



# Suicide menace in North-Eastern India: a hospital-based study on the clinical aspects of suicide attempters

## Abstract

**Context:** Suicide is a rapidly evolving public health problem affecting people worldwide and is the second leading cause of death among 15-29 year olds globally in 2012. It is a multidimensional and multifactorial phenomenon in terms of the cause and the effect. **Objectives:** To find out sociodemographic profiles, modes of attempting suicide, and prevalence of depression among the subjects with suicide attempt, and to find any association between them. **Methods:** One hundred and eight cases of attempted suicide were selected consecutively who were attending the hospital irrespective of the department and were evaluated to find out various sociodemographic variables, methods of attempting suicide, and if they fulfilled ICD-10 criteria for depressive disorder. **Results:** Higher prevalence of suicide was seen in cases with age <35 years (77.6%), female gender (54.62%), from rural background (69.44%), living in nuclear family (64.81%), who were unmarried/single (60.18%), illiterate or having education up to class Xth (71.29%), occupationally dependent (68.51%), belonging to lower/lower middle socioeconomic class (51.85%). Organophosphorus poisoning (42.59%) was the most common method of attempting suicide. 66.66% of cases suffered from depressive disorder at the time of attempting suicide. Poisoning was the more common method among cases with age less than 35 years (63.09%) and while males opted for drug overdose (16.32%) females used poisoning (64.40%) as the most common method to attempt suicide. **Conclusions:** The data provides a range of information to identify vulnerable groups so that a multidimensional approach can be planned for formulation of suicide prevention strategies.

**Keywords:** Public Health. Cause of Death. India. Demography. Depressive Disorder.

**Robin Victor<sup>1</sup>, Chiradeep Sengupta<sup>2</sup>,  
Subrata Naskar<sup>3</sup>, Bhanita Boro<sup>4</sup>,  
Kaveri Saxena<sup>5</sup>**

<sup>1,4,5</sup>Post Graduate Trainee, Department of Psychiatry, Silchar Medical College and Hospital, Silchar, Assam, India, <sup>2</sup>Registrar, Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam, India, <sup>3</sup>Psychiatrist, Department of Neuropsychiatry, Institute of Neurosciences, Kolkata, West Bengal, India

**Correspondence:** Dr. Robin Victor, Post Graduate Trainee, Department of Psychiatry, Silchar Medical College and Hospital, Ghungoor, Silchar-788014, Assam, India. robinvictor111@gmail.com

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## Introduction

Suicide is a rapidly evolving public health problem affecting people worldwide. It is an act of self-harm consciously aimed at self-destruction irrespective of personal intention to die with non-fatal outcome. The World Health Organization (WHO) in 1968 defines suicidal act as “the injury with varying degree of lethal intent and suicide as, such acts with fatal outcome.” Suicidal acts which does not result in death of the person are labelled as suicide attempts, attempted suicide, para suicide, or acts of intentional deliberate self-harm.[1] According to the 2012 WHO report suicide was reported as the second major cause of death among the population aged 15-29 years. It is estimated that each year 800,000 people die due to suicide.[2] Although suicide is a personal act it is considered as a multidimensional and multifactorial phenomenon in terms of the cause and the effect. Worldwide there is variation in the rates of suicide based upon the differences in the physical, psychological, social, financial, and political factors among the population. Highest rates of suicide were reported from Belarus (62.3 per 100,000 population) while the lowest were from Maldives (0.17 per 100,000 population). In the descending list of countries ranked according to the suicide

rates India ranks 43rd.[2] According to the National Crime Records Bureau (NCRB) report suicide is among the top ten causes of death and also among the top three causes of death in youth aged between 16 and 35 years of age group.[3] A suicide surveillance study by Dandona *et al.*[4] on Indian population observed an increase in the suicide rates from 14.9 in 2001 to 15.4 in 2010 per 100,000 population. It also reported that the more developed states had a higher percentage of suicide rates as compared to the less developed ones. While high suicide rates (>15 per one lakh population) were seen in the southern states of India, a comparatively lower rate (less than three per one lakh population) was seen in the northern Indian states.[5] The actual number of the suicide is much more than the reported ones as various socio-cultural stigmas, religious support, legal issues, and inadequate registration facilities lead to non-reporting, under reporting, or miscalculation of the actual figures.[6] Another study reported that young women from South India have the highest suicide rate in the world.[7] The average suicide risk for young females between 15-19 years of age in Tamil Nadu, India was 148 per 100,000 population and it was the leading cause of death among the adolescents.[7] As far as Assam is concerned according to NRCB the suicide rate in the year 2014 was 11.1 per 100,000

