



Journal Homepage: -www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/5706
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/5706>



RESEARCH ARTICLE

MULTIFACTORIAL ANALYSIS OF HANGING DEATHS IN CENTRAL INDIAN POPULATION: A CROSS SECTIONAL STUDY.

Dr. Laxmikant S. Rathod¹, Dr. Laxman Gangadhar Phad² and Dr. Jaydeo Laxman Borkar³.

1. Resident Doctor- III, Dept of Forensic Medicine Gmchnagpur.
2. Assistant Professor Dept of Forensic Medicine Gmchaurangabad.
3. Associate Professor Dept of Forensic Medicine Gmchnagpur.

Manuscript Info

Manuscript History

Received: 23 August 2017
 Final Accepted: 25 September 2017
 Published: October 2017

Key words:-

Complete hanging, Partial hanging, Subconjunctival petechiae, Cyanosis, Complete hanging, Type of knot.

Abstract

Background: Hanging is one of the ten leading causes of death in the world, accounting for more than a million deaths annually. Over the past 30 years, the incidence of suicide by hanging has increased, especially among young adults. The present study was conducted to evaluate the socio-demographic profile, place of hanging, ligature material, ligature point of suspension and type of hanging and post-mortem findings in hanging deaths.

Material and Methods: The present Cross sectional study was carried out in the Department of Forensic Medicine, during January 2015 to July 2016, on total 212 cases of hanging brought for medicolegal postmortem examination.

Conclusion: Hanging deaths were mostly suicidal, male predominance seen in hanging deaths Hanging deaths were more common in married than unmarried. Hanging deaths were more in Hindus; Most of victims of hanging deaths were form urban area. The unemployed and labourers were more vulnerable. Most of the victims of hanging deaths belong to upper lower class. Domestic quarrel and financial problem were common reason for hanging. Home is preferred place for hanging. Complete hanging was more as compare to incomplete. Single turns and fixed knot of ligature material was most common. Mostly the ligature mark was above the level of thyroid cartilage, most common position of knot was at the back of neck.

Copy Right, IJAR, 2017.. All rights reserved.

Introduction:-

Hanging is the form of asphyxia which is caused by suspension of the body by ligature which encircles the neck, the constricting force being the weight of the body, the whole weight of the body is not necessary and only a comparatively slight force is enough to produce death.¹ Among the unnatural deaths, violent asphyxial deaths are one of the most important causes for deaths.²

Hanging is ordinarily presumed to be suicidal unless circumstantial and other evidences with autopsy findings are sufficient enough to rebut the presumption. Whereas homicidal hangings is rare, the accidental hanging is rather uncommon.³ Millions of death due to hanging forms a statistic which inspire to think, and act accordingly and

Corresponding Author:- Dr. Laxman Gangadhar Phad

Address:- Assistant Professor Dept of Forensic Medicine Gmchaurangabad.

highlights our social duty to prevent the precipitating factors as it is great loss to family, nation and also to the world.

National crime record bureau 2014 report⁴, Out of total suicidal cases in India, hanging was leading means to adopt suicide accounting 41.8 % cases. In India the percentage share of the means as a hanging adopted in committing suicides during 2012-2014 is increasing, it was 37.0% in 2012, 39.8% in 2013 and 41.8% in 2014 so become the top most means adopted for suicide as it is a sure and rapid death. These suicidal deaths are the ghostly figures holding a noose, but saying nothing.

Along with the asphyxia by obstruction of the air passage, the possibility of occlusion of veins and arteries, fracture of cervical vertebrae and vagal inhibition are also present in combination with each other or separately in hanging death cases. It is easy to diagnose hanging when one finds the classical features. However all features are seldom present together. The application of pressure on the neck often results in findings, which are quite variable.⁵The present study was conducted to evaluate the socio-demographic profile, place of hanging, ligature material, ligature point of suspension and type of hanging and post-mortem findings in hanging deaths.

