



ORIGINAL RESEARCH PAPER

Forensic Medicine

PROFILE OF DEATHS DUE TO HANGING - A 10 YEARS AUTOPSY BASED RETROSPECTIVE STUDY AT A MEDICO-LEGAL CENTRE OF A TERTIARY HEALTHCARE CENTRE IN SOUTH-WESTERN MAHARASHTRA

KEY WORDS: Hanging, Asphyxia, Forensic Autopsy, Suicide, Ligature material

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ABSTRACT

Hanging is a form of asphyxia caused by suspension of the body by a ligature which encircles the neck, the constricting force being the weight of the body. Hanging is also a common method of suicide as the materials necessary for suicide by hanging are readily available to the average person, compared with firearms or poisons. The present 10 year retrospective study was undertaken with an objective to study the demography of hanging; its distribution according to age, sex, type of ligature material used, place of occurrence of the incidence, month wise variation and autopsy findings with an aim to identify pattern and recommended measures for the prevention of the same. During the ten-year study period from the year 2008 to 2018, a total of 2660 cases were brought for medico legal autopsy to mortuary of which suicide as a result of hanging accounted for 8.9 % (n = 237 cases). Predominant gender was male 157 cases (66.2 %) with male: female ratio of 1.9:1. In the age group 21-30 years (n = 94, 39.6%) maximum number of cases were found, second peak was found between 31-40 years (n = 54, 22.8%). In the month of Jul (n = 28, 11.8 %) the maximum numbers of cases were encountered. Next surge was in the following month of June (n = 27, 11.4 %). Dupatta/chunni was the commonest (35.1%) ligature material. Most (94.9%) of the bodies were recovered from inside the living rooms. Ninety seven percent had complete suspension. WHO estimates that about 170,000 deaths by suicide occur in India every year, but few epidemiological studies of suicide have been done in the country. Though such type of study cannot be the only solution for those human tragedies, the concept of "suicide as a preventable disease" should be well understood and demands thorough and detailed investigations including prevention strategies and outreach programmes especially in younger age group.

INTRODUCTION

Hanging is that form of death which is caused either by exclusion of air from lungs or oxygenated blood from the brain by means of a ligature round the neck, the constricting force being the weight of the body.¹ Suicidal hanging is the commonest. Accidental hanging is less common and homicidal hanging still less common.² Even in primitive and pre-industrial societies hanging was the most common suicide method.³ WHO estimates that nearly 900,000 people worldwide die from suicide every year, including about 200,000 in China, 170,000 in India, and 140,000 in high-income countries.⁴ The Government of India relies on its National Crime Records Bureau (NCRB) for national estimates, and these report fewer suicide deaths (about 135 000 suicide deaths in 2010) than is estimated by WHO.⁵ Experts mainly attribute the lower figures provided by NCRB to under-reporting and the fact that NCRB draws its data from First Information Reports (FIRs).⁶ A recent study reported in The Lancet Public Health, by Dandona and colleagues estimated the national age- standardized SDR (Sustainable Development Goal) for 2016 to be 17.9 per 100,000 population (14.7 per 100,000 among women and 21.2 per 100,000 among men), equating to an estimated 230,000 suicide deaths annually (100,000 more suicide deaths than recognized by the NCRB data).⁷ The alarming findings of the above study should prompt the development of suicide prevention plan at national and state level to tackle this complex public health problem. The aim of the present study was to analyze the profile of deaths due to hanging, study the postmortem findings in hanging cases and to compare the findings with previously published literature.

MATERIAL AND METHODS

The present study is a 10 years retrospective analysis of death due to hanging brought to the Medico legal Centre of a tertiary healthcare centre of a metropolitan city in South-Western Maharashtra from January 2008 to December 2018. During this period, total medico legal post-mortems were 2660 of which hanging cases were 237. Necessary permission was taken from the Institutional ethical committee. All the victims who died due to hanging and brought to the department for post-mortem examination were included in the study. Data was collected using a pre-designed format from Post mortem registers/records and Inquest papers. Police Inquest was carefully studied to know the

manner of death. The results were analyzed using appropriate statistical methods. Microsoft word and excel were used for generating charts and graphs.

OBSERVATIONS AND RESULTS

In this study period of 10-years between January 2008 and December 2018, a total of 2660 post-mortem examinations were carried out in our centre. Of these, 237 cases were hanging deaths that represented approximately about 8.9% of all the deaths (Table 1).

The Male victims (66.2%, n=157) outnumbered females (33.8%, n=80); with the male to female ratio was 1.9 : 1 (Table 2). The majority of victims belonged to 3rd decade among males (38.2%, n=60), followed by 4th decade (26.8%, n=42). 3rd decade was most common among females (42.5%, n=34), followed by 2nd decade (27.5%, n=22). Overall, 3rd decade, followed by 2nd decade, was the most common age group involved. No case was found below 10 years age group (Table 2).

