



Original Research Article

A One-Year Retrospective Medico-Legal Analysis of Suicidal Deaths at a Tertiary Care Centre in Surguja Region, Chhattisgarh.

Name of Author:	Abstract: Background: Suicide is a global medico-legal and public health challenge. The tribal and agricultural Surguja region in Northern Chhattisgarh presents unique socio-cultural dynamics. This study retrospectively analyses socio-demographic and medico-legal patterns of suicidal deaths brought for autopsy here. Materials and Methods: A one-year retrospective, cross-sectional observational study was conducted at a tertiary care center in Ambikapur, Chhattisgarh. We analysed all conclusively established suicidal deaths brought for medico-legal autopsy between January and December 2022. Data on age, sex, marital status, residential area, and suicide method were statistically analysed. Results: Of 201 analysed suicidal deaths, male predominance was observed (67.2% vs. 32.8% females). Young adults aged 21-30 years (41.3%) and 31-40 years (25.4%) were most vulnerable. Married individuals formed a majority (67.7%). Incidence was higher in rural areas (59.7%) than in urban areas (40.3%). Poisoning was the most common method (52.2%), followed by hanging (45.3%), burns (1.5%), and drowning (1.0%). Poisoning dominated in rural settings (82.9% of poisoning cases), while hanging prevailed in urban areas (69.2% of hanging cases). Conclusion: Young, married rural males represent the most vulnerable demographic for suicide in Surguja. The high rural prevalence of poisoning necessitates strict agrochemical regulations alongside expanded grassroots mental health and tele-psychiatry services.
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INTRODUCTION

The term 'suicide' is derived from the Latin words SUI (of oneself) and CAEDES (murder), which together represent the voluntary and intentional act of causing one's own death [4]. Today, it is recognized as a profound global medico-legal and public health challenge [18]. According to the World Health Organization (WHO), over 700,000 individuals die by suicide annually, translating to approximately one death every 40 seconds worldwide [18]. Furthermore, the WHO highlights that a vast majority of these global suicides, over 77%, occur in low- and middle-income

countries [18]. Studies from neighbouring developing nations similarly reflect this heavy burden, demonstrating that socio-economic disparities significantly exacerbate population vulnerabilities [13, 15].

In the Indian context, the magnitude of suicidal fatalities is alarmingly high and continually rising [17, 20]. According to the statistical reports published by the National Crime Records Bureau (NCRB) of India, over 1.6 to 1.7 lakh suicides are reported annually across the country [19]. Nationally representative mortality

surveys, such as the Million Death Study, further highlight that India accounts for a massive proportion of global suicide deaths [17, 21]. The national suicide rate has steadily climbed, disproportionately affecting the economically productive younger age groups and creating a severe drain on the country's demographic dividend [17, 21].

The etiology of suicide is highly complex, involving a multifaceted interplay of psychological, behavioural, and socio-economic determinants [14, 20]. Retrospective medico-legal analyses and psychological autopsies frequently identify family disputes, chronic illness, financial bankruptcy, and interpersonal conflicts as major precipitating triggers driving individuals toward intentional self-harm [1, 14]. Furthermore, prominent age and gender variability exists across different demographics, with young adults and married individuals frequently emerging as the most vulnerable cohorts in the Indian societal setup [12, 16].

The specific method adopted for intentional self-harm largely depends on a variety of factors, including the accessibility of lethal means, the socio-economic status of the individual, and regional socio-cultural practices [2, 7]. Across India, methods such as hanging and agrochemical poisoning remain the most prevalent, though other uncommon modalities like intentional electrocution or complex suicides are also encountered in modern forensic practice [9, 11, 12]. Regional studies spanning North India, Gujarat, Jaipur, and Kota confirm that poisoning dominates heavily in agrarian belts due to the easy availability of pesticides, while hanging is more frequently observed in urbanized sectors [1, 2, 4, 5].

