

A population-based analysis of suicidality and its correlates: findings from the National Mental Health Survey of India, 2015–16



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Summary

Background India accounts for 18% of the global population and 26·6% of global suicide deaths. However, robust population-based, nationally representative data on suicidality are not readily available to plan and implement suicide prevention programmes in India. We aimed to investigate the prevalence and sociodemographic differentials of suicidality using data from the National Mental Health Survey (NMHS) of India, 2015–16.

Methods Trained field data collectors from the NMHS obtained information on suicidality (during the past month) from a community sample of adults aged 18 years and older using the suicidality module of the Mini-International Neuropsychiatric Interview (version 6.0). Suicidality was categorised as low, moderate, high, and overall (representing any suicidality), and examined for sociodemographic differentials using normalised sampling weights. For each of the 12 surveyed states, we calculated the age-standardised suicidality prevalence for men and women, men-to-women ratio of weighted suicidality prevalence, ratio of suicidality to suicide deaths, and ratio of suicide attempts to suicide deaths. We used logistic regression analysis to examine the association between sociodemographic factors and overall suicidality and severity.

Findings Among 34 748 participants with complete interviews, 5·1% (95% CI 4·7–5·6) had some level of suicidality, and 0·3% (0·2–0·4) had at least one suicide attempt in the past month. The prevalence of overall suicidality was higher in women (6·0% [5·4–6·6]) than in men (4·1% [3·7–4·6]). The prevalence of overall suicidality was highest in those aged 40–49 years among women and in those aged 60 years or older among men. Compared with their counterparts, individuals with lower educational attainment, individuals residing in urban metropolitan cities, individuals who were widowed, separated, or divorced, and unemployed individuals had a higher prevalence of overall suicidality. The men-to-women ratio of overall suicidality prevalence for India was 0·68 (range 0·55–0·85). For every death by suicide in India, there were more than 200 people with suicidality and more than 15 suicide attempts. We found variations for various severities of suicidality. We found an increased risk for overall suicidality in women versus men (odds ratio [OR] 1·54 [95% CI 1·31–1·81]; $p < 0·0001$) and in individuals residing in urban metropolitan cities versus those residing in rural areas (1·75 [1·30–2·35]; $p = 0·0002$). Individuals belonging to the lowest income quintile (reference group with OR $< 1·00$ and $p < 0·05$ for other income quintiles), those with depressive disorders (28·78 [20·04–41·33]; $p < 0·0001$) and those with alcohol use disorders (6·52 [3·83–11·10]; $p < 0·0001$) had an increased risk for high suicidality, compared with their corresponding counterparts.

Interpretation A national suicide prevention strategy that is comprehensive, using multisectoral approaches, is required to address the prevailing sociodemographic and other risk factors for reducing suicidality and suicide deaths in India. This study also has implications for other low-income and middle-income countries in south Asia, where sociodemographic factors play a crucial role for suicide prevention.

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Introduction

Globally, an estimated 793 824 suicide deaths occurred in 2017, with an annual global suicide prevalence of 10·4 per 100 000 population (14·1 for males and 6·7 for females).¹ Suicide is one of the leading causes of death in people aged 15–29 years and an estimated 75·5% of all global suicides occur in low-income and middle-income

countries (LMICs), with India alone accounting for 26·6% of all global suicide deaths.^{1,2}

Among various risk factors for suicide, non-fatal self-harm (non-suicidal self-injury and non-fatal suicidal behaviours) is an important risk factor for subsequent suicide.³ Most commonly, suicide is preceded by non-fatal suicidal thoughts and behaviours (suicidality) that

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Research in context

Evidence before this study

Although population-based data that are nationally representative are available for suicide from the National Crime Record Bureau of India, several limitations exist due to methodological and reporting issues. Findings on suicide from the Global Burden of Disease Study (GBD) indicate wide heterogeneity between Indian states during 1990 to 2016 for several reasons. Suicide is only part of the complex range of suicidal behaviours and knowledge about suicidality from a public health perspective is insufficient. Our search using the terms “suicidal”, “suicidality”, “suicidal behaviours”, “suicidal intent”, “suicidal attempt”, “suicidal ideations”, “suicidal plan”, “epidemiology”, “India”, “mortality”, “suicide”, “suicid*” in various combinations by applying “AND” or “OR” on PubMed, PsycINFO, Ovid, and Google Scholar to retrieve studies from India (without date restrictions on March 5, 2019) revealed little information. No previous studies provide large nationally representative data on suicidality estimates for India through a comprehensive and systematic assessment.