population.[3] Out of the various factors proposed as the aetiological factors for suicide, psychiatric disorders occupy a prime position. Up to 90% of those who attempt/commit suicide are suffering from a mental disorder,[8] among which depressive disorder has been reported as the most common diagnosis.[9] In North-Eastern part of India, a limited number of studies are there regarding this topic hence we have designed this hospital-based cross-sectional study to find out sociodemographic profiles, modes of attempting suicide, and prevalence of depression among the subjects with suicide attempt presenting at a tertiary care centre. Our aim also was to find any association, if there is any, between the important sociodemographic and clinical variables and the presence of depression in the study subjects.

## Subjects and methods

This study was conducted in Silchar Medical College and Hospital (SMCH), Assam which is a tertiary care hospital after taking proper approval of the institutional ethics committee. Main catchment area of this hospital is the whole Barak Valley of southern Assam, India, which comprises of the districts of Cachar, Karimganj, and Hailakandi along with the neighbouring states like Manipur, Mizoram, and Tripura.

A case of attempted suicide was defined as “A person who has made deliberate act of self-harm consciously aimed at self-destruction irrespective of his/her intention to die, with non-fatal outcome.”[10]

All the subjects attending the hospital irrespective of the department, during the study period of one year, i.e. from 1 April 2015 to 31 March 2016, between the age of 15 and 64 years (as they were the minimum and maximum age of the cases) with suicidal attempt were included in the study. We excluded the subjects who were not medically stable or were uncooperative.

Tools used in the study are:

### Sociodemographic proforma

A standard proforma describing sociodemographic variables was designed and standardised in the Department of Psychiatry, SMCH. The sociodemographic proforma gave information about age, gender, religion, marital status, family type, domicile, education of patient, occupation, and socioeconomic status. It also had column indicating the method of attempting suicide (poisoning, hanging, drug overdose, burning, or physical injury).

### ICD-10

Depressive disorder was diagnosed using the tenth revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) criteria.[11]

At first written informed consent from all patients/guardians was taken after explaining them the purpose and procedure of the study. Then all the cases who were selected consecutively for study, were interviewed in detail using the above mentioned tools without any set limit. Interview pattern was flexible to elicit maximum data. For all cases privacy of interview and confidentiality was strictly maintained.

After data collection and tabulation, statistical analysis was done by GraphPad Prism for Windows version 6.01[12] and Statistical Package for the Social Sciences (SPSS v22) (SPSS Inc., Chicago, USA). Chi-square test was applied to find out p-value and statistical significance wherever necessary. Significance was determined at  $p < 0.05$ .

## Results

A total of 108 patients who attempted suicide were taken serially for this hospital-based cross-sectional study. Detailed clinical and mental state examination was done in each case. The sociodemographic distribution of the cases is given in Table 1. The study subjects were of age group 15-64 with the mean age  $26.23 \pm 10.40$  years. Out of the 108 patients who were included in the study, we found that majority belonged to age group of 15-24 years (59.25%) and least number of patients were from age range 55-64 years (2.77%). While looking across the gender it was seen that suicidal attempt was slightly more among females (54.62%) as compared to the males (45.37%). Most of the patients were Hindus (53.70%) and from a rural background (69.44%). Majority of the patients under study were from nuclear family (64.81%). Looking at marital status we found that majority of the cases were single (60.18%). 29.62% had attained primary level education followed by 25.92% cases who had studied between Vth to Xth standard. Occupation wise most of the cases who attempted suicide were unemployed (27.77%). It was also seen that most cases were from lower middle socioeconomic status (36.11%). Table 2 shows the various modes of attempted suicide, where we found that majority of cases had ingested an organophosphorus compound (42.59%), followed by hanging (16.66%), drug overdose (12.96%), consuming phenyl (12.03%), setting oneself on fire (4.62%), wrist slitting (3.70%), consuming kerosene (2.77%) or corrosive (2.77%) with only one case (0.92%) of consuming oleander and one case of mixed physical injury (0.92%).

