

An Epidemiological Study of Hanging Cases Brought to the Mortuary of A Teaching Hospital of Tripura

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Abstract

Background: According to WHO, 800000 people die due to suicide every year and becomes the top three causes of death among males and females aged 15 – 44 years¹⁰. According to the NCRB (National Crime Reports Bureau) report 2009 & 2015, in India, the major correlates of suicide were family problems (23.7%), illness (21%) [including insanity/mental illness (6.7%)], unemployment (1.9%), love affairs (2.9%), drug abuse/addiction (2.3%), failure in examination (1.6%), bankruptcy or sudden change in economic status (2.5%), poverty (2.3%) and dowry dispute (2.3%)¹². Hanging is a common and accessible method of committing suicide. There is an increasing tendency for suicides by hanging in India. The profile of victims in hanging includes married females or unmarried males in the age group of 21-30 years, stressors in the form of unemployment, harassment for dowry, prolonged illness, failure in examinations, financial interpersonal problems¹⁹. Number of people committing suicide in Tripura in 2015 is 746 (of which number of hanging is 528)¹². However, there is scarcity of data regarding the true extent of the problem as well as the epidemiological aspects of hanging in this state of Tripura. In this context, the present study was undertaken to generate an epidemiological database which in turn will help the law enforcing agencies and the concerned NGOs to take steps and create awareness among the vulnerable strata of the population of the state.

Methods: This cross-sectional descriptive study was carried out among the deceased persons autopsied at Agartala Government Medical College & G.B. Pant Hospital having the history & signs of hanging. Study Duration was one and half year (January 2019 - June 2020). Data collection was started after approval of the synopsis by the ethical committee and acceptance by the university. All cases of asphyxial deaths with hanging as cause of death were accepted as inclusion criteria whereas any such dead body which is putrefied was considered as exclusion criteria. All the autopsy cases fulfilling the inclusion and exclusion criteria during the study period were selected. Complete enumeration technique (census) was followed to select the study subjects. Data was statistically analysed.

Results: 176 asphyxial deaths with hanging as cause of death was studied for a duration of one and half year. Majority (24.4%) of the study subjects belonged to 31 – 40 years of age group followed by 21 – 30 years and 41 – 50 years (22.7% and 15.3% respectively). Mean age was 38.0 (\pm 16.3) years. 76.1% of the study subjects were male and 23.9% were female. Proportion of married, unmarried, widow/widower and divorced/separated were 72.2%, 18.8%, 9.1% and 0% respectively. Among the females, 47.6% were menstruating at the time of hanging. 54.5% of the study subjects were from rural area while 45.5% of them from urban area. 19.9% of the study subjects were farmer followed by business activity (16.5%) and home maker (14.8 %). majority of the subjects were from middle class family (69.9%) followed by lower middle (23.9%) and upper middle class (4.5%). Among the victims, previous suicidal attempts were present only in 5.7% cases. In majority cases (21.0%) psychiatric disorders were the main motive for hanging. Atypical hanging was most common found in the study subjects. 65.3% of the study subjects had complete hanging while 34.7% of cases had partial hanging. In 91.5% cases ligature mark was present above the thyroid cartilage and the mark was interrupted in 79% of cases. Dribbling of saliva was found in 74.4% cases and in 58.0% cases tongue was protruded out. Thyroid cartilage and hyoid bone were found fractured in 2.3% and 1.7% cases respectively.

Conclusion: Atypical hanging was most common as per classification of hanging based on position of knot. In most of the cases, ligature mark was prominent and was present above the level of thyroid cartilage. More than

half of the cases, the knot were on right side of the neck. Dribbling of saliva from the angle of mouth was observed in majority cases. Thyroid cartilage and hyoid bone were found in most of the cases. Majority of the victims were from young age group. Clothing material was the main ligature material. More than two third of the incidents were happened in indoors. Psychiatric disorders were the main motive for hanging. Majority of the study subjects did not have addiction.

Keywords: hanging, ligature, ligature material.

