

## An analytical study of asphyxial deaths due to hanging in and around Visakhapatnam

Rama Krishna Pedada<sup>1,\*</sup>, M. Taquiuddin Khan<sup>2</sup>, B.V.S. Ananda Rao<sup>3</sup>

<sup>1,3</sup>Assistant Professor, <sup>2</sup>Professor and Head, <sup>3</sup>Dept. of Forensic Medicine & Toxicology, <sup>1</sup>Andhra Medical College, Visakhapatnam, Andhra Pradesh, <sup>2</sup>Osmania Medical College, Hyderabad, Telangana, <sup>3</sup>Gitam Institute of Medical Sciences and Research, Gitam (Deemed to be University) Visakhapatnam, Andhra Pradesh, India

**\*Corresponding Author:**

Email: ramkifmt@gmail.com

### Abstract

**Objective:** To analyze and review the incidence of deaths due to hanging at Andhra medical college mortuary, Visakhapatnam city

**Materials and Methods:** This is an analytical study of all the deaths due to hanging seen in the department of forensic medicine & toxicology, Andhra medical college, Visakhapatnam city during January 2010-december 2010

**Results:** A total of 1772 autopsies were done during the period. One hundred and thirty seven (137) cases received by the mortuary were deaths due to hanging. Among them 77 cases were males and 60 cases were females. Majority of victims (59%) were aged between 21 to 40 years. Depression was the main motive for suicidal hanging accounting for 32%. Atypical hangings attributed for 85% of cases. Soft material was the commonest ligature material. Ligature mark was above the level of laryngeal prominence in 117 cases. No fracture of neck skeleton was noted in any of the cases. Marital history, place of hanging, point of suspension, position of tongue and salivary dribbling was also ascertained

**Conclusion:** This study highlights changing medico-legal scenario of opting hanging as commonest method of suicide and variations in incidence of cases of asphyxial deaths due to hanging.

**Keywords:** Hanging deaths, Motive, Atypical, Soft material, Suspension point, Ligature mark, Neck skeleton.

### Introduction

According to the World Health Organization, suicide is the 13th leading cause of death worldwide. Suicidal behavior ranges in degree from merely thinking about ending one's life, through developing a plan to commit suicide and obtaining the means to do so, attempting to kill oneself, to finally carrying out the act of 'completed suicide'. Suicide attempts are up to 20 times more frequent than completed suicides.<sup>1</sup>

In our study year (2010) country wide statistics reported 1,34,599 suicides, West Bengal(11.9%) and Andhra Pradesh (11.8%) take 1<sup>st</sup> and 2<sup>nd</sup> positions respectively.<sup>2</sup>

In India statistics show that hanging is between 1/3<sup>rd</sup> to 1/2 of suicides among males and 18% of female suicides.<sup>3</sup>

Though hanging is common in equal proportions to both men and women, it will be great challenge for medical officers in present days where hanging by a women is viewed suspiciously, more so when the hanging is atypical or the when body has been let down.

Absence of ligature mark, double ligature mark or partial hanging with feet touching the ground may mislead the investigating officer and give scope for false allegations as to cause and manner of death and in this situation role of medico legal expert becomes crucial.

### Materials and Methods

**Study Design:** A cross sectional analytical study.

**Study Setting:** King George Hospital Mortuary, Visakhapatnam, Andhra Pradesh.

**Period of Study:** January 2010 to December 2010.

**Sample Size:** All cases of hanging deaths autopsies during the study period i.e. One hundred and thirty seven (137) cases.

### Inclusion Criteria

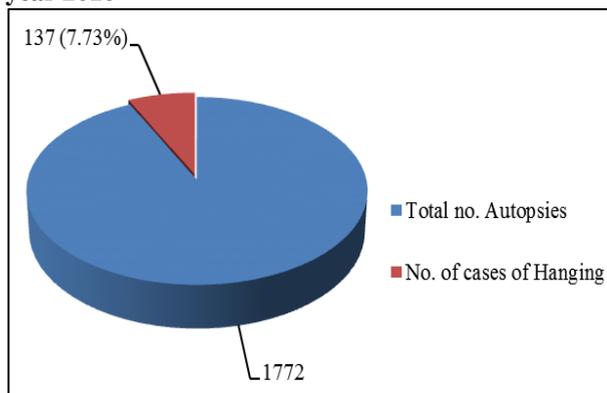
1. Cases brought in dead either from home or by police or common public to hospital.
2. Cases sent from different wards in KGH and other hospitals within Visakhapatnam city.

