



# A cross-sectional comparative study of insomnia, depression, and suicidality between male and female prisoners of Guwahati Central Jail

## Abstract

**Background:** Female prisoners are consistently reported to suffer more from insomnia, affective disturbances, and higher suicide rates than males. **Objective:** To compare the prevalence of insomnia, depression, and suicidality between male and female inmates, and to probe how the internal turmoil and the psychological burden consequent of the committed crime influences these morbid occurrences. **Method:** Forty male and 40 female prisoners of Guwahati Central Jail, Assam, India were assessed clinically and Beck Depression Inventory II, Pittsburgh Insomnia Rating Scale, and Columbia Suicide Severity Rating Scale were administered. Appropriate statistical tests for categorical and continuous variables were performed with significance defined as  $p < 0.05$ . **Results:** Prevalence of depression was 62.5 per 100 males and 85 per 100 females ( $p = 0.04$ ), that of insomnia and suicidal ideation were 65% and 72.5% ( $p < 0.01$ ), and ten per cent and 30% for male and female prisoners respectively ( $p < 0.05$ ). The relative risk of suicide was 0.33. Depression, insomnia, and suicidality were significantly associated with longer duration of stay, convict status, presence of physical illness, any substance abuse, and with higher age of their children in female prisoners; whereas, male prisoners had a striking association of the studied morbidities with under trial status and being free from any physical illness. **Conclusions:** Although limited in its inability to attribute causality, our study conclusively demonstrated increased prevalence of depression, insomnia, and suicidality in female prisoners. Penal status, duration of stay, comorbid physical illness, substance abuse, and factors related to motherhood negatively influenced the fairer sex in custody.

**Keywords:** Affective Symptoms. Crime. Substance Abuse.

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**Received:** 31 July 2017

**Revised:** 9 November 2017

**Accepted:** 5 December 2017

**Epub:** 9 January 2018

## INTRODUCTION

The recent times had witnessed a shocking upsurge of crimes all throughout the world.[1] In the recent years, India had also become a crime hub with a total violent crime rate of 24.4 per 100, with rape (5.7%), kidnapping (5.3%), and murder (2.7%) topping the list of violent crimes.[2]

The prison environment was traditionally been described as an “inherently non-therapeutic” environment.[3] The restriction of basic human rights coupled with the unhealthy overcrowding (the total prison occupancy rates in India and the state of Assam were 118.4 and 101.9 per the officially allotted quota of 100 respectively)[4] lead to anaemia, malnutrition, bacterial and viral infections, dermatitis, asthma, musculoskeletal diseases, and most alarmingly, tuberculosis and HIV/AIDS; which were reported to be much higher in prisoners than in general population.[5-7] Prevalence of mental illness among prisoners was also recognised to be very high globally with a wide range of prevalence,[8,9] which was precisely replicated by Indian studies (33% to as high as 79.9%).[10,11] Any neurotic problem[12,13] as well as sleep disturbances[14-16] and mood disorders, particularly

depression were very much rampant in the prisons, with depression showing a wide range from 4.2% to 25.5%,[17,18] which went upwards to 62% in exclusively female prisoner studies.[19] Despite this important gender bias that was observed in a few comparative studies,[17,19] no specific literature was found trying to probe this difference. The inmate suicide rate also consistently exceeded the suicide rate for the general population, more so in case of female inmates.[20,21]

Apart from the unfavourable conditions in prison, realisation about the nature of the crime committed, guilt feelings, and the progressively increasing isolation from society made the prisoners fragile from inside. Although our study design does not allow us to infer causality, this study is a humble attempt to find the impact of psychological trauma of being incarcerated upon the development of these psychiatric morbidities in the prisoners of this region.

## Aims and objectives

The primary objective of the study was to compare male and female prisoners in regard to the prevalence of insomnia,

depression, and suicidality. Secondly, the authors wanted to assess the relationship of insomnia, depression, and suicidal behaviour with the study variables of duration of stay in jail, the penal status, nature of crime, lifetime substance abuse, and physical morbidity; separately in male and female prisoners with a special emphasis upon the separation from their children in case of female prisoners.

