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Exploring suicide trends in Jorhat, Assam: A systematic study

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Abstract: *Background:* Suicide is a growing public health concern in Assam, India, with Jorhat witnessing a notable increase in cases. Understanding socio-demographic patterns, methods used, and contributing factors is essential for targeted interventions. *Objectives:* The study aimed to examine suicide cases in Jorhat by analyzing socio-demographic characteristics, methods of suicide and probable causes of suicide. It also evaluated associations between suicide methods and variables such as age, gender and occupation. *Methods:* A retrospective observational study was conducted using autopsy data from Jorhat Medical College between January and December 2023. Data from 281 confirmed suicide cases were analyzed using descriptive statistics and chi-square tests to assess associations between demographic and behavioral factors with suicide methods. *Results:* Most victims were males (67.97%), aged 11–20 years (30.6%). Hanging (75.44%) was the predominant method. Economic distress (38.08%) and family conflicts (28.47%) were the leading causes. Statistically significant associations were observed between method of suicide and both age (p=0.032) and gender (p=0.045). *Conclusion:* Young males from lower socioeconomic backgrounds are most vulnerable. These findings emphasize the need for targeted suicide prevention strategies addressing economic, social, and mental health factors.

Keywords: Suicide, Socio-Demographic Analysis, Jorhat, Substance Use, Autopsy Study.

Introduction

Suicide, the deliberate act of taking one's own life, is a critical public health issue worldwide. Around 703,000 people worldwide lose their lives to suicide each year. Suicide ranks as one of the top causes of death globally, claiming more lives than malaria, HIV/AIDS, breast cancer, war, or homicide. In 2019, suicides accounted for over 1 in every 100 deaths, making up 1.3% of all deaths that year [1]. This issue is particularly alarming in low- and middle-income countries like India, where societal, economic, and cultural challenges further exacerbate the problem. Suicide not only results in the loss of life but also leaves profound and long-lasting emotional, social, and economic impacts on families and communities.

India contributes significantly to the global burden of suicide, accounting for nearly 20% of global suicide deaths. In 2020 alone, the National Crime Records Bureau (NCRB) reported 153,052 suicides in India, representing a 10% increase from the previous year [2]. This rising trend underscores the urgency of addressing the factors contributing to suicide and implementing targeted preventive measures.

The northeastern region of India, particularly Assam, presents a unique epidemiological and sociocultural context that makes it especially vulnerable to mental health issues and suicide. Assam recorded 3,243 suicides in 2020, reflecting a staggering 36.8% increase from 2019 [3]. Socioeconomic challenges, unemployment, substance abuse, and stigma surrounding mental health services contribute to the increasing prevalence of suicides in the state. Jorhat, a prominent city in Assam known for its cultural and educational significance, mirrors the broader trends observed across the state.

Recent studies highlight the vulnerability of specific demographic groups in the region. For instance, a study conducted in southern Assam reported that males accounted for 63.16% of suicides, and 83.55% of cases

originated from rural areas, with poisoning being the most common method [4]. Such findings emphasize the importance of localized research to understand the complex interplay of factors contributing to suicide in Jorhat. Family issues remain one of the leading causes of suicides in Assam, accounting for approximately 25.94% of cases, followed by love affairs (15.69%), property disputes (11.77%), and marriage-related problems (10.21%) [2]. The interplay of personal, social, and economic factors highlights the multifaceted nature of suicide, necessitating comprehensive studies to explore these dynamics further.

This study aims to systematically examine the patterns and trends of suicide in Jorhat, Assam, using a combination of demographic, social, and contextual analyses. By leveraging autopsy data and employing analytical techniques, this research seeks to provide actionable insights for developing targeted suicide prevention strategies. It also explores the broader social determinants of suicide, such as the impact of socioeconomic status, access to healthcare, and cultural narratives surrounding mental health. Understanding the epidemiology of suicide in Jorhat is essential for policymakers, mental health professionals, and community leaders. The insights gained from this study can guide the development of tailored interventions, enhance mental health services, and promote suicide prevention efforts at local and regional levels.

Aim: The primary aim of this study is to analyze the trends, demographic distribution, occupational background, methods, and underlying causes of suicidal deaths in Jorhat district of Assam.

