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Original Research Article

PATTERNS, DEMOGRAPHICS, AND PUBLIC HEALTH IMPLICATIONS OF YOUTH SUICIDE IN EASTERN INDIA: A MEDICOLEGAL ANALYSIS FROM JHARKHAND

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ABSTRACT

Background: Suicide is a complex global public health problem and a leading cause of death among young people. In India, socio-cultural, economic, and regional differences strongly influence both the prevalence and the method of suicide. Eastern India, particularly Jharkhand, presents a distinctive profile due to rural predominance, agricultural dependence, and limited mental health resources. Understanding these patterns is essential for developing targeted prevention strategies. **Aim and Objectives:** This study aimed to analyse the demographic characteristics, methods, and associated factors of suicidal deaths among youth in Eastern India. The objectives were to determine the distribution of suicide methods among young adults aged 14–30 years, examine the association between suicide method and demographic variables such as sex, marital status, and place of residence, and identify public health implications for targeted suicide prevention interventions. **Materials and Methods:** A retrospective, cross-sectional study was conducted on medicolegal autopsies of suicidal deaths in individuals aged 14–30 years at the Department of Forensic Medicine, RIMS, Ranchi, from November 2019 to November 2021. Data on socio-demographic variables, method of suicide, and associated factors were collected from postmortem reports, inquest papers, and police records. Descriptive statistics and Chi-square tests were used to analyse associations, with $p < 0.05$ considered statistically significant. **Result:** A total of 245 suicidal deaths were analysed. Hanging was the most common method (52.24%), followed by poisoning (33.06%) and self-immolation (11.43%). Males predominated in hanging cases (65.62%), whereas poisoning (62.96%) and self-immolation (78.57%) were more common among females. The 21–25 years age group accounted for the largest share (51.43%). Married individuals formed 56.33% of cases, and rural residents constituted 60%. Significant associations were observed between method of suicide and sex ($\chi^2 = 39.082$, $p < 0.001$) and place of residence ($\chi^2 = 15.635$, $p < 0.001$), but not marital status ($\chi^2 = 2.301$, $p = 0.316$). **Conclusion:** Hanging is the predominant method of suicide among young adults in Jharkhand, with notable gender and rural–urban differences in method choice. These findings highlight the need for gender-sensitive prevention programs, pesticide access restrictions, and improved rural mental health services to reduce suicide burden in this vulnerable group.

INTRODUCTION

Suicide remains one of the leading causes of premature mortality worldwide, with the World Health Organization (WHO) estimating nearly one million deaths annually, translating to a global mortality rate of 16 per 100,000 population—one death every 40 seconds and one attempt every three seconds.[1] Young people are disproportionately affected, with suicide ranking among the top three causes of death in those aged 15–29 years in many countries (2). In India, the suicide rate was reported as 10.6 per 100,000 in 2009, placing the country 43rd globally.[1] Recent years have witnessed an upward trend, with particular concern over rising rates among youth, who face unique psychosocial stressors, including academic pressure, unemployment, relationship issues, and family conflict.[3,4]

Patterns of suicide vary geographically, reflecting differences in socioeconomic conditions, cultural context, and accessibility to means. In India, common methods include poisoning—particularly with readily available agricultural pesticides—hanging, and self-immolation.[5,6] These modes are influenced

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by regional factors such as agricultural practices, urbanisation, and prevailing sociocultural norms.[7] Understanding such patterns is crucial because method-specific prevention strategies, such as restricting access to lethal means, have proven effective in reducing suicide rates.[8]

Despite the high burden, suicide remains under-reported in India due to stigma, medicolegal implications, and limitations in death registration systems.[9] Studies suggest that actual rates, especially among rural and marginalised populations, may be significantly higher than official statistics.[10] The age group of 14–30 years warrants particular attention, as this period coincides with major life transitions and heightened vulnerability to emotional distress, impulsivity, and external pressures.[11] Targeted epidemiological research in this demographic is essential for developing culturally appropriate prevention strategies and for informing health policy.

