

Study of deaths due to hanging in ABVIMS and Dr Ram Manohar Lohia Hospital New Delhi

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Abstract

Background: Hanging is a form of violent asphyxial death produced by suspending the body with a ligature around neck and the constricting force being the weight or part of the body weight. Hanging is a common cause of suicide world-wide, along with poisoning and self-immolation in rural regions of India. Hanging is being common method of suicides while strangulation as one of methods in homicide. A total of 1,34,516 suicides were reported in the country during 2018 showing an increase of 3.6% in comparison to 2017 and the rate of suicides has increased by 0.3 during 2018 over 2017. Present study was undertaken to Study of deaths due to hanging in ABVIMS and Dr Ram Manohar Lohia Hospital, New Delhi. **Material and Methods:** Present study was prospective and observational, conducted in Department of Forensic Medicine and Toxicology ABVIMS and Dr Ram Manohar Lohia Hospital New Delhi, in cases which had history of death by hanging as reported by the police inquest. **Results:** In present study, total 118 cases of hanging were autopsied. All cases were related to suicidal deaths. Male cases (55 %) were more than female (45 %), male to female ratio was 1.2:1. 15-29 years age group was most common (48%), followed by 30-44 years age group (24%) and 45-59 years age group (19%). We noted that 63% cases had typical hanging. Nylon rope (35 %) was most common ligature material used in hanging, followed by dupatta/chunni (26%) and jute rope (16%). Common predominating suicidal motivating factors were domestic. Out of 33 cases of domestic cause, 16 were dowry related and rest were due to other domestic causes. Dowry deaths in young females is very distressing (14 %). Other motivating factors were financial (21%), love relationship (17%), disease related (15%), work related (10%) and education/career (8%). **Conclusion:** Different and multiple stress factors are increasingly reported to be associated with hanging, Identification of precipitating factors of suicide among younger victims and necessary sociological interventions are need of hour to prevent these premature deaths and socioeconomic burden on our society.

Keywords: Hanging deaths, Ante-mortem hanging, Ligature material, Pre-disposing factor

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INTRODUCTION

Deaths due to compression of neck by ligature are one of the most important unnatural deaths encountered by

forensic experts in mortuary. Hanging is a form of violent asphyxial death produced by suspending the body with a ligature around neck and the constricting force being the weight or part of the body weight. Hanging is a common cause of suicide world-wide, along with poisoning and self-immolation in rural regions of India. Hanging is being common method of suicides while strangulation as one of methods in homicide. All cases of hanging are considered to be suicidal until the contrary is proved.³ Many cultural and socio-economic factors are responsible for the causation of hangings. Rapid urbanization, industrialization and emerging family systems are resulting in social upheaval and distress.⁴ Over the past 30 years the incidence of suicide by hanging is on increase, especially among young adults.⁵ The fact that

71% of suicides in India are by persons below the age of 44 years imposes a huge social, emotional and economic burden on our society.⁶ A total of 1,34,516 suicides were reported in the country during 2018 showing an increase of 3.6% in comparison to 2017 and the rate of suicides has increased by 0.3 during 2018 over 2017.⁷ The reduction of suicide mortality has been prioritized by the World Health Organization (WHO) as a global target and included as an indicator in the United Nations Sustainable Development Goals (SDGs) under target 3.4, the WHO 13th General Programme of Work 2019-2023 and the WHO Mental Health Action Plan 2013-2030. ⁸Present study was undertaken to Study of deaths due to hanging in ABVIMS and Dr Ram Manohar Lohia Hospital, New Delhi.