Added value of this study

This is the first comprehensive, population-based study to assess suicidality and its associated factors in a representative population from 12 states in India, using robust methodology and standardised study instruments, while overcoming the limitations of previous studies. Our findings highlight that about 5% of adults in India were reported to have had at least

one suicidality phenomenon, and about 1% were reported to have high suicidality that requires urgent intervention. For every death by suicide in India, more than 200 people had suicidality and more than 15 had attempted suicide. Large differences in levels of suicidality by age, gender, place of residence, and socioeconomic status were observed. The sociodemographic differences in suicidality also varied across states. This study is the largest to investigate suicidality in India and the first to sample the entire surveyed states, including the north-eastern states.

Implications of all the available evidence

This study provides a comprehensive assessment of the magnitude and distribution of suicidality and suggests that suicidality is more prevalent than death by suicide, emerging as another complex public health problem that is unrecognised. To reduce morbidity and mortality from suicidality and death by suicide in India, the available data at the national level in combination with findings from this study can be used to develop the framework for the national suicide prevention strategy. The state-specific factors can be used to guide the action plans at the state level. These findings can also inform policy for other low-income and middle-income countries that are undergoing rapid sociodemographic transitions similar to that of India in achieving the Sustainable Development Goal for suicide reduction.

include ideation, plan, intent, preparatory behaviour, and attempt.^{2,4} Suicidal ideation refers to thoughts of harming or killing oneself; suicidal plan refers to formulation of a specific method, means, location, or timing through which one intends to die; suicidal intent refers to expectation and desire for a self-destructive act to end in death; suicide preparatory behaviour indicates acts or preparation toward making a suicide attempt but before the potential for harm has begun; and attempted suicide is a non-fatal, self-inflicted destructive act with explicit or inferred intent to die.^{2,4-6} A previous suicide attempt is the most important predictor of suicidal death, with each attempt increasing the risk of subsequent attempt, death, serious long-term physical injury, and psychological suffering in the general population.^{2,7} WHO recommends identifying and understanding suicidality as a key component of all comprehensive suicide prevention strategies.²

In India, suicide was among the leading ten causes of years of life lost in all state groups.⁸ Also, the contribution of suicide to the disease burden increased during 1990–2016 in India.⁸ India’s contribution to global suicide deaths increased from 25.3% in 1990 to 36.6% in 2016 among women, and from 18.7% to 24.3% among men.⁹ Because of the large population size (18% of the global population), suicides and suicidality in India have global implications towards achieving the sustainable

development goals (SDGs) that target a reduction by a third in premature mortality from non-communicable diseases by 2030, with the suicide mortality rate as one of the key indicators.¹⁰

For effective suicide reduction, the existence of a national suicide prevention strategy that is evidence informed is important and such evidence should include suicide and suicidality data, from a nationally representative general population.¹¹ In 2015, the National Crime Records Bureau (NCRB), a major source of suicide data in India, reported 133 623 deaths by suicide; much higher estimates were reported by the Global Burden of Disease Study (GBD; 230 833) and WHO (215 669).^{1,12,13} The limitations of NCRB data for suicide due to underreporting and misclassifications have been well documented.^{14,15} Estimates from GBD data comprehensively described population-based estimates of suicide mortality in India.⁹

Population-based suicidality data that are nationally representative will help to inform suicide prevention strategies because interventions can be developed and people with suicidality can be supported with suitable measures (by contrast with suicide deaths). However, such data on suicidality is not available from NCRB or from the available studies in India. Most studies on suicidality were confined to small sample areas or clinical populations and often are not representative of the general population.^{16,17}