Aim and Objectives

The present study was undertaken to analyse the pattern of suicides among individuals aged 14–30 years undergoing medicolegal autopsy at a tertiary care centre in Ranchi, Jharkhand. By identifying demographic variables, methods used, and associated circumstances, the study aims to contribute evidence that can guide effective, locally relevant suicide prevention initiatives.

MATERIALS AND METHODS

This retrospective, cross-sectional study was conducted in the Department of Forensic Medicine and Toxicology, Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, and included all medicolegal autopsies of suicidal deaths in individuals aged 14–30 years during the period from November 2019 to November 2021. Cases were considered suicidal based on circumstantial evidence, police inquest reports, postmortem findings, and, where available, suicide notes. All confirmed suicidal deaths within the specified age group were included, while deaths due to accidents, homicide, natural causes, or those where the manner of death could not be conclusively established were excluded. Data were collected from postmortem reports, police inquest papers, hospital records, and other available documents, recording variables such as age, sex, marital status, occupation, literacy status, place of residence (urban or rural), method of suicide, and possible precipitating factors. Suicide methods were categorised into hanging, poisoning, burns (self-immolation), drowning, firearm injury, and other methods, with poisoning cases further classified according to the type of poison identified from circumstantial evidence, autopsy findings, and forensic toxicology reports. All data were entered into a predesigned proforma, coded, and analysed using SPSS software, with descriptive statistics used to summarise categorical variables and chi-square tests applied to assess associations, considering a p value of less than 0.05 as statistically significant. As per institutional policy, ethics committee approval was not required for this retrospective study on deceased individuals, and all identifying details were kept confidential in reporting.

RESULTS

During the study period from November 2019 to November 2021, a total of 245 suicidal deaths in individuals aged 14–30 years were examined at RIMS, Ranchi. As shown in Table 1, hanging was the most common method of suicide, accounting for 52.24% (128 cases), followed by poisoning at 33.06% (81 cases), and self-immolation at 11.43% (28 cases). Other methods comprised 3.27% (8 cases).

Table 1: Distribution of cases by suicidal methods

Method of Suicide	Number of Cases	Percentage (%)
Hanging	128	52.24
Poisoning	81	33.06
Self-immolation	28	11.43
Others	8	3.27
Total	245	100%

Hanging displayed a male predominance with 84 males (65.62%) compared to 44 females (34.38%). Poisoning, in contrast, was more common among females, with 51 cases (62.96%) versus 30 males (37.04%). Self-immolation showed the highest female predominance, with 22 females (78.57%) and only 6 males (21.43%).

Table 2: Distribution of suicide methods by sex

Method	Male (n)	Female (n)
Hanging	84	44
Poisoning	30	51
Self-immolation	6	22
Total	120 (48.9%)	117 (47.8%)

The age distribution in Table 3 reveals that the 21–25 years group formed the largest share with 126 cases (51.43%), followed by the 26–30 years group with 73 cases (29.80%), and the 14–20 years group with 46 cases (18.78%).

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Table 3: Distribution of suicidal cases according to age group

Age Group	Number of Cases	Percentage (%)
14-20 years	46	18.78
21-25 years	126	51.43
26-30 years	73	29.80
Total	245	100%

Marital status analysis (Table 4) shows that married individuals accounted for 138 cases (56.33%), outnumbering the 107 unmarried cases (43.67%).

Table 4: Distribution of suicidal cases according to Marital status

Marital Status	Number of Cases	Percentage (%)
Married	138	56.33
Unmarried	107	43.67
Total	245	100%

Residence data (Table 5) indicate that rural residents constituted the majority with 147 cases (60%), while urban residents accounted for 98 cases (40%).

Table 5: Distribution of suicidal cases according to Residence

Residence	Number of Cases	Percentage (%)
Urban	98	40%
Rural	147	60%
Total	245	100%

Statistical analysis revealed a significant association between method of suicide and sex ($p<0.05$), as well as between method and place of residence ($p<0.05$), while no significant association was observed between marital status and method of suicide. Year-wise analysis indicated a slight increase in the total number of cases in the second year of the study, with a parallel rise in hanging and poisoning deaths.

