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Original Research Article

Choice of poisoning agent and self-reported reasons for attempted suicide - A retrospective study

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ABSTRACT

Background: Suicide, a tragic loss of life, is a complex and multifaceted phenomenon, presenting a significant challenge to public health efforts globally. The prevalence of suicide, particularly due to pesticide self-poisoning in rural areas of low and middle-income countries, underscores its significant impact. Despite efforts to understand suicide, little is known about the diverse range of poisoning agents used and the socioenvironmental factors surrounding their selection.

Aim: To study sociodemographic profile, choice of poisoning agent, and self-reported reasons for attempted suicide.

Materials and Methods: This was a retrospective observational study. All the case records of patients admitted for attempted suicide by oral poisoning in a tertiary care hospital were accessed and assessed in detail regarding sociodemographic profile, choice of oral poisoning agent, and self-reported reasons for attempted suicide.

Results: The present study, comprising 146 cases of attempted suicide, revealed a predominant age group of 18-27 years, with a male majority and a high illiteracy rate. The agricultural sector, low socioeconomic status, and unmarried status were prevalent among the participants. Herbicides were the most commonly used poisoning agents, followed by insecticides. Immediate precipitants for suicide attempts were family quarrels.

Discussion: The findings of the current study align with previous research, indicating a vulnerable demographic of young, unmarried males from low socioeconomic backgrounds. The predominance of agricultural sector involvement underscores the accessibility of pesticides as suicide agents. Family conflict was cited to be the immediate precipitant for suicide attempt. Thus, addressing underlying sociodemographic stressors and regulating pesticide availability could mitigate suicide risk. Moreover, interventions targeting psychosocial support and coping strategies are crucial for preventing suicide attempts.

Conclusion: This study presents insights into the choice of poisoning agents and self-reported motives in suicide attempts, shedding light on the underlying sociodemographic factors and immediate precipitants driving these behaviours.

1. Introduction

Suicide remains a pressing public health concern worldwide, with devastating consequences for individuals, families, and communities. According to the World Health

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Organization, death by suicide occurred throughout the lifespan and was the fourth leading cause of death among 15 to 29-year-olds; also, it was estimated that over 77% of global suicides occurred in low and middle-income countries in 2019.[1]

As per the National Crime Records Bureau (NCRB) statistical reports, methods used in recorded suicides were: insecticides/pesticides, other poisons, drowning, self-immolation, firearms, hanging, overdose of sleeping pills, self-inflicting injury, jumping (from height or from moving vehicles/trains), being hit by vehicles/trains, touching electric wire, and other means.[2] Approximately 11,290 cases of suicide due to oral poisoning were reported in India last year, which is a 5.7% increase in deaths reported due to oral poisoning from 2020.[3] Self-poisoning with pesticides accounts for 14–20% of suicides globally and the problem is most severe in rural Asian communities, where a wide range of agricultural highly hazardous pesticides are easily accessible.[4,5] Current suicide statistics suggest that pesticide self-poisoning is a common means of suicide in India.[6,7]

While various factors contribute to suicidal behaviour, the choice of poisoning agents in suicide attempts is a critical aspect requiring comprehensive understanding and analysis. Recent studies have shed light on the complex interplay of psychological, social, and environmental factors influencing the choice of poisoning agents in suicidal behaviour.[8–10] It is suggested that, in developing countries, a suicidal act is poorly contemplated with the choice of an agent determined impulsively.[11] The selection of a particular poisoning agent can vary widely depending on factors such as accessibility, lethality, familiarity, and perceived pain associated with ingestion. Many a time the agent is sourced from home/work, such as in case of the agent being medications, pesticides, or chemical agents/caustics.[12] While organophosphate poisoning in farmers is well reported in India, the multitude of other poisonings encountered and the socioenvironmental characteristics around their use are unknown.

The role of psychosocial stressors cannot be understated in the context of suicide attempts involving poisoning agents. A psychological autopsy study in central rural India found that economic problems, psychiatric illness, and stressful life events such as crop failure, interpersonal problems, medical illness, and marriage of female family members were important contributors to suicides.[13] In a study done among rural and urban populations of Puducherry in South India, most participants enumerated reasons for attempting suicide as being family-related, alcohol-related, finance-related, loss of loved one, loneliness, unemployment, health-related, and work/job-related among various other reasons and family-related issues being more prevalent of all.[14] Another study reported the presence of psychiatric illness, substance use disorders, and severe medical illness (such as cancer, head injury, peptic ulcer disease, HIV/AIDS, and chronic pain) as some of the other factors that result in suicidal ideation.[15]

Research suggests that suicide attempts tend to recur with each attempt showing increased capability of lethality and almost half of serious suicide attempters make another attempt within 5 years.[16] Addressing patient's distress, understanding their perspectives, provision of support, education, coping strategies, regular review, and follow-up might be helpful in forestalling reattempts. Additionally, cultural and regional differences may influence the choice of poisoning agents among individuals attempting suicide. Understanding the motivations and factors influencing the selection of poisoning agents in suicide attempts is crucial for tailoring preventive measures and providing targeted interventions to individuals at risk of suicidal behaviour. Thus, this study is taken up to study sociodemographic profile, choice of poisoning agent, and self-reported reasons for attempted suicide.