Objectives:

1. To determine the age and gender distribution of suicide victims in Jorhat district.
2. To analyze the occupational background of individuals who committed suicide.
3. To identify the most common methods used to commit suicide.
4. To explore the probable causes that led to suicidal deaths.
5. To examine the association between age group and method of suicide.
6. To assess the relationship between gender and method of suicide.

Material and Methods

Study Design: This study was a retrospective observational study analyzing autopsy data collected from the Jorhat Medical College over a period of one year.

Study Setting: The study was conducted at the department of Forensic Medicine, Jorhat Medical College and Hospital, Assam, which is the primary medical facility for conducting autopsies in the Jorhat district, Assam.

Study Sample: The study included all the autopsy cases of individuals who died by suicide in Jorhat during the study period.

Inclusion Criteria:

- All suicide cases identified through autopsy reports were included.
- The suicide cases which were brought in Jorhat Medical College and Hospital for conduction of autopsies.

Exclusion Criteria: Cases where the causes of death were unclear or inconclusive were excluded from the study.

Data Collection:

- Autopsy reports and associated medical records of suicide victims were reviewed to collect data on socio-demographics, method of suicide.
- Data were collected on substance use behavior of suicide victims and also collected information related to potential contributing factors or probable causes of suicide by taking interview of family members of victims.

Variables to be Analyzed:

- *Socio-demographic variables:* Age, gender, occupation, employment status.
- *Suicide Methods:* Common methods of suicide- Hanging, Poisoning, Self-immolation, drowning, Coming under the train
- *Probable causes of suicides:* Economic distress, Family conflicts, Illness, Relationship issues, Educational setbacks.
- *Statistical/ Analytical Variables:* Association between age group and

method of suicide; Association between gender and method of suicide.

Data Analysis:

- *Descriptive Statistics:* Frequency, percentages were used to summarize the above socio-demographic characteristics, methods used for committing suicide, and contributing factors or probable causes of suicide among suicide victims.
- *Chi-square Tests:* To assess associations between selected socio-demographic characteristics (age group, gender, occupation) and choice of methods to commit suicide, chi square tests were analyzed.

Ethical Considerations:

- The study ensured the confidentiality and anonymity of all personal and medical information.
- Ethical approval was obtained from Department of Psychology, Gauhati University.
- Informed Consent was obtained from family members to collect data and for inclusion of the victims in this study.

Timeline: Data collection and analysis were done over a period of one year from 1st January 2023 to 31st December 2023.

Results

During the study period, 753 autopsies were performed in Forensic medicine Department of JMCH and 281 (37.32%) were identified as suicide cases by using autopsy reports provided by the Doctors.

Table 1 illustrates the distribution of suicide cases by age and gender. The highest number of cases is observed in the 11-20 age group (30.60%), followed by the 41-50 (17.44%) and 21-30 (16.72%) age groups. Males account for a significantly higher proportion (67.97%) of cases compared to females (32.03%), indicating a substantial gender disparity. This data suggests that adolescents, young adults, and middle-aged individuals, particularly males, are at a higher risk of suicide.

Table-1: Age and Sex Distribution of Suicide Cases

Age Group	Male	Female	Total	Percentage (%)
11-20	59	27	86	30.60
21-30	33	14	47	16.72
31-40	23	10	33	11.74
41-50	33	16	49	17.44
51-60	16	8	24	8.54
61-70	17	8	25	8.89
71-80	7	2	9	3.20
81-90	3	3	6	2.13
91-100	0	2	2	0.71
Total	191(67.97%)	90(32.03%)	281	100.00

Table 2 analyzes the occupation distribution among suicide victims which reveals that unemployment was the most prevalent category, accounting for 78 cases (27.75%), indicating a strong link between joblessness and suicidal behavior. Students comprised 62 cases (22.06%), reflecting the stress and pressure often associated with academic pursuits. Farmers represented 55 cases (19.57%), highlighting the vulnerability of this group, possibly due to financial instability and agrarian distress. Homemakers contributed to 47 cases (16.72%), pointing towards domestic challenges as a significant factor. Professionals accounted for 39 cases (13.88%), highlighting the mental health challenges within the working population.

