

A hospital-based cross-sectional study on suicidal poisoning in Western Uttar Pradesh

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ABSTRACT

Background and Aims: Poisoning is most common method of committing suicide in India. Objectives of this study to assess prevalence of suicidal poisoning among all poisoning cases, its socio-demographic profile and its reasons in all admitted cases of suicidal poisoning in hospital. **Methods:** A cross-sectional study was conducted on cases of poisoning of any age group admitted in the Chhatrapati Shivaji Subharti Hospital, Meerut. Poisoning cases with history or evidence of suicide were further interviewed. A semi-structured interview schedule in Hindi was used to collect data. Microsoft Excel 365 and R software version 3.6.0 were used for data entry and analysis respectively. **Results:** Among total 135 poisoning cases admitted in hospital, 126 provided consent and included in the study. Prevalence of suicidal poisoning was 77.7% (98). Most common age group involved was 11-20 years (36.7%) and 21-30 years (35.7%) and most of the participants were males (59.2%). Most suicidal poisoning cases took Aluminum Phosphide (31.6%), followed by Organophosphates (20.4%) as poison. Most frequent reasons for suicide as described by participants were 'Family quarrel or family unhappiness' (29.6%), 'failure in examination or interview or business' (23.5%), 'ill treatment by spouse or in laws' (16.3%) and 'unemployment' (9.2%). **Conclusion:** Our study shows that consuming Agriculture poisons (Aluminum Phosphide and Organophosphates) are most common (52%) poisons consumed by suicidal poisoning cases. Agriculture poisons (Aluminum Phosphide and Organophosphates) are easily available in markets in India. There should be some restriction on their purchase to reduce suicidal incidences.

Keywords: Cross-sectional study, hospital based, poisoning, prevalence, reason, suicide

Introduction

According to the WHO, each year, almost 800000 people die from suicide and about its 20 times more people attempt suicide. In other words, it is one death every 40 seconds and

1 attempt in 3 seconds, on an average.^[1] Suicide contributed 1.8% of the total global burden of disease (GBD) in 1998 worldwide and in 2020, it is estimated that, this figure might shoot up to 2.4% in countries with markets and former socialist economies.^[2]

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Received: 25-02-2020

Revised: 19-03-2020

Accepted: 02-04-2020

Published: 30-06-2020

World Health Organization (WHO) also estimated that nearly 170000 people die from suicide in India every year.^[3] However, India's National Crime Records Bureau (NCRB)—which is officially responsible to provide suicide rates based on police reports—estimated only 135,000 suicides in 2011.^[4,5]

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How to cite this article: Patel NS, Choudhary N, Choudhary N, Yadav V, Dabar D, Singh M. A hospital-based cross-sectional study on suicidal poisoning in Western Uttar Pradesh. *J Family Med Prim Care* 2020;9:3010-4.

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_306_20

In various studies from across the world, it has been documented that poisoning is one of the most common method of suicide.^[6,7] Studies conducted in different parts of India i.e. Joseph A *et al.*^[8] (suicide by poisoning among all suicide cases 45%), Sharma B R *et al.* (47.1%)^[9] and Gajalakshmi V *et al.*^[10] (46.6%) reported that poisoning is most common method of committing suicide in India.

Despite the importance of suicide both as a health problem and as a social problem, the issue receives little attention from Indian policy makers.^[11] Independent verbal autopsy investigations of unnatural deaths conducted in several rural area of country documented that suicide rates may be five-fold higher than the official national average.^[10] This neglect of the topic is exaggerated by cultural taboos, religious restrictions, stigma around mental illness, political motives and economic factors.^[12,13]

Suicide is the final outcome of complex interactions of biological, genetic, psychological, sociological and environmental factors.^[14] Suicide is nevertheless a private and personal act and a wide disparity exists in the rates and reasons of suicide across different area of India. Understanding manner, type and reasons for suicidal poisoning might helpful to a family physician in diagnosing poisoning cases and managing them. A greater understanding of region-specific factors related to suicide would enable prevention strategies to be more culturally sensitive. There have been numerous such studies conducted on this issue across India, but there is dearth of data on this topic from Western Uttar Pradesh. Therefore, we conducted this study in a tertiary care hospital of Western Uttar Pradesh with objectives to assess prevalence of suicidal poisoning among all poisoning cases, its socio-demographic profile and its reasons in all admitted cases of suicidal poisoning.

Methods

A cross-sectional study was conducted on cases of poisoning of any age group admitted in the Chhatrapati Shivaji Subharti Hospital, Meerut, Uttar Pradesh. Initially all the cases of poisoning admitted in this duration in hospital were interviewed. Poisoning cases with history or evidence of suicide were further interviewed.

Ethical approval was obtained from the institutional ethical board. Participants' information sheets were provided to all the participants and written informed consent was obtained from them or their attendant. In a previous study, Gargi *et al.*,^[15] the prevalence of suicidal poisoning among all poisoning cases was 76.4%. We took this prevalence as a base to calculate sample size for our study using formula $(1.962) * P * Q / L2$. Considering 10% relative precision and 95% confidence final calculated sample size was 118 participants.

