



## Original Research Article

# A Retrospective Post Mortem Analysis Of Hanging Deaths At A Tertiary Care Teaching Hospital In Telangana.

Name of Author:

Mohd Muneeb Quraishi<sup>1</sup>,  
Shaik Khaja Moinuddin<sup>2\*</sup>.

Affiliation:

<sup>1</sup>Associate Professor, Forensic medicine, VRK Women's Medical College, Aziz Nagr, Hyderabad.<sup>2</sup>Professor, Department of Forensic Medicine Kakatiya Medical College, Hanamkonda.

Corresponding Author: Shaik Khaja Moinuddin.

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**Abstract: Background:** Hanging is an important form of mechanical asphyxia and remains one of the commonly encountered methods of suicide in India. Medicolegal investigation of hanging deaths requires careful evaluation of demographic characteristics, ligature material, knot position and the circumstances surrounding death. Regional studies are important because the demographic and sociocultural profile of hanging deaths may vary considerably. **Objective:** To retrospectively analyse the demographic profile, ligature materials, position of the knot and recorded precipitating factors among cases of hanging deaths subjected to post-mortem examination at a tertiary care teaching hospital in Telangana. **Materials and Methods:** A retrospective descriptive analysis was undertaken on 152 cases of hanging deaths subjected to medicolegal post-mortem examination. Data were obtained from the available post-mortem/medicolegal records. The variables analysed included age, sex, ligature material, position of the knot and the reason or precipitating circumstance recorded in the case history. The findings were expressed as frequencies and percentages. **Results:** Of the 152 deceased persons, 97 (63.82%) were males and 55 (36.18%) were females, giving a male predominance. The largest age group was >50 years, comprising 62 cases (40.79%), followed by 31–40 years and 41–50 years with 30 cases each (19.74%). Saree was the most frequently used ligature material, accounting for 44 cases (28.95%), followed by chunni 30 (19.74%), lungi 22 (14.47%), nylon rope 21 (13.82%), jute rope 17 (11.18%), towel 15 (9.87%) and plastic rope 3 (1.97%). The knot was situated at the nape of the neck in 58 cases (38.16%), followed by the right side of the neck in 50 (32.89%), left side in 39 (25.66%) and back of the neck in 5 (3.29%). Ill health was the most frequently documented reason, accounting for 37 cases (24.34%), followed by financial issues 23 (15.13%), job issues and business issues 13 each (8.55%), marriage issues 12 (7.89%) and family quarrel 11 (7.24%). **Conclusion:** The present study demonstrates a male predominance and a substantial representation of individuals above 50 years. Saree was the commonest ligature material and the nape of the neck was the most frequent knot position. Ill health and financial problems constituted the leading recorded precipitating factors. The findings emphasise the multifactorial nature of hanging deaths and the need for accurate medicolegal documentation, early identification of vulnerable individuals and appropriate preventive interventions.

**Keywords:** Hanging; suicide; post-mortem examination; ligature material; knot position; forensic medicine; Telangana.

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## INTRODUCTION

Hanging is a form of mechanical asphyxia resulting from constriction of the neck by a ligature, with the constricting force being generated by the weight of the body or a part of the body. It is an important cause of medicolegal death and is particularly significant in the context of suicide. The forensic examination of hanging deaths involves assessment of the circumstances, external findings, ligature mark, ligature material, knot and suspension point, together with careful internal examination of the neck structures [1,2].

The epidemiological pattern of hanging varies according to geographical, socioeconomic, cultural and demographic factors. Several Indian studies have demonstrated a predominance of males among victims of hanging, although the magnitude of male predominance differs between populations [3-5]. Age distribution also varies between studies, with young adults frequently represented prominently. However, older individuals may constitute a substantial proportion in particular hospital populations, reflecting differences in population structure and underlying social or medical circumstances [3,6].

The ligature material used in hanging generally reflects the availability of materials in the victim's immediate environment. Ropes and articles of clothing such as sarees, chunni/dupatta and other household textiles have been commonly reported in Indian studies [4,7]. The selection of readily available materials has important forensic implications because the characteristics of the ligature can influence the appearance of the ligature mark and associated injuries.

