

## Socio - demographic profile of Hanging Cases at a Tertiary Care Hospital and District Hospital, Chitradurga, Karnataka, India

Shreedhar NC<sup>1a</sup>, Chandan V<sup>1a</sup>, Manjunatha K<sup>2b</sup>, Venu RP<sup>3</sup>

### Abstract

The present study was done in the Department of Forensic Medicine & Toxicology of Basaveshwara Medical College and Hospital and in District Government Hospital, Chitradurga.

A prospective study was conducted by the Department of Forensic Medicine & Toxicology of Basaveshwara Medical College, Chitradurga 1<sup>st</sup> October 2018 to 31<sup>st</sup> March 2020. Data from the autopsies conducted by both Department of Forensic Medicine & Toxicology of Basaveshwara Medical College and Hospital and District Government Hospital, Chitradurga were included for the study. During that period, data was collected from 80 (n=80) victims who died due to hanging from the total number of 466 autopsies performed in both the institutions.

The objective was to find out the epidemiological findings, pattern of hanging and identifying appropriate reasons for hanging. It was observed that the most vulnerable age group was 21 to 30 years, 45[56.25%] in both sexes, with male to female ratio being 3:1. Males, Married, Hindu by religion, from rural area accounted for 71.87% cases. Majority 60[75.00%] belonged to low income group. Preferred place of hanging was indoor setting in 78[97.5%] cases. Financial problem was the most common cause for suicidal hanging. Marital issues, chronic non-curable illness, domestic violence were the other main causative factors of hanging. Ligature material was present in 78[97.5%] cases. It was above the level of thyroid cartilage in 70[87.50%]. It was oblique in 78[97.5%] and deep in 65[81.25%]. Rope was used as ligature material by 60[75.00%]. Salivary discharge was observed in 35[43.75%] cases. Protrusion of tongue was seen in 30[37.50%]. Asphyxial signs and congestion of organs was noted in most tissues, petechial haemorrhage was seen in 5 [6.25%], intimal tears of carotid artery in 10 [12.50%] cases, fracture of hyoid bone in 14[17.5%] cases and no thyroid cartilage fracture were seen.

**Keywords:** Hanging, Incidence, Ligature material, Income, Education

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### Introduction:

Hanging is a form of mechanical asphyxia caused by suspension of the body by ligature which encircles the neck, the constricting force being the weight of the body<sup>1</sup>. Depending on method adopted for hanging, body is either completely suspended without

any part touching the ground as in Complete hanging or as in Partial hanging, some part of the body touches ground. A slight force produced by weight of the head [5-6 kg] acts as a constricting force and can kill a person. Suicides among young adults pose a great socio-economic burden in a developing country like India. In India, killing a victim and suspending the body to make it appear as suicide is not uncommon. In such cases, it is necessary to find out if hanging is the cause of death in a suspended body by meticulous examination<sup>2</sup>.

A study on common methods of suicide, risk factors, socio-demographic factors, cultural aspects and other established reasons in an

<sup>1</sup> Associate Professor, Department of Forensic Medicine & Toxicology, <sup>a</sup> Basaveshwara Medical College & Hospital, Chitradurga-577502; <sup>b</sup> East Point College of Medical Sciences, Bengaluru, India. Karnataka, India;

<sup>2</sup>Forensic Medicine Expert, District Hospital, Chitradurga, Karnataka, 577501

**Correspondence:** Dr. Chandan.V

Email: [chandanforensic@gmail.com](mailto:chandanforensic@gmail.com)

Contact: +91 8550820075

area serve as road map not only for a forensic expert but also for local governing bodies to take appropriate control measures. This study is meant to serve the above needs.