Reports from police which included the deceased relatives version of circumstances leading to death, their inquest reports, crime scene reports and photographs were studied.

Detailed postmortem examinations were conducted in all cases of hanging, which included all external and internal findings. All other associated factors like previous injuries, poisoning, suicidal tendencies, attempted suicides, evidence of signs of struggle, associated drug abuse and intoxication were looked for, in addition to enquiring of suicidal notes.

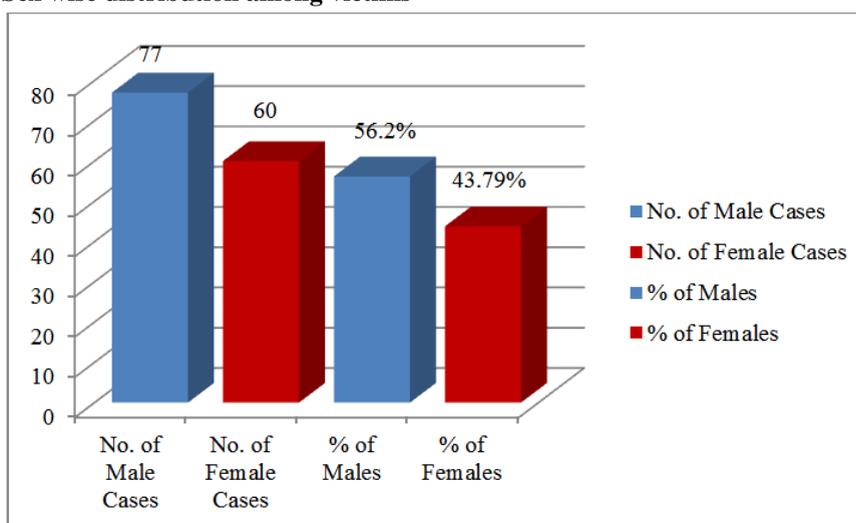
**Findings and Discussion**

**Pie Diagram 1: Cases of hanging autopsied in the year 2010**



Out of a total of 1772 cases that had been autopsied in mortuary during the course of this study, 137 cases (7.73%) were deaths due to hanging. There were a total of 229 cases of asphyxial deaths and hanging occupied the top of chart the as most frequent type of asphyxial death. Other violent asphyxial deaths include drowning about 4.5% and strangulation 0.5%.

**Bar Diagram 1: Sex wise distribution among victims**



Upon overall comparative study of hanging deaths among males and females it has been established that male cases outnumber the females in the ratio of 1.3:1.

**Table 1: Age wise distribution among the victims**

Years	1 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70
Male	0	9	22	27	14	5	0
Female	0	14	35	6	3	2	0
Total	0	23	57	33	17	7	0
Percentage	0	16.78	41.6	24.08	12.4	5.1	0

This table depicts the details of age wise distribution of hanging cases. The outcome of this division highlights that maximum number of cases of hanging were reported in 21-30 year age group i.e. almost 42%(41.6), followed by 24% in 31-40 age group,17% in 11-20 years and 12.5%in 41-50 age group. The least percentage of 5% was reported in 51-60 age group. The table also highlights that no hanging

cases were reported between 1-10 age group and after 60 years.

