

## Profile of deaths due to hanging- An autopsy based retrospective study at a tertiary care centre in Indore

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### Abstract

Hanging is that form of violent asphyxial death which is caused (i) either by the exclusion of air from lungs or oxygenated blood from the brain, (ii) by means of ligature around the neck, (iii) the constricting force is the weight of the body. It is the second most commonly used suicide methods in India and has a high mortality. The materials required are easily available, and a wide range of ligatures can be used. Hanging is the most common form of asphyxial death that forensic experts come across in their practice. The present study was conducted in the Department of Forensic Medicine & Toxicology of Sri Aurobindo Medical College & PGI, Indore, from January 2013 to December 2017. Total 113 cases of hanging were found in this duration. The different aspects of hanging cases like sex ratio, age group involved, residence, ligature material used, type of hanging, place of hanging, salivary stain marks, the position of the knot and other Postmortem findings have been discussed in detail in this study.

**Keywords:** Suicide, Hanging, Ligature mark.

### Introduction

Suicide is the final outcome of complex interactions of biological, genetic, psychological, sociological and environmental factors.<sup>1</sup> According to Anton J. L. van Hoof, hanging was the most common suicide method in primitive and pre-industrial societies.<sup>2</sup> A 2008 review of 56 countries based on World Health Organization mortality data found that hanging was the most common method in most of the countries.<sup>3</sup> Eighty-four percent of global suicides occur in low and middle-income countries (LMICs); India and China alone account for 49% of global suicides.<sup>4</sup> There is substantial variability both in the prevalence of suicide and in the factors that influence the occurrence of suicide between geographic regions, cultures, and over time, so country-specific analyses are needed to develop targeted suicide prevention efforts.

The World Health Organization (WHO) estimates that of the nearly 900,000 people who die from suicide globally every year, 170,000 are from India.<sup>5</sup> However, India's National Crime Records Bureau (NCRB) – which report official suicide rates based on police reports – estimated only 135,000 suicides in 2011.<sup>6,7</sup> The number of suicides in India during the decade (2005–2015) has recorded an increase of 17.3% (1,33,623 in 2015 from 1,13,914 in 2005). Majority of suicides were reported in Maharashtra (16,970) followed by 15,777 suicides in Tamil Nadu and 14,602 suicides in West Bengal, accounting for 12.7%, 11.8% and 10.9% of total suicides respectively. Karnataka (10,786 suicides) and Madhya Pradesh (10,293 suicides) accounted for 8.1% and 7.7% of the total suicides reported in the country respectively. These 5 States together accounted for 51.2% of the total suicides reported in the country.<sup>8</sup> Hanging is invariably suicidal. Accidental and homicidal hangings are rare.<sup>9</sup>

### Aims and Objectives

1. To study the profile of hanging cases.
2. To study the autopsy findings of hanging cases.

### Materials and Methods

A 5 years retrospective analysis of death due to hanging was conducted in the Department of Forensic Medicine & Toxicology of SAMC & PGI, Indore, during the period of January 2013 to December 2017. Post-mortem reports, police inquest report and panchanama report was analyzed. The aim of the present study was to analyze the various profiles of death due to hanging and to compare the findings with previously published literature.

**Inclusion Criteria:** All the victims who died due to hanging and brought to our department for post-mortem examination.

### Observations and Results

Total 1088 post-mortems were done during 5 years period, from January 2013 to December 2017, out of which total 113 cases (10.39%) were of deaths due to hanging. Male victims (68.14%) outnumbered females (31.86%); with the male to female ratio was 2.1: 1. As shown in table no.1, the majority of victims belonged to 3rd decade among males (24.77%), followed by 4th decade (17.70%), while 2nd decade was most common among females (15.04%), followed by 3rd decade (12.39%). Overall, 3rd decade, followed by 2nd decade, was the most common age group involved. No case was found in extremes of ages i.e. below 10 years and above 60 years age group.

