

# Study on Hanging with Brief Discussion upon Ambiguity in Method of Choice and Gender Differences for Completed Suicide in Existing Literatures in Nepalese Scenario

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## ABSTRACT

### Background

Hanging is one of the common forms of violent mechanical asphyxial deaths. When compared to other forms of unnatural death all over the world this method stands on top as death is instantaneous. Death due to hanging is always suicidal until and unless otherwise specified.

### Objective

To explore the socio-demographic characteristics in cases of death due to completed hanging in Nepal.

### Method

This prospective study of death due to hanging was conducted during the period of July 2011 to July 2013. Meticulous autopsy of the body was done in all cases with bloodless dissection of the neck was carried out.

### Result

During the study period medico legal autopsy of 91 cases of death due to hanging was conducted, out of which 57 (63%) were males and 34 (37%) were females. Majority of the deceased were suspended at their own house or peri-domestic settings. Based upon the circumstantial evidences 95.61% (n=87) cases attributed to suicide in nature.

### Conclusion

Hanging undoubtedly is one of the most preferred methods to commit suicide, popular for its lethality. Lack of suicide surveillance system and national data bank in Nepal has resulted into equivocal findings. More studies should be encouraged based upon autopsy findings to get a clear picture on mortality rates.

## KEY WORDS

*Asphyxia, Hanging, Hyoid bone, Medico legal autopsy*

## INTRODUCTION

Hanging is one of the important causes for unnatural death and also one of the preferred methods of suicide worldwide. Once attempted, there is no retreat as death is rapid occurring within minutes of the act.<sup>1</sup> Suspension of the body by a ligature, noosed around the neck which tightens with the body weight is hanging, which is popular for its lethality.<sup>2</sup> Modus operandi in suicide varies worldwide and also in different states in the same country which depends upon the availability and accessibility of the means of committing the act; and also upon the fatality of the method. Hanging is popular in this regards as any available object which could hold body weight during suspension can be used as a ligature material ranging from shoelaces to strong nylon ropes.

This study is intended to explore the socio-demographic characteristics in cases of death due to completed hanging in Nepal. The authors have further tried to compare the choice of various methods adopted in committing suicide worldwide and to make out if gender differences play a part thus contributing the Nepalese findings in the scientific arena. Medicolegal autopsies are mandatory in Nepal in any cases of unnatural deaths including suicide, hence autopsy based studies should be encouraged to perceive the pattern and incidences of suicide in the country.

## METHODS

This autopsy based descriptive cross-sectional study was conducted after obtaining approval from Institutional Ethics and Research Committee (IERC). The study included all the cases of deaths due to hanging brought for medicolegal autopsy at Western Regional Hospital, Pokhara during the period of two years from July 2011 to July 2013. The particulars of the deceased were obtained from the inquest report and entered into a Performa purposefully designed for this study. Detailed history of the cases was obtained from investigating officer and relatives of the deceased.

Findings at autopsy were recorded from autopsy reports. The study excluded the cases where the bodies were in advanced stage of putrefaction although alleged to have died due to hanging. Data thus collected were entered into datasheet and analysed using statistical software SPSS vs. 21 (SPSS Inc., Chicago, IL, USA). The findings were presented as count, frequency and percentages for all categorical variables. Continuous variables were further evaluated using Student T-test and ANNOVA; p value < 0.05 was considered significant.

## RESULTS

A total of 91 cases of hanging were autopsied during the study period of which 57 (63%) were male and 34 (37%) were female with a female to male ratio of 1:1.67. There

were four such cases during the study where the body was recovered from secluded location and the identity of deceased was unknown as per the inquest report. Age was estimated in those unidentified bodies based upon dentition, fusion of sternum and closure of cranial sutures. It was observed that maximum number of cases were within 21 to 30 year age group (n=25, 27.47%) followed by 31 to 40 years age group (n=18, 19.78%). Hanging was observed as a least preferred method in seventh, eighth and ninth decades (n=11, 12.08%). Particulars of the deceased based upon age, sex, marital status, religion and treatment status is detailed in Table 1.