The table also brought to fore that more number of male cases was reported in the ages between 31-40 (27 cases) while more number of females succumbed of hanging in ages of 21-30(35 cases). Similar data was also recorded and has corresponded with our study.<sup>4-7</sup>

**Table 2: Marital status**

Marital Status	Male	Female	Total	Percentage
Married	64	42	106	77.37%
Unmarried	12	17	29	21.16%
Unknown	1	1	2	1.46%

The analysis of Table 2 points the 77.37% of persons were married; 21.16% cases were unmarried and in two cases marital status remained unknown because of non-establishment of identity. Among the 42 cases of married females 26 cases opted for death by hanging within seven years of their married life

Another feature that becomes highlighted in this table is more number of deaths among unmarried females when compared to unmarried males was in ratio of 1.4:1, and also an almost one third to two third of females were unmarried, a significant number by any standards.

**Table 3: Motive of hanging**

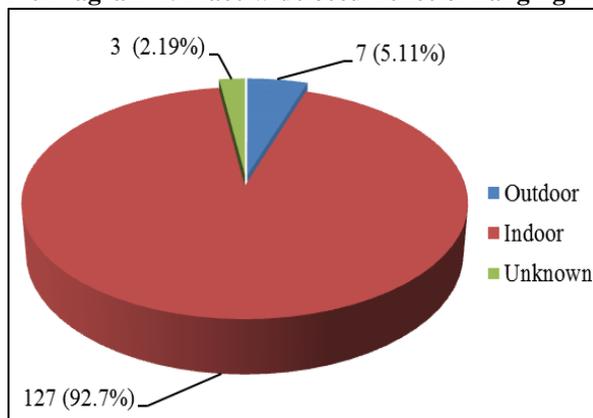
Motive of Hanging	Males	Females	Total	Percentage
Depression	24	20	44	32.12%
Diseases/Illnesses	16	14	30	21.90%
Financial Problems	25	1	26	19.98%
Quarrels between Couples	4	10	14	10.22%
Dowry Harassment	0	11	11	8.03%
Failure in Love	1	0	1	0.73%
Unknown	7	3	10	7.30%
No Motive (Accidental)	0	1	1	0.73%
Total	77	60	137	100%

The statement named table 3 tries to bring out the various observations during this study to arrive at exact motive to end one's life. Various psychiatric disturbances propelling the person towards suicide is dominated by depression, followed by emotional trauma, mental distress, helplessness & occasionally hysteria and it accounted for 32% of deaths.

**Table 4: Nature of ligature material used**

Ligature Material	Male	Female	Total	Percentage
Saree	25	23	48	35.03%
Chunni	9	27	36	26.27%
Rope	19	2	21	15.32%
Lungi	6	0	6	4.37%
Bed Sheet	4	0	4	2.91%
Telephone Wire	1	1	2	1.45%
Towel	2	0	2	1.45%
Door Curtain	1	0	1	0.73%
Iron Chain	1	0	1	0.73%
Muffler	1	0	1	0.73%
Shirt	1	0	1	0.73%
Unknown	7	7	14	10.21%
Total	77	60	137	100%

**Pie Diagram 2: Place wide occurrence of hanging**

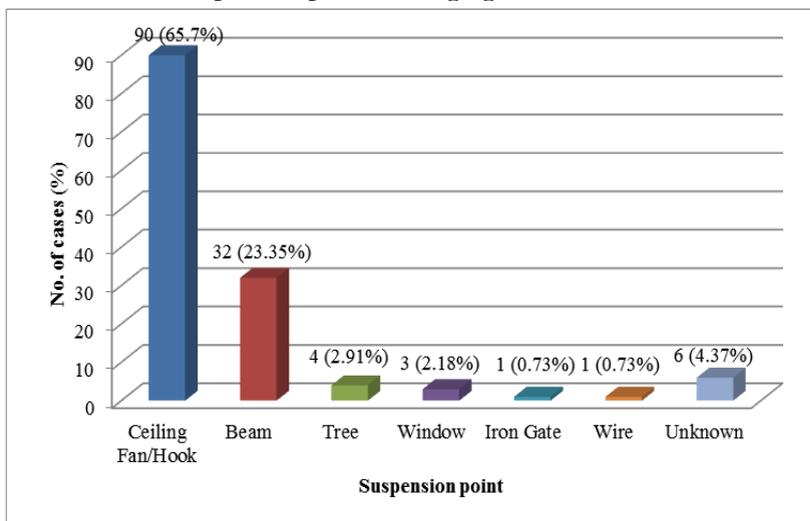


This pie diagram details the place of occurrence of hanging deaths. It is exposed that majority of cases of hanging occurred in the confines of his/her home or any other place which is secluded or hidden from public view

This table demonstrates actual number of hanging deaths that have occurred with various ligature materials. In our study we have observed that Saree is the main culprit amounting to 35% of the cases, followed by chunni and rope, which accounted to 26% and 15% respectively.