## MATERIALS AND METHOD

The study was conducted with the prisoners from Guwahati Central Jail, located near Sarusajai stadium, Lakhara Chariali, in the Kamrup district of Assam, India. The period of study extended from January 2012 to December 2012. Official permission from Inspector General of Prisons, Assam was obtained to interview the prisoners. The study design was that of a cross-sectional comparative study, and the sample size consisted of 80 consecutively selected male and female prisoners (40 each for male and females) from the Guwahati Central Jail, matching the gender at the study intake. The sample size calculation was based upon the prevalence of prison depression published in two separate studies conducted upon male [22] and female prisoners [19]. We used the formula, patients per group =  $p_1(1-p_1)+p_2(1-p_2)/(p_2-p_1)^2 \times f(\alpha,\beta)$ , [23] where  $p_1$  was the prevalence of depression in male prisoners (35%) and  $p_2$  was the prevalence of depression in female prisoners (63%) according to the two above mentioned studies. The power was fixed at 80% and the level of significance was five per cent, the value of  $f(\alpha,\beta)$  was 7.85. The obtained sample size for each group applying this formula was 41.1 which was rounded to 40 for each group. Both male and female prisoners aged 18 years and above were included in the study. Prior ethical approval was obtained from the Institutional Ethics Committee, Gauhati Medical College before commencement of the study and confidentiality was maintained regarding the information which was obtained from the prisoners. Subjects, literate either in English, Assamese, or Bengali were only included in the study. Subjects having previously diagnosed psychiatric illness or obvious mental retardation prior to intake into the study were excluded from the study, as well as those who were having severe hearing or visual impairment. Subjects having serious medical illness were also excluded from the study.

### Procedure

Those prisoners who fulfilled the inclusion and exclusion criteria were explained the purpose and procedure of the study. After taking informed and written consent, the prisoners were subjected to formal psychiatric history and mental status examination, and were interviewed using the sociodemographic and the other clinical variables questionnaire as described below. For statistical purpose, the continuous clinical variable of duration of prison stay was categorised into three groups of six months, six months to one year, and more than one year as three discrete categories. For the same reason, age of children was categorised by five years incremental groups for female prisoners having children. The prisoners were given the choice of selecting psychological or pharmacological interventions had they been found to suffer from clinically impairing morbidity.

## Assessment tools

1. Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) [24]
2. Beck Depression Inventory-II (BDI-II) [25]
3. Pittsburgh Insomnia Rating Scale (PIRS) [26]
4. Columbia Suicide Severity Rating Scale (C-SSRS) [27]
5. Sociodemographic Variable Questionnaire

BDI-II, created by Dr. Aaron T. Beck, was a 1996 revision of the BDI, to be compatible with DSM-IV. It was a 21-item, multiple choice, self-report inventory, each answer being scored on a scale value of zero to three. [25] The authors of the scale recommend following ranges of BDI-II cut-off scores for depression: 0 to 13 (minimal), 14–19 (mild), 20–28 (moderate), and 29–63 (severe). The test was shown to have a high one-week test-retest reliability (Pearson  $r$  is 0.93), and also a high internal consistency ( $\alpha=0.91$ ). For the purpose of use in the current study, BDI-II had been translated into Assamese and Bengali languages for the prisoners not well versed with English, and was validated subsequently in the Psychiatry Department of the study institution.

PIRS was a widely used instrument in clinical and research practice. [26] It is a scale with 65-items with three broad sections; the subjective distress score (46 items), subjective sleep parameters (ten items), and last is the quality of life (QOL) score (nine items). The minimum and the maximum score ranged from zero to 195. Prevalence of insomnia was calculated by dividing the continuous variables of sleep distress, sleep parameters, and QOL into three tertiles, and taking the second and third tertile as implying clinically significant impairment. This strategy of dividing into tertiles was piloted upon samples of ten male and ten female prisoners each, and found to have correlated well with clinical observation of significant insomnia as interviewed by two of the study authors independently. PIRS demonstrated good test-retest reliability and it measured severity of insomnia in the past week of assessment. It appeared to have good concurrent validity with the Pittsburgh Sleep Quality Index (PSQI). [27] For the purpose of this current study, PIRS had been translated into Assamese and Bengali version, and had been validated accordingly.