When month wise distribution of cases was analyzed, no any specific trend was observed (Table 2). Majority of victims were resident of an urban region

(85.84%), while 14.16% were from the rural area (Graph 2). Out of 113 cases, ligature material was not received with the body in 61 cases (56.63%). Synthetic saree and synthetic dupatta was the most common ligature material used for hanging (Table 3). In 78.76% cases, hanging was typical (knot in occipital region), while atypical in 21.24% cases (Graph 4). Among atypical hanging, the left side of the neck was slightly more common (11.02%) than the right side (10.22%) (as shown in Graph 6). Salivary stain mark was present in 26.55% cases, while it was absent in 73.45% cases (Graph 3). The place chosen for hanging was closed space in 99.02% cases, while open space in 0.98% cases (as per panchanama and history elicited from police and relatives).

In autopsy findings, as shown in table no. 4, bluish discoloration of nails/ lips/earlobes was the most common finding observed in 69.91% cases, subconjunctival hemorrhage was found in 27.43% cases, protrusion of tongue in 22.12%, ENT bleed in 5.3%, postmortem lividity in distal phalanx in 35.39%

cases. Seminal ejaculation and passing off of fecal matter was found in 10.61% cases. Planter flexed feet was found in 20.35% cases, while petechial hemorrhages over legs in 6.19% and in interlobar fissures of lungs in 16.81% cases.

Evidence of previous suicidal attempts in form of old, healed, multiple, superficial and parallel scar marks over forearm (tentative cuts) was found in 10 cases (8.8%). Evidence of alcohol ingestion (on the basis of gastric mucosal congestion and smell) was found in 8 cases (7%). Evidence of other suspected poisonous substance ingestion was observed in 6 cases (5.3%). Evidence of additional external injuries over the body was seen in two cases, both of which were married females. One case was a pregnant female with 3 months gestational age. One case was a decomposed body of about 35 years male. Out of total 113 cases, 97 cases (85.84%) were of police inquest (sec. 174 CrPC) and 16 cases (14.16%) were of magistrate inquest (sec. 176 CrPC).

**Table 1: Age and sex wise distribution of cases**

Age group	Male	Female	Total
0 – 10 yrs.	0 (0%)	0 (0%)	0 (0%)
11 – 20 yrs.	13 (11.50%)	17 (15.04%)	30 (26.55%)
21 – 30 yrs.	28 (24.77%)	14 (12.39%)	42 (37.16%)
31 – 40 yrs.	20 (17.70%)	3 (2.65%)	23 (20.35%)
41 – 50 yrs.	9 (7.96%)	1 (0.88%)	10 (8.84%)
51 – 60 yrs.	7 (6.19%)	1 (0.88%)	8 (7.07%)
61 & above	0 (0%)	0 (0%)	0 (0%)

**Table 2: Month wise distribution over four years of study**

Month	2013	2014	2015	2016	2017	Total
January	2	0	4	0	3	9 (7.96%)
February	1	1	1	3	3	9 (7.96%)
March	0	0	3	2	5	10 (8.84%)
April	4	2	2	1	3	12 (10.61%)
May	2	2	1	2	1	8 (7.07%)
June	2	0	0	2	5	9 (7.96%)
July	4	0	0	2	3	9 (7.96%)
August	4	1	0	0	4	9 (7.96%)
September	1	3	2	2	2	10 (8.84%)
October	0	1	2	1	5	9 (7.96%)
November	0	4	1	2	2	9 (7.96%)
December	2	1	0	2	5	10 (8.84%)
<b>Total</b>	<b>22</b>	<b>15</b>	<b>16</b>	<b>19</b>	<b>41</b>	<b>113</b>