Table also depicts that hard ligature materials like rope, iron chain and telephone wire was used in 24 cases and in 100 cases ligature material is soft. This is one of the reasons for recording more partial hangings as soft materials tend to stretch because of body weight.

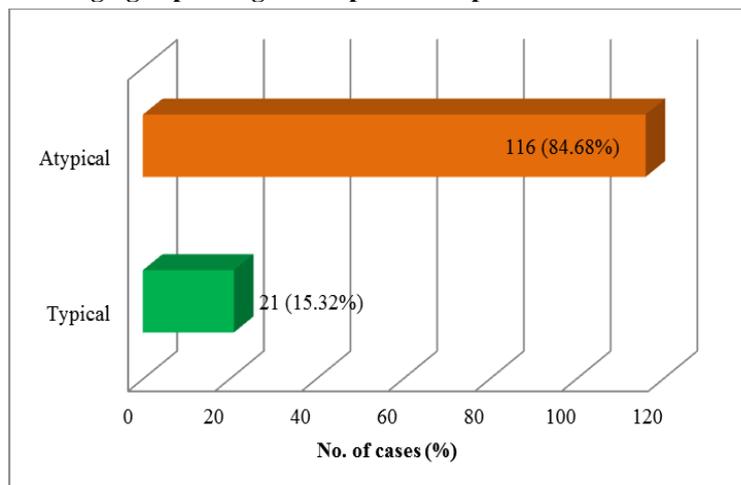
**Bar Diagram 2: Particulars of the suspension point of hanging**



This bar diagram shows the particulars of suspension point of hanging. It was observed that commonly used suspension point of hanging was ceiling fan or fan hook amounting to 65.7% (90 cases) followed by beam of roof 23.35% (32 cases), both accounting for 89%. Other suspension peaks used were tree (4 cases), Iron Gate and wire (1 case each).

The basic reason to opt for such a reference was that on innumerable occasions where the death though suicidal but at the same time, evoking some kind of suspicion on point of suspension accessibility, will require us or the investigating officer in consultation with the medicolegal expert to make the assessment firstly whether the event was suicidal or not.

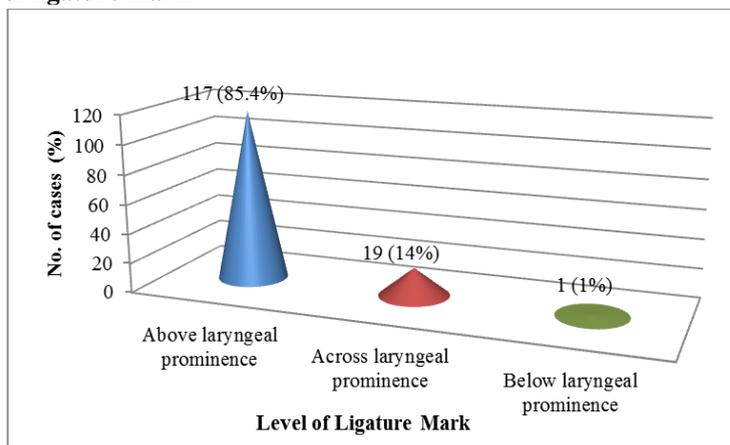
**Bar Diagram 3: Types of hanging depending on the probabale position of the knot**



This bar diagram shows the types of hangings depending on the position of the knot of the neck. Out of 137 cases of hanging in this study, 21 cases showed that the knot was placed over the nape of neck i.e., out of 137 cases 15% of cases were 'typical' hangings. The rest of the cases were atypical hangings as the knot was present at other locations other than the nape of neck. The results are tallying with other studies.<sup>5,8-10</sup> It can thus be inferred that the majority of hanging cases are atypical type, a pointer towards the lack of planning,

lack of time or the limited time available to accomplish the task, the ingenuity of the person and the amount of distress and desperation which is thought to, though unrealistically, liberate the struggling soul.