The position of the knot is another important component of the forensic assessment. Although the location of the knot can vary, studies have described the nape, right side and left side of the neck among the commonly encountered positions [7,8]. Knot position, however, should always be interpreted along with the complete autopsy findings and scene investigation rather than being used in isolation to determine the manner of death.

The forensic significance of injuries to the neck structures in hanging has been extensively discussed. Fractures of the hyoid bone, thyroid cartilage and other neck structures may occur, particularly with increasing age, but their absence does not exclude hanging [1,9]. Detailed documentation of external and internal findings is therefore essential for establishing the cause and manner of death and for differentiating hanging from other forms of neck compression [1,10].

Hanging is also closely associated with psychosocial and socioeconomic circumstances. Previous Indian studies have reported family problems, financial difficulties, marital problems, academic stress and occupational difficulties among the circumstances

associated with suicidal hanging [4,5,11]. Suicide is multifactorial, and the presence of a documented precipitating factor does not necessarily establish a single causal relationship.

A recent retrospective study from a tertiary hospital in Central India similarly reported male predominance and demonstrated that hanging deaths were associated with a variety of social and psychological stressors [12]. Such regional studies are valuable because patterns observed in one population may not necessarily be applicable to another.

The present study was undertaken at a tertiary care teaching hospital in Telangana to analyse the available post-mortem records of hanging deaths, with particular emphasis on sex, age, ligature material, knot position and recorded reasons associated with the deaths. Understanding these patterns may contribute to improved medicolegal documentation and provide useful information for suicide-prevention strategies in the region.

## METHODOLOGY

### Study Design

The present study was a retrospective descriptive post-mortem study.

### Place of Study

The study was conducted at the Department of Forensic Medicine and Toxicology, Kakatiya Medical College, Warangal, Telangana.

### Study Population

A total of 152 cases of hanging deaths subjected to medicolegal post-mortem examination were included in the study.

### Data collection

Relevant information was obtained retrospectively from the available post-mortem and medicolegal records. The following variables were evaluated:

1. Age of the deceased.
2. Sex of the deceased.
3. Type of ligature material used.
4. Position of the knot.
5. Reason/precipitating factor recorded in the case history.

The ligature materials documented in the records included chunni, lungi, saree, towel, jute rope, nylon rope and plastic rope. Knot position was classified as nape of neck, back of neck, right side of neck and left side of neck. The recorded reasons included medical, financial, educational, occupational, marital, familial and interpersonal circumstances.

### Statistical analysis

The collected data were entered and analysed descriptively. Categorical variables were expressed as

number and percentage. The results were presented in tabular form and interpreted in relation to findings reported in previous forensic studies.

#### **Ethical Clearance**

Ethical clearance was obtained from the Institutional Ethics Committee of Kakatiya Medical College, Warangal, prior to commencement of the study.

## **RESULTS**

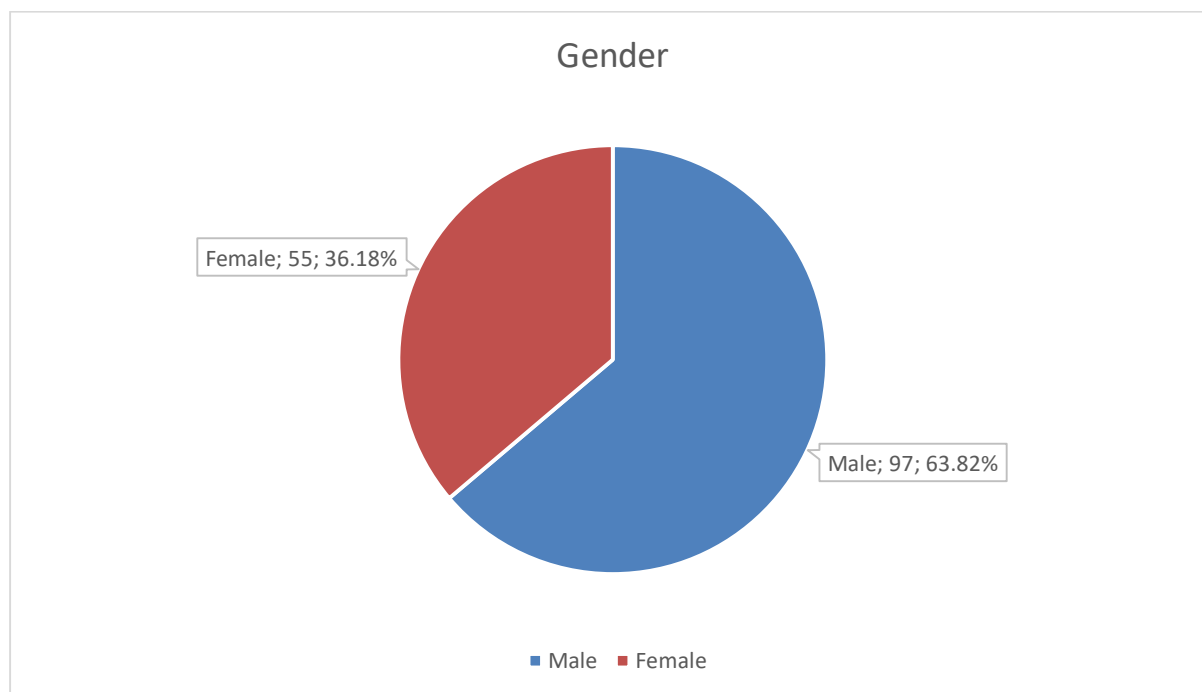
A total of 152 hanging deaths were included in the present analysis.