### Aim & objectives:

1. To study the profile and analysis of risk factors
2. To study the various patterns and types of hanging
3. To study the prevalence of hanging fatalities and determine the reasons

### Material and Methods:

This prospective study was carried out in the Forensic Medicine Department of Basaveshwara Medical College and District Government Hospital, Chitradurga and few Primary health centres of the district. Data of 80 cases of hanging were collected from 1<sup>st</sup> October 2018 to 31<sup>st</sup> March 2020 from post mortem reports, statements of relatives and police inquests. The collected data was statistically analyzed in form of ratio & frequencies and compared with other studies.

### Observations and Discussion

**Incidence:** It was observed that, out of 466 medico legal cases presented to the Dept. of Forensic Medicine, 80 were cases of hanging. Incidence was 1.71%. Similar observation was reported by a study conducted by Kumar S and Verma in Lucknow<sup>3</sup>.

**Age & Sex:** The maximum numbers of hanging 45[56.25%] cases were observed between age group of 21-30 years. 70[87.50%] victims were aged less than 40 years. The most vulnerable age group for hanging was observed as 21-40 years. 10[12.5%] each in young (up to 20 years) and elderly (above 40years) aged group chose hanging. No cases were found in age below 10yrs and in extreme age above 60yrs. These were consistent with the studies conducted by Kumar S and Verma in Lucknow<sup>3</sup> and Joshi Rajeev, Chanana Ashok, Rai Hakumat<sup>4</sup>. This particular age group of 21-40yrs is most active period in one's life. Frustration due to various reasons such as financial problems,

the burden of livelihood, unemployment, broken relationships and poverty contributed to their death. Among 80 hanging cases, 60 were males and 20 females, which suggest male predominance. The male to female ratio is 3:1. These are consistent with authors [3-7]. [Table no.1]

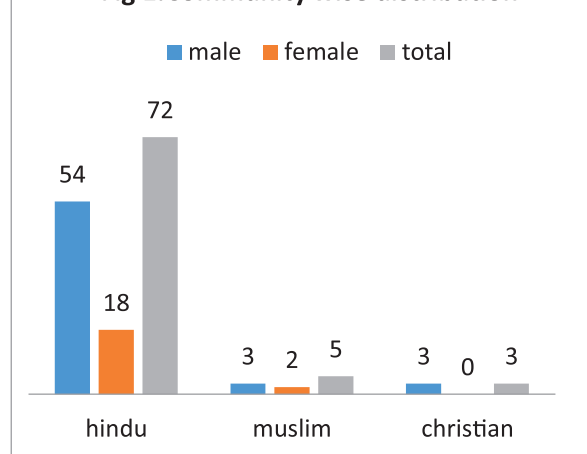
**Religion:** Religion wise, most of victims 72[90%] were Hindu, which is similar to author<sup>8</sup>. [Fig1]

**Marital status:** 53[66.25%] victims were married which outnumbered the unmarried. Similar observations are noted by authors<sup>5-10</sup>. This shows that the marital disharmony, personal, financial responsibilities stimulated them to commit suicidal hanging. [Fig 2]

**Table No.1. Age and Sex wise distribution**

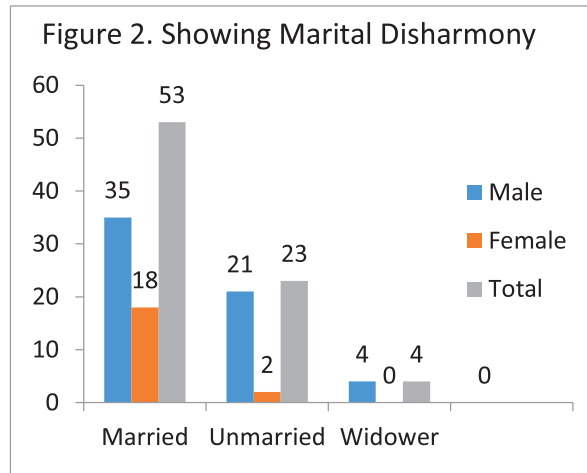
Age in years	Male	Female	Total
0-9	0	0	0
10-20	7[8.75%]	3[3.75%]	10[12.5%]
21-30	35[43.75%]	10[12.5%]	45[56.25%]
31-40	8[10%]	2[2.5%]	10[12.5%]
41-50	5[6.25%]	5[3.12%]	10[12.5%]
51 -60	5[6.25%]	0	5[6.25%]
61 above	0	0	0
Total	60[75.00%]	20[25.00%]	80[100%]