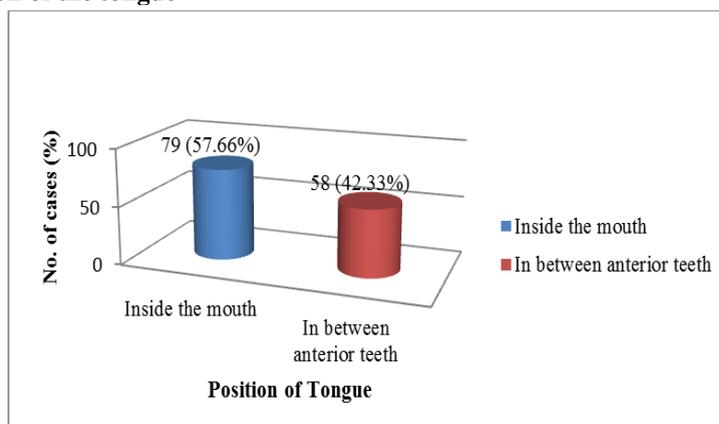
**Bar Diagram 4: Level of ligature mark**



The most frequent level at which ligature mark was found on front of neck in our study was above the laryngeal prominence, amounting to 85%. It was across

or over the laryngeal prominence in 14% and in one case alone it was below the laryngeal prominence. Results tallying with other studies.<sup>6,11</sup>

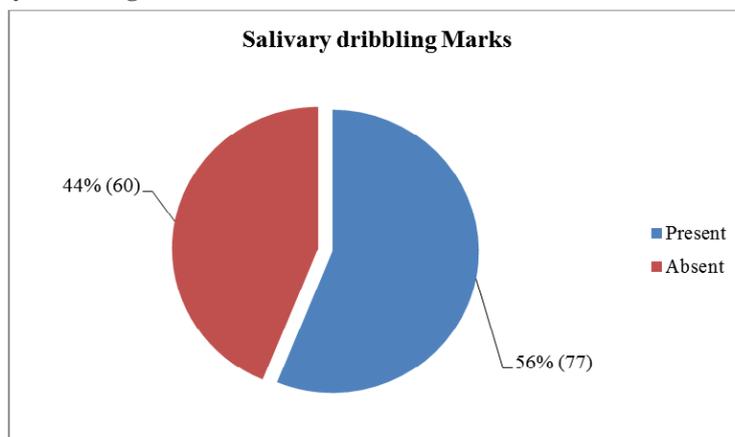
**Bar Diagram 5: Position of the tongue**



It was noted that the tongue was found to be protruded at its tip and bittern or placed in between anterior/incisor teeth in 58 cases i.e., 42% and the tongue remained inside the mouth in 79 cases i.e., 58%.

The 58 cases with protruded tongue included 3 decomposed cases where combined effect of hanging as well as decomposition can be considered.

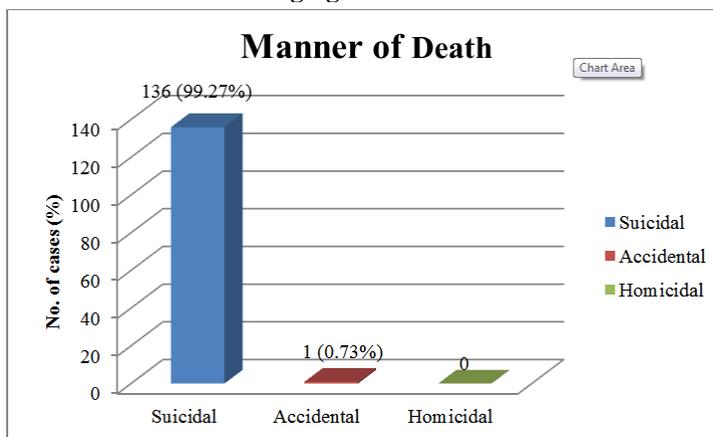
**Pie Diagram 3: Salivary dribbling marks**



Of the 137 cases, 56% (77cases) shows dribbling of salivary stains on the body of victim or his clothing and

44% (66cases) did not show salivary stains.