### **Gender distribution**

Males constituted the majority of the cases, with 97 (63.82%), while females accounted for 55 (36.18%). The male-to-female ratio was approximately 1.76:1 as shown in Table 1 and Figure 1.

**Table No. 1      Gender Distribution**

| <b>Gender</b> | <b>No. of Patients (%)</b> |
|---------------|----------------------------|
| Male          | 97 (63.82 %)               |
| Female        | 55 (36.18 %)               |
| Total         | 152 (100.00 %)             |



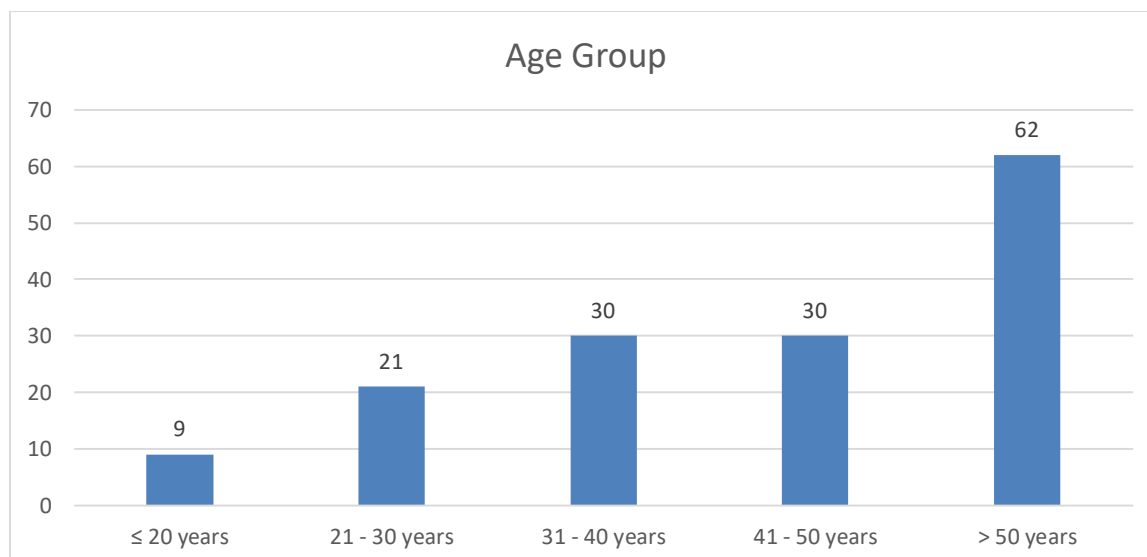
**Figure No. 1      Gender**

### **Age distribution**

The highest number of cases occurred among individuals aged >50 years, with 62 cases (40.79%). The 31–40 years and 41–50 years groups each accounted for 30 cases (19.74%). Twenty-one cases (13.81%) were in the 21–30-year age group, while 9 cases (5.92%) were aged ≤20 years as given in the Table no. 2 and Figure 2.