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Introduction

Hanging is a common and accessible method of committing suicide as it causes painless death for the victims and there is no costs involvement other than that of the ligature material. A thin rope around the neck will cause unconsciousness in 15 seconds [1,2,3].

In India, hanging is among the top five methods of choice for committing suicide, the other preferred methods being poisoning, drowning, burning and jumping from a tall structure etc[4]. According to the NCRB (National crime reports bureau) report 2009 & 2015, the incidence of suicide by hanging in India is 31.7% in 2007, 32.2% in 2008, and 31.5% in 2009 which increased to 45.6% in 2015. Our state of Tripura has recorded a suicide rate of 19.6 compared to National rate 10.6, which is much higher (Rate is the number of suicides per one lakh population). Number of people committing suicide in Tripura in 2015 is 746 (of which number of hanging is 528)[12]. However, there is scarcity of data regarding the true extent of the problem as well as the epidemiological aspects of hanging in this state.

Aims and objective

1. To study the epidemiology of hanging cases brought to the mortuary of a teaching hospital of Tripura.
2. To determine the motive and manner of death in above said population.
3. To study the association of different types of hanging with socio demographic parameters.

Material and Method

Study Type & Design: Descriptive study with Cross-sectional design.

Study Duration: One and half year. (January 2019 - June 2020.)

Data collection: Data collection was started after approval of the synopsis by the ethical committee and acceptance by the university. Data were collected for the next 1 year.

Data analysis and submission of thesis: following next 6 months.

Study Population: Deceased autopsied at Agartala Government Medical College & G.B. Pant Hospital having the history & signs of hanging.

Inclusion Criteria

All cases of asphyxial deaths with hanging as cause of death.

Exclusion Criteria

1. All cases of asphyxial deaths not having hanging as cause of death
2. Decomposed/ Putrefied /Mutilated bodies.

Sample Size and sampling technique: All the autopsy cases fulfilling the inclusion and exclusion criteria during the study period were selected. Complete enumeration technique (census) was followed to select the study subjects. The final sample size came to be 176.

Results

176 asphyxial deaths with hanging as cause of death were studied for duration of one and half year to generate information regarding the pattern and epidemiological distribution of the hanging cases. The findings are presented in this section under following subsections.

Section I: Socio-demographic Characteristics of the study subjects

Table 1.1: Distribution of study subjects according to age group.

Age group	Frequency	Percentage (%)
< 20	26	14.8
21 – 30	40	22.7
31 – 40	43	24.4
41 – 50	27	15.3
51 – 60	23	13.1
61 – 70	11	6.3
< 70	6	3.4
Total	176	100

Table 1.1 shows that majority (24.4%) of the study subjects belonged to 31 – 40 years of age group followed by 21 – 30 years and 41 – 50 years (22.7% and 15.3% respectively). Mean age was 38.0 (\pm 16.3) years.

Table 1.2: Distribution of study subjects according to sex.

Sex	Frequency	Percentage (%)
Female	42	23.9
Male	134	76.1
Total	176	100

Above table shows that 76.1% of the study subjects were male and 23.9% were female.

Table 1.3: Distribution of study subjects according to marital status.

Marital Status	Frequency	Percentage (%)
Married	127	72.2
Unmarried	33	18.8
Widow/widower	16	9.1
Divorced/ separated	0	0
Total	176	100

Table 1.3 shows that proportion of married, unmarried, widow/widower and divorced/separated were 72.2%, 18.8%, 9.1% and 0% respectively.

Table 1.4: Distribution of female study subjects according to menstruation status.

Menstruation status	Frequency	Percentage (%)
Absent	22	52.4
Present	20	47.6
Total	42	100

Table 1.4 shows that among the females, 47.6% were menstruating at the time of hanging.

Table 1.5: Distribution of study subjects according to place of residence.

Place of residence	Frequency	Percentage (%)
Rural	96	54.5
Urban	80	45.5
Total	176	100

Table 1.5 shows that 54.5% of the study subjects were from rural area while 45.5% of them from urban area.

Table 1.6: Distribution of study subjects according to occupation.