Table 6: Association between suicidal methods with its factors

Factors	χ^2 value	p-value	Significance
Method of suicide vs Sex	39.082	<0.05	Significant
Method of suicide vs Place of residence	15.635	<0.05	Significant
Method of suicide vs Marital status	2.301	>0.05	Not significant

Illiteracy and education only up to the primary or middle school level were common among victims, while higher education was infrequently observed. Pesticide ingestion was the predominant form of poisoning, with organophosphates being the most frequent agents identified. In many cases, the precipitating factors could be traced to family disputes, marital disharmony, financial stress, and failure in examinations. These findings highlight notable demographic trends, including the predominance of hanging overall, the gender-specific patterns in poisoning and self-immolation, and the increased vulnerability of rural populations to suicide.

DISCUSSION

In the present study, hanging was the most common method of suicide among young individuals aged 14–30 years, accounting for over half of the cases. This finding aligns with previous studies from India, where hanging consistently emerges as the predominant method due to its high lethality, easy availability of ligature materials, and minimal requirement for planning or resources.[12,13] Poisoning, primarily with pesticides, was the second most common method, which is consistent with patterns observed in rural and agrarian settings where such substances are readily accessible.[14,15] Self-immolation, though less frequent overall, was predominantly reported among females, reflecting socio-cultural factors and domestic conflicts, a trend also noted in other Indian studies.[16,17]

The male predominance in hanging deaths observed in our study is in keeping with earlier reports, where men tend to choose more lethal methods.[18] Conversely, poisoning and self-immolation showed female predominance, possibly due to impulsive behaviour, domestic harassment, and societal pressures faced by women in the studied age group.[19] The age distribution, with a peak in the 21–25 years group, mirrors previous findings highlighting the vulnerability of young adults facing educational, employment, and relationship-related stressors.[20,21]

Married individuals constituted a higher proportion of victims, contradicting the protective effect of marriage reported in Western literature.[22] This may be explained by marital disharmony, dowry-related harassment, and early marriage patterns in parts of India.[23] Rural predominance in suicides, particularly poisoning, is supported by prior studies indicating that limited mental health services, higher pesticide access, and economic stress in rural areas contribute to the elevated risk.[24,25]

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The statistical association between method of suicide and sex, as well as residence, highlights the influence of gender and environment on suicidal behaviour. However, no significant association was found between marital status and suicide method, suggesting that while marriage may affect overall risk, it may not dictate the method chosen. Our findings emphasise the urgent need for targeted suicide prevention strategies in young adults, including restricting access to pesticides, improving crisis intervention services, and strengthening community-based mental health support. Awareness campaigns tailored to rural populations, alongside socio-economic interventions, may help address the multifactorial nature of suicide in this demographic.

Globally, the WHO advocates a multifaceted approach encompassing means restriction, mental health promotion, and early identification of at-risk individuals. In India, integrating suicide prevention into primary healthcare, particularly in rural blocks, and strengthening crisis helplines may be practical steps. Given that over one-third of our cases involved educational or interpersonal stressors, collaboration between educational institutions, NGOs, and healthcare providers can provide early psychosocial support.

Limitations of the present study include its retrospective design, reliance on medicolegal records, and possible under-reporting of suicides due to stigma and legal concerns. Nevertheless, the findings contribute valuable regional epidemiological data, which can guide locally tailored suicide prevention policies in Jharkhand and similar socio-demographic settings.

CONCLUSION

Suicide among young individuals aged 14–30 years constitutes a significant public health challenge in the region, with hanging emerging as the most common method, followed by poisoning and self-immolation. Distinct demographic patterns were evident, with method choice influenced by sex, rural or urban residence, and socio-cultural factors. The predominance of hanging among males and poisoning and self-immolation among females underscores the need for gender-sensitive interventions. The high proportion of rural cases, particularly pesticide ingestion, highlights the importance of restricting access to lethal means and improving rural mental health services. Targeted, culturally appropriate prevention strategies, including early identification of at-risk individuals, crisis intervention, community awareness, and socio-economic support measures, are essential to reduce suicide rates in this vulnerable population.

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