When month wise distribution of cases was analyzed, the highest frequency was registered in July (11.8%), followed by June (11.4%) and January (10.9%) (Fig. 1).

There was no significant seasonal variation. We registered higher number of victims in spring and a slight decrease in summer. (Table 3)

Majority of victims were resident of an urban region (59.4%, n=141), while 40.6% (n=96) were from the rural area (Fig. 2).

The most common place of death was home/work place setting (94.9%, n=225) and it was isolated outdoor place in a very few cases (5.1%, n=12) (Table 4).

Out of 237 cases, ligature material was not received with the body in 15 cases (6.3%). dupatta/chunni was the most common ligature material used for hanging (Table 5).

Almost all the hanging deaths that occurred were suicide events (97.1%, n=230), hanging was an accidental event in 5 cases, and it

was homicidal in 2 cases (Table 6). Data regarding the type of suspension (complete or incomplete) were available in all cases; of these, complete hanging represented 97.4%, n=231 (Table 7). In 82.3% (n=195) cases, hanging was typical (knot in occipital region), while atypical in 17.7% (n=42) cases (Table 8).

In autopsy findings, Salivary stain mark was present in 59.5% (n=141) cases, while it was absent in 40.5% (n=96) cases, bluish discoloration of nails/ lips/earlobes was the most common finding observed in 95.3% cases, subconjunctival haemorrhage was found in 18.1% cases, protrusion of tongue in 57.8%, nasal bleed in 36.2% and seminal discharge in 19.4% and passing off of faecal matter was found in 7.6% cases (Fig. 3).

DISCUSSION

The present study was carried out in the Department of Forensic Medicine & Toxicology of a tertiary care hospital of South Western Maharashtra, during the period from January 2008 to December 2018.

In the present study, the incidence of hanging was 8.9% (237/2660) amongst all medico legal autopsies conducted during the study period. Many studies done across the country have reported the incidence rate between 6-10%.⁸⁻¹⁰ Males outnumbered females in the present study with the male to female ratio of 1.9:1. 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 which causes more mental agony. Similar findings were observed by other authors.⁸⁻¹²

In the present study 3rd decade i.e. 21-30yrs, was the most common age group affected among both males (38.21%) and females (42.5%). Personal or social factors such as socioeconomic circumstances, interpersonal, social and cultural conflicts, alcoholism, financial problems, unemployment, and poor health are known as major reasons for suicide in this age group. Similar findings were reported by other authors.¹³⁻¹⁵

On analysis of seasonal variation, highest number of cases were seen in spring season (29.2%, n=69) and least in summer season (21.5%, n=51). In most of the Indian studies hardly any significant seasonal variation was noted.⁹⁻¹⁰ In our study, the month wise distribution of cases did not show any significant variation which is similar to other studies.⁹⁻¹⁰

Most of victims were resident of the urban region (59.4%) in our study, while 40.6% were from rural area which is similar to other studies.⁸⁻¹⁰ Suicidal ideation and their correlates are influenced by social-cultural variables. The youth in urban areas experience of a range of socio-economic adversities as well as fewer social and cultural benefits which probably puts individuals with urban background at increased risk of suicidal behaviors. Also young adults in urban region attending college, the risk of suicidal ideation is greater than for the same-age counterparts.¹⁶⁻¹⁷

The commonest type of ligature material used for hanging was a dupatta/chunni followed by an saree which is similar to studies of Ahmad and Hussain¹⁸ and Patel et al¹⁹ however its different from study of Tumram et al²⁰ which reported the nylon rope as the commonest type of ligature material used for hanging in the Nagpur region of central India. These items are easily available and accessible in every household that is why they are commonly used.

In present study complete hanging was observed in most of the cases over the partial (incomplete) hanging and this finding is well corroborated by other studies.²¹⁻²⁴ The position of the knot in a majority of cases was behind the neck (typical hanging) in 82.3%, while on the side of the neck (atypical hanging) in 17.7% cases. These findings are in consistence with those reported by Saisudheer and Nagaraja²³, Penaranda et al²⁴ and Sharma et al²⁵.

In our study, the place chosen for hanging was closed space i.e. either home or workplace, in 94.9% (n=225) cases, while isolated open space in 5.1% (n=12) cases. More than 95% of victims preferred the home for committing suicide by hanging in studies by

Ahmad and Hossain¹⁸ and Vijayakumari²⁶. It's easy to isolate oneself by locking in a room at home where ligature material is also readily available.