2. Materials and Methods

The present study was a retrospective observational study conducted to study the sociodemographic profile, choice of poisoning agent, and self-reported reasons among those who were admitted for attempted suicide by oral poisoning in a tertiary care hospital over one year from January 1, 2023 to December 31, 2023. Permission was taken from the hospital authorities to access the medical records of those admitted for attempted suicide, after obtaining waiver from Institutional Ethical Committee. All the case records that contained detailed history and mental status examination by a psychiatrist were included in the study. Case records with insufficient information were excluded.

Of the 153 inpatient case records identified as those admitted for attempted suicide, seven were excluded (the mode of suicide attempt as recorded in four of them was hanging and in three of them was deliberate physical harm). A total of 146 case records meeting the fixed criteria were selected and assessed in detail regarding sociodemographic profile, choice of oral poisoning agent, and self-reported reasons for attempted suicide. The sociodemographic data collected included age, gender, educational status, socioeconomic status, occupation, and marital status. Data pertaining to the choice of poisoning agent and self-reported reasons for attempted suicide was also collected.

Data was entered in Microsoft Excel. Descriptive statistical analysis was done using the Statistical Package for Social Sciences (SPSS), version 26.0.

3. Results

The present study, comprising 146 cases of attempted suicide, revealed a predominant age group of 18-27 years, with a male majority (68.49%) and a high illiteracy rate

(61%). The agricultural sector (89%), low socioeconomic status (83%), and unmarried status (62%) were prevalent among the participants, as shown inTable 1.

Herbicides (52%) were the most commonly used poisoning agents, followed by insecticides (24%) and rat poison (9%). About 52% of them resorted to suicide by ingesting herbicides, followed by insecticides (24%) and rat poison (9%). Other agents used were fungicides (4%), petroleum (3%), bleaching powder (2%), gammaxene (1%), household disinfectants (1%), unknown poison (3%) and drug overdose (2%), as depicted in Table 2.

More than half of the subjects (53%) reported family quarrels as the immediate precipitant for attempting suicide. Other self-reported reasons were marital discord (20%), unemployment (10%), financial problems (6%), relationship issues (3%), physical illness (2%) and undivulged reasons (2%), as shown in Table 3.

Table 1: Descriptive statistics forsociodemographic variables

Variable		Number of subjects (n=146)
Age (in years)	< 18 years	0
	18-27 years	65 (45%)
	28-37 years	43 (30%)
	38-47 years	21 (14%)
	48-57 years	10 (7%)
	58-67 years	6 (4%)
	>67 years	0 (0%)
Gender	Male	100 (68%)
	Female	46 (32%)
Educational status	Illiterate	89 (61%)
	Primary school	33 (23%)
	Secondary school	7 (5%)
	High school	9 (6%)
	Graduate and above	8 (5%)
Socioeconomic status	Lower socioeconomic status	121 (83%)
	Middle socioeconomic status	20 (14%)
	Upper socioeconomic status	5 (3%)
Marital status	Married	37 (25%)
	Unmarried	90 (62%)
	Single/divorced	10 (7%)
	Widow	9 (6%)
Occupation	Agriculture section	128 (89%)
	Non-agriculture sector	18 (11%)

Table 2: Choice of poisoning agent in attempted suicide

Choice of poisoning agent in attempted suicide	Number of subjects (n=146)
Insecticides	35 (24%)
Herbicides	76 (52%)
Rat poison	13 (9%)
Fungicides	6 (4%)
Petroleum	4 (3%)
Bleaching powder	3 (2%)
Gammaxene	1 (1%)
Household disinfectants	1 (1%)
Drug overdose	3 (2%)
Unknown poison	4 (3%)

Table 3: Self-reported reasons for attempted suicide

Self-reported reasons for attempted suicide	Number of subjects (n=146)
Family quarrel	77 (53%)
Marital discord	29 (20%)
Unemployment/work-related problems	15 (10%)
Financial problems	9 (6%)
Relationship issues	4 (3%)
Physical illness	3 (2%)
Reasons not known	9 (6%)

