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Original Research Article

Medico-legal Evaluation of Suicidal Poisoning Cases at Tertiary Care Institution

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Key words

Suicide,
Precipitating factors,
Agricultural poisons,
Survival period.

Abstract

Background: The poisoning was the most commonly used method for suicide in earlier days. Now due to strict regulations on sale and purchase of poisonous substances reduced the availability of poisons to cause suicidal poisonings. **Material & Methods:** Present study is carried out at a tertiary care institution in Mumbai. Out of a total 216 suicide cases, 30 cases (13.9%) were of suicidal poisoning. **Results:** Out of 30 suicidal poisoning cases 19 were male (63.33%) and 11 were females (36.67%). Total 18 deceased (13 male & 5 Female) were married (60%). 11 cases (36.67%) were from age group of 20 to 30 years. In 24 cases (80%), deceased were unemployed. A history of acute depression was present in 5 (16.67%) individuals at the time of suicide. **Conclusion:** Suicide tendency is more common in males as compared to females. Suicide incidences are more seen in young age groups. Unemployment and money crisis is the commonest cause for suicide. The low socioeconomic group is more vulnerable to suicide than the middle and upper socioeconomic groups. Mentally ill persons are highly prone to develop suicidal tendencies. In the menstrual phase, suicidal tendency is more seen. Agricultural chemicals (poisons) are most commonly used for suicide.

1. Introduction

The world health organization defines a suicidal act "as the injury with varying degrees of lethal intent and suicide may be defined as a suicidal act with fatal outcome." Eighty-four percent of global suicides occur in low and middle-income countries (LMICs); India and China alone account for 49% of global suicides.¹ Precipitating factors may include domestic quarrels, loss of employment, financial difficulties, substance abuse, chronic disease, or mental illness.²

The word "suicide" was first introduced in the 17th century, said to be derived from the Latin words Sui (of oneself) and caedere (to kill). Apparently, Sir Thomas Browne – a physician and a philosopher – was the first to coin the term suicide in his *Religio Medici* (1642).³

In India, the highest suicide rate is in the age group of 18-30 years. Some of the highest rates of suicide in India are reported from Pondicherry, West Bengal, Madras, and Bangalore.⁴

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Tamil Nadu has reported the highest number of suicides (16,927) accounting for 12.5% of total suicides followed by Maharashtra (16,112), West Bengal (14,957).⁴ Acute organic insecticide poisoning is a major health problem all over the world, particularly in developing countries, where organophosphates (OPs) are the most common suicidal poisons with high morbidity and mortality and account for a large proportion of patients admitted to intensive care units. Several hundred people around the world die each year from OP poisoning.⁵ Some persons intentionally or often impulsively take poisons or an overdose of drugs, after a disagreement with a close person. Most persons who take a deliberate overdose of drugs are found to be psychologically disturbed.⁶

Aims and objectives:

- 1) To study age and the sex-wise incidences.
- 2) To study the factors like race, religion, marital status, occupation, socio-economic status, environment, and mental health in suicidal deaths.

2. Material and methods:

This study is a prospective study carried out at a tertiary care hospital attached to a medical college and associated with a medico-legal post mortem center in Mumbai. The study duration is from 01 October 2012 to 30 September 2014. The permission was taken from the ethics committee before starting the study. The cases were studied with consideration of age, sex, education, occupation, employment, socioeconomic status, place, time, environment, privacy for suicide, etc. History was studied for previous suicide attempts, history of addiction, alcoholism too.

In hospitalized victims, the hospital treatment case papers were studied for psychiatric history, chronic illness, behavioral changes, current

mental status, nature of provocation, duration of admission, menstrual history, and history of marital status & marital period. The treatment papers, post mortem findings, and chemical analysis reports were analyzed before finalizing the cause of death. The opinion about the manner of death whether suicide or not was made after a detailed review of the above features in every case.