**Table No. 2      Age Distribution**

| <b>Age Group</b> | <b>No. of Patients (%)</b> |
|------------------|----------------------------|
| ≤ 20 years       | 9 (5.92 %)                 |
| 21 – 30 years    | 21 (13.81 %)               |
| 31 – 40 years    | 30 (19.74 %)               |
| 41 – 50 years    | 30 (19.74 %)               |
| > 50 years       | 62 (40.79 %)               |
| Total            | 152 (100.00 %)             |

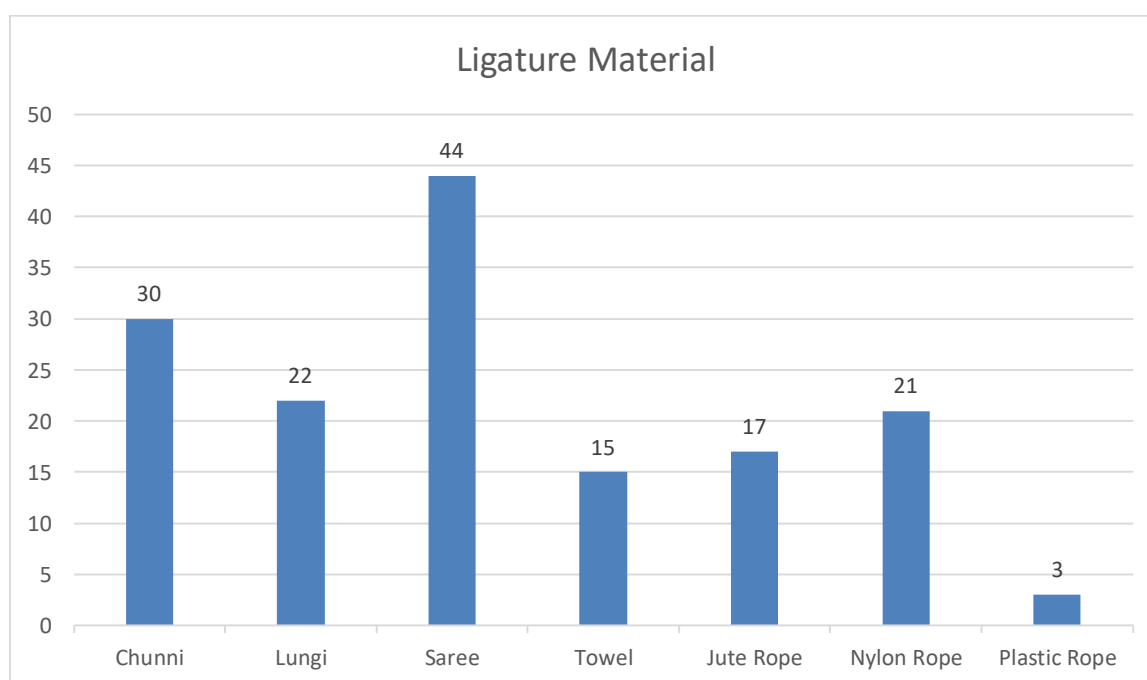


**Figure No. 2 Age Group**

### Ligature material

Saree was the most commonly used ligature material, accounting for 44 cases (28.95%). It was followed by chunni in 30 cases (19.74%), lungi in 22 cases (14.47%), nylon rope in 21 cases (13.82%), jute rope in 17 cases (11.18%), towel in 15 cases (9.87%) and plastic rope in 3 cases (1.97%) as mentioned in the Table no. 3 and shown in Figure no. 3.

| Table No. 3 Ligature Material |                     |
|-------------------------------|---------------------|
| Ligature Material             | No. of Patients (%) |
| Chunni                        | 30 (19.74 %)        |
| Lungi                         | 22 (14.47 %)        |
| Saree                         | 44 (28.95 %)        |
| Towel                         | 15 (9.87 %)         |
| Jute Rope                     | 17 (11.18 %)        |
| Nylon Rope                    | 21 (13.82 %)        |
| Plastic Rope                  | 3 (1.97 %)          |