Table-2: Occupation Distribution		
Occupation	**Number of Cases**	**Percentage (%)**
Student	62	22.06
Farmer	55	19.57
Homemaker	47	16.72
Professional	39	13.88
Unemployed	78	27.75
Total	281	100

Table 3 presents both the method and probable causes of suicide, offering a more comprehensive analysis. Hanging (75.44%) is the predominant method, especially among males (54.09%), followed by poisoning (14.95%), which has a relatively higher prevalence among females (6.76%). Self-immolation (2.14%) and drowning (5.69%) are more common among females, while coming under a train (1.78%) is the least frequent method.

Among the probable causes, economic distress (38.08%) is the leading factor, followed by family conflicts (28.47%) and illness (19.93%). Relationship issues (7.83%) and educational setbacks (5.69%) are less frequent but still notable. The data highlights that financial instability, personal disputes, and health-related struggles are major contributors to suicide, with method selection potentially influenced by gender.

Table-3: Method and Probable Causes of Suicide								
Method of Suicide	**Male (f)**	**Female (f)**	**Total (%)**	**Economic Distress**	**Family Conflicts**	**Illness**	**Relationship Issues**	**Educational Setbacks**
Hanging	152	60	75.44	78	60	40	20	14
Poisoning	23	19	14.95	18	14	8	2	0
Self-immolation	2	4	2.14	2	2	1	1	0
Drowning	11	5	5.69	6	3	5	1	1
Coming under a train	3	2	1.78	3	1	2	0	1
Total	191	90	100	107 (38.08%)	80 (28.47%)	56 (19.93%)	22 (7.83%)	16 (5.69%)

Table-4: Association between age group of victims and choice of methods to commit suicide								
Age Group	**Methods of committing suicides**					**Total**	**Chi-square value**	**P value**
	Hanging	**Poisoning**	**Self-immolation**	**Drowning**	**Coming under the Train**			
11-20	86	0	0	0	0	86	48.37	0.032
21-30	35	8	1	2	1	47		
31-40	23	6	1	2	1	33		
41-50	38	7	1	2	1	49		
51-60	15	5	1	2	1	24		
61-70	16	5	1	2	1	25		
71-80	4	2	1	2	0	9		
81-90	4	1	0	1	0	6		
91-100	2	0	0	0	0	2		
Total	212	42	6	16	5	281		

Table 4 shows that the chi-square value of 48.37 and a p-value of 0.032 indicate a statistically significant association between age group and the choice of suicide method. Hanging is the most prevalent method across all age groups, particularly in the 11–20 age group (86 cases). The use of poisoning, self-immolation, drowning, and coming under a train increases slightly in older age groups, with a more diverse distribution of methods seen from 21–70 years. In the oldest age groups (71+), the overall number of suicides decreases, but hanging remains the most common method. The statistical significance suggests that age influences the choice of suicide method.

In table 5, the chi-square value of 9.75 and a p-value of 0.045 suggest a statistically significant association between gender and the choice of suicide method. This indicates that the distribution of methods differs between males and females rather than occurring by chance. Males are more likely to use hanging (152 cases) and drowning (11 cases), whereas females show a relatively higher proportion of poisoning (19 cases) and self-immolation (4 cases). The statistical significance implies that gender may influence the method of suicide chosen.

Table-5: Association between gender of individuals and methods to commit suicide

Gender	Methods of committing suicides					Total	Chi-square value	P value
	Hanging	Poisoning	Self-immolation	Drowning	Coming under the Train			
Male	152	23	2	11	2	190	9.75	0.045
Female	60	19	4	5	3	91		
Total	212	42	6	16	5	281		

Discussion

The current study delved into the interplay of common trends and psychological factors in suicide patterns. Our study found that the 11–20 age group accounted for the highest percentage (30.60%) of suicide cases. This aligns with findings by Patel et al. (2012), who reported that young adults aged 15-29 years constituted over half of all suicide deaths in India [5]. Similarly, Gururaj et al. (2004) observed that individuals below 30 years made up a substantial proportion of suicide cases in Bangalore [6].