Occupation	Frequency	Percentage (%)
Business	29	16.5
Driver	14	8.0
Farmer	35	19.9
Govt. Service	14	8.0
Home maker	26	14.8
Manual labourer	13	7.4
Private employee	11	6.3
Student	27	11.9
Unemployed	7	4.0
Total	176	100

Table 1.6 shows that 19.9% of the study subjects were farmer followed by business activity (16.5%) and home maker (14.8 %).

Table 1.7: Distribution of study subjects according to socio-economic status (According to modified BG Prasad scale).

SES	Frequency	Percentage (%)
Lower	1	0.6
Lower Middle	42	23.9
Middle	123	69.9
Upper Middle	8	4.5
Upper	2	1.1
Total	176	100

Table 1.7 shows that majority of the subjects were from middle class family (69.9%) followed by lower middle (23.9%) and upper middle class (4.5%).

Table 1.8: Distribution of study subjects according to type of ligature material.

Ligature material	Frequency	Percentage (%)
Bed sheet	16	9.1
Cable wire	2	1.1
Dupatta	23	13.1
Electrical wire	3	1.7
Gamchha	40	22.7
Jute rope	9	5.1
Lungi	10	5.7
Nylon rope	36	20.5
Saree	37	21.0
Total	176	100

Above table shows that towel (Gamcha) (22.7%) was the major ligature material followed by saree (21.0%) and nylon rope (20.5%).

Table 1.9 : Distribution of study subjects according to history of previous suicidal attempts.

H/o previous suicidal attempts	Frequency	Percentage (%)
Yes	10	5.7
No	166	94.3
Total	176	100.0

Table 1.9 shows that previous suicidal attempts were present only in 5.7% cases.

Table 1.10: Distribution of study subjects according to motive for hanging.

Motive for hanging	Frequency	Percentage (%)
Chronic illness	21	11.9
Death of loved one	10	5.7
Failure in exam	10	5.7
Family problem	13	7.4
Financial problem	26	14.8
Failure in love	15	8.5
Marital disharmony	26	14.8
Psychiatric disorder	37	21.0
Unemployed	6	3.4
Unknown	12	6.8
Total	176	100.0

Table 1.10 shows in majority cases (21.0%) psychiatric disorders were the main motive for hanging. Financial problem and marital disharmony, both contributed 14.8. Chronic illness was responsible in 11.9% cases.

Section II: Autopsy findings of the asphyxia deaths

Table 2.1: Distribution of study subjects based on degree of suspension (complete/partial).

Degree of suspension	Frequency	Percentage (%)
Complete	115	65.3
Partial	61	34.7
Total	176	100.0

Table 2.1 shows that 65.3% of the study subjects had complete hanging while 34.7% of cases had partial hanging.

Table 2.2: Distribution of study subjects according to level of ligature mark.

Level of ligature mark	Frequency	Percentage (%)
Above the thyroid cartilage	161	91.5
Below the thyroid cartilage	2	1.1
Over the thyroid cartilage	13	7.4
Total	176	100.0

Table 2.2 shows that 91.5% cases ligature mark was present above the thyroid cartilage, 1.1% cases it was below the thyroid cartilage and 7.4% cases it was over the thyroid cartilage.

Table 2.3: Distribution of study subjects according to continuity of ligature mark.

Continuity	Frequency	Percentage (%)
Continuous	37	21.0
Interrupted	139	79.0
Total	176	100.0

Table 2.3 shows that among 21% cases, ligature mark was continuous while in 79% cases it was interrupted.

Table 2.4: Distribution of study subjects according to types of position of knot.

Position of knot	Frequency	Percentage (%)
Back	9	5.1
Left	63	35.8
Right	104	59.1
Total	176	100.0

Table 2.4 shows that among 59.1% cases, position of knot was in right side, 35.8% cases it was in left side and 5.1% cases it was situated on back.

Table 2.5: Distribution of study subjects according to dribbling of saliva.

Dribbling of saliva	Frequency	Percentage (%)
Absent	45	25.6
Present	131	74.4
Total	176	100.0

Table 2.5 shows that dribbling of saliva was found in 74.4% cases.