3. Results:

During the study period, a total of 3429 cases were referred for medico-legal post mortem examination to the Forensic Medicine department of a medical college in Mumbai. Out of these 1669 cases were natural and 1314 (38.3%) cases were unnatural. Out of 1314 unnatural cases, 216 are suicidal, which contributes 16.43% of all unnatural cases. Out of a total of 3429 cases, 216 cases (6.29%) are of suicide. Out of a total of 216 cases of suicide 30 cases (13.9%) were of suicidal poisoning while accidental poisoning was seen in 73 cases which were excluded from the study. Every case of poisoning was studied in detail and the results are as follows, viscera were preserved for chemical analysis in all 30 cases (100%).

Sex: Out of 30 poisoning cases 19 were males (63.33%) and 11 were females that are 36.67% and the Male to female ratio is 1.7:1 (Fig. 1, Table 1).

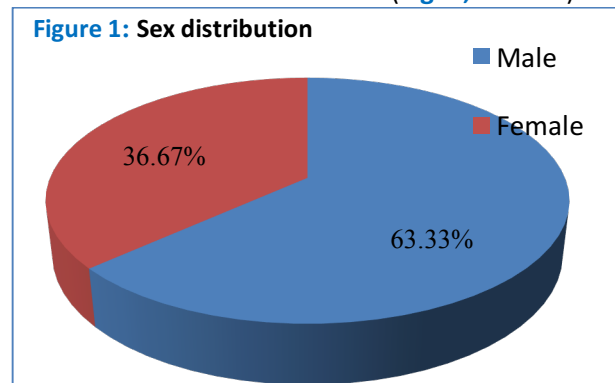
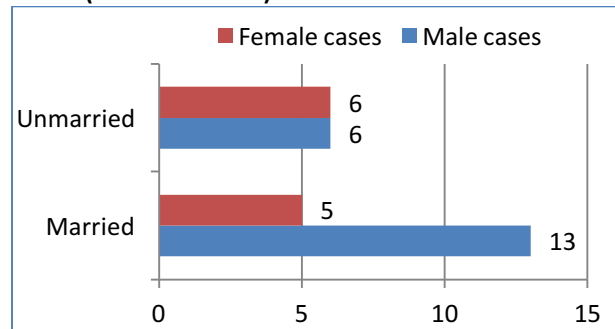


Table 1: Age group-wise distribution of male and female [F- Female, M-Male, %- Percentage].

Age Group (Years)	Sex					
	F	%	M	%	Total	%
11-20	3	27.27	2	10.52	5	16.67
21-30	5	45.46	6	31.58	11	36.67
31-40	2	18.18	6	31.58	8	26.66
41-50	1	9.09	3	15.79	4	13.33
51-60	0	0.0	2	10.52	2	6.67
Total	11	100	19	100	30	100

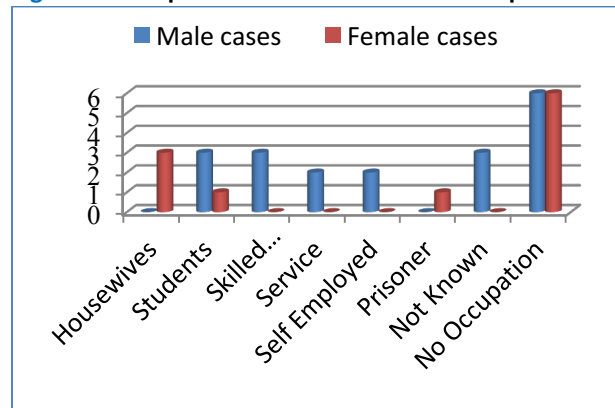
Marital status: Out of 30 cases 18 (13 were male & 5 females) cases were married (60.0%), 12 (6 were male & 6 females) cases (40.0%) were unmarried.

Figure 2: Male to female cases comparison of marital status (n= M-19 & F-11).



Occupation: According to occupation grouping is done as follows, Government or private service- 2 cases (6.67%), Self-employed those including businessmen comprises of 2 cases (6.67%), Housewives- 3 cases (10.0%), Laborers are classified in three groups depending upon work as Skilled laborer- 3 cases (10.0%), Unskilled laborers and Casual laborers no case found. Students- 4 cases (13.33%), Prisoners- 1 case (3.33%), those having no job at present 12 cases (40.0%). However, in 3 cases (10.0%) occupation of the victims was not specified.