Among the total sample of 108 patients, 72 cases, i.e. 66.66% fulfilled the ICD-10 criteria for depressive disorder as shown in Figure 1. The comparison and statistical association of the sociodemographic variables of the patients committing suicide with the mode of committing suicide is shown in Table 3. For application of statistics we combined the methods of attempting suicide into five main categories namely poisoning (organophosphorus, phenyl, corrosive, kerosene,

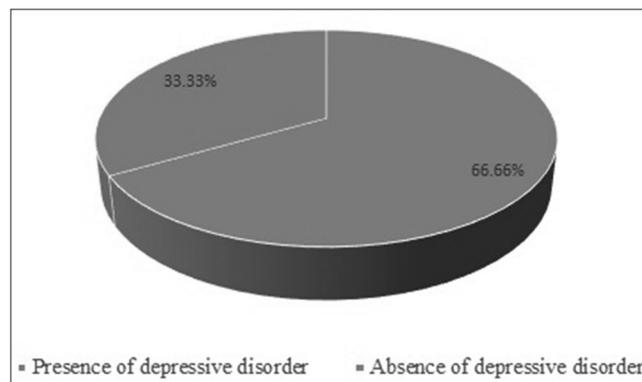


Figure 1: Distribution of depressive disorder in patients attempting suicide.

**Table 1:** Sociodemographic variables of the suicide attempters

Variables	No. of subjects (n=108) (%)
Age group (in years)	
15-24	64 (59.25)
25-34	20 (18.51)
35-44	15 (13.88)
45-54	6 (5.55)
55-64	3 (2.77)
Gender	
Male	49 (45.37)
Female	59 (54.62)
Religion	
Hindu	58 (53.70)
Muslim	47 (43.51)
Domicile	
Rural	75 (69.44)
Urban	33 (30.55)
Family type	
Joint	25 (23.14)
Nuclear	70 (64.81)
Extended	13 (12.03)
Marital status	
Single	65 (60.18)
Married	37 (34.25)
Widow/widower/divorced	6 (5.55)
Education	
Illiterate	17 (15.74)
Primary	32 (29.62)
V-Xth	28 (25.92)
XI-XIIth	16 (14.81)
Graduate	14 (12.96)
Postgraduate	1 (0.92)
Occupation	
Unemployed	30 (27.77)
Farmer	3 (2.77)
Daily wager	9 (8.33)
Housewife	23 (21.29)
Student	21 (19.44)
Private sector	8 (7.41)
Business/self-employed	11 (10.18)
Govt. job	3 (2.77)
Socioeconomic status	
Lower	17 (15.74)
Lower middle	39 (36.11)
Middle	19 (17.59)
Upper middle	17 (15.74)
Higher	16 (14.81)

**Table 2:** Various modes of suicide attempt among the study subjects

Mode of attempt	Total no. of cases (%)
Organophosphorus	46 (42.59)
Corrosive	3 (2.77)
Phenyl	13 (12.03)
Drug overdose	14 (12.96)
Hanging	18 (16.66)
Burning	5 (4.62)
Wrist slitting	4 (3.70)
Kerosene	3 (2.77)
Oleander	1 (0.92)
Mixed physical injury	1 (0.92)
Total	108 (100)

and oleander), hanging, burning, drug overdose, and physical injury (wrist slitting and mixed physical injury). We found that poisoning (63.09%) and drug overdose (14.2%) were the main modes of suicide attempt in subjects aged <35 years while hanging was the higher (29.16%) in those >35 years of age. Burning and suicide attempt by physical injury were almost equally distributed among both the age groups. However, these findings were not statistically significant ( $p=0.451$ ). Gender wise males had a higher incidence of suicide attempts by drug overdose (16.32%) and physical injury (8.16%) while poisoning (64.40%), hanging (18.64%), and suicide attempt by burning (5.08%) were more prevalent among the females. We did not find any statistical significance among this association ( $p=0.434$ ). Looking into domicile we found that poisoning was more prevalent in cases from rural areas (66.66%) as compared to those from urban areas (48.48%) while cases from urban background had higher incidence of hanging (18.18%), drug overdose (18.18%), and physical injury (12.12%). Cases from joint/extended families mainly used hanging (21.05%) and drug overdose (18.18%) as mode of attempting suicide while cases from nuclear families opted for poisoning (65.71%) as the main mode of suicide. Suicide attempt by physical injury and burning was almost equally distributed among both the family types. We observed that cases who were married attempted suicide mainly by hanging (27.02%), physical injury (5.41%), and burning (8.11%) as compared to the other group (unmarried/divorced/widow/widower) which used mainly poisoning (66.19%) and drug overdose (15.49%) to commit suicide. These findings were statistically significant ( $p=0.0035$ ). Education wise we found that cases with education up to class Xth (illiterate/primary/class Vth-Xth) mainly used poisoning (63.63%), hanging (18.18%), and burning (5.19%) as the main mode of suicide while those with education above class Xth (class XIth-XIIth/graduate/postgraduate) mainly opted for drug overdose (16.12%) and physical injury (12.90%) as most common means of attempting suicide. However, these findings were not statistically significant ( $p=0.107$ ). In occupation we observed that hanging (18.91%) and drug overdose (13.51%) were more prevalent in the dependent group (unemployed/housewife/