C-SSRS is a suicidal ideation rating scale created by researchers at Columbia University to evaluate suicidality in children of ages 12 and above. [28] It rated an individual's degree of suicidal ideation on a scale, ranging from 'wish to be dead' to "active suicidal ideation with specific plan and intention". This measure contained six "yes" or "no" questions in which respondents were asked to indicate whether they had experienced several thoughts or feelings relating to suicide over the past month. These questions measured severity of different components of suicidal ideation. The intensity of the suicidal ideation subscale had demonstrated strong internal consistency.

### Statistical analysis

Statistical analysis was done using descriptive statistics and mean values were calculated for continuous variables. Chi-square ( $\chi^2$ ) test and Student  $t$  test were performed as

required for the comparison analysis. Confidence interval was fixed at 95% and a p value of 0.05 was taken as being statistically significant. For the association analysis,  $\chi^2$  test for independence and  $\chi^2$  test for trend were used wherever indicated. We used GraphPad Prism 6.02 (March 2013) for data analysis and statistical calculations.

## RESULTS AND OBSERVATIONS

### Sociodemographic and crime related variables analysis

As shown in Table 1, mean age of the study population was 36.75 years (SD=10) and Hinduism was the dominant

**Table 1:** Distribution of sociodemographic variables among the prisoners

Socio-demographic variables	Total (N=80)	Male (N=40)	Female (N=40)	p values (p<0.05)
Mean age in years (SD)	36.75 (10)	39.8 (10.2)	33.7 (8.8)	0.5532
Marital status				0.0016
Married	51 (63.75)	29 (72.5)	22 (55)	
Single	15 (18.75)	10 (25)	5 (12.5)	
Divorced	7 (8.75)	1 (2.5)	6 (15)	
Widowed/widower	7 (8.75)	0	7 (17.5)	
Religion				0.7279
Hindu	63 (78.75)	32 (80)	31 (77.5)	
Islam	14 (17.5)	6 (15)	8 (20)	
Christian	3 (3.75)	2 (5)	1 (2.5)	
Educational status				0.2147
Primary	39 (48.75)	20 (50)	19 (47.5)	
High school	19 (23.75)	5 (12.5)	14 (35)	
Matriculate	7 (8.75)	5 (12.5)	2 (5)	
Higher secondary	5 (6.25)	2 (5)	3 (7.5)	
Graduate	6 (7.5)	4 (10)	2 (5)	
Postgraduate	4 (5)	4 (10)	0	
Occupation				0.0025
Unemployed	2 (2.50)	1 (2.5)	1 (2.5)	
Daily labourer	37 (46.25)	21 (52.5)	16 (40)	
Service	20 (25)	12 (30)	8 (20)	
Student	2 (2.5)	1 (2.5)	1 (2.5)	
Professional	3 (3.75)	2 (5)	1 (2.5)	
Homemakers	12 (15)	0	12 (30)	
Others	4 (5)	3 (7.5)	1 (2.5)	
Socioeconomic status				0.4106
Lower	29 (36.25)	12 (30)	17 (42.5)	
Lower middle	40 (50)	21 (52.5)	19 (47.5)	
Middle	11 (13.75)	7 (17.5)	4 (10)	
High	0	0	0	
Locality				0.8216
Rural	45 (56.25)	23 (57.5)	22 (55)	
Urban	35 (43.75)	17 (42.5)	18 (45)	
Family type				0.1045
Nuclear	69 (86.25)	32 (80)	37 (92.5)	
Joint	11 (13.75)	8 (20)	3 (7.5)	

Tests of comparison applied were  $\chi^2$  test and student t test.