**Bar Diagram 6: Manner of death in cases of hanging**



This particular statement comprising of manner of hanging deaths of 2010 at our center showed that in more than 99% cases the death was suicidal in nature.

The lone accidental hanging did not pose this dilemma because there were witnesses and patient was treated at hospital.

becoming rare in cases of hanging as soft material being used as commonest ligature material.

This study highlights changing medico-legal scenario of opting hanging as commonest method of suicide and variations in incidence of cases of asphyxial deaths due to hanging.

**Table 5: Fracture of neck skeleton in cases of hanging**

Neck Structures	Frequency	Total No. of Cases
Hyoid Bone	0	137
Thyroid Cartilage	0	137
Cricoid Cartilage	0	137
Cervical Spine	0	137

In our study not a single case showed damage or fracture to any of the above mentioned structures. This aspect is well documented in many studies conducted in the recent past and there references are quoted herewith.<sup>8,12,13,14</sup> Another probable reason for diminishing evidence of damage to internal structures of the neck could be attributable to an excessive or increased usage of soft and occasionally stretchable material and more casualties resulting from partial hangings.

**Conclusion**

Hanging is a common means of suicide among younger people belonging to the lower socio-economic group of the society, and is usually committed in familiar surroundings with ligature materials easily available to the victim. Marital disharmony is a common predisposing factor of suicide in women, depression and illness are main motive in other cases. Fracture of hyoid bone and other neck skeleton

**References**

1. World Health Organization–Mental Health - Suicide statistics – Suicide prevention and special programmes-2011.
2. National Crime Records Bureau-2010 statistics, Ministry of Home Affairs, India.
3. Grewal thacker and Spink, Lyons Medical Jurisprudence for India, First edition 1953.
4. Meel BL. A study on the incidence of suicide by hanging in the sub-region of Transkei, South Africa. J Clin Forensic Med. 2003; 10(3):153-7.
5. Saini OP, Saini PK, Jain R, Mathur PN. Position of Knot in neck & relation with working hand in Cases of Hanging. IJFMT. 2005;3(1).
6. Sharma BR, Harish D, Singh VP, Singh P. Ligature mark on neck: how informative? JIAFM. 2005;27 (1):10-15.
7. Wyatt JP, Wyatt PW, Squires TJ, Busuttill A Hanging deaths in children. Am J Forensic Med Pathol. 1998 Dec;19(4):343-6.
8. Sharma BR, Sing VP, Harish D. neck structure injuries in hanging – comparing retrospective and prospective studies. Med. Sci. Law. 2005;45(4):321-329.
9. Naik SKK, Patil DY. Fracture of hyoid bone in cases of asphyxial deaths resulting from constricting force round the neck. JIAFM. 2005;27(3):149-153.
10. Sharma BR, Harish D, Sharma A, Sharma S, Singh H. Injuries to neck structures in death due to constriction of neck, with a special reference to hanging. J Forensic Leg Med. 2008;15:298-305.
11. Naik SK. Obliquity vs. Discontinuity of ligature mark in diagnosis of hanging - a comparative study. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology.2006;7(1).
12. Bennewith O, Gunnell D, Kapur N, Turnbull P, Simkin S, Sutton L, Hawton K. Suicide by hanging: multicentre study based on coroners records in England. Br J Psychiatry. 2005;186:260-1.

13. Di Maio DJ, Di Maio D. Forensic pathology. 2nd Edition, New York: CRC Press, LLC;2001:229–77.
14. Elfawal MA, Awad OA. Deaths from hanging in the eastern province of Saudi Arabia. Med.Sci.Law.1994;34(4):307-12.