**Table 3:** Comparison and statistical association of the sociodemographic variables of the patients attempting suicide with the type of suicide attempt

Variables	Poisoning (%)	Hanging (%)	Drug overdose (%)	Physical injury (%)	Burning (%)	Total (%)	p-value	X <sup>2</sup> , df	p-value significance
Age (in years)									
<35	53 (63.09)	11 (13.09)	12 (14.2)	4 (4.7)	4 (4.75)	84 (100)	0.451	3.675, 4	Non-significant
>35	13 (54.16)	7 (29.16)	2 (8.33)	1 (4.16)	1 (4.16)	24 (100)			
Gender									
Male	28 (57.14)	7 (14.28)	8 (16.32)	4 (8.16)	2 (4.08)	49 (100)	0.434	3.796, 4	Non-significant
Female	38 (64.40)	11 (18.64)	6 (10.16)	1 (1.69)	3 (5.08)	59 (100)			
Domicile									
Rural	50 (66.66)	12 (16)	8 (10.66)	1 (1.33)	4 (5.33)	75 (100)	0.080	8.327, 4	Non-significant
Urban	16 (48.48)	6 (18.18)	6 (18.18)	4 (12.12)	1 (3.03)	33 (100)			
Type of family									
Joint/extended	20 (52.63)	8 (21.05)	6 (15.78)	29 (5.26)	2 (5.26)	38 (100)	0.767	1.829, 4	Non-significant
Nuclear	46 (65.71)	10 (14.28)	8 (11.42)	3 (4.28)	3 (4.28)	70 (100)			
Marital status									
Married	19 (51.35)	10 (27.02)	3 (8.11)	2 (5.41)	3 (8.11)	37 (100)	0.003	15.68, 4	Significant
Others	47 (66.19)	2 (2.81)	11 (15.49)	3 (4.22)	2 (2.81)	71 (100)			
Education status									
Up to class Xth	49 (63.63)	14 (18.18)	9 (11.68)	1 (1.29)	4 (5.19)	77 (100)	0.107	7.600, 4	Non-significant
Above class Xth	17 (54.83)	4 (12.90)	5 (16.12)	4 (12.90)	1 (3.22)	31 (100)			
Occupation									
Dependent	44 (59.45)	14 (18.91)	10 (13.51)	3 (4.05)	3 (4.05)	74 (100)	0.876	1.212, 4	Non-significant
Earning members	22 (64.70)	4 (11.76)	4 (11.76)	2 (5.88)	2 (5.88)	34 (100)			
Socioeconomic status									
Lower/lower middle class	35 (62.5)	11 (19.64)	6 (10.71)	0	4 (7.14)	56 (100)	0.088	8.080, 4	Non-significant
Middle/upper middle/upper class	31 (59.61)	7 (13.46)	8 (15.38)	5 (9.61)	1 (1.92)	52 (100)			

students) while poisoning (64.70%), physical injury (5.88%), and burning (5.88%) was common among the earning members. In socioeconomic status we found that cases from lower/lower middle class mainly used poisoning (62.5%), hanging (19.64%), and burning (7.14%) as the common modes of suicide while among the cases from middle/upper middle/upper class, drug overdose (15.38%) and attempt by physical injury (9.61%) were more common. We did not find any statistically significant association ( $p=0.088$ ) between these findings.