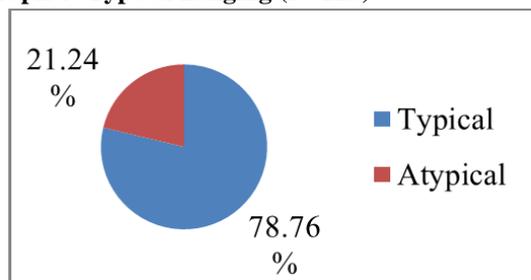
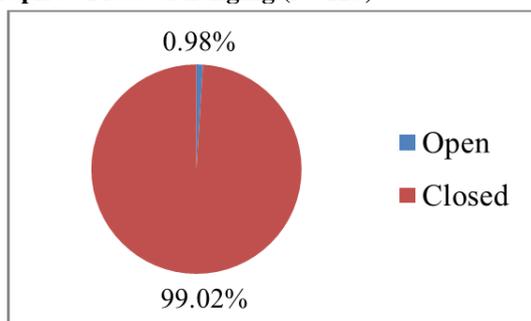
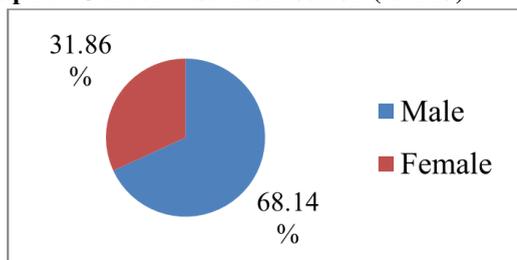
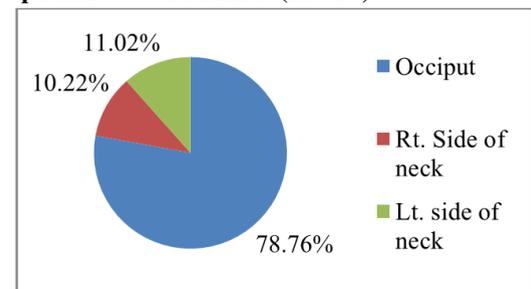
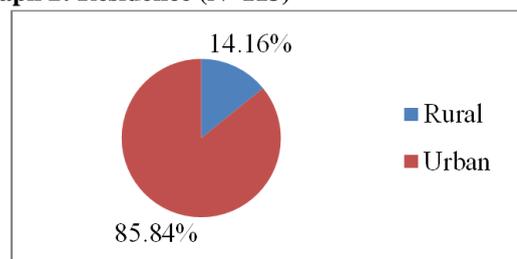
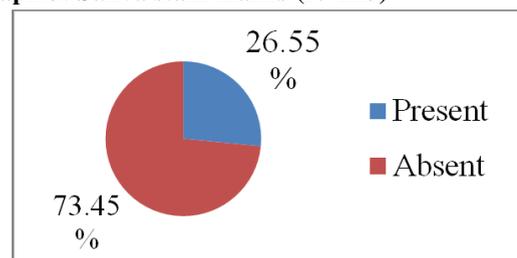
**Table 3: Ligature material**

Ligature Material	Number of cases	Percentage
Cotton Dhoti	1	0.88%
Cotton Dupatta	3	2.65%
Cotton Saree	1	0.88%
Cotton bed sheet	2	1.76%
Cotton rope	1	0.88%

Cotton Gamchha	4	3.53%
Synthetic saree	16	14.15%
Synthetic Dupatta	11	9.73%
Nylon rope	8	7.07%
Jute rope	5	4.42%
NA	61	56.63%
<b>Total</b>	<b>113</b>	<b>100%</b>

**Table 4: Post mortem examination findings**

Findings	Number of cases	Percentage
Sub conjunctival hemorrhage	31	27.43%
Protrusion of tongue	25	22.12%
Ear/ Nose/ Mouth bleed	6	5.30%
Bluish discoloration of nails/ lips/ear lobes	79	69.91%
Post mortem lividity over distal phalanx	40	35.39%
Semen ejaculation	12	10.61%
Fecal matter passed off	12	10.61%
Feet planter flexed	23	20.35%
Patechial hemorrhage over legs	7	6.19%
Patechial hemorrhage at interlobar fissure of lungs	19	16.81%

**Graph 4: Type of hanging (N=113)****Graph 5: Place of hanging (N=113)****Graph 1: Gender wise Distribution (N=113)****Graph 6: Position of Knot (N=113)****Graph 2: Residence (N=113)****Graph 3: Saliva stain marks (N=113)**

## Discussion

The present study was carried out in the Department of Forensic Medicine & Toxicology, Sri Aurobindo Medical College & PGI, Indore, M.P, during the period from January 2013 to December 2017. It has been compared with other similar studies carried out in different parts of the world to bring out the similarities and differences.