Figure 3: Occupation male to the female comparison.



Socioeconomic status: Depending upon the education and occupation of the head of family and income of the family, four groups were made as per Kuppuswamy's socioeconomic scale as follows, Upper class having higher income group- no case, Middle upper class- 1 case (3.33%), Middle lower class- 10 cases (33.33%), lower economic group or class- 19 cases (66.33%).

Religion: Out of 30 cases 17 cases were Hindu (56.67%), 13 cases were Muslim (43.33%). While all the cases were Indian nationals.

Place of suicide: Place of suicide selected by victims were home or residence in 25 cases (83.34%), Work Place was in 1 case (3.33%), one case committed suicide while in police custody (3.33%). Public Place was in 3 cases (10.0%).

Period of year: Out of 30 cases, 9 individuals (30.0%) committed suicide in the duration of the month January to April, 6 cases from May to August (20.0%), and 15 cases from September to December 50.0%. Privacy for suicide was maintained by selecting a lonely place by 1 case (3.33%) but not so by 29 cases (96.67%).

Previous attempts: In the present study in all 30 cases previous history of previous attempts of suicide was traced. By detailed inquiry with relatives and investigating agencies. In 2 cases (6.67%) there was a definite history of previous attempts of suicide. The first case was a married female with a history of previous unsuccessful attempts and the second was a married male having three unsuccessful attempts were found. In 28 cases (93.33%) there was no previous attempt and victims committed suicide in the first attempt.

Nature of provocation: It is determined by reading ADR and inquest Panchnama, statements of relatives provided by police, and interviews of relatives wherever possible. Out of a total of 30 cases in 28 cases (93.33%), suicide was committed following sudden provocation & in 2 cases (6.67%) suicide act was planned and pre-decided.

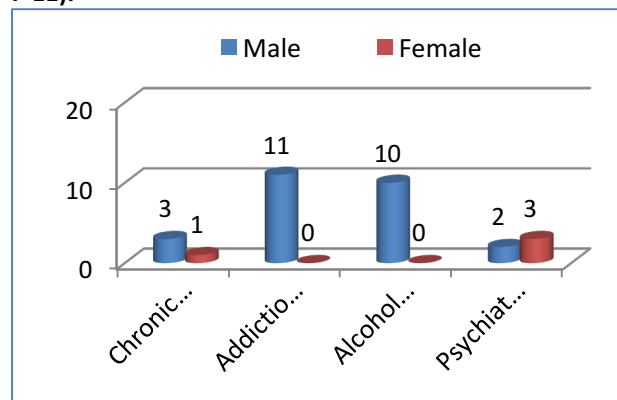
Hospitalization following attempted suicide: Out of 30 cases, 29 cases (96.67%) were alive when brought to the hospital, which was subsequently succumbed during treatment. However, one case (3.33%) of attempted suicide died before hospitalization.

Survival period: Out of 30 cases 1 case (3.33%) was found dead before admission and 29 cases (96.67%) were alive after attempting suicide, which was hospitalized and subsequently died in hospital during treatment. The survival period in hospital grouped as follows, Less than 24 hours in 3 cases (10.0%), 1 to 3 days in 10 cases (33.33%), 4 to 7 days in 11 cases (36.67%), 1 to 2 weeks in 2 cases (6.67%) and 3 victims (10.0%) died after more than two weeks of hospitalization.

Chronic illness: In 26 cases (86.67%) there was no history of chronic disease process or illness while in 4 cases (13.33%) has documented chronic illness as a reason for suicide. In all these cases pathological

disease process observed which is studied in detail as chronic illness is one of the etiological factors to develop depression which is a provocative factor behind suicide.

Figure 4: Gender wise various comparisons (n= M-19 & F-11).



Type of chronic illness or disease: Distribution of chronic illness or disease cases (n=4) as follows, Tuberculosis- 1 case, high BP, and Gout in 1 case, however in 2 cases nature of the chronic illness was not mentioned in inquest papers, so it is taken as unknown. Out of four 3 were males and one was female.