**Table 1. Demographic features and treatment status in hanging victims**

Variables	Frequency (%)	
Age group (years)	11 to 20	17 (18.68)
	21 to 30	25 (27.47)
	31 to 40	18 (19.78)
	41 to 50	11 (12.08)
	51 to 60	09 (09.89)
	61 to 70	05 (05.49)
	71 to 80	04 (04.39)
	81 to 90	02 (02.19)
Gender	Male	57 (62.64)
	Female	34 (37.36)
Marital status	Married	58 (63.74)
	Unmarried	30 (32.97)
	Unknown	04 (04.39)
Religion	Hindu	82 (90.11)
	Buddhist	05 (5.49%)
	Unknown	04 (04.40)
Treatment status	Treated	05 (05.49)
	Spotted dead	86 (94.51)

The study observed partial suspension in 74.73% (n=68) with atypical ligature mark wherein the knot was positioned over right side of the face (n=63, 69.24%). Soft clothes were chosen as a preferred ligature material (n=52, 42.46%) which were positioned above the level of thyroid cartilage (n=63, 69.23%). Rope as a ligature material was observed in most of the cases (n=38, 41.75%). Frequency for the plastic rope was high amongst the known type of ropes (n=9, 9.89%). Unspecified type of ropes (n=18, 19.79%) included cloth strap, jacket line, petticoat stripe etc. The findings suggested wire or metallic ligature material were least preferred for hanging constituting 3.29% of cases (n=3). Other types of ligature material included leather belt, cloth belt, karate belt, woollen muffler, handmade halter, etc. (Table 2)

Majority of the deceased were found suspended at their own house or peri-domestic area like cattle shade (n=72, 79.12%), while 20.88% (n=19) were found in isolated place

**Table 2.** Distribution of type and nature of ligature material used for hanging

Type of ligature material	Frequency	Percent	
Rope	Plastic	9	9.89
	Nylon	7	7.69
	Jute	4	4.39
	Others	18	19.79
Saree	4	4.39	
Shawl	19	20.90	
Handmade halter (damlo)	3	3.29	
Wire	3	3.29	
Karate belt	1	1.09	
Soft cloth	14	15.39	
Others	9	9.89	
<b>Total</b>	<b>91</b>	<b>100</b>	

**Table 3.** Summary of characteristic features of ligature mark, ligature material, knot position, suspension type and fracture of neck structures.

Variables	Frequency (%)	
Type of suspension	Partial	68 (74.73)
	Complete	23 (25.27)
Type of ligature mark	Typical	06 (06.59)
	Atypical	85 (93.41)
Position of the knot	Right side of the face	63 (69.24)
	Left side of the face	19 (20.88)
	Occipital region	06 (06.59)
	Chin	03 (03.29)
Character of ligature mark	Continuous	14 (15.39)
	Interrupted	77 (84.61)
Position of ligature mark	Above thyroid cartilage	63 (69.23)
	Overriding thyroid cartilage	28 (30.77)
	Below thyroid cartilage	00
Texture of ligature material	Hard	39 (57.14)
	Soft	52 (42.46)
Rope burn	Present	05 (05.49)
	Absent	86 (94.51)
Place of incidence	House/ peri-domestic area	72 (79.12)
	Outside house	19 (20.88)
Fracture of hyoid bone	Absent	89 (97.80)
	Present	02 (02.20)
Manner of death	Suicide	87 (95.61)
	Undetermined	04 (04.39)

away from home e.g. jungle. Dissection of neck structures at autopsy revealed fracture of hyoid bone was present only in 2.20% of the total cases. Based upon circumstantial evidences, suicide note at crime scene and police inquest;

the manner of death was suicidal in all cases except for four unidentified bodies where manner was designated undetermined (Table 3). The findings were significant for position and character of ligature mark, place of incidence and treatment status when the variable were analyzed against gender using statistical software at  $p < 0.05$  as shown in Table 4.