Figures indicate the number of prisoners in each category with percentages in parentheses.

religion. Female prisoners as a group had significantly more divorced and widowed participants ( $\chi^2=12.913$ ,  $df=2$ ,  $p<0.01$ ). Educational attainment was low and majority of them were daily wage earners from lower middle socioeconomic status

of rural background. The findings from the parameters related to incarceration were tabulated in Table 2. The males served terms significantly longer than females (combining six months to one year and more than one year as a single category,

**Table 2:** Distribution of prisoners according to different categories of incarceration variables

Variables	Total (N=80)	Male (N=40)	Female (N=40)	p value
Duration of stay				0.0002
<6 month	28 (35)	6 (15)	22 (55)	
6 month - 1 year	10 (12.5)	4 (10)	6 (15)	
>1 year	42 (52.5)	30 (75)	12 (30)	
Penal status				0.0431
Convict	36 (45)	23 (57.5)	13 (32.5)	
Under trial	44 (55)	17 (42.5)	27 (67.5)	
Nature of crime				0.0217*
Murder	32 (40)	21 (52.5)	11 (27.5)	
Rape	3 (3.75)	3 (7.5)	0	
Human trafficking	4 (5)	2 (5)	2 (5)	
Drug peddlers	14 (17.5)	3 (7.5)	11 (27.5)	
Dowry killing	3 (3.75)	0	3 (7.5)	
Others (robbery, kidnap, etc.)	26 (32.5)	13 (32.5)	13 (32.5)	
Substance use				<0.0001
None	15 (18.75)	3 (7.5)	12 (30)	
Tobacco	35 (43.75)	9 (22.5)	26 (65)	
Alcohol	15 (18.75)	13 (32.5)	2 (5)	
Opioid	0	0	0	
Polysubstance	15 (18.75)	15 (37.5)	0	
Physical illness				0.1482
None	66 (82.5)	33 (82.5)	33 (82.5)	
Acute	3 (3.75)	0	3 (7.5)	
Chronic	10 (12.5)	7 (17.5)	3 (7.5)	
Others	1 (1.25)	0	1 (2.5)	
Females having children			N=35	
No child			3 (8.6)	
1-2 children			23 (65.7)	
>2 children			9 (25.7)	
Females having children with different age groups			N=35	
No child			3 (8.6)	
<5 years			8 (22.9)	
5-10 years			12 (34.3)	
10-15 years			2 (5.7)	
>15 years			10 (28.5)	

\*Comparing murderers and drug paddlers in both sexes as other crimes were equally prevalent.

Figures indicate the number of prisoners in each category with percentages in parentheses.

$\chi^2=14.066$ ,  $df=1$ ,  $p<0.001$ ). Significantly more males were convicted than female prisoners,  $\chi^2$  test p value being 0.04.

### Comparison between sexes for prevalence of insomnia, depression, and suicidality

Eighty five percent of the female prisoners suffered from depression in comparison to 62.5% of the males ( $\chi^2$  test for independence= $8.298$ ,  $df=3$ ,  $p=0.04$ ). The prevalence of sleep distress in males was 65% and that in females was 72.5%. Prevalence of sleep parameter impairment was 62.5% in males and 82.5% in female prisoners, and that of sleep QOL impairment was 57.5% and 87.5% in male and female prisoners respectively. Male and female prisoners did not differ in respect to their sleep distress or sleep parameter, sub-scores in PIRS (p value being 0.66 and 0.09 respectively). But, a significantly higher number of females had poorer QOL when compared to male prisoners (QOL,  $\chi^2$  test for independence= $9.836$ ,  $df=2$ ,  $p<0.01$ ).

When C-SSRS scores are examined (Table 3), females significantly outnumbered males as 30% of them had suicidal ideation in comparison to only ten per cent of the males having such ideas during the stay ( $p<0.05$ , relative risk= $0.33$ , 95% CI= $0.117-0.946$ ). Only one female prisoner (2.5%) had both suicidal behaviour and suicidal attempt, whereas no male prisoner had any suicidal behaviour or attempt.