In investigating these unnatural deaths, the forensic pathologist plays an indispensable role in classifying the exact manner of death whether suicide, homicide, accident, or natural—through meticulous post-mortem and toxicological examinations [3, 6]. While national and state-level data provide a macro-perspective, localized forensic evaluation is critical [6, 16]. In Chhattisgarh, previous regional analyses from Bilaspur and other central medical institutes have demonstrated specific geographical trends in unnatural deaths and hanging [8, 10]. However, the Surguja region, a distinct tribal and agricultural belt in Northern Chhattisgarh, presents unique socio-cultural and geographical dynamics that remain under-researched.

Accurate local epidemiological data serves as a direct reflection of a region's prevailing social fabric and mental health status [1, 3]. With this rationale, the present retrospective study was undertaken to thoroughly investigate the socio-demographic and medico-legal patterns of suicidal fatalities brought for autopsy in the Surguja region. By establishing this foundational database, the study aims to guide future preventive interventions, strict agrochemical

regulations, and targeted grassroots tele-psychiatry services [8, 10].

Objectives of the Study

Primary Objective:

- To retrospectively analyse the socio-demographic and medico-legal patterns of suicidal deaths brought for medicolegal autopsy at a tertiary care center in the Surguja region over one year.

Secondary Objectives:

- To identify and determine the prevalence of various methods adopted for committing suicide.
- To evaluate the statistical association between the method of suicide and various demographic variables such as age, gender, residential area, and marital status.

MATERIALS AND METHODS

Study Design: A one-year retrospective, cross-sectional observational study based on medico-legal autopsy records.

Study Setting: The study was conducted using records retrieved from the mortuary of a tertiary care center in Ambikapur, Chhattisgarh.

Study Period: The study was conducted over one year, from January 1, 2022, to December 31, 2022.

Sample Size: The sample size (n) comprises all consecutive medico-legal autopsy cases that met the inclusion criteria during the study period. Out of a total of 799 autopsies conducted, n = 201 cases were conclusively identified as suicidal deaths.

Sampling Technique: A total enumeration sampling method was employed to include all eligible cases in the study.

Inclusion Criteria:

1. All cases of unnatural deaths brought for medico-legal autopsy during the defined one-year study period.
2. Cases where the manner of death was conclusively established as 'Suicide' corroborated by the police inquest report (under Section 174 CrPC) and post-mortem findings.
3. Suicidal deaths encompassing all observed modalities (poisoning, hanging, self-immolation, and drowning).
4. Cases with complete and well-documented socio-demographic and medico-legal autopsy records.

Exclusion Criteria:

1. All unnatural deaths identified as accidental or homicidal.
2. Cases involving highly decomposed or skeletal remains where the exact cause could not be determined.

3. Cases where the final police inquest report was inconclusive or pending.

extracted from post-mortem reports and police inquests were systematically coded and entered into Microsoft Excel. We performed descriptive statistics (frequencies and percentages) to summarize the demographic profile.

Data Collection and Statistical Analysis: Data

RESULTS

During the one-year retrospective study period, a total of 799 medico-legal autopsies were conducted at the tertiary care center. Out of these autopsies, 201 cases (accounting for 25.16% of the total caseload) were conclusively identified as suicidal deaths.

The detailed age- and sex-wise distribution of the victims is explicitly illustrated in **Figure 1**. A distinct male preponderance was observed, with 135 male victims (67.2%) compared to 66 female victims (32.8%). The highest vulnerability was seen in the 21-30 years age group (83 cases, 41.3%), followed by the 31-40 years age bracket (51 cases, 25.4%).

As shown in **Table 1**, the distribution of suicidal deaths based on age and marital status indicates that a vast majority of the victims were married (136 cases, 67.7%), while unmarried individuals accounted for 65 cases (32.3%). The highest concentration of married victims was seen in the 31-40 years group (49 cases).

The modalities of suicide adopted across different age groups are detailed in **Table 2**. Poisoning emerged as the leading cause of death overall (105 cases, 52.2%), closely trailed by hanging (91 cases, 45.3%). Burns and drowning were significantly less common, accounting for 3 cases (1.5%) and 2 cases (1.0%), respectively.

Figure 2 depicts the distribution of suicidal deaths based on residency and sex. The overall incidence was notably higher in rural populations, which accounted for 120 cases (59.7%), compared to urban areas with 81 cases (40.3%). Both males and females showed higher absolute numbers of suicides in rural settings.