**Fig 1. Community wise distribution**

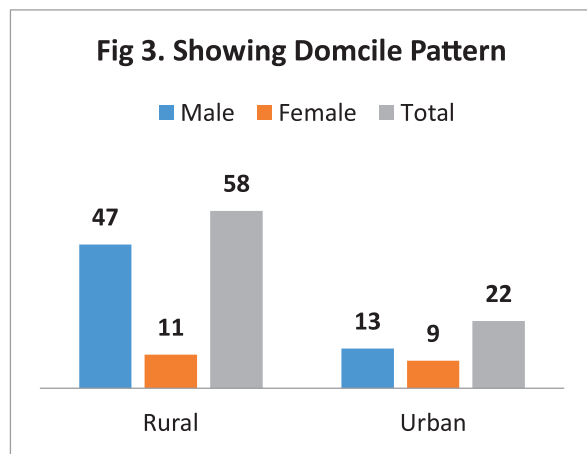


**Domicile pattern:** Highest numbers of 58[72.5%] victims were from rural areas. Similar to authors<sup>6,7</sup>. High incidence noted in rural area is due to rural population migration, crops loss either droughts or rains, loss of work [Fig 3]. Population migration, crop loss

either by droughts or floods, lack of work, loss in other traditional occupations contributed to their high incidence.



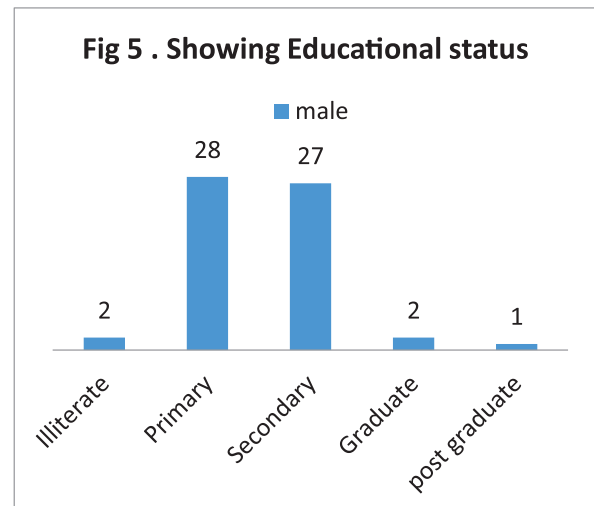
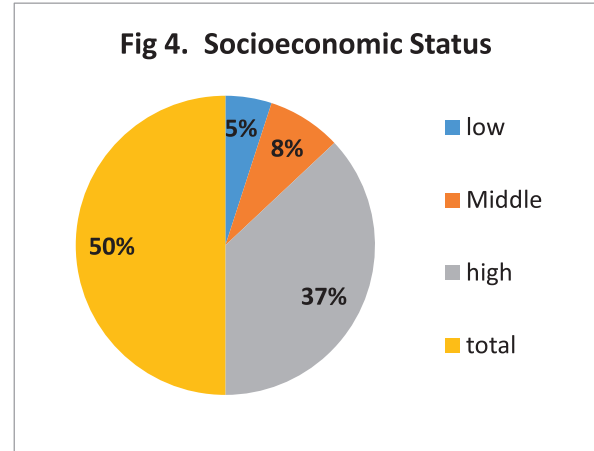
**Income group:** We observed that incidence of hanging was more in low income groups 60[75.00%]. These are consistent with authors<sup>6-10</sup>. This showed that low income rose dissatisfaction among individuals and commit suicide by hanging which indicated that hanging was more of psychological in origin. [Fig 4]