Data collection started in September 2011 and required sample size was achieved in May 2013. Following a brief introduction, the purpose of the study was explained to

the participants, confidentiality was ensured, and written consent was sought. Those, who did not give consent, were excluded from the study. Due to the personal nature of some enquiries, special efforts were made to establish rapport with the respondents and confidentiality of the information was assured. An attempt was made to conduct the interview in privacy, to have an opportunity for responses on all issues. A semi-structured interview schedule was designed in Hindi to elicit information on socio-demographic details and reason for suicide in participants. Collected data has been entered in Microsoft Excel 365 software and analysis has been done in R software version 3.6.0 (cran.r-project.org). Prevalence and other categorical data have been described as proportions and frequency tables.

Results

Total 135 cases of poisoning admitted in C.S.S. Hospital Meerut in study period. Those participants, who did not provide consent (9 participants, 7.1%) were excluded from the study. Therefore, data collection and analysis were done for 126 cases only. Prevalence of suicidal poisoning among all poisoning cases was 77.7% (98 cases out of 126 total).

Among suicidal poisoning cases (n = 98), the most common age group involved was 11-20 years (36.7%) followed by 21-30 years (35.7%), 31-40 years (16.3%) and more than 40 years (11.2%). Most of the participants were males (59.2%) and the majority of the participants were from rural areas (58.2%). Religion-wise, almost all (91.8%) of the participants were Hindu. Most (65.3%) of the participants were educated up to higher secondary or above. Most of them were unmarried (58.2%) and the rest were married (40.8%) or widow/widower (1%). Almost two-third participants belong to joint families (62.2%), one third belonged to nuclear families (33.7%) and very few were living as single (4.1%). Majority of participants belonged to the Above Poverty Line economic status (62.2%) followed by Below Poverty Line economic status (37.8%) [Table 1]. Aluminum Phosphide (31.6%) was most commonly used poison for suicide, followed by Organophosphates (20.4%) and Organochlorines (5.1%) [Table 2].

'Family quarrel or family unhappiness' (29.6%) was listed as most common reason as reasons for suicide among suicidal poisoning cases, followed by 'failure in examination or interview or business' (23.5%), 'ill treatment by spouse or in laws' (16.3%), 'unemployment' (9.2%), 'failure in love affair' (8.2%), 'poverty' (6.1%), 'loneliness' (3.1%), 'incurable disease' (1%) and any other causes (3.1%) [Table 3]. As an outcome, out of 98 cases, 88 (89.7%) cases survived, and 10 (10.2%) cases died.

Discussion

In this study, prevalence of suicidal poisoning among all poisoning cases was 77.7% (98 out of 126 total). Similar results

Table 1: Socio-demographic details of the suicidal poisoning cases

Characteristics	Number (Percentages) n=98
Age group	
11-20 years	36 (36.7)
21-30 years	35 (35.7)
31-40 years	16 (16.3)
>40 years	11 (11.2)
Gender	
female	40 (40.8)
male	58 (59.2)
Rural/Urban	
Rural	57 (58.2)
Urban	41 (41.8)
Religion	
Hindu	90 (91.8)
Muslim	7 (7.1)
Sikh	1 (1)
Education	
Illiterate	12 (12.2)
Primary	17 (17.3)
High School	5 (5.1)
Higher Secondary	43 (43.9)
Graduate	20 (20.4)
Post-Graduate	1 (1)
Marital status	
Married	40 (40.8)
Unmarried	57 (58.2)
Widow/Widower	1 (1)
Family Type	
Joint	61 (62.2)
Nuclear	33 (33.7)
single	4 (4.1)
Socio-economic status	
APL	61 (62.2)
BPL	37 (37.8)

Table 2: Type of poison used among participants

Types of poison	Number (Percentages) n=98
Aluminium Phosphide	31 (31.6)
Organophosphates	20 (20.4)
Organochlorines	5 (5.1)
Rat killer	5 (5.1)
Other pesticides	4 (4.1)
Cypermethrin	5 (5.1)
Alcohol	2 (2)
Sodium Carbonate (Caustic soda)	2 (2)
Petroleum	2 (2)
Others (Corrosive poison, Cannabis, Benzodiazepine, Ketamine, Oleander)	6 (6.1)
Unknown	16 (16.3)

have been documented by other studies from India. Gargi *et al.*^[15] (76.46%), Gupta *et al.*^[16] (65.32%), Jaiprakash *et al.*^[17] (94%), Singh *et al.*^[18] (69%) also reported higher prevalence of suicidal poisoning cases among all poisoning cases admitted in hospitals in India. In the current study, the majority of participants were

young (72.4% were younger than 30 years of age). Poisoning is a major problem in young adults who commit suicide mainly due to hardships of life encountered during early adulthood. Similar observations were made by Gargi *et al.*,^[19] Patel *et al.*^[20] and Gupta *et al.*^[21]

Gender-wise, most of the patients admitted with poisoning were males (59.2%). Higher numbers of males in most of the age groups indicates higher familial, social and financial pressures faced by males in the Indian society. Insecticides and pesticides, which are easily available for agricultural works, enable them to commit suicide during moments of despair. Such results were also reported by Jain *et al.*,^[22] Gupta *et al.*^[21] and Khurana *et al.*^[23] In all these studies, the gender ratio (male to female) was 2:1 or more.

