspension is high support is often used to reach the ligature, for example: a chair, stool box or ladder. The victim then jumps off or kicks the support away. Some ligatures stretch easy nylon, so this might still result in partial suspension. The circumstances for hanging are privacy which is essential. In suicide cases, the victims are found left alone long enough for death to occur without intervention from another person. This is especially true for suicide deaths where time is spent findings and securing the ligature. In one survey 72% of cases occur at home. Some hanged themselves in the midnight when other residents were asleep. Or during the day when they were out. Others retired to a bedroom, a bathroom, or out-house. Other locations can include places of work and secluded outdoor areas.

Conclusion

Various methods of hanging in the present study are more or less similar to the pattern found in other countries like India, Nepal, Srilanka. For this similar parameters were also used in this study. The rope was the most common ligature material used in hanging. The tree is the common suspension point and the victim mostly uses slip knots.

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