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Original Research Article

Autopsy-Based Demographical Profile of Hanging Victims In A Rural Area Of Central India.

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Key words
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Ligature material,
Complete hanging,
Degree of suspension.

Abstract

Background: Hanging has been used as the most common suicidal method for centuries old. Typically, all hanging cases are suicidal. Accidental hanging is uncommon and homicidal cases are rare. **Materials and methods:** The present study was carried out at the autopsy centre of a rural medical college in India from 01/08/2011 to 31/07/2017 in which 101 cases of hanging were autopsied. **Results:** The most commonly adopted method was complete hanging in 77 (76.23%) cases and in 24 (23.76%) cases it was partial hanging. In the majority of victims 41 (40.59%) cases, the nylon rope was used as ligature material, in 24 (23.76%) cases the ligature material was not made available for examination, in 12 (11.88%) cases "Dupatta" was being used, in 8 (7.92%) cases, rope other than nylon rope was used, in 6 (5.94%) cases, the saree was used while the cable wire was used in 1 case (0.99%) and metallic wire in 3 (2.97%) cases. The piece of cloth and "Gamaccha (Turban)" was used as a ligature material in 2 (1.98%) and 3 (2.97%) cases respectively. **Conclusion**: The most common ligature material used for the hanging is nylon rope and the complete hanging method is commonly used for suspension by the victims.

1. Introduction

The term asphyxia is better characterized to be caused by breath interference or lack of breathable oxygen or inability to extract carbon dioxide during breathing, which leads to oxygen deprivation or unconsciousness or death of tissues and organs. The asphyxial deaths constitute a large number of medicolegal cases that are subjected to medicolegal autopsies. Asphyxial death in forensic autopsy procedures is a common occurrence and it is very important in such cases to determine the reason behind death. The state of Maharashtra recorded a significant number of 16,970 (12.7%) suicides in the year 2015. Hanging was the adopted method in 60,952 (45.6%) cases followed by poiso-

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ning in 37,232 (27.9%). [1] As per the ICD classification and related health problems, suicides by hanging are included under code X70 which is intentional self-harm by hanging, strangulation and suffocation.[2] Typical or atypical hanging can be according to the ligature mark features. Based on the degree of suspension, it may be total or partial. When the body is suspended completely and any part of the body does not touch the ground, it is considered a full suspension and if any portion of the body touches the ground then the partial suspension is considered.[3]

For cases of judicial hanging, the trend for neck injury varies from that of suicidal hanging. In hanging accidental autoerotic deaths rarely occur. Irrespective of the noose material, the hanging destroys its victims in three ways: carotid arteries compression, jugular veins compression and airway compression.[4, 5] The carotid artery gets compressed by a pressure of 5 kg; for the jugular veins it is 2 kg and for the airway at least 15 kg of pressure is needed.[6] The ligature mark is a dynamic confirmation of deaths due to hanging. The source of the ligature mark with its direction helps in differentiating the death as being due to hanging or strangulation. An inverted mark as V-shaped is seen in cases of hanging. Occasionally the tongue is protruded due to jaw pressure resulting in a dry and desiccated appearance.[3] In hanging, the ligature mark is commonly located above the thyroid cartilage and compresses the internal structures of the neck. The injury to the various internal structures of the neck depends on the ligature material nature, the weight of the body and the time period of suspension.[3]

Aims and objectives

1. To assess the cases of hanging considering the suspension method adopted for hanging in rural areas.
2. To determine the commonly used ligature material for suspension in rural areas.

2. Materials and methods

It is a retrospective cross-sectional study, conducted on either sex with the deceased being brought for medico-legal autopsy examination with hanging as the suspected cause of death in the inquest panchanama and the history given by the relatives. The autopsy was conducted at a rural medical college in central India from 01/08/2011 to 31/07/2017. A total number of 101 cases was included in the study. All the autopsied cases of death due to hanging were included in the study. All the other violent forms of asphyxial death and the bodies in an advanced stage of decomposition were excluded from the study. The informed consent was obtained from the relatives of the deceased. The related data in the form of history given by the relatives, from the inquest conducted by police, crime scene examination and photographs along with post-mortem examination report were included in the study. The statistical analysis was done using SPSS and the diagrams and tables are prepared using windows 10.

3. Observations and results

It is a cross-sectional study design with 101 hanging cases carried over the duration of six-year. The autopsy cases of hanging are being investigated. The autopsied cases were selected precisely according to the purpose of the analysis, and inclusion and exclusion criteria.

Table no.1: Hanging cases considering the method adopted (Complete or Partial).

Degree of suspension	No. of cases (n=101)	Percentage
Complete	77	76.23
Partial	24	23.76
Total	101	100

Out of the 101 cases, the most common method adopted was complete hanging in 77 (76.23%) cases and in 24 (23.76%) cases the method adopted was partial hanging (Table 1).

