



# Gender differences among suspected suicide attempts in a rural tertiary care hospital in South India

## Abstract

**Context:** Globally, majority of suicide completers are known to be men as opposed to the majority of suicide attempters being women. Men use lethal methods more often than women who rely more on poisoning. **Aims:** To study the gender differences in the characteristics of the suspected cases of suicidal attempts among the medicolegal cases admitted to a rural tertiary care hospital. **Settings and design:** Retrospective, explorative-descriptive study of medicolegal case records of patients admitted to a rural tertiary care hospital situated in the southern state of Karnataka, India. **Methods and material:** Medicolegal case records of suspected cases of suicide attempt (n=829) admitted between the period of January 2013 to December 2015 were analysed. **Statistical analysis:** Descriptive analysis for frequencies and percentages was done. The Pearson's chi-square test was used to study the gender difference amongst the different variables. **Results:** Majority of the suspected suicide attempters were male (59.8%), in the age group of 21-30 years (44.8%), married (62.2%), farmers (51.4%), and belonging to lower socioeconomic status (62.7%). For both the genders, the most common mode of attempting suicide was by pesticide poisoning (overall 49.2%) and the most common immediate precipitants were relationship issues (overall 49.5%). Females were significantly younger than males. There was statistically significant association of gender with age group, occupation, mode of attempt, and immediate precipitant. **Conclusions:** Gender differences among suicide attempters might be reflective of the socio-cultural and regional influences on suicidal behaviour in a rural agrarian setting.

**Keywords:** Pesticides. Poisoning. Rural Hospitals. Medicolegal Aspects.

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## Introduction

Globally, most of the research on suicidal behaviour has shown that the rate of completed suicide among males is four times that of females while the rate of suicide attempt among females is three to four times higher than that among males. This gender difference has been attributed to various reasons, such as men attempting suicide by more lethal methods like firearms and hanging to which they have easier access while women attempt suicide by poisoning and drowning thereby having a higher likelihood of being rescued or resuscitated.[1] As to why women choose less lethal methods, the explanations given are questionable intent to die, gender socialisation, and easy availability of poisoning as a method to attempt suicide.[2] Though most of the global research has a similar finding of male preponderance among completed suicide and females among suicide attempters, China had differed significantly in the past in that females had a higher rate of completed suicides than males prior to 2000, but subsequently this trend has reversed.[3] Government statistics for completed suicides in India show a clear male predisposition with male to female ratio for 2014 being 67.7:32.3. When compared with the

statistics for the preceding year of 2013, there was a marginal increase in male and a marginal decrease in female suicides (67.2:32.8).[4] There have been few Indian studies on gender differences among suicide attempters and most of them have been conducted in tertiary care hospitals located in urban settings where socio-cultural factors might be different from that in a rural setting. Though it is often remarked that India lives in its villages, and farmers' suicides receive a lot of media attention, research on suicidal behaviour among the rural population has been relatively sparse. Overall, the relative paucity in publications on suicide has been attributed to several reasons like the sensitivity, stigma, and legal implications surrounding suicidal behaviours.[5] As per the National Crime Records Bureau's statistics for 2014, the suicide rate in Karnataka was 17.8, higher than the national average of 10.6, and it accounted for 10,945 suicides out of 1,31,666 (8.3%) in that particular year.[4] Our study attempts to study the gender differences among the various characteristics of suicide attempts in a rural community of Karnataka in South India and then to find out how it compares with other Indian studies, both rural and urban.

## Subjects and methods

This retrospective case register based exploratory study was carried out at Adichinchunagiri Institute of Medical Sciences, which is a rural tertiary care hospital situated in the southern part of Karnataka, India. Medicolegal cases were screened for suspected suicidal attempt cases and all the poisoning cases, hanging, and overdose of medications, and other suspected suicidal attempt cases were included in the study. These case files were scrutinised for socio-demographic details, mode of attempt, immediate precipitant, and other variables. Data was analysed using SPSS, version 16.

### Aims and objectives

1. To study the gender differences among the socio-demographic variables of the suspected suicide attempters among the registered medicolegal cases.
2. To study the association of gender with the modes of attempts and immediate precipitant causes.
3. To compare our findings with the results from other Indian studies.

### Source and study population

Source population were all the medicolegal cases admitted at a tertiary care hospital situated in rural South India during the period of January 2013 to December 2015. A total of 7,763 medicolegal cases were registered in this period and among them 1281 (16.5%) were those of suspected suicidal attempt. Of these 1281, adequate data as per the study objectives, could be found in only 829 case files and thus the study population was 829. Of the 452 that were rejected due to lack of data, 275 were males and 177 were females.