## Discussion

In this hospital-based cross-sectional study we included 108 attempted suicide patients serially and while looking into the various sociodemographic variables we found that the majority of the subjects belonged to age group of 15-24 years (59.25%), followed by the age group of 25-34 years (18.51%). Sharma[13] in Shimla found similar results where 53.4% cases were in the age group of 15-24 years. Khan *et al.*[14] in Secunderabad reported findings of higher prevalence of

suicide among the age group of 20-24 years. Narang *et al.*[15] in Ludhiana found the mean age to be  $25.11 \pm 8.17$  years among the attempters. Chavan *et al.*[16] in Chandigarh and Sarkar *et al.*[17] in Pune found that the peak age for suicide attempt ranges from 21-30 years. A study done in Edmonton by Bland *et al.*[18] found maximum suicide cases among the age range of 25-29 years. Thus most of the patients were from late adolescence and early adulthood group. As these age group individuals are exposed to more psychosocial stress in the educational field, occupational stresses as well as inter-familial stresses, they become more vulnerable for suicidal behaviour. Moreover, familial demands in this age group is more due to poor socioeconomic status prevailing in this region. All this adds up to the stress leading to higher suicide attempts in this age group. While looking into the gender, suicidal attempt was slightly more among females (54.62%) as compared to the males (45.37%). Similar findings were reported by various other national and international studies. Sharma *et al.*[13] found higher prevalence of suicide in females (53.4%). Studies by Srivastava *et al.*[10] in Pondicherry and Suresh Kumar[1] in Kerela found similar results. Beautrais *et al.*[19] in New

Zealand also showed female predominance (54.3%) among the attempters. Females play the role of daughter, sister, wife, and mother, and as such has to handle a lot of stresses in rearing their children and hence can be the reason behind their increased suicidality. Most of the patients were Hindus (53.70%) followed by Muslims (43.51%). In our study we found that 69.44% patients came from rural background and 30.55% from urban background. Sharma *et al.*[13] found most of the attempted suicides were from rural areas (68%). Kar[20] found similar results in his study where 72.4% of the victims were found to be belonging to rural areas. We found that most of the patients who attempted suicide were from nuclear families (64.81%) followed by joint families (23.14%). Srivastava *et al.*[10] found maximum suicidal attempts in the nuclear families (76.6%). Srivastava and Kumar[21] in Varanasi also found similar results. Thus the findings clearly indicate the importance of emotional support that one gets from joint or extended families in preventing suicide. The lack of this emotional support in nuclear families may be the reason which predisposes an individual to a state of despair and finally to choose suicide. Our study demonstrated among the suicide attempters 65.73% patients were unmarried/widow/widower/divorced while 34.25% were married. Chavan *et al.*[16] reported 57.4% unmarried subjects attempted suicide while Khan *et al.*[14] found 52% of the suicide attempters were unmarried. Similarly, Cheng *et al.*[22] also showed unmarried to have increased risk of suicidal attempts (49.6%). Various factors such as social and financial insecurity, and lack of emotional support which is more among the unmarried may lead to a higher suicidal risk among this group. Regarding the education 29.62% patients had attained primary level education, 25.92% had studied between Vth to Xth standard while 15.74% were illiterate. Overall 55% of the attempters had education below matriculation in the study. Similar results were depicted in a number of studies. A study by Ashish Srivastava[23] in Goa showed 48% patients attempting suicide had attained primary education, 30% up to secondary level while 22% of the victims to be illiterate. Probably the higher educated group has better coping skills, and good social and financial resources which aid in prevention of depression and suicide. In occupation most of the patients were unemployed (27.77%), followed by homemakers (21.29%) and students (19.4%). Chavan *et al.*[16] in their study found that majority of the subjects attempting suicide were unemployed (55.4%). Ashish Srivastava[23] and Srivastava *et al.*[10] found similar high prevalence of suicide among the unemployed subjects. Sharma[13] in his study found 32% of suicide attempts among housewives followed by students (28%). Hence it is evident that most of the cases of suicide are from the dependent class of population (unemployed/housewives/students). Maximum of our cases belonged to lower middle socioeconomic status (36.11%), followed by middle (17.59%) and almost equal number of cases from lower (15.74%), upper middle (15.74%), and higher (14.81%) socioeconomic status. Combining lower and lower middle class together 52% of the cases were from lower socioeconomic status. Chavan *et al.*[16] found that 50.4% cases were from low income group, 24.7% were from lower middle income group, and 21.7% of the subjects were from the middle income group. Beautrais *et al.*[19] also found that in lower socioeconomic background people have higher risk of

suicidal attempt. Narang *et al.*[15] also found similar results. As the cases from the marginalised section of the society are exposed to more physical, psychological, and social stressors with limited resources to deal with them hence they might be more vulnerable to suicide.