4. Discussion

The present study focused on the choice of poisoning agents and self-reported reasons for attempted suicide. In our findings, young adults, particularly those in the 18-27 age group, emerged as a high-risk population for attempted suicide. Analysis of recent data reveals distinct demographic patterns among individuals attempting suicide. Purushothaman P et al. in their study reported the age group 20-29 years to be one of the risk factors for attempted suicide, owing to their less experience with critical life situations that drive them to opt for suicide to tide over trivial issues.[17] Furthermore, gender disparities were evident in our study with the majority of those who attempted suicide being males, which is in line with the studies by Benjamin RN et al. and Patel NS et al. with males comprising a significant majority of suicide attempters.[12,18] A study on the risk factors for farmers' suicides in central rural India found male farmers to be at risk for attempted suicide.[13] In contrast to our findings, studies in India by Singh A**,** Lingeswaran A**,** and Purushothaman P found more number of females attempting suicide, which could be due to differences in the population sampled.[17,19,20]

In accordance with the results of a qualitative study on attempted suicide among young people in India, the majority of our subjects who attempted suicide were unmarried.[21] Low educational attainment, low socioeconomic status, and involvement in the agricultural sector were found to be the vulnerable demographics for heightened suicide risk in our sample. A similar trend of sociodemographics was reported by Kumar RS et al. and Patel NS et al. in their studies on attempted suicide in rural India.[18,22] Low socioeconomic status was observed

to increase the likelihood of suicide/attempted suicide in Asia.[23]

Poisoning remains one of the most common methods of suicide globally, with a diverse range of substances utilized for this purpose.[24] Studies highlight the prevalence of herbicides, insecticides, and rat poison among suicide attempters, particularly in rural agricultural areas.[18,22,25] In our study, herbicides (52%) were the agents most commonly used, followed by insecticides (24%), and rat poison (9%). Other agents used were fungicides (4%), petroleum (3%), bleaching powder (2%), gammaxene (1%), household disinfectants (1%), unknown poison (3%) and drug overdose (2%). Our findings align with previous studies by Bhise MC et al. and Kumar RS et al. indicating pesticide poisoning to be the most common method of attempted suicide.[13,22] Accessibility and availability play a critical role in the selection of poisoning agents. Accessibility to lethal substances, such as household chemicals, or pesticides, can increase the likelihood of their use in suicide attempts. Additionally, the emergence of novel poisoning agents, such as household disinfectants and drug overdoses, warrants further investigation into their epidemiological trends and associated risk factors. Restricting access to these substances through means such as legislation, storage regulations, or educational campaigns is paramount to address availability as a preventive measure in attempted suicide.

Furthermore, understanding the underlying motives driving suicide attempts is also essential for developing effective prevention strategies. Consistent with other studies in India, more than half of the subjects (53%) in the current study reported family quarrels as the immediate precipitant for attempting suicide.[18,26,27] Other self-reported reasons were marital discord (20%), unemployment (10%), financial problems (6%), relationship issues (3%), and physical illness (2%). Research identified a myriad of psychosocial stressors contributing to suicidal ideation, including familial conflicts, marital discord, financial difficulties, and unemployment.[18,22,28] These findings underscore the complex interplay between individual vulnerabilities and external stressors in shaping suicidal behaviour. The stigma surrounding mental health issues and limited access to mental health services may exacerbate the risk of suicide among vulnerable populations. Thus, exploring the choice of poisoning agents in suicide attempts and understanding the underlying motivations and factors driving this decision is critical for developing effective suicide prevention strategies. By identifying the complex interplay of individual, societal, and environmental factors influencing the choice of poisoning agents and reasons behind the suicide attempt, healthcare professionals and policymakers can work towards mitigating the risk of suicidal behaviour among the general population.

5. Conclusion

In conclusion, this study provides valuable insights into the complex dynamics of suicide attempts, with a particular focus on the choice of poisoning agents and self-reported motivations. In light of these findings, targeted interventions aimed at addressing sociodemographic stressors and promoting mental health resilience are paramount. Psychosocial support services, including counselling and crisis intervention play a crucial role in mitigating suicide risk and enhancing coping mechanisms. Additionally, regulatory measures to restrict access to lethal substances, particularly in rural agricultural communities, are essential for preventing impulsive suicide attempts. Collaborative efforts involving policymakers, healthcare professionals, and community stakeholders are needed to implement comprehensive suicide prevention strategies that address the multifaceted nature of this public health crisis.

6. Source of Funding

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7. Conflict of Interest

None.

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