### Inclusion criteria and exclusion criteria

All poisoning cases including those with organo-phosphorous, other pesticides, unknown compounds, household agents, and overdose of medications were included in the study. Also included were cases of partial hanging. All suspected suicidal attempts whose data fulfilled the objectives of the study were included and those with inadequate or sketchy data were excluded from the study. As there was ambiguity in the causation of the burns cases, these which formed 135 of the 7763 total medicolegal (1.7%) were excluded from the study.

### Sampling procedure

Consecutive medicolegal case registers of suspected suicidal attempt were reviewed and those fulfilling inclusion criteria were taken up for the study.

### Data collection

From the medicolegal inpatient case records, data was collected using a semi-structured proforma that was prepared by the investigators. The files were scrutinised for socio-demographic characteristics like age, sex, occupation, socioeconomic status, marital status, past and family history of suicidal behaviour, modes used to attempt suicide, and

immediate precipitant causes. No patients were contacted for collecting information for this study.

### Data analysis

The data was analysed using Statistical Package for Social Sciences (SPSS) version 16 for descriptive measures like means, frequencies, and percentages for the different variables. t-test was used to study the mean ages. The association of gender with socio-demographic variables, mode of suicide attempt, and immediate precipitant was analysed using Pearson's chi-square test ( $p$  being significant if less than 0.05).

### Ethical statement

Ethical clearance was obtained from the institutional ethical review board. As this was a case register based study, consent could not be obtained, but care was taken to de-identify and code the medicolegal case files so as to protect the identity of the individuals.

### Results

The analysis of the socio-demographic data pertaining to age groups, is tabulated in Table 1. Figures 1 and 2 show the gender difference among the mode of the suicidal attempt and the immediate precipitant causes.

#### Gender

The male to female ratio in our study was 1.4:1.

#### Age

The overall mean age was 29.48 years with a standard deviation (SD) of 12.63. The range extended from 12 to 80 years. The mean age among males was 31.23 years (SD 12.196) and that among the females was 26.87 (SD 12.841). Independent sample t-test showed this difference to be statistically significant ( $t=4.938$ ;  $df=827$ ;  $p=0.000$ ;  $CI=95\%$ ). Altogether, 85.8% of the attempters were younger than 40 years. Males were the majority in almost all age groups except for the second decade group, where females outnumbered the males. The information pertaining to gender difference with respect to the different ages is represented in Table 1.

#### Marital status

Majority of the attempters were married and only a minority were divorced or widowed. There were more widowed females than males.

#### Religion

An overwhelming majority of the attempters belonged to the Hindu religion. Only two attempters were Christian, both of whom happened to be females.

#### Occupation

A little more than half of the attempters were farmers. In the medical records, the occupation was recorded as agriculture and there was no information available if these farmers were farm owners or labourers. Among the farmers, unemployed,

**Table 1:** Socio-demographic details (percentages among males and females columns refer to percentages within gender specific groups)

Characteristics	n (%)			Pearson chi-square	df	p value
	Males (496, 59.8%)	Females (333, 40.2%)	Total (829)			
Age (years)						
10-20	74 (14.9)	120 (36.0)	194 (23.4)	65.46	5	0.000*
21-30	234 (47.1)	137 (41.1)	371 (44.8)			
31-40	100 (20.1)	46 (13.8)	146 (17.6)			
41-50	48 (9.6)	7 (2.1)	55 (6.6)			
51-60	26 (5.2)	9 (2.7)	35 (4.2)			
>61	14 (2.8)	14 (4.2)	28 (3.4)			
Marital status						
Single	172 (34.6)	115 (34.5)	287 (34.6)	5.508	3	0.138
Married	311 (62.7)	205 (61.5)	516 (62.2)			
Divorced	7 (1.4)	2 (0.6)	9 (1.1)			
Widowed	6 (1.2)	11 (3.3)	17 (2.1)			
Religion						
Hindu	482 (97.1)	319 (95.7)	801 (96.6)	3.406	2	0.182
Muslim	14 (2.8)	12 (3.6)	26 (3.1)			
Christian	0 (0)	2 (0.6)	2 (0.2)			
Occupation						
Farmers	355 (71.5)	71 (21.3)	426 (51.4)	3.643	4	0.000*
Student	73 (14.7)	98 (29.4)	171 (20.6)			
Unemployed	33 (6.6)	12 (3.6)	45 (5.4)			
Homemakers	0 (0)	150 (45.0)	150 (18.1)			
Others	35 (7.0)	2 (0.6)	37 (4.5)			
Socioeconomic status						
Lower	320 (64.5)	200 (60.0)	520 (62.7)	3.202	2	0.202
Middle	161 (32.4)	116 (34.8)	277 (33.4)			
Upper	15 (3.0)	17 (5.1)	32 (3.9)			
Past history of suicidal attempt						
Yes	70 (14.1)	46 (13.8)	116 (14)	0.015	1	0.903
No	426 (85.8)	287 (86.1)	713 (86)			
Family history of suicide/attempt						
Yes	23 (4.6)	15 (4.5)	38 (4.6)	0.008	1	0.929
No	473 (95.3)	318 (95.4)	791 (95.4)			