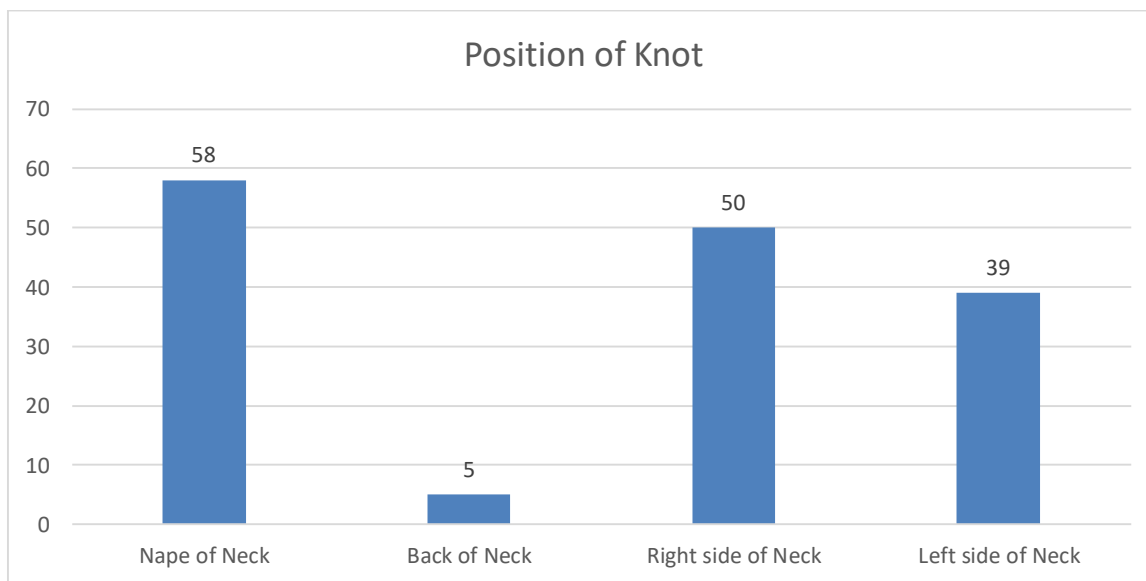
**Figure No. 3 Ligature Material**

### Position of knot

The nape of the neck was the most frequent knot position, observed in 58 cases (38.16%). The knot was located on the right side of the neck in 50 cases (32.89%), left side in 39 cases (25.66%) and back of the neck in 5 cases (3.29%) as given in Table no. 4 and Figure no. 4.

**Table No. 4 Position of Knot**

| Position of Knot   | No. of Patients (%) |
|--------------------|---------------------|
| Nape of Neck       | 58 (38.16 %)        |
| Back of Neck       | 5 (3.29 %)          |
| Right side of Neck | 50 (32.89 %)        |
| Left side of Neck  | 39 (25.66 %)        |