**Educational status:** Out of 74[92.5%] victims who went to school, 40[50%] received primary education, 30[37.5%] received secondary education. Same results are made by author<sup>10</sup>. Only one postgraduate committed suicide [Fig 5]

**Occupation:** More number of cases of suicide by hanging was found in farmers 60[75.00%]. These findings were consistent

with authors<sup>10-13, 15</sup>. Committing suicide by hanging was observed in farmers with financial problems due to failure of crops either by floods or droughts. Presence of poverty, lack of crop insurance schemes also contributed.



**Table 2. Showing position of ligature knot**

Position of ligature knot	Male	Female	Total
Fixed knot	50 [62.50%]	13 [16.25%]	63 [78.75%]
Running noose	8 [10%]	5 [6.25%]	13 [16.25%]
Slip knot	2[2.5%]	2[2.5%]	4[5%]
Total	60	20	80

**Site of Hanging:** Usually victim of suicide prefers any secluded place which will suit his purpose of committing suicide. We observed that the home was the place of choice by

55[68.75%] victims. Among total number of hanging cases outside home, 25[31.25%] were males. Similar findings were found in study done by authors<sup>10-16</sup>. This suggests that females chose home for hanging more than males.

**Time of Hanging:** Most of the victims 65[81.25%] committed hanging in day time. These are consistent with Indian authors. It suggests that victim of suicide prefers any particular time which will suit his purpose of committing suicide also other family members engaged with their daily activities during day time.

**Season of Hanging:** Highest incidences of hanging 30[37.50%] cases were reported in rainy season. Similar findings are observed by authors<sup>11,13</sup>. Loss of crops either due to droughts or floods badly resulted financial crisis.

**Table 3: Postmortem Findings**

Post-mortem findings	Present	Absent
Ligature material	76 [95%]	4[5%]
Ligature mark	80[100%]	-
Above the level of thyroid cartilage	73 [91.25%]	7 [8.75%]
Below the level of thyroid cartilage	5 [6.25%]	75 [93.75%]
At the level of thyroid cartilage	3 [3.75%]	77 [96.25%]
Protrusion of tongue	30 [37.50%]	50 [62.5%]
Salivary discharge	35 [43.75%]	45 [56.25%]
Hyoid bone fracture	14 [17.5%]	56 [70%]
Fracture of Thyroid cartilage	00	00
Fracture of Cricoid cartilage	00	00
Soft tissue hemorrhage	5 [6.25%]	75 [93.75%]
Carotid artery intimal tears	10 [12.50%]	70 [87.50%]
Other discharges	5 [6.25%]	75 [93.75%]

**Reason for Hanging:** Reasons for committing suicide by hanging was observed maximum in persons with financial problems 35[43.75%] followed by marital disharmony 12[15%], psychiatric 10[12.50%], chronic non-curable illness 7[8.75%], domestic violence 8[10%], academic failure 5[6.25%] and love failure 3[3.75%]. These are consistent with authors<sup>6,7,11,13</sup>. While in most active phase of one's life (21-40 years), exposure to anxiety, stress, financial problems, unemployment, failure in studies, love endings, alcohol addiction, and emotional instability were the alleged reasons for committing hanging.[Fig 6]

**Table 4: Showing PM findings**

Post mortem Findings:	Cases	%
<b>External:</b>		
Rigor mortis	53	66.25
Pm staining	30	37.50
Blood in natural orifices	15	18.75
Protrusion of tongue	30	37.50
Salivary stains	30	37.50
Asphyxial signs	80	100
<b>Internal:</b>		
Hyoid bone fracture	14	17.5%
Thyroid cartilage fracture	0	-
Cricoid cartilage fracture	0	-
Congestion of organs	80	100

**Type of Hanging:** Complete hanging was observed in 60 [75.00%] cases. These are consistent with other studies<sup>7,15,18</sup>. Typical hanging was observed in 25[31.25%] cases while atypical hanging was reported in 55[68.75%]. These are similar to findings reported by few authors.<sup>15-19</sup>

**Position of ligature knot:** In our study, position of the ligature knot was fixed around neck in 62.5=63[78.75%] cases. Same findings are made by other authors<sup>18,19</sup>. [Table no 2]

**Type of ligature loop:** We observed single ligature loop in 47[58.75%] cases. These are consistent with authors<sup>19,20</sup>.