Observation and results:-

Out of the total 212 hanging deaths, male were involved in 74.06% cases and female in 25.94% cases with male female ratio of 2.85:1. The minimum age of suicidal hanging for male was 13 years and maximum age was 80 years. The minimum age of suicidal hanging for female was 15 years and maximum age was 80 years. Two cases of accidental hanging was seen in age group 0-10 year age group. The peak incidence of hanging death was noted in age group of 21-30 years seen in 33.49% cases followed by 31-40 years in 24.06% cases. The young age group less than 20 years were more common (16.03%) than old age above 50 years (10.85%). Suicidal hanging was seen in 99.06%, accidental hanging in 0.94% and none of the cases of homicidal hangings were observed during the study.

Table No.01:-Distribution of hanging deaths according to gender and age group

Age Groups (Years)	Gender				Total	%
	Male	%	Female	%		
0-10	1	00.64%	1	01.82%	2	00.94%
11-20	12	07.64%	20	36.36%	32	15.09%
21-30	50	31.84%	21	38.18%	71	33.49%
31-40	44	28.03%	7	12.73%	51	24.06%
41-50	30	19.11%	3	05.45%	33	15.57 %
51-60	12	07.64%	2	03.64%	14	06.60%
Above 60	8	05.10%	1	01.82%	9	04.25%
Total	157	74.06%	55	25.94%	212	100%

Victims of hanging deaths were married in 61.80% and unmarried in 37.26%. Widows were noted in 0.94% cases of hanging deaths. The hanging deaths were more common in Hindu religion seen in 76.42% cases followed by Buddhist in 21.70% cases. In Muslim and Christian religion hanging deaths were 1.42% and 00.46% respectively.

Urban area constitutes 86.32% cases and rural areas constitute 13.68% cases of hanging deaths. Hanging deaths were maximum in unemployed victim seen in 19.81% followed by labourers in 17.46%.The victim of hanging deaths were Student, Private Job, self-employed, housewife, government jobs and other seen in 16.98%, 14.16%, 12.26%, 11.79%, 4.24% and 3.30% respectively.

Table No. 2:-Distribution of hanging deaths according to manner.

Manner of hanging	Gender				Total	%
	Male	%	Female	%		
Suicidal	156	99.36%	54	98.18%	210	99.06%
Accidental	01	00.64%	01	01.82%	02	00.94%
Homicidal	00	00.00%	00	00.00%	00	00.00%
Total	157		55		212	100%

Depending on the socioeconomic status, most of the victims of hanging deaths belong to upper-lower class seen in 39.16%, followed by lower class in 22.64% cases both commonly account for 61.80%. The hanging deaths in lower middle class seen in 19.34% cases, upper middle class in 14.62% and upper class in 04.24% cases. The hanging deaths were common in victims those were educated up to secondary matriculate education seen in 44.34% cases followed by primary in 20.76% cases, higher secondary education in 17.46%. Minimum number of hanging deaths 7.54% cases were seen in victims those who had illiterate. Out of 212 cases of hanging deaths, 24 cases had left suicide note which accounts for 11.32%. Suicide note was absent in 88.68% cases of hanging deaths. Most common reason for hanging deaths were domestic quarrel seen in 25.94% cases, followed by financial problems in 15.57% cases. The organic disease seen in 14.15% cases, failure in love and affair in 13.21% cases, psychiatric illness in 12.74% cases, family problem in 09.91% cases, Exam failure in 04.24% cases, alcohol addiction in 3.33% cases and accident in 00.94% cases. Most common place of hanging were home seen in 95.24% cases, followed by forest in 2.38%, public place in 1.42%, hostel in 00.48% and hotel in 00.48% .

The most common ligature materials used for hanging were nylon rope present in 31.13% cases followed by odhani in 26.42% cases. Dupatta as a ligature material was noted in 15.57% cases, sari in 15.09% cases, cotton rope in 04.25% cases, jute rope were used in 00.47% cases and Other type of ligature material were noted in 7.07% cases. This includes bed sheet, jeans pant, towel, iron chain, creeper wel, television cable, electric wire, crape bandage and dhoti. The ligature point of suspension in hanging were beam seen in 34.91% cases followed by ceiling fan in 33.96% cases, ceiling hook in 22.64% cases. The window grill present in 4.72% cases, tree in 02.83% cases and other in 00.94%. Complete hanging was present commonly seen in 59.91% cases as compare to partial hanging in 28.57% cases. Ligature mark over the neck was above the level of thyroid cartilage seen in 83.02% cases. It was over the level of thyroid cartilage in 15.56% cases and below the level of thyroid cartilage in 01.42% cases.