MATERIAL AND METHODS

Present study was prospective and observational, conducted in Department of Forensic Medicine and Toxicology, ABVIMS and Dr Ram Manohar Lohia Hospital, New Delhi over a period of 15 months study from June 2018 to September 2019. Institutional

committee approval was taken. Strict confidentiality was kept regarding identity, medical and forensic details of study subjects. The materials taken for this study are those autopsy cases which had history of death by hanging as reported by the police inquest. Cases suggestive of strangulation were not included. We thoroughly scrutinized information gathered from Police, inquest report and hospital treatment records. Regular autopsy examination is done with special attention to thorough examination of the neck structures. Necessary information for the study such as autopsy related documents, history from relatives of the deceased, hospital records, concerned investigating agencies and laboratory report of viscera and their contents, fluids, deceased tissues and organs and other relevant suspicious samples, was collected. Skin samples are taken from the ligature mark and also corresponding area of the underlying carotid vessels and sent for histopathological examination along with control. Collected data was entered in Microsoft excel. The result so obtained was then subjected to statistical analysis. Statistical analysis was done using descriptive statistics.

RESULTS

In present study, total 118 cases of hanging were autopsied. All cases were related to suicidal deaths. Male cases (55 %) were more than female (45 %), male to female ratio was 1.2:1. 15-29 years age group was most common (48%), followed by 30-44 years age group (24%) and 45-59 years age group (19%).

Table 1: Age wise Distribution of Suicides during Study Period

Age Group (Yrs)	Male (%)	Female (%)	Total (%)
0-14 years	1(1%)	0	1(1%)
15-29 years	26(22%)	31(26%)	57(48%)
30-44 years	17(14%)	11(9%)	28(24%)
45-59 years	14(12%)	8(7%)	22(19%)
>60 years	7(6%)	3(3%)	10(8%)
Total	65(55%)	53(45%)	118

We noted that 63% cases had typical hanging. Most cases had features of complete and atypical hanging (57 %), partial and atypical hanging (33 %). Only 6% had features of Complete and typical hanging.

Table 2: Incidence of Type of Hanging

Type of Hanging	Cases	Percentage
Complete and Typical	7	6%
Complete and Atypical	67	57%
Partial and Typical	5	4%
Partial and Atypical	39	33%
Total	118	1

Nylon rope (35 %) was most common ligature material used in hanging, followed by dupatta/chunni (26%) and jute rope (16%). Other ligature material used were lungi/khudei (8%), sari (6%), cable wire (4%), curtain (3%) and bed sheet (2%).

Table 3: Ligature material used

Ligature materials	No.	%
Nylon rope	41	35%
Dupatta/chunni	31	26%
Jute rope	19	16%

Lungi/khudei	10	8%
Sari	7	6%
Cable wire	5	4%
Curtain	3	3%
Bed sheet	2	2%
Total	118	

Most common characteristic features noted at ligature mark were grooving (97%), color change i.e. blackening (97%), heaping of epithelium in margins at ligature mark (97%), abrasion/excoriation at ligature mark (96%), leathery hard and pale ligature mark (96%), oblique shaped ligature mark (86%), incomplete ligature mark (discontinuity noted) (83%) and ligature mark above the thyroid cartilage (81%).

Table 4: Findings at the ligature mark.

Ligature mark findings	No.	Percentage(%)
Grooving	114	97%
Color change – blackening	114	97%
Heaping of Epithelium In margins	114	97%
Abrasion/Excoriation	113	96%
Leathery hard And pale	113	96%
Oblique shape	102	86%
Incomplete (Discontinuity)	98	83%
Above The thyroid cartilage	95	81%
Right side accumulation Of Epithelium	70	59%
Left side accumulation Of Epithelium	38	32%
Complete mark	25	21%
Over the Thyroid cartilage	13	11%
Below the Thyroid cartilage	10	8%
Undisplaced epithelium	10	8%
Horizontal shape [partial suspension]	9	8%
Near Oblique shape [partial suspension]	7	6%
Intact skin	7	6%

During post-mortem examination, various internal trauma in neck noted. Trauma to Sternocleidomastoid muscle (60%), Carotid artery (36%), Cervical vertebra (19%) were common amongst them.