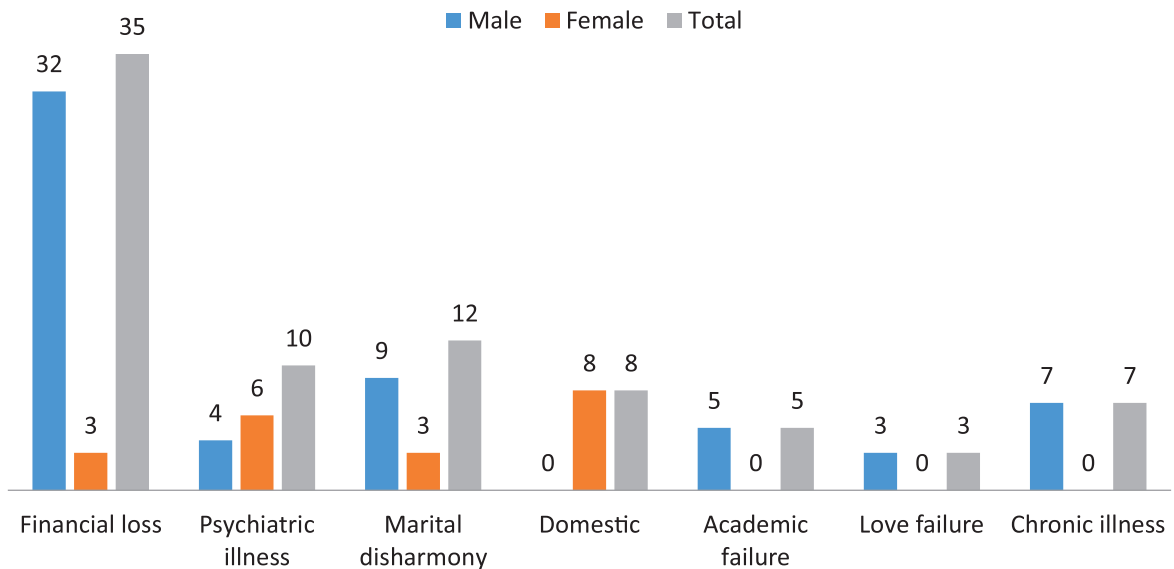
**Manner of Hanging:** All cases were suicidal and there was no evidence suggestive of foul play.

**Cause of death:** Cause of death in maximum 60[80.00%] cases was due to the combination of both asphyxia as well as venous congestion. Similar results were observed by authors<sup>7, 14, 20</sup>. [Fig 7]

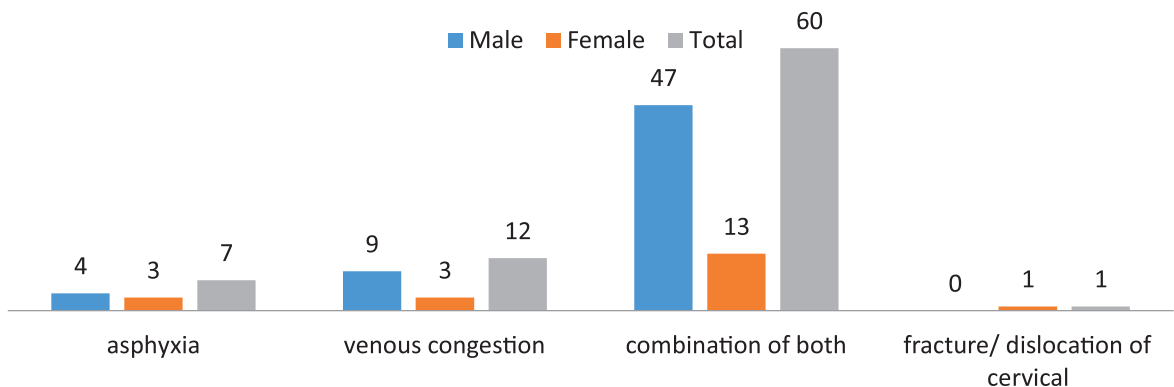
**Ligature findings:** According to the ligature findings, in majority of hanging cases, the ligature mark was oblique 78[97.7%], above