Figure 3 highlights a striking association between the specific method of suicide and the residential area. Poisoning was the overwhelmingly dominant method in rural settings, accounting for 87 out of the 105 total poisoning cases (82.9%). Conversely, hanging was predominantly observed in urban areas, accounting for 63 out of the 91 total hanging cases (69.2%).

Gender preferences regarding the choice of suicide method are outlined in **Table 3**. Males preferred poisoning (69 cases) and hanging (64 cases) in relatively similar proportions, whereas all cases of self-immolation via burns (3 cases) were exclusively observed among female victims.

Finally, **Table 4** delineates the method of suicide in relation to marital status. Married individuals heavily favoured poisoning (82 cases, 78.1% of all poisoning cases), whereas unmarried individuals preferred hanging (40 cases, 44.0% of all hanging cases).

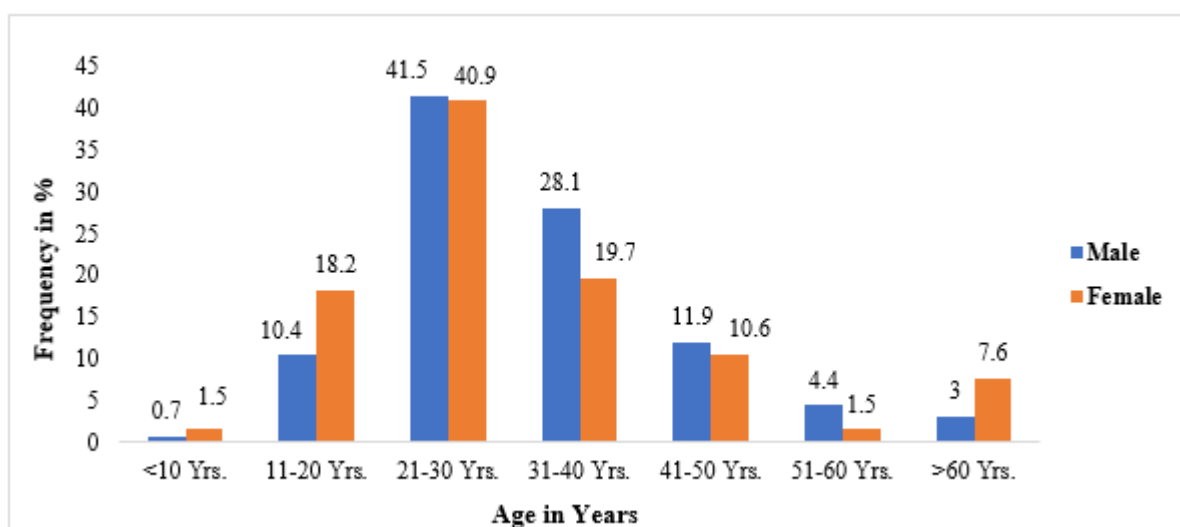


Figure 1: Bar graph showing age- and sex-wise distribution of suicidal victims

Table 1: Distribution of Suicidal Deaths based on Age and Marital Status

Age in Years	Marital Status		Total
	Married	Unmarried	
<10 Yrs.	0 (0%)	2 (3.1%)	2 (1.0%)
11-20 Yrs.	1 (0.7%)	25 (38.5%)	26 (12.9%)
21-30 Yrs.	47 (34.6%)	36 (55.4%)	83 (41.3%)
31-40 Yrs.	49 (36.0%)	2 (3.1%)	51 (25.4%)
41-50 Yrs.	23 (16.9%)	0 (0%)	23 (11.4%)
51-60 Yrs.	7 (5.1%)	0 (0%)	7 (3.5%)
>60 Yrs.	9 (6.6%)	0 (0%)	9 (4.5%)
Total	136 (100%)	65 (100%)	201 (100%)