Table 5: Internal trauma in the neck

Neck tissue	No.	Percentage(%)
Sternocleidomastoid muscle	71	60%
Carotid artery	42	36%
Cervical vertebra	23	19%
Hyoid bone	11	9%
Thyroid cartilage	1	1%
Cricoid cartilage	0	0%

For each suicidal case one or more motivating factors were present. Common predominating suicidal motivating factors were domestic. Out of 33 cases of domestic cause, 16 were dowry related and rest were due to other domestic causes. Dowry deaths in young females is very distressing (14 %). Other motivating factors were financial (21%) , love relationship (17%) , disease related (15%), work related (10%) and education/career (8%).

Table 4: Motivating Factors*.

Motivating factors	Male	Female	Total (%)
Financial	19(16%)	6(5%)	25(21%)
Love relationship	11(9%)	9(8%)	20(17%)
Disease related	12(20%)	6(5%)	18(15%)
Domestic – others	8(7%)	9(8%)	17(14%)
Domestic - Dowry related	0	16(14%)	16(14%)
Work related	8(7%)	4(3%)	12(10%)
Education/career	7(6%)	3(3%)	10(8%)
Total	65(55%)	53(45%)	118

(* - finalised after reviewing all case details)

DISCUSSION

Hanging is a serious area of concern to community, so as for forensic experts. In present study male cases (55 %) were more than female (45 %), male to female ratio was 1.2:1. Kumar *et al.*¹⁰, Udhayabanu *et al.*¹¹, and Momin *et al.*¹², reported a male: female ratio of about 2:1. Rawat and Rodrigues¹³ reported 78.22% cases of male and 21.78% cases of female with male to female ratio of approximately 3:1. Kumar *et al.*¹⁴, reported male to female ratio of about 2.1:1. The overall male: female ratio of suicide victims for the year 2018 was 68.5:31.5, which remains same as compared to year 2017 (68.5:31.5). The proportion of female victims were more in 'Marriage Related Issues' specifically in 'Dowry Related Issues', and 'Impotency/Infertility'. The age group (18 and above - below 30 years) and persons above 30 years - below 45 years of age were the most vulnerable groups resorting to suicides. These age groups accounted for 34.9% and 31.6% suicides respectively⁷. Males are 2.52 times and 2.08 times more likely than females to commit suicide by hanging and poisoning respectively, whereas females are 1.5 times more likely to commit suicide by fire/self-immolation¹⁵. As observed in our study, 15-29 years age group was most common (48%), followed by 30-44 years age group (24%) and 45-59 years age group (19%), represents the most active and productive section of the society. Our study is in agreement with study of Udhayabanu *et al.*¹¹, Rawat and Rodrigues¹³, Kumar *et al.*¹⁴, Bhosle *et al.*¹⁶, Ahmad *et al.*¹⁷ and Ajay Kumar *et al.*¹⁸ where majority of the victims were in the age group of 21-30 years. The age group (18 and above - below 30 years) and persons above 30 years - below 45 years of age were the most vulnerable groups resorting to suicides. These age groups accounted for 34.9% and 31.6% suicides respectively. 'Family Problems' (2,236), 'Failure in Examination' (1,529), 'Love Affairs' (1,131) and 'Illness' (932) were the main causes of suicides among children (below 18 years of age)⁷. Suicide by 'Hanging' (51.5%), Consuming 'Poison' (26.7%), 'Drowning' (4.9%) and 'Self-Immolation' (4.4%) were the prominent means of committing suicides during 2018. During the year 2018, share of 'Hanging' (from 49.8% in 2017 to 51.5% in 2018), have increased during 2018 over 2017⁷. With regard to precipitating/causative factors in committing suicide, domestic cause (29 %), Other motivating factors were financial (21%) , love relationship (17%) , disease related (15%), work related (10%) and education/career (8%). Dowry deaths in young females is very distressing (14 %). Rawat and Rodrigues¹³ who noticed physical illness as the most common cause in 22.77% cases followed by poverty in 21.78% cases and drug addiction in 16.83% cases. Udhayabanu *et al.*¹¹, noticed family disputes like marital