Table N0. 3:-Distribution of hanging deaths according to occupation

Occupation	Gender				Total Cases	%
	Male	%	Female	%		
Unemployed	42	26.75%	0	00.00%	42	19.81%
Labourers	31	19.75%	6	10.91%	37	17.46%
Student	15	09.55%	21	38.18%	36	16.98%
Private Job	28	17.83%	2	03.64%	30	14.16%
Self Employed	26	16.56%	0	00.00%	26	12.26%
Housewife	0	00.00%	25	45.45%	25	11.79%
Government Job	9	05.74%	0	00.00%	9	04.24%
Other	6	03.82%	1	01.82%	7	03.30%
Total	157		55		212	100%

The ligature mark over the neck was obliquely placed seen in 96.70% and horizontally placed in 03.30%. The ligature mark over the neck was completely encircling the neck seen in 20.28% cases and incompletely encircling the neck in 79.72% cases. It was observed that position of knot on left side of occiput seen in 29.72% cases, right side of occiput in 16.51% cases and mid occiput in 3.77%. Thus most common place of knot was back of nape of neck seen in 50% cases. Least common position of knot was chin seen in 1.89% cases. Atypical hangings were seen in 96.23% cases as compare to typical in 03.77% cases.

Out of 212 hanging cases a single ligature mark over the neck were present in 93.40% cases, double in 06.13% cases and multiple in 00.47% cases. Dribbling of saliva seen in 29.72% cases of hanging death and absent in 70.28% cases of hanging death. Tongue clinched between teeth or protruding out present in 26.88% cases of hanging death. Gross contusion of neck muscle were seen in 0.94% cases, fracture of hyoid bone present in 00.94% cases, fracture of thyroid present in 0.47% cases, and no fracture of cervical vertebrae and cricoid cartilage were seen.

Table 4:-Distribution of hanging cases according to reason of hanging

Reason of Hanging	Gender				Total	%
	Male	%	Female	%		
Domestic Quarrel	36	22.93%	19	34.55%	55	25.94%
Financial Problem	32	20.38%	1	01.82%	33	15.57%
Organic Disease	24	15.29%	6	10.90%	30	14.15%

Failure in Love and Affair	10	06.36%	18	32.73%	28	13.21%
Psychiatric Illness	25	15.92%	2	03.64%	27	12.74%
Family Problem	16	10.20%	5	09.09%	21	09.91%
Exam Failure	6	03.82%	3	05.45%	9	04.24%
Alcohol Addiction	7	04.46%	0	00.00%	7	03.30%
Accidental	1	00.64%	1	01.82%	2	00.94%
Total	157		55		212	100%

Discussion:-

Manner of hanging deaths:-

In present study, out of 212 cases of hanging deaths 99.06% cases were suicidal and 0.94% cases were accidental and none of the cases of homicidal hanging were observed during study period. These findings are in accordance with study carried out by Patel AP et al⁶ (2012), Bhosle SH et al⁷ (2015), Davidson A et al⁸ (1986), Reddy KSN⁹

Gender and Age group:-

Out of total 212 cases of hanging deaths 74.06% cases were male and 25.94% cases were female with male: female ratio 2.85:1. The above observation is in accordance with NCRB⁴ 2014, Ambade VN et al¹⁰ (2014), Badkur DS et al¹¹ (2012), Waghmare PB et al¹² (2014), Chandegara P et al¹³ (2014), Bhosle SH et al¹⁴ (2014). Male predominance due to the fact that males have double burden of family responsibility. They expected to earn for family and bear all responsibility and work hard accordingly in competitive world so vulnerable to more stress and tension as compare to female. On the other hand females have more accommodative to changing mentally and traumatic circumstances and they have strong emotional binding with their family and children. It might be due to the reason that in their region female were less educated and repeatedly got tortured physically and mentally by husbands for various family problems and dowry so they go beyond So accidental hanging might be due to lack of care and attention by the parent towards infant and curiosity of child who was ignorant and unaware about consequence of playing. The maximum number of hanging deaths observed in age group 21-30 years due to fact that this is transit phase of life in which there is transformation from student life where they were protected by parents to an adult life where they were expected to start earning and take responsibility of family associated with increase aggressive behaviour and easy loss of temper.