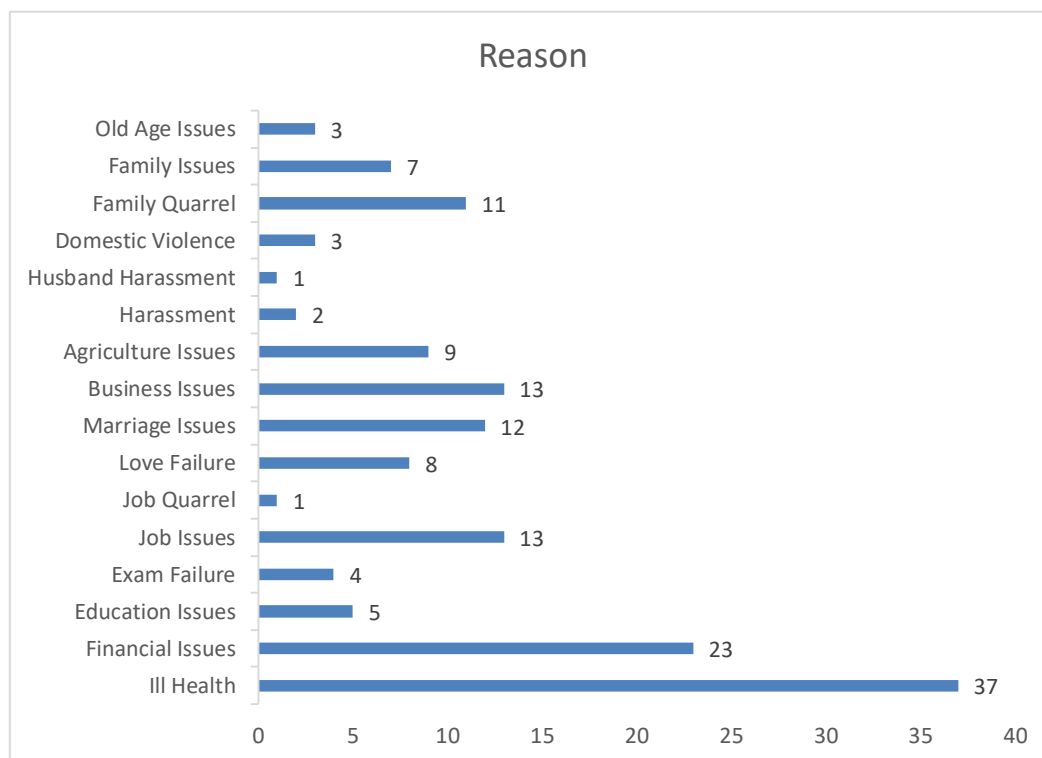
**Figure No. 4 Position of Knot**

### Recorded reasons/precipitating factors

Ill health was the most frequently recorded reason, accounting for 37 cases (24.34%). Financial issues were documented in 23 cases (15.13%). Job issues and business issues were each recorded in 13 cases (8.55%), while marriage issues accounted for 12 cases (7.89%) and family quarrel for 11 cases (7.24%). Other documented circumstances included agriculture issues, love failure, education issues, exam failure, harassment, domestic violence and old-age issues (Table no. 5, Figure No.5)

**Table No. 5 Recorded reasons**

| Reason             | No. of Patients (%) |
|--------------------|---------------------|
| Ill Health         | 37 (24.34 %)        |
| Financial Issues   | 23 (15.13 %)        |
| Education Issues   | 5 (3.29 %)          |
| Exam Failure       | 4 (2.63 %)          |
| Job Issues         | 13 (8.55 %)         |
| Job Quarrel        | 1 (0.66 %)          |
| Love Failure       | 8 (5.26 %)          |
| Marriage Issues    | 12 (7.89 %)         |
| Business Issues    | 13 (8.55 %)         |
| Agriculture Issues | 9 (5.92 %)          |
| Harassment         | 2 (1.32 %)          |
| Husband Harassment | 1 (0.66 %)          |
| Domestic Violence  | 3 (1.97 %)          |
| Family Quarrel     | 11 (7.24 %)         |
| Family Issues      | 7 (4.61 %)          |
| Old Age Issues     | 3 (1.97 %)          |



**Figure No. 5** Precipitating factors

## DISCUSSION

The present retrospective analysis of 152 hanging deaths demonstrates a clear male predominance, with males accounting for 63.82% of cases and females for 36.18%. This finding is consistent with several forensic studies from India in which males constituted the majority of hanging deaths. Pal et al. reported male predominance in their analysis of suicidal hanging, while other Indian studies have similarly documented higher proportions of male victims [3,4,7]. A recent retrospective autopsy study from Central India also found that males constituted 62% of hanging deaths [12]. Differences in male-to-female ratios between studies may reflect variations in social structure, occupational exposure, access to means and regional patterns of suicidal behaviour.

An important finding in the present study was the predominance of individuals aged more than 50 years, who accounted for 40.79% of cases. This differs from several published Indian studies in which young adults, particularly those aged 21–30 years, constituted the largest proportion [4,5,7,12]. For example, Waghmode et al. reported the 31–40-year age group as the most commonly affected, whereas another recent tertiary-care study reported 21–30 years as the predominant age group [5,12]. The relatively higher proportion of older individuals in the present study may reflect the demographic characteristics of the hospital catchment population. Ill health was also the leading recorded precipitating factor in the present series, which may

partly explain the higher representation of older individuals.

The present study showed that saree was the commonest ligature material, accounting for 28.95% of cases, followed by chunni (19.74%) and lungi (14.47%). Ropes collectively also represented a substantial proportion of cases, including nylon, jute and plastic ropes. The choice of ligature material in hanging is generally influenced by accessibility and availability within the immediate environment. Previous studies have reported considerable variation in the commonest material. Pal et al. reported rope followed by chunni/dupatta as the most frequently used materials, while other Indian studies have reported nylon rope as the leading material [7,8]. In contrast, a South Indian tertiary-centre study reported saree as the most frequently used material [4]. These differences support the view that ligature choice is strongly influenced by local clothing practices and household availability.