### Association of crime related variables with depression, insomnia, and suicidal ideations

Male prisoners had no statistically significant association of their duration of prison stay either with depression, insomnia, or suicidal ideation (Table 4[A]). But, female prisoners, who were imprisoned for more than six months, had more severe degrees of depressive symptoms ( $\chi^2=4.718$ ,  $df=1$ ,  $p<0.05$ ) and significantly more suicidal ideation ( $\chi^2=4.622$ ,  $df=1$ ,  $p<0.05$ ) than those who stayed in prison for shorter term. Males were more depressed while they remained under trial than when they were convicted ( $\chi^2=3.851$ ,  $df=1$ ,  $p<0.05$ ) which was the opposite finding in case of female prisoners (Table 4[A]). Apart from male rape convicts who had significantly more suicidal ideation ( $\chi^2=8.120$ ,  $df=1$ ,  $p<0.01$ ), no statistically significant association was found between nature of crime and depression or insomnia in both male and female prisoners (Table 4[A]). It was seen that male prisoners who used substance ever in their lifetime were significantly more depressed than those who did not ( $\chi^2=7.332$ ,  $df=2$ ,  $p<0.05$ ), while those female prisoners who ever used substance had significantly more suicidal ideation ( $\chi^2=5.448$ ,  $df=1$ ,  $p<0.05$ ). Another striking result of the analysis (Table 4[B]) was that those male prisoners who had any form of physical illness were significantly less depressed (37.5%) than those who did not have any illness (81.25%) ( $\chi^2=4.146$ ,  $df=1$ ,  $p<0.05$ ), while

**Table 3:** Distribution of prisoners falling in different ranges of cut-off scores for the tools for assessment of depression, insomnia, and suicidal ideation/behaviour

Assessment tools score range	Male (N=40)	Female (N=40)
Beck depression inventory-II (BDI-II):		
0 to 13	15	6
14 to 19	13	10
20 to 28	5	11
29 to 63	7	13
Pittsburgh insomnia rating scale (PIRS):		
Distress score		
0 to 46	14	11
47 to 92	8	7
92 to 138	18	22
Sleep parameter score		
0 to 10	15	7
11 to 20	14	22
21 to 30	11	11
Quality of life (QOL) score		
0 to 9	17	5
10 to 18	14	17
19 to 27	9	18
Columbia-Suicide severity rating scale (C-SSRS):		
Suicidal ideation present	4	12
Suicidal behaviour present	0	1
Suicide attempt present	0	1

**Table 4[A]:** Association analysis of the crime related variables with depression, insomnia, and suicidality

Assessment tools	$\chi^2$ test for independence (p value)							
	Duration of prison stay (less than 6 months/6 months to 1 year and more*)		Penal status (under trial/convicted*)		Nature of crime (murder/rape*/other crime)		Any substance abuse (none/alcohol/poly-substance*)	
	Male	Female	Male	Female	Male	Female	Male	Female
BDI-II	0.1625 (0.6869)	4.7182 (0.0299)	3.851† (0.0497)	4.5688 (0.0325)	0.206 (0.9022)	0.163 (0.6869)	7.332 (0.0256)	0.0373 (0.8464)
PIRS-QOL	0.2058 (0.9022)	2.1925 (0.3341)	1.1712 (0.5567)	7.3024 (0.0260)	0.2098 (0.9077)	0.1675 (0.6695)	1.750 (0.4169)	1.940 (0.3790)
C-SSRS ideation	0.7843 (0.3758)	4.6222 (0.0316)	0 (1)	5.215 (0.0223)	8.120 ‡ (0.0044)	2.469 (0.2910)	0.1602 (0.6890)	5.448 (0.0196)

\*Figures in bold indicate significant association with worse BDI-II, PIRS-QOL, and C-SSRS ideation scores.

†Male prisoners had more depression associated with under-trial penal status.

‡Comparing murderers with other male criminals, including rapists, as other category of criminals did not have any suicidal ideations.

BDI-II: Beck Depression Inventory-II, PIRS-QOL: Pittsburgh Insomnia Rating Scale-Quality of life, C-SSRS: Columbia-Suicide Severity Rating Scale.

**Table 4[B]:** Association analysis of the crime related variables with depression, insomnia, and suicidality

Assessment tools	$\chi^2$ test for independence (p value)				Females having children of different age (less than 5 years/5 to 15 years/more than 15 years)
	Any physical illness (yes*/no)		Females having children (1/1-2 and more than 2 children*)		
	Male	Female	Male	Female	
BDI-II	4.146† (0.0417)	0.4108 (0.5215)	8.2512 (0.0161)		0.0039‡
PIRS-QOL	1.523 (0.4669)	2.190 (0.3345)	12.691 (0.0018)		0.0025‡
C-SSRS ideation	0.0694 (0.7921)	4.750 (0.0293)	10.728 (0.0047)		5.197 (0.0226)§

\*Figures in bold indicate significant association with worse BDI-II, PIRS-QOL, and C-SSRS ideation scores.