\*Refers to significant association with gender as  $p < 0.05$

and others categories, males vastly outnumbered females. Agriculture was the leading occupation among the males and among the females, homemakers were the majority. Homemakers were wholly female and among the student population, females were the majority. The 'others' category comprised of other non-farming occupations like teachers, blue collar employees, and daily wage earners like masons, mechanics, drivers, and vendors. The gender difference among the different occupations was statistically significant. This information is depicted in Table 1.

### Socioeconomic status

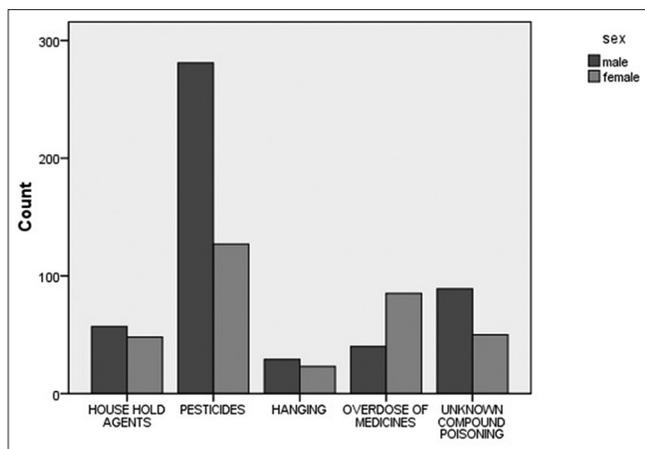
Majority of the attempters in our rural sample belonged to the lower socioeconomic status.

### Past history and family history of suicidal behaviour

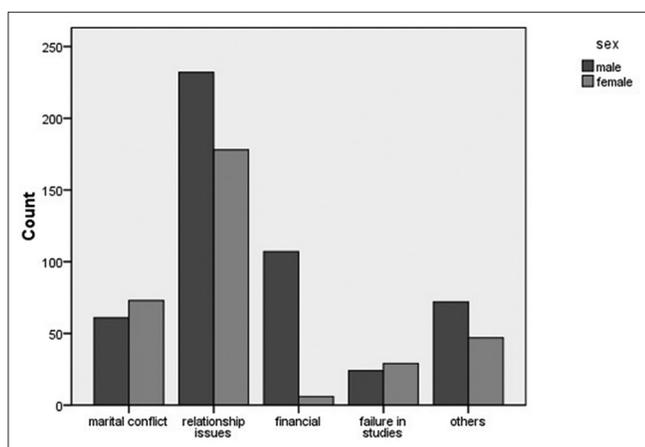
There was no statistically significant gender difference with regards to either past or family history.

### Modes of suicidal attempt

Almost half of the attempters had resorted to pesticide poisoning (408, 49.2%), making this the most common mode of suicidal attempt among both the genders. In this study, all the toxic substances used by the farmers on their fields were included in the pesticides rubric and this encompassed organophosphate, organochlorates, fungicides, herbicides, and cypermethrin. The next most commonly used method



**Figure 1:** Mode of attempt among male (496) and female (333) suicide attempters.  $\chi^2=56.883$ ,  $df=4$ ,  $p=0.000$