In our study poisoning was the predominant mode of suicide attempt (61.11%). Among the poisoning cases (n=66), organophosphorus happens to be the most prominent one (69.69%) followed by phenyl poisoning (19.69). Probably in the agriculture-based rural society, easy availability and accessibility of organophosphorus pesticide is the main reason of this finding. Many other studies have reported findings similar to ours. Gajalakshmi and Peto[24] in Tamil Nadu also found poisoning to be the commonest method employed for suicide followed by hanging. Narang *et al.*[15] in their study found a very high percentage of attempt of suicide by poisoning (91%). Sharma[13] also reported organophosphorus compound as the commonest mode of attempt of suicide (74.7%). Other studies reporting similar findings were Zhang *et al.*,[25] and Kumar and Chandrasekaran.[26]

We found 66.66% of the suicide attempters to be suffering from depressive disorder. Various studies have demonstrated the significant link between suicide and presence of depression. Srivastava[23] in his study reported that 54% of the cases committing suicide suffered from depression while another study by Latha *et al.*[27] reported 64% of the suicide attempters to be suffering from various forms of depression. Other studies done outside India reported 70-89% of the subjects committing suicide to be suffering from some form of depression.[28-30] Our findings are almost similar to various national and international studies.

Kanchan and Menezes[31] stated that the method of committing suicide not only depends upon the availability and accessibility of the method but also on the various cultural, religious, and social issues. We observed that among males the preferred mode of suicide was drug overdose (16.32%) and physical injury (8.16%) while females opted for poisoning (64.40%) and hanging (18.64%). Also poisoning (63.09%) and drug overdose (14.2%) were the main modes of suicide attempt in subjects aged <35 years. Schrijvers *et al.*[32] and Värnik *et al.*[33] found similar higher incidence of poisoning among the female gender. However, in contrast to our study, they found hanging to be more common in men. A study by Kanchan *et al.*[34] found hanging as the preferred mode of suicide among the younger females as compared to men. Details of the other associations between the sociodemographic variables and method of hanging are given in Table 3.

Thus cases with age <35 years, female gender, Hindu religion, from rural background, living in nuclear family, who were unmarried/single, illiterate, having education up to class Xth, occupationally dependent group (unemployed/housewives/students), belonging to lower/lower middle socioeconomic class were found to be more prone to attempt suicide in our study. Organophosphorus poisoning was the most common method of attempting suicide followed by hanging. 66.66% of our cases suffered from depressive disorder at the time of attempting suicide. Poisoning was the more

common method among cases with age less than 35 years. While males opted for drug overdose, females used poisoning as the most common method to commit suicide. Poisoning was the common method among cases from rural background or belonging to nuclear families. Married cases attempted suicide mainly by hanging, physical injury, and burning. Hanging and suicide attempt by drug overdose was more common in occupationally dependent cases, and cases from lower/lower middle socioeconomic status mainly preferred poisoning and hanging as the common method of suicide.

## Conclusion

From our study we observed that suicide attempts were predominant in the cases belonging to the marginalised section of the society exposed to various psychosocial stressors. Comorbid depressive disorder was high among the cases attempting suicide and the method of suicide varied among the cases according to differences in sociocultural, religious, financial, and other social issues. Our findings were almost similar to most of the national and international studies. Thus all these associations should be kept in mind and a multidimensional approach should be planned for formulation of suicide prevention strategies.

However, this study has few limitations. As this is a tertiary care medical centre-based study, it may not reflect actual pattern of sociodemographic and clinical variables of suicide attempters as well the method of suicide prevalent in the community. The number of study subjects taken were less and no control group was taken. Also apart from depressive disorder we did not look for presence of any other psychiatric morbidities among the cases. Hence, more number of prospective studies involving larger number of cases need to be conducted specially in the North-Eastern part of India, where such studies are still lacking.

## Key messages

Despite an increase in awareness and knowledge about suicide, its causes and its prevention, people often do not seek help due to various psychosocial reasons associated with it. We tried to identify the population most vulnerable to suicide and we found that it comprises mainly of marginalised and discriminated section of society. This study can serve as guide so that governments can take appropriate steps on basis of their resources for suicide prevention.

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