Marital status:-

In the present study depending on the marital status, victims of hanging deaths were married seen in 61.80% and unmarried in 37.26%. Widows were noted in 0.94% cases of hanging deaths. Similar findings present in the study done by Vijayakumari N.¹⁵ (2011), Saisudheer T et al¹⁶ (2012), Chandegara P et al¹³ (2014), Vinita VE et al¹⁷ (2014), Tirpude BH et al¹⁸ (2010), Raju K. et al¹⁹ (2013), Bardale R. et al²⁰ (2011), Married have to face more responsibilities, domestic problem, financial problem, unemployment and other leading them to end their life. In married male domestic quarrel, financial burdens, psychiatric illness and family problems were the main motives behind Hanging.

Religion:-

In the present study the hanging deaths were more common in Hindu religion seen in 76.42% cases followed by Buddhist in 21.70% cases. In Muslim and Christian religion hanging deaths were 1.42% and 00.46% respectively. Similar findings were present in the study of Waghmare PB et al¹² (2014), Sharija S. et al²¹ (2011), Bardale R et al.²⁰ (2011)

Locality:-

In the present study hanging deaths from urban area constitutes 86.32% cases and rural areas constitute 13.68% cases.

Occupation:-

Maximum hangings cases were seen among unemployed 19.81%, followed by labourer 17.46%, student 16.98%, private jobs 14.16%, self-employed 12.26% , housewife 11.79%, government jobs 4.24% and other 03.30%. The above findings are in accordance with the study done by Sharija S. et al²¹ (2011). Difference in pattern of occupation

in these studies suggests the work pattern of the people in that area. Also urbanization, modernization with rapidly growing population with competition causes maximum number of hanging in unemployed.

Socioeconomic Status:-

Depending on the socioeconomic status lower class and upper lower class account for maximum number of hanging 61.80%, followed by lower middle class and upper middle class 33.96%. This finding is similar to study done by Tirpude BH et al¹⁸ (2010). The high rate of hanging deaths among lower class could be due to financial problems with low income, an individual cannot fulfil the daily needs of family. Lower socioeconomic status is linked to domestic crowding, a condition which has negative consequences for adults and children, including higher psychological stress and poor health outcomes.

Education status:-

In the present study the hanging deaths were common in victims those were educated up to secondary/ matriculate education seen in 44.34% cases followed by primary education in 20.76% cases, higher secondary education in 17.46%. Hanging deaths is more prevalent in persons with low education level attributed to many factors such as low income and unstable job to these persons.

Suicide note of Hanging:

Out of 212 cases of hanging deaths, 11.32% cases had left suicide note. Suicide note was absent in 88.68% cases of hanging deaths. This finding is similar with Vijayakumari N.¹⁵ (2011), Waghmare PB et al¹² (2014), This may be attributed to the fact that hanging is done due to a sudden impulse and this may be causative factor for less percentage of suicide notes being written.

Reason of Hanging:

Most common reason for hanging deaths were domestic quarrel seen in 25.94% cases followed by financial problems in 15.57% cases. Other reasons like organic disease accounts for 14.15% cases, failure in love and affair accounts for 13.21% cases, psychiatric illness accounts for 12.74% cases, family problem constitutes 09.91% cases, Exam failure constitutes 04.24% cases, alcohol addiction accounts for 3.30% cases also present. The present study is in accordance with the study of Vinita VE et al¹⁷ (2014) Bardale R. et.al²⁰ (2011). In spite of modernization and urbanization domestic issue still remain the most common predisposing factors for hanging. The marriages were arranged and those few who dared to have love affairs marriages were faced with stiff opposition.