In the present study, the incidence of hanging was 10.39% (113/1088) amongst all medicolegal autopsies conducted during the study period. Almost similar incidence (13.68%) was observed by Manoj K Baishya & Putul Mahanta.<sup>10</sup> Males outnumbered females in the present study with the male to female ratio of 2.1:1. More cases of suicide by hanging among male may be due to the fact that they are more exposed to occupational stress as well as social and family burden causes more mental agony. Similar findings were observed by other authors.<sup>10,11</sup>

In the present study 3rd decade i.e. 21-30 yrs, was the most common age group affected among males

(24.77%), while in females 2nd decade i.e. 11 to 20 yrs was most common age group affected (15.04%). Overall, the 3rd decade was most commonly affected age group with 37.16% cases. Increased suicide among youth may be due to social disorganization in this modern society, increased expectation from life with increased competition for jobs. This age group is more vulnerable to frustration and breakdown due to decreased patience, unemployment, poverty, dowry tortures, love affair failures and domestic quarrels. Similar findings were reported by other authors.<sup>10-12</sup>

No, any significant season wise variation was observed in the present study. Majority of victims were resident of the urban region (85.84%), while 14.16% were from rural area. Similar findings were observed by Manoj K Baishya et al.<sup>10</sup> More hanging cases from the urban region may be due to more struggles for existence in an urban area than the rural population. There is higher population density in the city, with fast and busy life, more competition for jobs and high expectations from life, failure in which may lead to frustration and depression resulting in such kind of suicidal acts.

The ligature material used for hanging was most easily available material in-house like synthetic saree, dupatta, and rope which is consistent with findings of Modi.<sup>13</sup>

In present study position of the knot in a majority of cases was behind the neck (typical hanging) in 78.76%, while on the side of the neck (atypical hanging) in 21.24% cases. In atypical hanging, the knot was almost equally distributed on the left and right side (11.02% and 10.22% respectively). This finding was in contrast with findings of other similar studies who found the side of the neck is more common.<sup>10</sup>

In the present study, salivary stain mark was present in 26.55% cases, while it was absent in 73.45% cases. Soumya R. Nayak et al<sup>12</sup> found dribbling of saliva in 16.4% cases, while Mohammed M. Sheikh et al<sup>14</sup> observed in 38.37% cases. Dribbling of saliva is considered as the surest sign of antemortem hanging. Our findings are not consistent with Modi,<sup>13</sup> who observed 'saliva is often found dribbling out of one angle of mouth down on chin and chest'.

In the present study, the place chosen for hanging was closed space i.e. either home or workplace, in 99.02% cases, while open space in 0.98% cases. P. N Murkey et al<sup>15</sup> observed in his study 78.43% indoor cases while 21.57% outdoor cases of hanging. Sharifa S. et al<sup>16</sup> from Kerala found 71.27% cases from an enclosed area, while 28.73% cases from open space.

Evidence of previous suicidal attempts in form of old, healed, multiple, superficial and parallel scar marks over forearm (tentative cuts) was found in 10 cases (8.8%). Mohammed M. Sheikh et al<sup>14</sup> observed only one case with evidence of a previous suicidal attempt. Other findings like bluish discoloration of nails & lips, subconjunctival hemorrhage, ear/nose/mouth bleed,

hypostasis on the distal part of limbs, petechial hemorrhages over legs etc. were observed in the different percentage of cases in the present study.

In the present study out of total 113 cases, 97 cases (85.84%) were of police inquest (sec. 174 CrPC) and 16 cases (14.16%) were of magistrate inquest (sec. 176 CrPC) i.e. females dying within 7 years of marriage.

## Conclusion

The present study highlights the various profile of suicidal hanging in Indore region of Central India, though it represents only part of the region. In the present study Males of younger age group in majority have committed suicide by hanging in closed space, preferred place was at home. Salivary dribbling, which is considered a hallmark of antemortem hanging, was present only in 26.55% cases. No case of hyoid bone or thyroid cartilage fracture was found.

## Recommendations

Suicide today has become a major health issue throughout the world, despite all legal, moral, social and religious barriers. Males of younger age group were mostly involved in the study. Elderly persons at home should take the responsibility in hard times during life and console youngsters. Other family members should keep a constant watch on the affected member of family and should try to engage them in continuous talks. Psychiatric counseling should be taken for the member. Development of prevention of suicide programmes with their proper implementation is required. Public awareness with the involvement of NGO's and social organizations may play the beneficial role. In future prospective study can be conducted including psychological autopsy for extended in depth study which can be helpful for the society and aiming towards reducing such untimely and unfortunate incidences.

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**Conflict of Interest:** Nil

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