**Figure 2:** Immediate precipitant event among male (496) and female (333) suicide attempters.  $\chi^2=75.036$ ,  $df=4$ ,  $p=0.000$

was poisoning with unknown compounds (139, 16.8%), which presumably were plant, seed, or other native poisons. Among the 125 (15.1%) who overdosed on prescription medicines, majority (85, 68%) were females and this was the only method in which females outnumbered the males. Household agents including phenols, dettol, bleaching powder, rat, cockroach and ant poisons, kerosene, acid, and spirit were used by 105 (12.7%). Though 150 among 333 females were homemakers (45% of total women), household agents were used for suicidal attempt only by 48 women (14.41%) and majority of the women (127, 38.13% of total women) had attempted suicide by pesticide poisoning. Among the 52 (6.3%) who were registered as attempted or partial hanging cases, males and females were almost equally represented (29 males and 23 females). Among the males, the most common modes of suicidal attempt, in descending order, were pesticide poisoning (281, 56.7%), unknown compound poisoning (89, 17.9%), household agents poisoning (57, 11.5%), overdose of medicines (40, 8.1%), and hanging (29, 5.8%). Among the females, the most common methods were pesticides poisoning (127, 38.1%), overdose of medicines (85, 25.5%), unknown compound poisoning (50, 15%), household agents poisoning (48, 14.4%), and hanging (23, 6.9%). None of the medicolegal cases registered during our study period had attempted

suicide by violent methods like slashing body parts, stabbing, injuries with fire-arms or railway accidents. We had excluded the drowning and burns cases due to the ambiguity related to such cases and hence these could not be commented upon. Mode of attempt was significantly associated with gender ( $\chi^2=56.883$ ,  $df=4$ ,  $p=0.000$ ). This information is depicted in Figure 1.

### Immediate precipitant

There were significant differences among the sexes when they were studied for immediate precipitant causes. The different relationship issues that were recorded as per the medicolegal registers were failure of romantic relationships, conflicts with parents, siblings, grandparents, children, friends, or other relatives. The leading immediate precipitant among both the sexes was relationship issues, which was reported by almost half of the overall sample (410, 49.5%). While 46.8% of males (232) had reported relationship issues, a slightly higher percentage of females (178, 53.5%) had done so. Though only an overall 16.2% (134) reported marital conflict to be the triggering event, more than half of them (73) were females. Financial issues were reported by only 13.6% (113), but there was a glaring gender disparity in this. Of these 113, only six were females. Failure in studies was reported by almost an equal number of males (24, 2.9%) and females (29, 3.5%). While the second leading precipitant among males was financial reasons, that among the females was marital conflict. The immediate precipitants among males in descending order were as follows: relationship issues (232, 46.8%), financial reasons (107, 21.6%), others (72, 14.5%), marital conflict (61, 12.3%), and failure in studies (24, 4.8%). For the females it was relationship issues (178, 53.5%), marital conflict (73, 21.9%), others (47, 14.1%), failure in studies (29, 8.7%) and financial (six, 1.8%). There was statistically significant gender difference ( $\chi^2=75.036$ ,  $df=4$ ,  $p=0.000$ ). This information is depicted in Figure 2.

### Discussion

With this exploratory study we have tried to study the gender differences characterising the suicidal attempts presenting to a rural South Indian tertiary care hospital and to compare it with the findings from the different urban and rural Indian studies on attempted suicides. While there have been many hospital based studies on socio-demographic and other characteristics of suicidal attempts, studies focussing on gender differences have been few.

### Socio-demographic details

A large cross-national epidemiological survey found that socio-demographic risk factors for suicidal behaviours in both developed and developing countries include: female sex, younger age, lower education and income, unmarried status and unemployment.[6] In comparison, in our study, we found a majority of them to be male, younger age, lower socioeconomic status, married, and employed.

### Gender distribution

A study conducted in middle and low income countries found more female than male attempters.[7] A study

from neighbouring Pakistan have also found a female preponderance of almost 4:1 among suicide attempters.[8] Indian studies have varied findings with relation to gender distribution probably because of the regional and socio-cultural variations. Studies from Bengal have found almost a 70% female preponderance,[9-12] while some others have found a near equal distribution.[13,14] Few other studies from different parts of India too have found a higher female prevalence.[15-17] Our finding of males being a majority (60%) resembled most other studies, especially those from South India which found a higher male percentage in their samples ranging from 55-65%.[18-27] A nationally representative survey found that being male, belonging to a rural setting, and residing in South India, all contributed to an increased cumulative risk of death due to suicide.[28] More studies might be required to understand what places the rural men of South India at a higher risk of suicide than others.