disharmony and quarrel with spouse in 52.25% cases followed by mental illness in 23.87% cases. 'Family Problems' and 'Illness' were the major causes of suicides which accounted for 30.4% and 17.7% of total suicides respectively during 2018. 'Marriage Related Issues' (6.2%), 'Drug Abuse/Addiction' (5.3%) 'Love Affairs' (4.0%), 'Bankruptcy or Indebtedness' (3.7%), 'Failure in Examination' and 'Unemployment' (2.0% each), 'Professional/Career Problem' (1.3%) and 'Property Dispute' (0.9%) were other causes of suicides⁷. The means adopted for committing suicide varied from the easily available and effective means such as consumption of poison, jumping etc. to more painful means such as self-inflicted injuries, hanging etc. Like previous year, 'Hanging' (51.5%), consuming 'Poison' (26.7%), 'Drowning' (4.9%) and 'Fire/Self-Immolation' (4.4%) were the prominent means/mode of committing suicide⁷. In present study, nylon rope (35 %) was most common ligature material used in hanging, followed by dupatta/chunni (26%) and jute rope (16%). In a study by Dinesh Rao¹⁹, the commonest choice of ligature material used was female dress (soft) material [(Stole (n – 79) and Sari (n – 68)] constituting to 55.68% (n – 147) cases and the least preferred choice was the Waist Belt, reported in only 2 cases (0.76%). Sharma *et al.*²⁰, they had opined 47% and 56% of their victims respectively preferred Soft ligature material like sari, Stole, shawl. These results were contrary to the observations made by Pradhan *et al.*²¹ wherein they had observed that only 9.09% (n – 4) used sari. Whereas the study conducted by Saisudheer and Nagaraja²² concluded with 86% of Soft material used for ligature. This wide nature of deviations in the choice of ligature material can be explained by the dressing fashion of the population and occupation.

We noted that 63% cases had typical hanging. Sharma *et al.*²⁰ and Saisudheer and Nagaraja²² in their study, 68% and 64% of the cases respectively were due to Complete Hanging. This highlights the regional influence, lifestyle and to a certain extent the type of residence. Dribbling of saliva from the angle of mouth is supposed to be a sure sign of ante-mortem hanging. It could be because of congestion and mechanical stimulation of salivary glands consequent upon friction by ligature⁶. It is also well known fact that discontinuity along the course of the ligature mark is another important criterion while describing the ligature mark of hanging or ligature strangulation. Other most important finding of ligature mark are level, obliquity of the ligature mark, etc. which differentiate hanging from ligature strangulation. However, it is a fact that not all these differentiating features are present simultaneously in all cases of hangings and strangulations. In practice, the distinction between the two groups important because strangulation

is usually homicidal and hanging in vast majority is considered to be suicidal^{12,20}. Suicide is a complex multifactorial phenomenon that makes it difficult to estimate the specific contribution of effective suicide prevention strategies or other changes on societal, community or individual rates. Further action and strengthening of ongoing efforts in the implementation of key effective suicide prevention interventions (i.e. restricting access to means of suicide, interaction with the media for responsible reporting, training young people in their life skills, and early identification, management and follow-up) as described in the LIVE LIFE strategy (WHO, 2018) are crucially needed, to save lives lost to this serious public health issue²³.

CONCLUSION

Different and multiple stress factors are increasingly reported to be associated with hanging, Identification of precipitating factors of suicide among younger victims and necessary sociological interventions are need of hour to prevent these premature deaths and socioeconomic burden on our society.