Table 2: Modalities of Suicide Across Different Age Groups

Age in Years	Suicidal Death				Total
	Hanging	Poisoning	Burns	Drowning	
<10 Yrs.	1 (1.1%)	1 (1.0%)	0 (0%)	0 (0%)	2 (1.0%)
11-20 Yrs.	19 (20.9%)	7 (6.7%)	0 (0%)	0 (0%)	26 (12.9%)
21-30 Yrs.	39 (42.9%)	39 (37.1%)	3 (100.0%)	2 (100.0%)	83 (41.3%)
31-40 Yrs.	23 (25.3%)	28 (26.7%)	0 (0%)	0 (0%)	51 (25.4%)
41-50 Yrs.	5 (5.5%)	18 (17.1%)	0 (0%)	0 (0%)	23 (11.4%)
51-60 Yrs.	2 (2.2%)	5 (4.8%)	0 (0%)	0 (0%)	7 (3.5%)
>60 Yrs.	2 (2.2%)	7 (6.7%)	0 (0%)	0 (0%)	9 (4.5%)
Total	91 (100%)	105 (100%)	3 (100%)	2 (100%)	201 (100%)

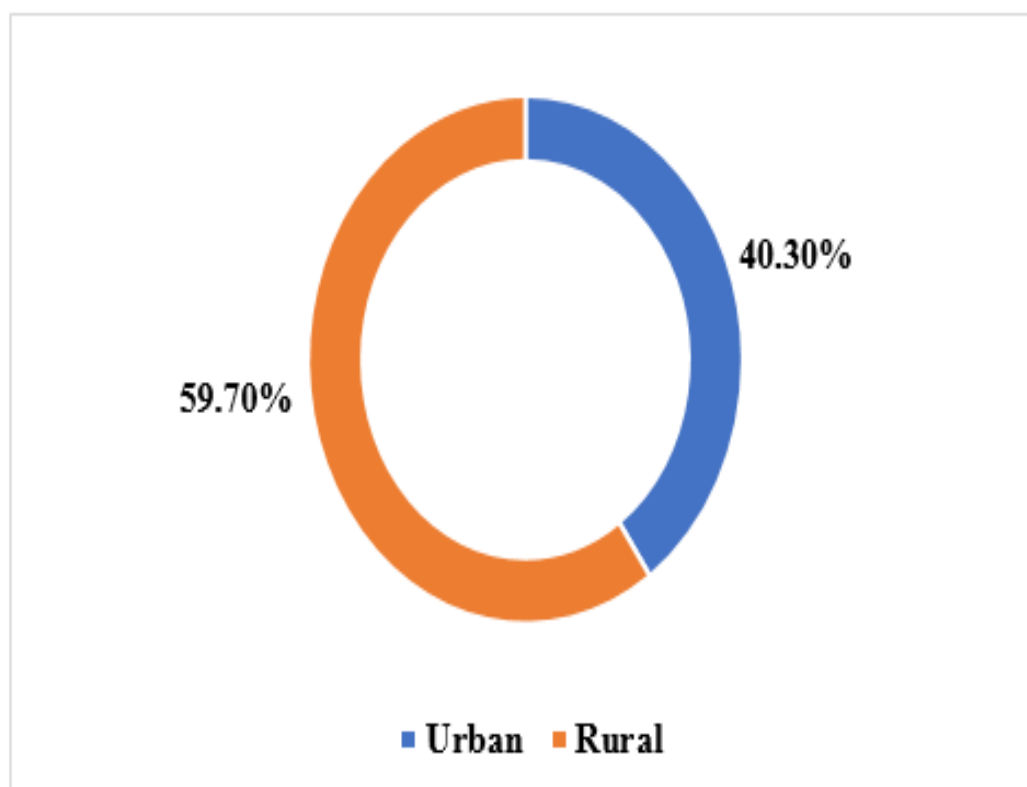


Figure 2: Pie chart depicting the distribution of suicidal deaths based on residential area