Table 2.6: Distribution of study subjects according to condition of tongue.

Condition of tongue	Frequency	Percentage (%)
Not protruded	74	42.0
Protruded	102	58.0
Total	176	100.0

Table 2.6 shows that tongue was protruded in 58.0% cases.

Table 2.7: Distribution of study subjects according to condition of thyroid cartilage.

Condition of thyroid cartilage	Frequency	Percentage (%)
Fractured	4	2.3
Not fractured	172	97.7
Total	176	100.0

Table 2.7 shows that thyroid cartilage was fractured in only 2.3% cases.

Table 2.8: Distribution of study subjects according to condition of hyoid bone.

Condition of hyoid bone	Frequency	Percentage (%)
Fractured	3	1.7
Not fractured	173	98.3
Total	176	100.0

Table 2.8 shows that hyoid bone was fractured in only 1.7% cases.

Discussion

Death is certain for all living beings, but humans end their lives prematurely by committing suicide. Among various methods opted, hanging is one of the most common, as materials necessary are easily available and of high success rate.

176 asphyxial deaths with hanging as cause of death were studied. The most vulnerable age for hanging was found to be between 31 to 40 years. The next vulnerable age group was 21 to 30 years. In old age, i.e. after 70 years, incidence came down to 3.4 %. Studies done by Kanchan T et al[6] observed similar findings. It is in contrast to the findings observed by Bastia BK et al[5], Halder A et al [8], Ahmad M et al.[9] For the present study, among the victims, 76.1% are males and 23% are

females. The male female ratio is 3.3:1. Males outnumbered the females. Similar findings were observed by Halder A et al [8], Robert JK et al[14]and Sharma BR et al[15] where males were predominant. It is contrast to the findings observed by Saisudheer T et al[16] and Ahmad M et al.[9] In the present study, married people (72.2) are more prone to hang themselves, when compared to unmarried (33%). Similar findings were observed in the studies conducted by Halder A et al [8], Ahmad M et al[9] , Saisudheer T et al[16] and Mohanty S et al[18] where majority victims were married. Chavan BS et al[17] reported that in their study majority were unmarried.

In the present study, non-menstruating women (22%) are more prone to hanging themselves than menstruating women. Opposite features were

present in the study conducted by Chetankumar et al[33] which shows a direct relationship between hanging and women victims who were menstruating.

In the present study, hanging deaths occurring in rural areas (54.5%) outnumbered the urban area (45.5%). Similar findings were observed in the studies conducted by Mohanty S et al[18]. But Chavan BS et al[17] reported that (70.2%) of the victims had an urban back ground, while 9.89% were from suburban area.

Most of the study subjects were from middle class family (69.9%) followed by lower middle (23.9%) and upper middle class (4.5%). Similar picture is reflected in studies conducted by Chavan BS et al[17], Gouda MRN et al[15] and Mohanty S et al[18].

People living in nuclear families (92.6%) outnumbered those in non-nuclear families (7.4%). Among the suicides committed, 5.7% of people in study population had past history of suicidal attempts, in which they could not succeed. Remaining 94.3% of people had no past history of suicidal attempts. Similar findings were observed in the studies conducted by Chavan BS et al[17] and Demirci S et al[28]. Mohanty S et al[18] reported the opposite.

In the present study, psychiatric diseases claimed 37 lives (21%). Financial problems and marital disharmony accounted for 26 deaths (14.8%) each, chronic illness accounted for 21 deaths (11.9%), othe motives for hanging were love failure (8.5%), unemployment, (9.06%), family problems (7.4%), failure in examination (5.7%) and death of loved one (5.7%)etc. This is supported by the studies by Sharija S et al[29] and Vijaykumari N et al30. It is in contrast to the findings observed by Ahmad M et al[9] and Mohanty S et al[18].

Majority of the study subjects did not have any addiction (83.0%). Alcohol and cannais as an addiction was noticed among 15.35 and 1.7% cases respectively. Study by Sharija S et al[29] states alcoholism as major addiction among the males.