The nape of the neck was the most common knot position in the current series, occurring in 38.16% of cases, followed by the right side (32.89%) and left side (25.66%). Published literature demonstrates variation in knot location. Studies have described the left side, right side and nape as common sites depending on the study population [7,8]. Knot position is influenced by the method of tying and suspension and should not be interpreted independently of the ligature mark,

suspension point, external examination and internal neck findings. Detailed forensic documentation remains essential because the interpretation of a hanging death requires integration of multiple findings rather than reliance on a single characteristic [1,10].

The present study also identified several social, medical and socioeconomic circumstances associated with the deaths. Ill health was the most frequently documented factor (24.34%), followed by financial problems (15.13%). Occupational and business problems accounted for 8.55% each, while marriage-related problems and family quarrels accounted for 7.89% and 7.24%, respectively. Such findings reinforce the multifactorial nature of suicidal behaviour. Previous Indian studies have identified financial difficulties, family problems, marital conflict, academic stress and other psychosocial factors among individuals dying by hanging [4,5,11]. The presence of these factors highlights the importance of social support, timely psychological assessment and early intervention in vulnerable individuals.

The comparatively high proportion of deaths attributed to ill health deserves particular attention. Physical illness, especially when associated with chronic disability, pain, functional limitation or social isolation, may contribute to psychological distress. However, the present retrospective data only record the reason documented in the case history and do not permit determination of the independent contribution of medical illness to the decision to die by suicide. Therefore, these findings should be interpreted as recorded associations rather than established causal relationships.

Financial difficulties were the second most frequently documented circumstance. Economic stress has repeatedly been reported in Indian suicide literature and may coexist with family, occupational and mental-health problems [4,11]. The identification of financial stress in 15.13% of cases suggests that prevention efforts should not be restricted to clinical mental-health services but should also incorporate social and economic support mechanisms.

The occurrence of marriage-related problems, family quarrels, domestic violence and harassment in the present dataset further demonstrates the relevance of interpersonal stressors. These factors are particularly important in forensic investigation because the history provided by relatives, police records and scene investigation may help identify circumstances that are not evident during autopsy. Nevertheless, information concerning precipitating factors may be subject to incomplete reporting or retrospective interpretation and should therefore be corroborated whenever possible.

From a medicolegal perspective, hanging deaths require systematic examination and documentation. Injuries to

neck structures can occur in hanging, and their prevalence may vary according to age, ligature characteristics and other factors [1,9]. Sharma et al. emphasised the importance of careful examination of neck structures in deaths caused by constriction of the neck [1]. Tumram et al. also demonstrated the importance of assessing ligature-related injuries and their relationship with the material used [8]. Thus, documentation of the ligature material and knot position, as performed in the present study, forms an important part of the overall post-mortem evaluation.

The findings of this study have practical relevance for both forensic medicine and public health. The predominance of easily available clothing materials such as saree and chunni indicates that restricting access to a particular type of ligature material alone is unlikely to be sufficient as a preventive strategy. Rather, prevention should focus on identification of individuals experiencing severe health, financial, family or occupational stress, strengthening mental-health services and ensuring timely psychosocial intervention. Research from India has similarly highlighted the need for a broader suicide-prevention approach because suicide results from interacting biological, psychological and social factors [11].

#### CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

#### CONCLUSION

The present retrospective post-mortem analysis of 152 hanging deaths at a tertiary care teaching hospital in Telangana showed a male predominance (63.82%), with individuals aged >50 years forming the largest age group (40.79%). Saree was the most commonly used ligature material (28.95%), followed by chunni and lungi. The nape of the neck was the commonest knot position (38.16%). Among the documented precipitating circumstances, ill health (24.34%) and financial problems (15.13%) were the most frequent.

The findings indicate that hanging deaths are associated with a broad range of medical, socioeconomic, occupational and interpersonal circumstances. Comprehensive post-mortem documentation, careful medicolegal investigation and early recognition of vulnerable individuals are important components of suicide prevention. Region-specific studies such as the present one can help forensic departments and public-health authorities understand local patterns and develop appropriate preventive strategies.

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