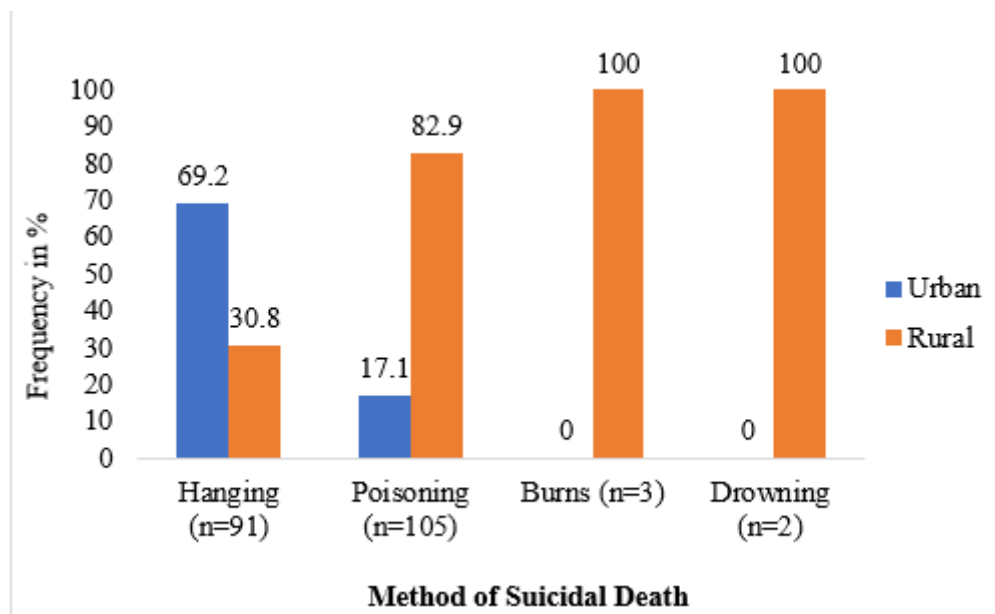


Figure 3: Clustered bar graph highlighting the association between the method of suicide and residential area

Table 3: Gender Preferences in the Choice of Suicide Method

Sex	Suicidal Death				Total
	Hanging	Poisoning	Burns	Drowning	
Male	64 (70.3%)	69 (65.7%)	0 (0%)	2 (100.0%)	135 (67.2%)
Female	27 (29.7%)	36 (34.3%)	3 (100.0%)	0 (0%)	66 (32.8%)
Total	91 (100%)	105 (100%)	3 (100%)	2 (100%)	201 (100%)

Table 4: Method of Suicide in Relation to Marital Status

Marital Status	Suicidal Death				Total
	Hanging	Poisoning	Burns	Drowning	
Married	51 (56.0%)	82 (78.1%)	2 (66.7%)	1 (50.0%)	136 (67.7%)
Unmarried	40 (44.0%)	23 (21.9%)	1 (33.3%)	1 (50.0%)	65 (32.3%)
Total	91 (100%)	105 (100%)	3 (100%)	2 (100%)	201 (100%)

DISCUSSION

The present study provides critical, localized insights into the epidemiological and medico-legal profile of suicidal deaths in the Surguja region, a tribal-predominant area in Northern Chhattisgarh. Out of the 799 medico-legal autopsies conducted during the one-year study period, suicidal deaths accounted for a substantial 25.16% (201 cases). This incidence is noticeably higher than findings reported in other parts of the country; for instance, Dutta et al. reported a suicide rate of 12.6% among medico-legal autopsies in Jaipur [4], while Nagar et al. noted that suicidal hangings alone accounted for 7.56% of total autopsies in North India [2]. This high proportion in Surguja reflects a significant and concerning regional burden of intentional self-harm, echoing broader epidemiological trends observed across Indian autopsy centers [12].

A pronounced male preponderance was observed in this study, with males constituting 67.2% of the victims compared to 32.8% females. This finding is highly consistent with multiple studies across India and neighbouring regions [13, 16]. Nagar et al. reported an

even higher male ratio of 76.92% [2], and Dutta et al. found similar male susceptibility [4]. This recurring trend of male predominance is often attributed to greater exposure to external environmental stressors, rigorous occupational pressures, unemployment, and heavy financial obligations predominantly borne by males in traditional social setups [2, 5, 20]. Conversely, when analysing female victims, literature suggests that triggers are often deeply tied to domestic issues, unending dowry demands, and marital maladjustment [1, 7].