†Male prisoners free from any form of illness had significantly more depression (81.25%vs. 37.5%).

‡ANOVA P values (comparing mean BDI-II scores of females in less than 5, 5 to 15, and more than 15 years age group categories of their children).

§ $\chi^2$  test comparing 5 to 15 years and more than 15 years age groups.

BDI-II: Beck Depression Inventory-II, PIRS-QOL: Pittsburgh Insomnia Rating Scale-Quality of life, C-SSRS: Columbia-Suicide Severity Rating Scale.

physically ill females had more suicidal ideation as expected ( $\chi^2=4.750$ ,  $df=1$ ,  $p<0.05$ ). A statistically significant association was found in case of mothers for all three dependant morbidity variables in comparison to females who did not have children (Table 4[B]), with the strength of association increasing with increasing number and age of their children ( $\chi^2$  test for trend=8.486,  $df=1$ ,  $p<0.01$  for insomnia and  $\chi^2$  test for trend=9.884,  $df=1$ ,  $p<0.01$  for suicidal ideation).

## DISCUSSION

Internalising psychiatric disorders or distresses were reported by many researchers to be more prevalent in prison inmates than in general population.[14,21,29] Females used to suffer more from these morbidities than male prisoners[17,19] and the significantly more divorced, widowed, and homemaker females found in our study in contrast to their employed and married male counterparts, highlighted the importance of such basic demographic characteristics in comparative prevalence of such morbidities.

## Analysis for the primary objective

A recent Indian prison study[29] found the prevalence of clinical depression in prisons to be 16.1% and international studies reported such varied rates as 5.04%[30] to even 91% in one study.[13] In line with that, our comparative study in two representative samples of male and female inmates came up with very high estimates, and the difference between the genders assumed statistical significance. Other researchers also previously reported this important sex difference.[11,19] Now, coming to the issue of sleep disturbance, nearly three quarters of the male inmates and four fifths of the females in our study had sleep impairment in all the three subscales of PIRS, and the female inmates had significantly poorer QOL due to sleep impairment in comparison to their male counterparts. Both the external factors related to overcrowding, the unavoidable human rights restrictions and lack of appropriate health resources[15,16] as well as the internal turmoil that the prisoner went through while being incarcerated[14] were deemed responsible by many previous

authors for such high prevalence of sleep disturbances. On the other hand, we found much less prevalence of suicidal ideation or attempt in our prisoners, which was reported to be much higher in previous studies done outside India.[20,31,32] This was a consistent finding all over the world, as in the Bangalore prison study [11] six out of the total 30 deaths were found to be due to prisoner suicide against a national backdrop of 10.6 suicides per one lakh general population.[33] A recent study done in Australia even reported a staggering fifth of the total studied prisoners attempting suicide.[34] Although solitary confinement[21] and prisoner abuse, overcrowding, and hopelessness[20,21,29,32] were put forward as explanations, the literature still lacks causal explanations for this overwhelming rate of prisoner suicide.