Psychiatric illness: A history of acute depression was present in 5 (16.67%) individuals at the time of suicide. Out of five 3 were females and 2 were males. In 25 cases (83.33%) there was no history of psychiatric illness or acute depression.

Behavioral changes: Information gathered about change in attitude and behavior of the deceased just before an attempt and few days before incidence, dialogue with relatives and friends. Behavioral changes were noticed by relatives in 26 cases (86.67%), changes like become silent and less talkative, short-tempered, violent or rowdy, etc. However, no behavioral changes were noted by relatives in 4 cases (13.33%).

Addiction: Out of 30 cases the history of addiction was present in 11 cases (36.67%) and no history of addiction was observed in 19 cases (63.33%). All the victims were males.

Alcohol consumption: Out of 30 cases the history of alcohol consumption before the act was present in 10 cases (33.33%) and no alcohol consumption before committing suicide in 20 cases (66.67%).

Preparation made: In 29 cases (96.6%) the availability of required poison was made by victims themselves, except in 1 case (3.33%) in which poison

was made available through relatives without intimating them about motive. 37 years woman told her daughter to bring acid for cleaning the toilet and then she consumed the same corrosive as poison.

Period of menstruation (n=11): History of menstruation was present in 1 case (9.09%) out of 11 females at the time of suicide which was confirmed during the autopsy. However, 9 females (81.82%) were not in the menstruating phase. In one case (9.09%) history of menstruation could not be traced.

Suicide within seven years after marriage: In the present study out of 11 females 6 females (54.54%) were unmarried and five females (45.46%) were married. Four women (80.0%) had completed more than seven years of marriage. However, 1 female (20.0%) were within seven years of marriage. These observations were confirmed from inquest papers & interviews with relatives of the deceased.

Type of poisoning: In all poisoning cases the viscera samples were preserved for chemical analysis. The ADR, inquest Panchnama, treatment papers, gastric lavage analysis reports, and chemical analysis reports were analyzed in detail. Out of 30 cases in 7 cases (23.33%) were of insecticide poisonings, 6 cases (20%) were of Organophosphate poisoning, 3 cases (10%) were of Rodenticide poisoning, and 3 cases (10%) of corrosive poisoning. In 11 cases (36.66%) type of poison was not known so it is labeled as unknown poison.

4. Discussion:

The possibility of the manner of death when suicide is tried to establish based on scientific study findings. The results are compared with previous different studies in which different factors are studied based on critical analysis conclusions are drawn. Suicide by poisoning are predominantly noted in males i.e. 63.33% compared to females i.e. 36.67% (Fig. 1). It is consistent with the study of Sachil Kumar et al⁷ (56.61%), Bennett and Collins et al⁸ (79.5%), and Chavan KD et al⁹ (59.4%). Most commonly affected age group was between 21 to 30 years (36.67%), followed by 31-40 years (26.66%) (Table no. 1). It correlates with studies of Ambade VN et al¹⁰. In this productive younger and vulnerable age group, the suicidal tendency is more frequently observed may be due to frustration & acute depression resulting in suicidal attempt secondary to exam failure, unsuccessful love affair, marital

disharmony, unemployment, etc. which are the associate factors in the present study. **Figure 2** describes the prevalence of suicide is more in married people 63.33% followed by unmarried 36.33%. It is correlated with the study of Kadu Sandeep et al¹¹ (74.68%), but Panarat Sritus et al¹² observed unmarried (46.7%) were outnumbered married (17.5%).

Maximum victims 56.67% were Hindu, which is consistent with studies of Kadu Sandeep et al¹¹ (87.0%). As per **figure 3**, the rate of suicide by poisoning was more noted in students (13.33%) followed by housewives (10.0%). It was observed that in the present study maximum of 66.33% cases were in the low socioeconomic group followed by the middle-lower socioeconomic group 33.33% cases. It is consistent with Kadu Sandeep et al¹¹. The lower and middle socioeconomic groups are more vulnerable to suicides because these groups are exposed to the continuous financial and daily stress of life. Suicide by poisoning was more common in unemployed victims 80.0% followed by employed victims 16.67%.