In our study, most of the participants were well educated, having received education up-to higher secondary or above (65.3%). The proportion of educated persons is slightly higher in this study than the studies by Jain *et al.* and Khurana *et al.*^[23,24] possibly due to higher literacy rate in this area. In contrast to these reports, a study in Jamnagar found that 55% of the cases were illiterate.^[21] High literacy rate in the suicidal poisoning cases may indicate higher ambitions and expectations in educated families. Failure to fulfil these dreams might have contributed to the suicidal attempt. The only post-graduate participant in this study was an engineer, who has committed suicide due to unemployment by taking ketamine, an anesthetic drug used in rave parties.

In this study, the majority (58.2%) of the participants were unmarried. This is probably due to, young people of this area are more ambitious and want to lead a comfortable life in modern style and if they cannot achieve it, they commit suicide. They are also prone to alcohol and other intoxicating agents which contributes to increasing the familial discord. In other parts of the country scenario is reverse where majority of the victims were married.^[21,25,26]

Most (62.2%) of the participants in this study were living in a joint family. This may be probably due to more stress in joint families, especially in lower economic classes. Similar results are also seen in study by Guntheti *et al.*^[24] and Gupta *et al.*^[21]

In our research we found that, Aluminum Phosphide (31.6%) was most commonly used poison for suicide, followed by Organophosphates (20.4%), Organochlorines (5.1%) and Rat killers (5.1%). Aluminum phosphide and organophosphate are the two common pesticides whose poisoning is prevalent throughout the country. Among all suicidal poisoning cases, aluminum phosphide poisoning is the commonest in some regions and^[19,27] organophosphates poisoning is common used in other places.^[21,24,28]

Zinc phosphide (a rat killer) poisoning is also documented in our study probably because of easy availability. Similar results were also observed by Guntheti *et al.*^[24]

Table 3: Reason for suicide among suicidal poisoning cases

Reason for suicide	Number (Percentages) n=98
Family quarrel or family unhappiness	29 (29.6)
Failure in examination or interview or business	23 (23.5)
Ill treatment by spouse or in laws	16 (16.3)
Unemployment	9 (9.2)
Failure in love affair	8 (8.2)
Poverty	6 (6.1)
Loneliness	3 (3.1)
Incurable disease	1 (1)
Any other reason	3 (3.1)

Family quarrel and marital unhappiness is the most common reason behind committing suicide. It was the reason for 29.6% of the total suicides. Probably unemployment or inability to bear the responsibility of family is the main reason behind family quarrel which forces them to commit suicide. Failure in the examination or interview is another important reason behind suicide, reported in 23.5% participants. Similar results were obtained by Khurana *et al.*^[23]

Total 23.5 of the participants committed suicide due to ill treatment by their spouse or in-laws. It seems that in spite of widespread efforts to reduce domestic violence against women, our male dominant society still treats women badly. Problems like dowry, child marriage are still prevalent in Indian society. Similar results were observed by Patel *et al.*^[20] Poverty, especially indebtedness, was seen in 6.1% participants. Only 1 (1%) participant committed suicide due to incurable health problem, who was suffering from carcinoma larynx.

In our study, out of a total 98 cases, 88 (89.7%) cases survived, and 10 (10.2%) cases died. Which is similar to Reddy *et al.* (2020), who have conducted study in south India, reported 10.9% (66 out of 604) deaths among cases admitted due to poisoning.^[29]

Conclusion

In our study, we found that people having unhappy family life or having stress due failure in examination or interview are vulnerable for committing suicide, so we should provide them psychiatric counselling services to prevent such suicidal attempts. Our study shows that consuming Agriculture poisons (Aluminum Phosphide and Organophosphates) are most common (52%) poisons consumed by suicidal poisoning cases. Despite several banning attempts,^[30] agriculture poisons (Aluminum Phosphide and Organophosphates) are easily available in market in India and they are easily accessible to everybody who want to commit suicide. Therefore, government need to take concrete steps to regulate purchase of these agriculture poisons, so that they would not be easily available for everybody who have an impulse of committing suicide.

Limitations

It is a hospital based cross sectional study and hospital-based studies are not representative of the community. For further research, community based cross sectional studies are required.

Ethical approval

This study was conducted in the Department of Forensic Medicine and Toxicology of N.S.C.B. Subharti Medical College, Meerut, UP. Ethical Approval was obtained from same institute in the year of 2012.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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