the thyroid cartilage in 72[90%], incompletely encircling the neck in 60[75.00%], single turn in 48 [60%], with a width of 0-3cms. In 23[71.87%] cases, rope was used as a ligature material. Similar results were noted by authors<sup>15-20</sup>. Ligature mark around the neck, presence of abrasions, ecchymoses and redness about the ligature

**Fig 6. Showing reasons for hanging**



**Fig 7: Showing Cause of death**



mark, trickling of saliva from mouth, ecchymoses of larynx or epiglottis, rupture of intima of the carotid and post mortem signs of asphyxia served as tool for diagnosis of hanging. [Table no. 3]

**Other post-mortem findings:** Post-mortem findings, asphyxial signs, congestion of

organs were observed in all cases. Petechial haemorrhages were seen in the eyes. Body showed lividity in the legs, forearms and hands. Similar results were noted by authors<sup>17-21</sup>. Asphyxia in hanging is usually related to the compression of the carotid arteries, rather than blockage of the airways.



Their absence helped to distinguish hanging from other strangulations. [Table no. 4] The ligature mark was reddish brown in 45[56.25%] cases, it was pale in 5[6.25%] and parchmentized in 30[37.5%]. Similar observations are reported by authors<sup>14, 15</sup>. The colour of the ligature mark depends mostly on the duration of suspension of the body and nature of the ligature materials used and also the time elapsed between death and autopsy. Protrusion of tongue was seen in 30[37.5%] cases. Similar findings were made by authors<sup>20-21</sup>. The probable reason for this phenomenon could be that the constricting force of the ligature caused upward pressure on the neck structure causing elevation of the tongue. Salivary stain was present in 35[43.73%] cases of hanging. These are consistent with findings of few other authors<sup>17, 19, 21</sup>. Saliva is often found dribbling from angle of the mouth down the chin. This is supposed to be sure sign of ante mortem hanging as secretion of saliva being a vital function, cannot occur after death. Hyoid bone fracture was noted in 14[17.5%] cases of hanging and that age was above 40 years. This may be due to calcification and fragility of bony structures. These results were also observed by authors<sup>17-20</sup>. In our study, majority of victims were of young age below 40 years, and the fracture frequency of hyoid bone increased with age as it got ossified.

### Conclusion:

Incidence of hanging was 1.71%. Most vulnerable age group was 21 to 30 years with male to female ratio being 3:1. Married, Hindu males, from rural areas, working as farmers with low educational and financial background committed suicidal hanging in rainy season during day time at their homes. Ligature material was rope in majority of the cases. Financial problem was the most common reason in males. Marital disharmony is utmost reason in females. Asphyxial signs and congestion of the organs, cardinal signs, dribbling of saliva, presence of redness of ligature mark, and evidence of fracture of hyoid bone helped in arriving at a conclusion

in most cases. Combination of asphyxia and congestion remained as cause of death.

**Preventive measures:** Appropriate education, farmer's crop insurance, Government financial aids, proper psychotherapy can control hanging in most of the cases.

**Conflict of interest:** Nil

**Ethical clearance:** Obtained

**Source of Funding:** Self

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