In the present study, typical hangings are seen in 10 (5.75%) cases and atypical hangings are seen in 166 (94.3%) cases. In 161 (91.5%) cases, the level of the ligature mark was above the thyroid cartilage, in 13 (7.4%) cases it was over the thyroid cartilage and in 2 (1.1%) cases it was below the thyroid cartilage. Similar findings were observed in the studies conducted by Saisudheer T et al[16], Sharma BR et al[15] and Momin S G et al [31]. It also showed that, in the present study, among 21% cases, the ligature mark was continuous while in 79% cases it was interrupted. Sheikh M I et al [23] and Sharma R K et al[24] had showed the similar findings in their studies.

In the present study partial hanging is seen in 61(34.7%) deaths. Complete hanging is taking lives mostly, which accounted for 115 (65.3%) deaths (Table 2.1). Similar findings were observed by Ahmad M et al[9] and Saisudheer T et al [16] in their studies.

In the present study, it is observed that in 161 (91.5%) cases, the level of the ligature mark was above the thyroid cartilage, over the thyroid cartilage in 13 (7.4%) cases and below the thyroid cartilage in 2 (1.1%) cases (Table No. 2.2). Similar findings were observed in studies conducted by Saisudheer T et al[16], Sharma BR et al[21] and Momin S G et al[31].

In the present study, it is observed that among 21% cases, the ligature mark was continuous while in 71% cases it was interrupted (Table No. 2.3). Similar findings were observed in studies conducted by Sheikh M I et al [23] and Sharma R K et al[24].

K not was present in right side of the neck in 104 (59.1%) cases, over left side of neck in 63 (35.8%) cases and over centre of occipital region in 9 (5.1%) cases. Similar findings were reported in studies conducted by Sharija S et al [29] and Ahmad M et al[9]. But Saisudheer T et al [16] reported in 61 % the knot was in left side of the neck, in 28% cases it was in right side of neck and in cases of 11% it was on the back of neck.

Dribbling of salivary stains over the angle of mouth is considered as an important antemortem sign of hanging, but was not present in all the cases studied. Dribbling of saliva was present in 74.4% cases and absent in 2.6% cases in this study (Table No. 2.5). Study by Patel AP et al [32] reports the same.

It is showed that tongue was protruded in 58.0% cases and protrusion was not seen in 42.0% cases (Table No. 2.6). The similar observations were noted in other studies.

Present study showed thyroid cartilage was fractured in 2.3% cases and not fractured in 97.7% cases (Table No. 2.7). Similar findings were reported in studies conducted by Meera TH et al7 and Charoonate et al [25]. It is in contrast to the findings observed by Sharma BR et al[15] and Green H et al26 where they showed percentage of thyroid cartilage fracture (17% and 22.5% respectively) were more as compared to the present study. Hyoid bone was found fractured in only 1.7% cases and intact in 98.3% cases (Table No. 2.8). The reason being the fracture increases with age, high level of ligature mark on the neck, increased duration of suspension and with a thin hard ligature material. Similar findings were observed by Charoonate et al [25], Green H et al[26] and Feign G et al[27]. But Uzun I et al20

and Sharma BR et al[21] reported more number of hyoid fracture compared to this study (40% and 21% respectively).

Conclusion

Atypical hanging was most common as per classification of hanging based on position of knot. In most of the cases, ligature mark was prominent and was present above the level of thyroid cartilage. More than half of the cases, the knot were on right side of the neck. Dribbling of saliva from the angle of mouth was observed in majority cases. Thyroid cartilage and hyoid bone were found in most of the cases. Majority of the victims were from young age group. Clothing material was the main ligature material. More than two third of the incidents were happened in indoors. Psychiatric disorders were the main motive for hanging. Majority of the study subjects did not have addiction.

Declarations

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Approval of research ethics board : Taken (Approval given by Institutional Ethics Committee for Clinical Research of Agartala Govt. Medical College, Tripura vide Ref. No. 4(6-ii) – AGMC/Medical Education/ Ethics Com./2018, dated, 31st December, 2018. Website: www.agmc.nic.in).

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