**Table 4.** Analysis of the study variables against gender.

Variables	t- value	Significance ( $p < 0.05$ )
Marital status	23.972	0.223
Religion	23.639	0.061
Position of knot	34.990	0.215
Type of suspension	38.142	0.679
Position of ligature mark	26.848	0.006
Rope burn	43.920	0.314
Character of ligature mark	48.542	0.008
Place of incidence	27.945	0.003
Treatment status	80.977	0.050
Fracture of hyoid bone	127.992	0.738

## DISCUSSION

### Characteristics features of hanging

The present study observed youths aged between 21 to 40 years were the susceptible victims of hanging. With increasing age, incidence of hanging declined which is in line with studies on suicide from Asian nations.<sup>2-4</sup> The youths are more vulnerable for suicide as they have more risk taking attitude with low emotional maturity to cope up with adverse life situations.<sup>1,5</sup>

Peri-domestic setting was common place for committing the act of hanging in the present study. Ambade et al. makes a note that home provides a secluded environment and easy accessibility for ligature materials.<sup>6</sup> Victims who couldn't manage an isolated location or doubted unhindered completion of the act at home might have chosen a remote location e.g. jungle.

Studies on hanging from neighbouring country India observed soft ligature material was preferred over hard ligature material which holds true in case of present study.<sup>7-9</sup> Dressing of Nepalese females is similar to India who put on sari and kurta-salwar unlike the pants and trousers in the west, for the reason same soft cloths were more preferred for suspension in females. Hard ligature material in the present study comprised of nylon ropes, hand woven plastic ropes, jute ropes which are easily available in domestic settings. Hard ligature materials outnumbered soft cloths in one of the Indian studies.<sup>6</sup> Pokhara valley in western development region of Nepal where the present study is undertaken is a cool place with highest annual rainfall and also experiences freezing temperatures during winter. Woollen mufflers also served

as ligature materials as witnessed by authors in the present study. The study uniquely reported the use of handmade halter (local: damlo) as a ligature material in one deceased who hung himself in the cowshed.

Position of the knot if over the occiput is regarded as typical hanging which is not a common finding in deaths due to hanging. Majority of the deceased in the present study had the knot at atypical position which is consistent with other studies.<sup>6,7,9,10</sup>

In terms of degree of suspension, the present study noted majority of the cases were partially suspended which is in contrast with other studies from India, Spain, Saudi Arabia and Costa Rica.<sup>6,10-12</sup>

When a person suspends with a ligature over the neck, the ligature material is positioned above the thyroid cartilage. With the gravitational pull of the body the ligature mark may be positioned further deep under the mandible. Hanging is an act of suicide until proven otherwise and position of the ligature mark at or above thyroid is constant with the studies upon hanging.<sup>6-11</sup>

### Gender differences

There is higher risk of suicide in males during young and middle age compared to females hence it won't be wrong if completed suicide is attributed to a male phenomenon.<sup>13-14</sup> An increase in suicide rate among males was observed in Poland over past forty years, with a similar trend in Asian and African countries.<sup>3-4,15-16</sup> World Health Organisation (WHO) estimates male/female ratio of 1.57:1 in completed suicides in South East Asia which includes the countries Bangladesh, India, Sri Lanka and Nepal.<sup>3</sup>

Male predominance is seen in the present study which is consistent with other hanging studies.<sup>6,8-10</sup> This finding is strongly in contrast to a study from Nepal on deliberate self harm in the same region where nearly two third of the suicide cases were females.<sup>17</sup> The study however did not detail the reason for female preponderance yet observed equivocal incidences of hanging in both the genders.<sup>17</sup>

Autopsy based study from Kathmandu upon violent and traumatic deaths observed 2.2:1 male female ratio, which is in contrast to some Nepalese studies that have observed near equal or higher incidences of suicide in females compared to males.<sup>18-21</sup> The differences in the findings may be attributed to studies within a particular locality and limited researches in the field. Suicide is illegal in Nepal and any survivor of such attempt if brought into book is liable for fine, imprisonment or both. Such social and legal consequences might be just another reason for inaccurate reporting of suicide in Nepalese scenario.<sup>22</sup> Various studies on suicide throughout the globe have documented that males are more vulnerable than females.<sup>2-5,13-14,18</sup> Although previously documented high female suicide rate in China, current statistics suggest declining rate of female suicide completers.<sup>2,4-5,23</sup>