Furthermore, the highest incidence of suicide in our study was noted in the age group of 21-30 years (41.3%), followed closely by the 31-40 years group (25.4%). This pattern strongly aligns with the observations of Sharma et al. [5], Nagar et al. [2], and Manigandan et al. [16], highlighting that young, economically productive age groups are the most vulnerable. This extreme vulnerability is linked to the intense psychological and economic stress individuals face during major life transitions regarding academics,

careers, and newly established marital lives [16, 20]. Married individuals formed a significant majority (67.7%) of the victims in our dataset. This starkly indicates that marital disharmony, nuclear family disputes, and associated socio-economic responsibilities play a critical role in precipitating suicidal behaviour. This trend is robustly corroborated by the findings of Khan et al. in Vijayawada [3] and Singh et al. in Central India [7], where married persons outnumbered unmarried victims.

Geographically, the rural population in Surguja was more severely affected (59.7%) than the urban population (40.3%). This disparity emphasizes the urgent need for targeted rural mental health interventions [8]. While some studies like Khan et al. note higher urban suicides [3], our rural dominance mirrors findings from regions with a predominantly agrarian economy, where crop failures, financial debts, and marginal farm returns induce severe psychological distress [4, 8, 12].

The choice of a suicide method is profoundly influenced by its availability, lethality, and the socio-economic environment of the victim [2, 4]. In the current study, poisoning emerged as the most common method (52.2%), closely followed by hanging (45.3%). These findings are in strong agreement with studies by Khan et al. [3] and Sharma et al. [5], which also reported poisoning as the leading cause of suicidal death. Similarly, Prajapati et al. noted poisoning as the primary method among females in South Gujarat [1]. However, this contrasts with data from CIMS, where Yadav et al. [10], and North India, where Nagar et al. [2], found hanging to be the most prominent method. While other uncommon methods like intentional electrocution [11] or complex suicides [9] are reported in modern forensic literature, they were absent in our dataset.

An intriguing and vital demographic association was discovered regarding the choice of method: poisoning was overwhelmingly prevalent in rural areas (accounting for 82.9% of all poisoning cases), whereas hanging was the preferred modality in urban settings (accounting for 69.2% of all hanging cases). The exceptionally high incidence of poisoning in rural Surguja directly correlates with its agricultural background, where toxic agrochemicals and organophosphate pesticides are easily accessible in households without strict storage regulations [8]. Conversely, hanging, which requires minimal preparation and simple household materials, remains universally accessible, particularly in urban areas where pesticide availability is lower [2, 10].

Additionally, only 1.5% of cases involved self-immolation (burns), all of which were females. The choice of self-immolation is highly gender-specific in the Indian context, frequently pointing toward specific

socio-cultural dynamics such as domestic disputes or dowry-related violence, as kerosene and matchsticks are easily accessible to housewives [1, 7].

Limitations: While this study provides highly valuable demographic data, it is subject to certain inherent limitations. Being a retrospective autopsy-based study heavily reliant on police inquests and post-mortem reports, detailed psychiatric histories, records of prior suicidal attempts, and deep psychological triggers could not be comprehensively evaluated. Future multicentric, prospective studies integrating psychological autopsies, as recommended by Sharma et al. [14], are essential to facilitate a more holistic understanding of suicide dynamics.

CONCLUSION

The present retrospective study establishes that suicide is a critical medico-legal and public health issue in the Surguja region, disproportionately affecting the young, productive age group of 21-40 years. Married males residing in rural areas represent the most vulnerable demographic.

The data highlights a distinct geographical divide in the choice of suicide method: poisoning is the leading cause of suicidal death in rural areas, likely due to the easy accessibility of agrochemicals and pesticides in agricultural belts. Conversely, hanging is the predominant method in urban settings.

These findings emphasize the urgent need for targeted, multi-sectoral preventive strategies. Strict regulations on the sale and safe storage of agricultural poisons, combined with the establishment of accessible mental health counselling centers and tele-psychiatry services (such as Tele-MANAS) at rural primary health centers, are crucial steps to mitigate this preventable loss of life.

Declarations:

- **Conflict of Interest:** The authors declare no conflicts of interest.
- **Funding:** This research received no specific grant.
- **Ethical Approval:** As per the institutional ethical committee rules, no permission is required if the study is done on already deceased victims and the study is retrospective, and permission is taken from the Head of the Forensic Medicine Department..

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