Place of hanging:-

In present study the most common place for hanging were home seen in 95.24% and other least common place were hostel, hotel, forest, public place. It is because these study carried out in rural district where joint family, small homes diverts them to choose other secure and lonely place other than home and also due to the fact that they were related to forest and farm work as compare to our study in metropolitan city. So the secure places other than home were also selected.

Type of hanging:-

In present study complete hanging was present commonly seen in 59.91% cases as compare to incomplete hanging in 40.09% cases. This is in accordance to the study of Ambade VN et al¹⁰ (2014). Saisudheer T. et al¹⁶ (2012), Raju K. et al¹⁹ (2013), Vinita VE. et al¹⁷ (2014). Reason behind that is most of these cases were occur in homes where they use chair or stool to reach the point of suspension and push them away to hang completely to achieve the motive of suicide without any risk of survive.

Type knot of ligature material:-

Ligature material present around neck in situ during autopsy in 85 cases out of 212 total cases. Out of these 85 cases fixed knot were seen in 72.94% cases and running knot seen in 27.06% cases. It is similar to the study of Ambade VN et al¹⁰ (2014), Raju K. et al¹⁹ (2013).

Encircling of ligature mark over neck:-

In the present study, ligature mark was completely encircling the neck in 20.28% cases and incompletely encircling the neck of the victim in 79.72%. It was due to the reason that there is a gap at nape of neck due to hair coming between ligature material and skin below it. This also may be due to any materials like cloths or hairs of female

comes between ligature material and skin below it and also may be due to the pull on knot away from the point of suspension over neck creating a gap.

Position of knot and type of hanging according to position of knot:-

In the present study the most common position of knot was back of nape of neck seen in 50% cases. Least common position of knot were chin seen in 1.89% cases. Atypical hanging were in 96.23% cases and typical in 3.77%. The present study is similar to study of Ambade VN et al¹⁰ (2014) Badkur DS et al¹¹ (2012) Patel AP et al⁶ (2012).

Dribbling of Saliva:-

In present study out of 212 hanging cases dribbling of saliva seen in 29.72% cases of hanging death and absent in 70.28% cases of hanging death. These observation is consistent with the study of Waghmare PB et al¹² (2014).

External findings in hanging deaths:-

In the present study it was observed that Tongue clinched between teeth or protruding out present in 26.88% cases, Gloves and stock lividity in 4.71% cases, subconjunctival petechiae in 10.84% cases, cyanosis observed in 78.77% cases. These findings are similar to the study of Waghmare PB et al¹² (2014), Patel AP et al⁶ (2012) Though the hanging deaths is a form of asphyxial death, signs of asphyxia is not present in all the cases and other factors like Venous congestion, Cerebral anaemia, Reflex vagal inhibition, Fracture or dislocation of cervical vertebrae separately or in combination with asphyxia may causes the death in hanging.

Internal findings in neck:-

In the present study the gross contusion in neck muscles was present in 00.94% cases, fracture of thyroid cartilage in 00.47% cases, fracture of hyoid bone present in 00.47% cases, no fracture of cricoid cartilage and cervical vertebrae present observed.

The present study is similar to Saisudheer T. et al¹⁶ (2012), Waghmare PB et al¹² (2014), These variations in the frequency of hyoid bone fractures in hanging cases may be the bone is having natural joints between the body and the greater horns. In teenagers and young adults, the joints are cartilaginous and mobile and they calcify irregularly as the age increases in middle and later life

Conclusions:-

Hanging deaths were mostly suicidal, male predominance seen in hanging deaths Hanging deaths were more common in married than unmarried. Hanging deaths were more in Hindus; Most of victims of hanging deaths were from urban area. The unemployed and labourers were more vulnerable. Most of the victims of hanging deaths belong to upper lower class. Domestic quarrel and financial problem were common reason for hanging. Home is preferred place for hanging. Ligature material used for hanging was mostly soft in consistency. Complete hanging was more as compare to incomplete. Single turns and fixed knot of ligature material was most common. Mostly the ligature mark was above the level of thyroid cartilage, obliquely placed and incomplete. Most common position of knot was at the back of neck.