Today we live in a paternalistic society where the role of male is considered superior to females. "Boys don't cry" a statement very famous in our culture prevent boys from expressing their pain. Rhodes et al did a comprehensive study on youth suicidal behaviour and assumed "Masculine norm of personal autonomy prevents boys from seeking help".<sup>24</sup> Boys thus indulge into substance abuse and alcohol - a temporary means of masking or overcoming pain contrary to females who seek help within the family or peer group in adversities; "women seek help - men die".<sup>13</sup> Substance abuse and consumption of alcohol has its direct links to depression and mental health risks which is further linked with suicide.<sup>24</sup> Gender difference observed in suicide may be attributed to the fact that men choose violent techniques with irreversible consequences e.g. hanging and shooting in comparison to females who opt for less lethal methods e.g. poisoning.<sup>14</sup>

### Method of choice in completed suicides

There is a difference observed in method of choice in completed suicides globally. In most of the Asian countries hanging outnumbered all other methods of committing suicide.<sup>4</sup> In China, pesticide poisoning was a leading cause of suicide whereas jumping from high building was more common in Hong Kong and Singapore.<sup>3-4</sup> Similarly, hanging is method of choice for completed suicides in Europe except for Switzerland where firearm ranked first.<sup>14-15</sup> Hanging and poisoning were predominant methods for suicide across African continent.<sup>16</sup> WHO statistics suggests hanging is the leading cause of deliberate self harm in South East Asia; however, the trend of suicide is different in South East Asian countries when taken singularly.<sup>25</sup> In Pakistan and Sri Lanka poisoning ranked top in the list whereas in Bangladesh and India mixed results were observed which included hanging and poisoning as preferred methods; no published report from Afghanistan is available.<sup>2-4</sup> The choice of method adopted again relies upon the available means; for instance run over railway tracks is popular in eastern India with wide railway network, whereas in Nepal it is not possible.<sup>3</sup> Due to strict law on firearms and the government policy of not permitting tall buildings, self shooting and jumping is rare in South East Asian countries including Nepal.

A four year retrospective study in Nepalese capital during 2000 and 2004, it was observed suicide accounted about 25% of total autopsied cases.<sup>18</sup> Hanging was the prime method for suicide as per the study. In another retrospective study from Western Development Region carried out between April 2002 and March 2005 it was observed poisoning was the method of deliberate self harm in 89.6% of cases followed by hanging (6.9%).<sup>17</sup> In highly populous countries like China and India, data obtained from studies in certain state/province do not match the data from other regions within the country due to differences in geography, climatic conditions, culture and lifestyles.<sup>4</sup> India and Sri Lanka are the only South Asian countries to publish annual national suicide data. Afghanistan, Bangladesh, Nepal and Pakistan

have no suicide surveillance system and rely upon police data; furthermore, limited number of studies from certain section of the country as in Nepal and Bangladesh limits the reliability of available data.<sup>3</sup> Jordan et al. reviewed the available publications on suicide from South Asia and assigned a quality score 0 (zero) and 1 (one) against the retrospective study of mortality records on Nepalese population.<sup>3,18,26</sup>

## CONCLUSION

Hanging undoubtedly is one of the most preferred methods to commit suicide, popular for its lethality. Lack of suicide surveillance system and national data bank in Nepal has resulted into equivocal findings. More studies should be encouraged based upon autopsy findings to get a clear picture on mortality rates. Psychological autopsies done

upon the bereaved family members will identify the risk factors for deliberate self harm. Education, compassion and untoward pressure upon youths will definitely decline the rate for committing suicide during young age. If mortality by self harm could be decreased in youth years; economically active population; it will undoubtedly boost the economy of the developing country like Nepal.

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