Table no.2: Hanging cases considering the nature of the material of ligature used.

Nature of ligature material	No. of cases (n=101)	Percentage
Cable wire	01	0.99
Metallic wire	03	2.97
Dupatta	12	11.88
Gamaccha	03	2.97
Cloth	03	2.97
Nylon rope	41	40.59
Rope	08	7.92
Saree	06	5.94
Not available	24	23.76
Total	101	100

Of the 101 cases, in the 41 (40.59%) cases, the nylon rope was used as ligature material, in 24 (23.76%) cases the ligature material was not made available for examination, in 12 (11.88%) cases “Dupatta” was being used, in 8 (7.92%) cases, rope other than nylon rope was used, in 6 (5.94%) cases, the saree was used while the cable wire was used in 1 case (0.99%) and metallic wire in 3 (2.97%) cases. The piece of cloth

and "Gamaccha (Turban)" was used in 2 (1.98%) and 3 (2.97%) cases respectively as a ligature material(**Table 2**).

4. Discussion

4.1. Hanging cases considering the method adopted (Complete or Partial)

The most common method adopted was complete hanging in 76.23% of cases i.e. the feet or any part of the body doesn't touch the ground, while in 23.76% of cases, adopted the partial hanging method i.e. feet or any part of the body touches the ground. The above parameters indicate that majority of victims adopted a complete hanging method.

The findings of our study correlate with the study by authors Rao D[7], Samanta AK et al [8], Ambade VN et al[9], Sharma BR et al[10], K Jyothi Prasad et al [11]. The findings might be due to the underlying fact as the houses build up in this area are with the structure and pattern in the form of small conical huts having the main wooden rafter inside the house bearing the weight of the whole house, generally situated at the height of about 12 feet from the ground surface without having any suspended ceiling fans. Such a structure is so build-up to keep the house cool and protects oneself from the scorching heat of the sun. As in this tropical area, in the summer season, the maximum temperature rises to 45-48 degrees centigrade. Considering this high point of suspension, cases of complete hanging are more commonly seen than cases of partial hanging.

Our study findings are in contrast to that of Pradhan A et al[12] in Nepal where he had found that about 56.81% of victims adopted the partial hanging method which is in contrast to our percentage of 26.73%. The above-said author from Nepal had discussed the point of complete and partial hangings in relation to the medicolegal aspect of hanging i.e.to differentiating the case whether it is hanging or strangulation. The above point is not considered a relevant aspect in our present observational point and it is a separately discussed topic.

4.2. Hanging cases considering the nature of the material of ligature used

Out of the101 cases, the use of nylon rope as a ligature material was observed in the majority of victims (40.59%) while in 24.75% of cases, the ligature material was not made available for examination. In 11.88% of cases "Dupatta" was being used; in 7.92% rope other than nylon rope was used, in 5.94%, the saree was used while the cable wire was used in 0.99% cases and the metallic wire in 2.97% cases. The piece of cloth was used in 1.98% and "Gamaccha (Turban)" was used in 2.97% of cases as a ligature material.

The findings of our study are consistent with the study done by authors Pal S K et al [13], Singh Pradipkumar K H et al [14], Bhosle S H et al [15] and Sahoo N et al [16]. The fact that the nylon rope is an inexpensive, readily available material for ligature and is being used frequently by farmers (which is a predominant population in the study area) as a means of daily use in various day-to-day activities, for farming, tying the animals in the cattle shed adjacent to the house and for stacking. It is also a household commodity used in rural areas for day-to-day activities.

Our study findings are in contrast with that by Rao Dinesh[7] where the stole was used in 29.92% of cases, Najan BA et al [17] where the chunni was used in 37.70% of cases, Udhayabanu R et al[18] where the synthetic saree was used in 47.74% of cases, Chandegara PK, et al [19] where the "Dupatta" was used in 41.4% of cases, Das TK et al [20] where the soft material was used in 54.74% of cases.

The reason might be the fact that in hanging, the condition of the victim is very stressful and there is the presence of impulsive nature and in such conditions, the victim uses any kind of material easily available at hand like "saree", "dupatta", "chunni", electric wire, cable wire, rope or a piece of cloth, "Gamaccha (Turban)" as a ligature material.

5. Conclusion

It can be inferred that the most common ligature material used for the hanging is nylon rope and the complete hanging method is commonly used for suspension by the victims. The commonly available household material or any material available at the scene of the crime that can be turned into a ligature is frequently used for hanging due to the underlying emotional stress.

The victim is completely determined to end life by hanging. Moreover, the victim adopts the complete method of hanging as the houses are built in the rural area in such a way that the ligature material can only be tied at a particular height due to which the body parts do not touch the ground.

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Contributor ship of Author: All authors equally contributed.

Conflict of interest: None to declare.
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