Table 2: Place of suicide in male (M) vs. female (F)

Place	Gender			
	F	M	Total	%
Home	9	16	25	83.34
Public Place	1	2	3	10.0
Work Place	0	1	1	3.33
Custody	1	0	1	3.33
Total	11	19	30	100

Place of suicide was own home (residence) in 83.34% of cases of suicide (**Table no. 2**). Consistent with Lisa B. E. Shields et al³ (63.9%). As described in table 3 maximum cases have occurred in the afternoon period (40.0%) followed by morning (26.67%) This finding correlates with studies of Chavan KD et al⁹ and Kadu Sandeep et al¹¹. In the afternoon family members are outside from home for a job so that female victims get privacy for their suicide act. This may be the cause of more suicides in the afternoon. The 50.0% of cases of suicide due to poisoning are seen in September to December. It is consistent with Kadu et al¹¹ (41.77%). In 93.33% suicide was committed following sudden provocation & in 6.67% of cases, the suicidal act was planned and pre-decided. A study of this factor was not observed in available previous studies. In 6.67%

there was a definite history of previous attempts of suicide while in 93.33% of cases there were no previous attempts and victims committed suicide in the first attempt. Bagadiya et al¹³ reports 7% of victims had a history of previous attempts, of which 2.4% had more than one previous attempt. Victims with a history of previous attempts were more prone to suicide compared to those who have no history of previous attempts. 13 96.67% were alive when brought to the hospital, which was subsequently succumbed during treatment, however in 3.33% of attempted suicide, the victim died before hospitalization. 3.33% was found dead before admission and 96.67% were alive after attempting suicide. Was hospitalized and subsequently died in hospital.

In 36.67 % of cases, the survival period was 4 to 7 days followed by 1 to 3 days in 33.33% cases. As described in **figure 4** the 13.33% of cases have documented chronic illness as a reason for suicide. It is consistent with Kadu Sandeep et al¹¹ (9.49%). A positive history of addiction was present in 36.67% of cases. All cases were male. In 33.33% of cases, a history of alcohol consumption before suicide was found. Alcohol consumption history was positive in 10 males (52.63%) out of 19 males. History of acute depression was present in 16.67% of individuals at the time of suicide. In 83.33% there was no history of psychiatric illness or acute depression noted. Sachil Kumar et al⁷ reports mental depression in males (10.9%) and females (27.3%). History of acute depression was present in 29 (23.38%) individuals 9 females & 18 males at the time of suicide. Behavioral changes were noticed by relatives in 86.67% of individuals, changes like become silent and less talkative, short-tempered, violent or rowdy, etc. A study of this factor was not observed in available previous studies.

5. Conclusions:

After critical analysis of all suicidal cases following conclusions are drawn: Suicide tendency is more common in males as compared to females. Suicide incidences are more seen in young age groups i.e. between 21 to 30 years. 63.33 percent of suicidal poisoning victims were married. The commonest cause of suicide in housewives is marital disharmony. Unemployment and money crisis is the commonest cause for suicide. The low

socioeconomic group is more vulnerable to suicide than the middle and upper socioeconomic groups. The time of suicide is afternoon in 40.0 percent of cases of suicides. It was found that the Place for suicide was own home or residence preferred by a maximum (83.34%) victims. Suicide in police custody was observed in 3.33 percent of cases. In 93.33 percent of cases, suicide was committed following sudden provocation. Behavioral changes were noticed by relatives in 86.67 percent of cases.

In the present study maximum suicides are in September to December ie. 50.0 percent cases. Privacy for the suicidal act is maintained by 3.33 percent of victims only. In 6.67 percent of cases, there was a definite history of the previous attempt. Chronic illness is one of the contributing factors for suicide noted in 13.33 percent of cases. History of addiction is noted in 36.67 percent of cases. Consumption of alcohol is noted in 33.33 percent of cases at the time of suicide. Mentally ill persons are highly prone to develop suicidal tendencies. In the menstrual phase, the suicidal tendency is more seen. Suicide within seven years of marriage in females is observed in 20.0 percent of cases. Agricultural chemicals (poisons) are most commonly used for suicide. The Maximum survival period is 4 to 7 days in 36.67% of cases.

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