References:-

1. Reddy KSN, Murty OP. The essentials of Forensic Medicine & Toxicology. 33rded. New Delhi:Jaypee brothers medical publishers (P) Ltd;2014. p.338-47.
2. Nandy A. Principles of forensic medicine including toxicology. 3rd ed. Kolkata: New central book agency (P) Ltd;2010. p.517-29.
3. Karmakar RN. JB Mukherjee's forensic medicine and toxicology. 4th ed. Kolkata: Academic Publishers;2011: p.504-23.
4. Accidental deaths and suicidal deaths in India 2014 statistics, National crime records bureau. Ministry of home affairs. [Internet] [cited 28 December 2014] retrieved from: http://ncrb.gov.in/ADSI_2014/adsi-2014_20full_20report.pdf.
5. Parikh C.K. "Parikh's textbook of medical jurisprudence, Forensic Medicine and Toxicology for classrooms and courtrooms". 6th ed.NewDelhi:CBS publishers and distributors;1999:3.33-4.10.
6. Patel AP, Bansal A, Shah JV, Shah KA. Study of Hanging Cases in Ahmedabad Region. J Indian Acad Forensic Med October-December 2012;34:342-5.

7. Bhosle SH, Zanjad NP, Dake MD, Godbole HV. Deaths due to hanging among adolescents - A 10-year retrospective study. *Journal of Forensic and Legal Medicine* 2015;29:30-33.
8. Davidson A, Marshall TK. Hanging in Northern Ireland-a survey. *Med Sci Law* 1986; 26: 23-28.
9. Vij K. Text book of Forensic medicine and Toxicology: principles and practice. 6thed. New Delhi: Reed Elsevier India Private Limited;2014. p.71-2.
10. Ambade VN, Tumram NK, Meshram S, Borkar JL. Ligature material in hangings deaths: The neglected area in forensic examination. *Egyptian Journal of Forensic Sciences* 2014;5:109-13.
11. Badkur DS, Yadav J, Arora A, Bajpayee R, Dubey BP. Nomenclature for Knot Position in Hanging A Study of 200 cases. *J Indian Academic Forensic Med* Jan- March 2012;34:34-36.
12. Waghmare PB, Chikhalkar BG, Nanandkar SD. Analysis of Asphyxial Deaths Due To Hanging. *J Indian Acad Forensic Med* 2014;36(4):343-5.
13. Chandegara P, Patel J, Zanzrukiya K, Patel U, Parkhe S, Gajera C, Govekar G. Socio-demographic profile of hanging cases at new civil hospital, surat. *International Journal of Medical Science and Public Health* 2014;3(12):1474-77.
14. Bhosle SH, Batra AK, Kuchewar SV. Violent asphyxial death due to hanging: a prospective study. *Journal of Forensic Medicine, Science and Law A Journal of Medicolegal Association of Maharashtra* 2014;23(1).
15. Vijayakumari N. Suicidal Hanging: A Prospective Study. *J Indian Acad Forensic Med* October-December 2011;33:355-7.
16. Saisudheer T, Nagaraja TV. A study of ligature mark in cases of hanging deaths. *Int J Pharm Biomed Sci* 2012;3:80-84.
17. Vinita VE, Paul PM, Janani, Pradhan P, Kumar PS. Pattern of neck tissue injuries in hanging – A prospective study. *J Punjab Acad Forensic Med Toxicol* 2014;14(2):101-4.
18. Tirpude BH, Murkey PN, Pawar VG, Shende SA. Profile of hanging cases on autopsy at a tertiary care hospital in central India. *J. Karnataka Med. Leg. Soc.* 2010;19(2):3-8.
19. Raju K, Kumar H, Chandan, Gouda S. A Study of Suicide by Hanging in Farmers in Chitradurga. *Indian Journal of Forensic Medicine & Toxicology* 2013;7(1):154-6.
20. Bardale R, Tumram N, Dake M, Shrigiriwar M, Dixit P. Trends of suicide in urban area:a 5 year study. *Int J med Toxicol Legal Med.* 2011; 13(3): 28-37.
21. Sharija S, Sreekumari K, Geetha O. Epidemiological Profile of Suicide by Hanging in Southern Parts of Kerala: An Autopsy based Study. *J Indian Acad Forensic Med* 2011;33(3):237-40.