### The association analysis

A general trend of increased vulnerability for these morbid occurrences was seen in female inmates in comparison to their male counterparts. For example, in females, the severity of depressive symptoms increased as a function of time as well as a change in the penal status from under trial to conviction. This association of morbidity regarding convict status and subsequent longer duration of stay was evident also with suicidal ideation in female inmates but not in males. In fact, male prisoners had less depression once they were convicted of their crimes. This finding posed an intriguing question as to what conferred the males with such significant resilience that in place of getting broken down to depression, they actually were able to cope better as their stay lengthened in prison. One probable but untested explanation might be that male prisoners were relieved of the apprehension and panic once they were convicted of their crimes, and were able to accept and adjust more rapidly in the prison environment than females. Exactly what conferred them with this impressive resilience was obviously out of purview of our study, and supposedly involved numerous biological and environmental variables, and is a fertile ground for future studies. Another interesting finding of the study was that all of the male prisoners who were tried or convicted of rape had expressed suicidal ideation. This reached statistical significance when compared to other categories of crime committed by male offenders. Why all the rape perpetrators would harbour suicidal ideation was something we were unable to explain, and further studies are needed drawing upon a much larger sample of prisoners to validate this finding and to look for an explanation. In the current study, another association worth nothing was between substance abuse and depression. A statistically significant association was found between lifetime substance abuse and depression in male prisoners. As reported by a recent researcher, a lifetime history of substance use predisposed the prisoners for development of depression; still worse, if the prisoners were originally convicted for a substance related crime.[35] The present study cannot claim causal associations because of the study design, but testified to the validity of such a gloomy scenario at least in the cross-sectional observation which needed further long-term studies to confirm the association. Another finding from the current study was in stark contrast with previous findings. As we have mentioned earlier, a major bulk of the prisoners in our study did not suffer from any physical illness and in the attempt to associate physical illness with depression, it was found that male prisoners who were suffering from chronic physical illness

were actually suffering significantly less from clinical depression in comparison to the ones having any physical illness. We were unable to find any literature supporting this finding and were left only to speculate if the physical illness were allowing them to at least remain preoccupied with something else, and rescued them from the pervasive feeling of boredom and the torturing whiplashes of their relentless conscience. One of the most interesting findings from our study pertains to the statistically significant differences in prevalence of depression, poor sleep quality, and suicidal ideation between the group of female prisoners who had children when compared with those who did not have any children. This finding had been previously reported by the large Bangalore prison study where the researchers had found separation from children as an important factor impacting women prisoners' psychological health.[11] Age of their children also significantly affected their wellbeing as those who had very young and adolescent children were affected more. Traditionally, women are considered more caring and psychologically sophisticated than males, and they are also more vulnerable for internalising disorders.[36,37] One could logically infer that the motherly instinct and the inherent biological vulnerability would make mothers suffer more from these psychological morbidities once they were separated from their children due to imprisonment.

### Strength and limitations

The present study was limited in some important aspects. The first important limitation was an unavoidable selection bias due to the cross-sectional study design and serial sampling procedure in the form of probable inclusion of prison inmates who might have already been suffering from depression or insomnia or harbouring suicidal ideation prior to their incarceration. This was attempted to be minimised by selection of rating scales which asked questions about their psychological and behavioural functioning in the cross-sectional time frame or the preceding week prior to the study intake. Another issue of concern to the authors was that the independent clinical variables which were tested for supposed association with the dependent outcome variables of morbidity, were themselves seemed to be related to each other, and more exhaustive regression analysis was needed to address this issue. Finally, the study participants were not followed-up for test-retest reliability as the study design did not permit, but all of them were separately examined by the authors to ensure the validity and reliability of the clinical diagnosis.

### Conclusion

This was the first study as per the authors' knowledge, to be conducted in the North-Eastern part of India which looked inside the prisoners' troubled world. Although clinical data were available from various Indian studies regarding the general and mental health conditions inside the prisons in India, that data was limited only to prevalence estimates of various morbidities. This was the first attempt to trace any link between the self-realisation, pervasive isolation from society and children, and detrimental effects of substance abuse and physical ill health upon the psychological wellbeing of the incarcerated. The authors deliberately kept aside factors related to unhygienic prison conditions, overcrowding, prisoner maltreatment and abuse, deprivation and humiliation of basic human rights of the prisoners, and poor infrastructure issues of the jails as many

authors highlighted these issues previously. What came out from this study was an unusually high prevalence of depression, sleep disturbance, and suicidal ideation in the prisoners of both the sexes in comparison to the general population, although female inmates had suffered significantly more from these morbidities. More statistically and methodically rigorous studies spanning over an entire prison population and following a longitudinal design in the future may be able to validate these important findings that the current study brought forth. Taking into consideration the immense unmet needs of the prison population in terms of mental health and wellbeing, such studies in the immediate future are the call of the hour.

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Source of support: Nil. Declaration of interest: None.