### Age

The mean age among males was 31 years when compared to that of females at 26 years. This finding of mean age among males being higher was similar to international as well as most Indian studies.[7,8,12,17,21,27] While most other studies found relatively similar mean ages in both genders, Suresh Kumar[18] found a higher mean age of 44 and 36 years among the males and females respectively. Most of the other studies have found that majority of the attempters fall in the age group of >30 years which is similar to our finding too. When analysing for differences among the age groups, Kar[13] found that while the gender distribution was closer to one among the adults, it was 1:3 among adolescents. In our study, males outnumbered females among all the age groups, except the ten to 20-year olds, in which we found a male:female ratio of 1:1.6 compared to an overall ratio of 1.4:1. This finding of females outnumbering males among the younger age group is consistent with other Indian studies focussing on adolescents.[29,30]

### Marital status

While Western literature has reported being single, divorced, or widowed as a risk factor for suicide, most Indian studies have found contradictory results with married population constituting almost 60% or more of the attempters.[12,14,24,28,31] Among the studies looking at association of marital studies with gender, Fleischmann *et al.*[7] found that women who were married attempt suicide more frequently than men, Narang *et al.*[26] found that single men outnumbered single females and married females outnumbered married males, Suresh Kumar[18] and Nagendra Gouda and Rao[22] found a higher percentage of married females than married males, and Sudhir Kumar *et al.*[32] found more men to be single than married. Singh *et al.*[17] when studying the characteristics of suicide attempters over a decade, found that the percentage of married subjects had decreased from 60% to 43% and this was mainly because of the increase in unmarried females in their study population. Sixty per cent of our sample was married and this was similar to most Indian studies, however we found no significant association of marital status with gender in our study. Ours being a rural population, marriage is likely to be

a product of social norms rather than an individual's choice and further studies might be needed to explore if suicidal behaviour is used by both sexes to cope with a bad marriage more often than separation or divorce, which are still not widely acceptable in traditional agrarian societies.

### Occupation

Amongst our rural population, we found majority of the male and female attempters to be farmers and homemakers respectively. Among the student population, females outnumbered the males. Considering that ours was a rural population, it was not surprising that our finding was similar to most other Indian studies which found an over-representation of housewives among the female population or that females had a lower rate of employment outside the home.[12,15,18,22,26]

### Socioeconomic status

Studies from urban settings have a majority belonging to middle-lower socioeconomic status[13,14] and another study based in rural settings had a majority belonging to lower socioeconomic status which was similar to our finding of 62.7% belonging to this category. We could not find any studies reporting on gender differences with respect to socioeconomic status and in our study, we found no statistically significant association with gender.

### Past and family history

Indian studies have generally found suicide attempters having a positive past history of suicidal behaviour ranging from 1.5% to 18%.[9,14,16,21,24] Kar's study[13] found more than 50% having a prior suicidal attempt. Some studies have found more male suicidal attempters with positive past history,[12,13,18] while others have found slight female preponderance.[23,28,31]

There have been very few Indian studies looking at family history of suicidal behaviour and its association with gender. Among them only one study showed that male subjects clearly outnumbered female subjects in this aspect.[23] Kar[13] found an overall 13% had a positive family history without any significant gender difference. Compared to this, in our study we found a positive past and family history of 14% and 4.6% respectively, and there was no significant association with gender for both variables.

### Mode of attempt

Global studies have shown that suicide by pesticides and firearms have replaced traditional methods like hanging in most countries and that pesticide poisoning is more prevalent in Asian and Latin American countries.[1] An epidemiological analysis from European countries found that men rely more on lethal methods than women who resort more often to poisoning and over-dosage methods.[33] Suicide or attempted suicide by firearms is uncommon in our country and Indian studies have found pesticide poisoning to be the most common method of suicide attempt, and in our study too we found more than half of them to have used pesticides.[12,14,20] Those studies that have reported on gender variations found significant differences with men

more likely to use organo-phosphorous pesticides and women more likely to use native/plant poisons or over-dosage of medicines than men.[18,22,23,32,34] Our findings too were similar in that though a majority of both men and women used pesticide poisoning (almost 50% overall), women were more likely to use overdose of medicines than men. It was also interesting to note that though a majority of our females were homemakers, over-dosage of medicines as a method outnumbered poisoning by unknown compounds (probably native and plant poisons) and household agents, and was only second to pesticide poisoning. In a rural, agrarian population where most of the land owners and farm workers are men, access to pesticides might be relatively easier for men than women and this might possibly be one of the reasons for this gender difference. Contrary to Western literature, we found no violent means of attempts like gunshot wounds, self-mutilation, jumping from heights or jumping in front of trains which might be dependent on accessibility and availability of such methods.