Almost all of the cases of hanging were represented by suicidal events (97.1%, n=230). There were 5 cases (2.1%) of accidental events and only 2 of homicide (0.8%). This is similar to findings of Russo et al.²⁷ According to the available literature, homicidal hanging is a rare event; it is usually used to cover up strangulation.²⁸⁻³²

In the present study, salivary stain mark was present in 59.4% cases, while it was absent in 41.6% cases. Other findings like bluish discoloration of nails & lips, subconjunctival hemorrhage, ear/nose/mouth bleed, hypostasis on the distal part of limbs, petechial hemorrhages, seminal and fecal discharge etc. were observed in the different percentage of cases in the present study. These findings were slightly different from studies which have observed these autopsy findings.^{13,33-34}

CONCLUSION

The conclusion drawn from this study is that, the incidence of asphyxial deaths due to constriction of the neck is more in males as compared to females, belonging to urban region and in most of these cases, the manner of death is suicide. A maximum numbers of cases are seen in young adults (21-30 years). Most of these cases were observed in spring season and in month of June and July. In most of the cases, the soft cloth (dupatta/chunni) was used as ligature material. The knot of the ligature material was mostly typical. In a maximum number of cases, the hanging was complete and body was found indoors in most of these cases. Typical autopsy findings of suicidal hanging were seen in most of the cases.

Recommendations

In India the disproportionately high suicide deaths are a public health crisis. Among young adults suicide ranks as the leading cause of death. To take into account the wide variations in trends between the states and the context of each state and to reduce the burden of suicide deaths in India a national suicide prevention strategy is needed as a guide, which then has to be adapted at the state level.

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Conflict of interest :None declared.

Ethical approval :Necessary ethical approval was obtained.

Limitations :Due to record based and its retrospective design in very few cases not all the information pertaining to our study format was available for comparison and compilation.

Figures and Tables

Table 1. Year wise distribution of no. of cases.

Year	No. of autopsies	No. of hanging cases	% of cases with respect to no. of autopsies
2008	90	9	10.0
2009	318	25	7.9
2010	276	28	10.1
2011	272	26	9.5
2012	222	19	8.5
2013	222	17	7.6
2014	178	10	5.6
2015	148	9	6.1
2016	481	39	8.1
2017	216	29	13.4
2018	237	26	10.9
Total	2660	237	8.9

Table 2. Age and Sex Distribution

Age Group (years)	Male	Female	Total
0-10	0	0	0
11 – 20	17 (10.83%)	22 (27.5%)	39 (16.4%)
21 – 30	60 (38.22%)	34 (42.5%)	94 (39.6%)
31 – 40	42 (26.75%)	12 (15%)	54 (22.8%)
41 – 50	14 (8.92%)	3 (3.75%)	17 (7.1%)
51 – 60	14 (8.92%)	5 (6.25%)	19 (8.1%)
61 – 70	7 (4.46%)	3 (3.75%)	10 (4.3%)
>70	3 (1.91%)	1 (1.25%)	4 (1.7%)
Total	157 (65.8 %)	80 (34.2%)	237
Ratio	157	80	1.9:1

Figure 1. Distribution of cases by Months

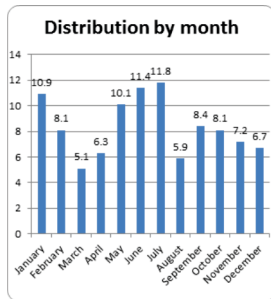


Table 3. Distribution according to Season

Season	No. of cases	% of cases
Winter	61	25.7
Summer	51	21.5
Spring	69	29.2
Autumn	56	23.6
Total	237	100.0

Figure 2. Distribution by Place of residence

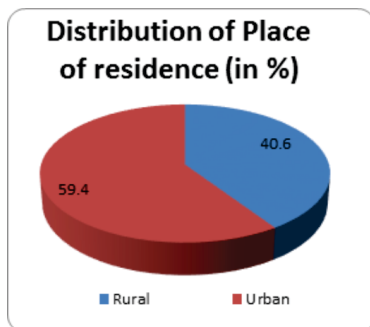


Table 4. Distribution of place of occurrence.

Place	No. of cases	% of cases
Indoor	225	94.9
Outdoor	12	5.1
Total	237	100.0

Table 5. Type of ligature material used.

Ligature material used	No. of cases	% of cases
Unknown	15	6.3
Bed sheet	29	12.3
Rope	19	8.1
Cloth	13	5.4
Electric wire	37	15.6
Saree	41	17.2
Dupatta / Chunni	83	35.1
Total	237	100.0

Table 6. Distribution of Manner of Death

Manner of Death	No. of Cases	% of cases
1. Suicide	230	97.1
2. Accidental	5	2.1
3. Homicidal	2	0.8

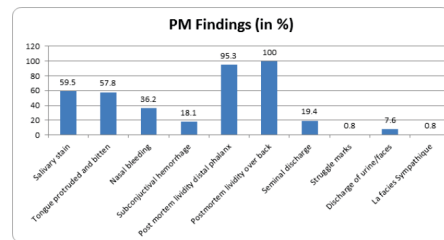
Table 7. Distribution by Type of Suspension

Type of Suspension	No. of Cases	% of cases
1. Complete	231	97.4
2. Incomplete	6	2.6

Table 8. Distribution by Type of Hanging

Type of Hanging	No. of Cases	% of cases
1. Typical	195	82.3
2. Atypical	42	17.7

Fig 3. Distribution of Postmortem Findings



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