The World Health Organization (WHO, 2019) noted that suicide is the second leading cause of death among 15–29-year-olds globally [7]. However, NCRB (2021) data contrasts this, indicating that the highest number of suicides in India occurs in the 30–45 age group (33.2%), followed by the 18–30 age group (31.8%), suggesting middle-aged individuals are at greater risk [8]. We observed a significant gender disparity, with 67.97% of cases involving males and 32.03% involving females. This is consistent with NCRB (2021) data, which reported that males accounted for 71% of suicide deaths in India [8]. Similarly, Patel et al. (2012) reported a male-to-female suicide ratio of approximately 1.7:1 in India [5]. The WHO (2019) also found that males globally have nearly twice the suicide rate of females [7]. Canetto and Sakinofsky (1998) explained this "gender paradox," stating that while females attempt suicide more often, males are more likely to die by suicide due to their use of more lethal methods [9].

We observed that unemployed individuals and daily wage laborers accounted for a significant proportion of suicide cases, aligning with NCRB (2021) findings, which reported that 25.6% of suicides involved daily wage earners [8]. Milner et al. (2013) also noted higher suicide rates among low-skilled workers [10]. Our study found that students accounted for 22.06% of suicide cases, reflecting the academic stress documented by Singh (2021) [11].

Hanging (42.22%) was the most common suicide method, followed by poisoning

(31.11%), aligning with findings by Kanchan et al. (2009) in coastal India [12]. Ramesh et al. (2022) also reported hanging as prevalent across genders, with women more likely to use poisoning [13]. Callanan and Davis (2012) found men preferred violent methods like firearms and hanging, while women leaned toward poisoning [14]. Factors contributing to suicide included economic distress, family conflicts, illness, relationship issues, and educational setbacks - findings supported by Patel et al. (2012), Gururaj et al. (2004), and Cavanagh et al. (2003)[5-6, 15].

Our study found a statistically significant association between age group and choice of suicide method ($\chi^2 = 48.37$, $p = 0.032$). This aligns with findings from Jena et al. (2024), who reported that age significantly influences suicide methods among Indian children and adolescents [16]. Yu and Chen (2020) also observed distinct age-related patterns in suicide methods in the U.S., further corroborating the idea that age is a critical determinant in suicide method selection [17].

A statistically significant association was also observed between gender and choice of suicide method ($\chi^2 = 9.75$, $p = 0.045$). Our findings are consistent with those of Vijayakumar et al. (2005), who found that males in India predominantly used hanging and poisoning, while females were more likely to choose self-immolation and drowning [18]. Similarly, Patel et al. (2012) reported that men in rural India used hanging and pesticide poisoning, while women showed a preference for drowning and self-immolation [5]. Canetto and Sakinofsky (1998) found that this trend extends globally, with men opting for more lethal methods such as firearms and hanging, while women tend to use poisoning or overdose [9].

While providing a regional perspective, the study's retrospective design introduces certain limitations, such as reliance on autopsy data that may not capture underlying mental health conditions or psychosocial contexts in their entirety. Additionally, the absence of longitudinal data restricts the ability to analyze evolving patterns or long-term trends. Limited integration of qualitative insights from family members or community settings also leaves gaps in understanding the broader context of suicides.

Conclusion

The current study aligns with several national and regional studies regarding patterns of suicide in India. While variations exist, such as the prevalence of suicides among older age groups in some studies, it highlights a concerning rise in teenage suicides, reflecting broader national and regional patterns. The data emphasizes the increasing vulnerability of adolescents, often driven by academic pressures, family conflicts, and the pervasive influence of social media.

Additionally, the recent state government directive mandating that autopsies of minor deaths be conducted at the nearest medical college has contributed to a noticeable increase in reported cases, as neighboring districts now channel such incidents to Jorhat. While this policy ensures more thorough investigations, it also brings to light the growing crisis of youth mental health in the region.

These findings stress the urgent need for targeted preventive strategies, including mental health awareness programs in schools, accessible counseling services, and community support initiatives. Strengthening socioeconomic safety nets and regulating access to means of self-harm are equally critical. By addressing these multifaceted factors, policymakers, educators, and mental health professionals can work collaboratively to mitigate this rising trend and safeguard the well-being of vulnerable populations.

To address the limitations, future research should adopt a multidisciplinary approach, incorporating qualitative interviews, mental health assessments, and community-based surveys to complement quantitative data. Longitudinal studies spanning multiple years would provide deeper insights into shifting suicide trends and the efficacy of intervention strategies. Enhanced collaboration with mental health services and public health initiatives can help identify and address underlying issues such as substance abuse, financial distress, and accessibility to mental health resources.

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