### Immediate precipitant

Negative life events have a consistent association with suicidal ideation and behaviour.[35] Most Indian studies have found interpersonal conflicts with others (with some studies mentioning the others to be non-spouse persons) to be leading stressor or precipitant event.[10,14,21-24] Our study too had a similar finding with majority of both men and women reporting relationship issues (almost 50% of the sample) to be the leading immediate precipitant. Whether there is a rise in interpersonal conflicts with non-spouse others as rural societies see a transformation from traditional joint families to nuclear setups with smaller land holdings, would require more exploration. Our finding of only 13% reporting financial difficulties as the antecedent cause, resembled an urban and a rural study which reported only a minority as having financial reasons as the antecedent precipitant and differed from another South Indian study which found financial losses as being the leading life event, followed by family problems and then marital conflict.[23,24,36] If the rural area is fertile as ours is, and not drought stricken, financial hardships are unlikely to be the leading precipitant in most cases. Among the studies that commented on gender differences, our study resembled a study from neighbouring Pakistan which mentioned that females reported conflicts with spouse or in-laws while men were more troubled by financial difficulties.[8] Among the Indian studies that have studied gender differences with respect to antecedent cause, a study from urban Kolkata found conflict with spouse to be the commonest cause in both sexes with some female predominance, followed by conflict with guardians which was more common in males, though this difference was not statistically significant.[10] We found significant association of gender with immediate precipitant cause with more females reporting marital conflict than males and far more males reporting financial difficulties than females and this is understandable as, in rural agrarian settings, males are generally the breadwinners while women are the homemakers. Hence, when faced with difficulties in efficiently carrying out the roles that have been ascribed to them by society, these men and women might see suicidal behaviour as a way out of their difficulties.

### Strengths and limitations

Not all attempted suicide cases get referred to or are seen by the psychiatrist and so one of the biggest strengths of this study apart from its sample size is that it includes medicolegal cases registered at the hospital and not just those referred to the psychiatry department. However, this study also has several limitations. Characteristics of suicide completers might differ significantly from those of suicide attempters. Moreover, since this was a medicolegal case register study, only limited information could be obtained and variables like literacy status, intentionality and lethality of the act, presence of comorbid physical illness, presence of physical illness as a precipitant cause, and pre-existing psychiatric illnesses could not be studied. Though they did not form a significant number among the registered medicolegal cases, ambiguous cases like burning and drowning were not included in this study and hence this contributed to selection bias. Suicide attempt is associated with significant stigma which affects service utilisation and hence registration of such cases. The rate of access to medical care might further drop in a rural society, more so if the attempter is a female. Keeping these numerous factors in mind, this hospital based, case register study might not be representative of the general population.

### Conclusion

In this medicolegal case register based study of suspected suicide attempters, we found the majority to be male (59.8%), married (62%), and belonging to lower socioeconomic status (63%). The mean age of females ( $26.87 \pm 12.84$  years) was significantly lower than males ( $31.23 \pm 12.19$  years). We found a significant association of gender with age group distribution, occupation, mode of attempt, and immediate precipitant cause, but not with marital status, religion, socioeconomic status, family or past history. There was a male preponderance in all age groups except for those in their second decade where females outnumbered the males. Considering that ours was a rural population, it was not surprising that a majority of men were farmers and women, homemakers. Pesticide poisoning (49.2%) was the most common mode of attempt for both the sexes probably because of its easy accessibility and availability in an agricultural setting. However there was a significant gender association, in that women were more likely to use over-dosage of prescription medicines than men. For both genders, relationship issues (with non-spouse others) (49.5%) were the most common immediate precipitant event, but women were more likely to report marital conflict and men, financial difficulties. Financial difficulties were reported by a mere 13%. Our study has some similarities with studies especially from South India and differs from those reported from urban or eastern India which have found a female preponderance or a higher percentage of unmarried females. Suicidal behaviour is a result of complex interplay of various socio-cultural influences which may be region specific and this could possibly explain the myriad findings from different studies. Future research should consist of community based and prospective studies that would help us explore and understand factors influencing suicidal behaviour, so that effective gender specific interventions could then be planned.

## Key messages

Post suicidal attempt interventions need to be sensitive to the gender issues that influence such behaviours.

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