REFERENCES

1. Dogra TD, Rudra A. *Lyon's Medical Jurisprudence and Toxicology*. 11th ed. Delhi: Delhi Law House; 2013. pp. 958.
2. Mythri S, Ebenezer JA. Suicide in India: distinct epidemiological patterns and implications. *Indian J Psychol Med* 2016;38(6):493-8.
3. Modi J P. *Medical Jurisprudence and Toxicology*, Edited by K Mathiharan and Amrit K Patnaik, Lexis Nexis Publishers, New Delhi, 23rd edition; 2008: 565 – 614.
4. Kamalakar D (2012) A new trend of suicides in India, *Countercurrents.org.*, June 2016.
5. David Gunnell, Olive Bennewith, Keith Hawton, Sue Simkin and Nav Kapur. The epidemiology and prevention of suicide by hanging: a systematic review. *International Journal of Epidemiology* 2005; 34(2):433-442.
6. Vijaykumar L. Suicide and its prevention: The urgent need in India. *Indian J Psychiatry* 2007; 49:81-4.
7. *Accidental Deaths and Suicides in India 2018*, published by National Crime Records Bureau (Ministry of Home Affairs), Government of India.
8. World Health Organization (WHO) <https://apps.who.int/iris/bitstream/handle/10665/324775/WHO-PRP-18.1-eng.pdf> (accessed 23 August 2019).
9. World Health Organization (WHO) https://www.who.int/mental_health/publications/action_plan/en (accessed 23 August 2019).
10. Kumar C, Rana N, Goyal AK, Tanna J, Pathak A, et. al., (2015) Epidemiology of cases of hanging at Vadodara, Gujarat. *IRPMS*. 1(2): 23-26.
11. Udhayabanu R, Toshi S, Baskar R (2015) Study of hanging cases in Pondicherry region. *IOSR- JDMS*. 4 (7): 41-44.
12. Momin SG, Mangal HM, Kyada HC, Vijapur MT, Bhuva SD (2012) Pattern of ligature mark in cases of compressed neck in Rajkot region: A prospective study. *J Indian Acad Forensic Med*. 34(1): 40-43.
13. Rawat V, Rodrigues EJ (2015) Medico-legal study of hanging cases in north Goa. *Int J Forensic Sci Pathol*. 3(5): 110-118.
14. Kumar N, Sahoo N, Panda BB, Dutta A (2016) Demographic profile of hanging cases autopsied in Rims, Ranchi. *GJRA-Global Journal for Research Analysis*. 5(3): 119-121.
15. Kamalja and Khangar, A statistical study of suicidal behavior of Indians, *Egyptian Journal of Forensic Sciences* (2017) 7:12
16. Bhosle SH, Batra AK, Kuchewar SV (2014) Violent asphyxia death due to hanging: a prospective study. *J Forensic Med Sci Law*. 23(1): 1-8.
17. Ahmad M, Rahman FN, Hussain MA, Chowdhury MH, Yasmeen BHN (2015) A medico-legal study of hanging cases at Dhaka Medical College. *NIMCH J*. 7(1): 110-114.
18. Ajay Kumar S, Chandan V, Rudresh YC, Govindaraju HC, Gouda S (2013) Study of violent asphyxial deaths in Chitradurga district of Karnataka. *IJBAR*. 4(12): 868-871.
19. Dinesh Rao, An autopsy study of death due to Suicidal Hanging of 264 cases, *Egyptian Journal of Forensic Sciences* (2016) 6, 248-254
20. Sharma BR, Harish D, Sharma A, Sharma S, Singh H. Injuries to neck structures in deaths due to constriction of neck, with a special reference to hanging. *J Forensic Legal Med* 2008 Jul;15(5): 298-305.
21. Pradhan A, Mandal BK, Tripathi CB. Hanging: nature of ligature material applied and type of hanging according to point of suspension. *Nepal Med Coll J* 2012;14(2):103-6.
22. Saisudheer T, Nagaraja TV. A study of ligature mark in cases of hanging deaths. *Int J Pharm Biomed Sci* 2012;3(3):80-4.
23. World Health Organization (2018). National suicide prevention strategies: progress, examples and indicators. World Health Organization, Geneva.

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