	Participants, n (%)	Low, % (95% CI)	Moderate, % (95% CI)	High, % (95% CI)	Overall, % (95% CI)
Total	34748 (100.00%)	3.50% (3.18–3.82)	0.71% (0.57–0.84)	0.90% (0.73–1.06)	5.11% (4.66–5.55)
Gender					
Men	16553 (47.64%)	2.88% (2.54–3.21)	0.59% (0.43–0.75)	0.65% (0.48–0.81)	4.12% (3.66–4.57)
Women	18195 (52.36%)	4.08% (3.66–4.51)	0.81% (0.61–1.02)	1.14% (0.90–1.37)	6.03% (5.44–6.62)
Age, years					
18–29	11829 (34.04%)	2.67% (2.27–3.07)	0.55% (0.37–0.74)	0.86% (0.63–1.08)	4.08% (3.53–4.63)
30–39	7050 (20.29%)	3.64% (3.04–4.24)	0.83% (0.57–1.09)	0.81% (0.48–1.15)	5.28% (4.49–6.08)
40–49	5845 (16.82%)	3.92% (3.29–4.55)	0.85% (0.53–1.18)	1.19% (0.80–1.58)	5.97% (5.14–6.79)
50–59	4441 (12.78%)	4.32% (3.56–5.07)	0.59% (0.29–0.88)	1.02% (0.56–1.47)	5.92% (4.97–6.87)
≥60	5583 (16.07%)	4.18% (3.49–4.87)	0.85% (0.47–1.22)	0.70% (0.42–0.97)	5.73% (4.86–6.59)
Area of residence					
Rural	23913 (68.82%)	3.36% (2.99–3.72)	0.65% (0.52–0.79)	0.76% (0.60–0.91)	4.76% (4.28–5.25)
Urban non-metropolitan	6597 (18.99%)	3.16% (2.52–3.79)	0.58% (0.27–0.90)	0.54% (0.28–0.79)	4.27% (3.38–5.17)
Urban metropolitan	4238 (12.20%)	4.28% (3.29–5.28)	1.00% (0.53–1.47)	1.69% (1.08–2.30)	6.98% (5.50–8.46)
Education					
None	8426 (24.25%)	4.55% (3.94–5.17)	0.77% (0.53–1.01)	1.06% (0.72–1.41)	6.39% (5.57–7.20)
Primary	6173 (17.77%)	3.82% (3.21–4.43)	0.89% (0.48–1.30)	1.27% (0.86–1.68)	5.98% (5.06–6.89)
Secondary	5757 (16.57%)	3.28% (2.74–3.82)	0.86% (0.53–1.20)	0.99% (0.64–1.34)	5.13% (4.32–5.94)
High school	6487 (18.67%)	2.69% (2.18–3.19)	0.64% (0.41–0.88)	0.54% (0.37–0.71)	3.87% (3.26–4.48)
Pre-university and vocational	3865 (11.12%)	2.64% (2.05–3.24)	0.36% (0.16–0.55)	0.71% (0.18–1.24)	3.71% (2.82–4.61)
Graduate and above	4040 (11.63%)	2.85% (2.21–3.49)	0.45% (0.15–0.76)	0.43% (0.23–0.64)	3.74% (2.96–4.51)
Occupation					
Employed	16771 (48.26%)	3.48% (3.09–3.87)	0.70% (0.52–0.88)	0.81% (0.63–1.00)	5.00% (4.46–5.53)
Unemployed	17977 (51.74%)	3.51% (3.12–3.91)	0.71% (0.52–0.90)	0.97% (0.75–1.19)	5.20% (4.64–5.75)
Marital status					
Never married	6668 (19.19%)	2.63% (2.10–3.16)	0.47% (0.27–0.67)	0.70% (0.45–0.95)	3.81% (3.11–4.50)
Married	25938 (74.65%)	3.49% (3.15–3.82)	0.74% (0.57–0.90)	0.91% (0.72–1.09)	5.13% (4.66–5.61)
Widowed, or divorced, or separated	2142 (6.16%)	6.76% (5.26–8.26)	1.16% (0.50–1.81)	1.53% (0.76–2.30)	9.45% (7.56–11.33)
Income quintile					
Lowest quintile	6982 (20.09%)	4.24% (3.60–4.88)	0.88% (0.58–1.18)	1.44% (0.96–1.92)	6.56% (5.68–7.44)
Second quintile	6839 (19.68%)	3.59% (2.97–4.21)	0.52% (0.33–0.71)	0.95% (0.64–1.26)	5.07% (4.30–5.83)
Middle quintile	6852 (19.72%)	3.24% (2.59–3.89)	0.83% (0.53–1.13)	0.77% (0.51–1.03)	4.84% (4.00–5.69)
Fourth quintile	6991 (20.12%)	3.23% (2.68–3.77)	0.73% (0.44–1.03)	0.77% (0.49–1.05)	4.73% (3.93–5.52)
Highest quintile	7084 (20.39%)	3.30% (2.75–3.84)	0.59% (0.37–0.81)	0.64% (0.35–0.92)	4.52% (3.83–5.21)

Table 1: National-level weighted suicidality prevalence for various sociodemographic characteristics as per level of suicidality

The National Mental Health Survey (NMHS) of India—a large-scale, population-based, multicentre survey for mental, behavioural, and substance use disorders (MBSUDs)—examined suicidality in a representative sample. We provide details on the prevalence and correlates of suicidality among the general population in India.

Methods

Study design and population

Details about the NMHS methods are available elsewhere.^{18,19} Briefly, the NMHS was done in 12 states in India (from October 2, 2015, to June 10, 2016), in six zones (north, east, west, south, central, and northeast) that were selected to represent the sociocultural diversity of India to collect data on prevalence, pattern, and outcomes for MBSUDs, and the performance of the mental health system in India.^{18,19}

The NMHS included adults (aged ≥18 years), interviewed at their doorsteps using a multistage sampling that selected a representative population from six talukas in each state (appendix p 3).^{18,19} The Mini-International Neuropsychiatric Interview (MINI; version 6.0) was used to assess various MBSUDs, including suicidality, depression, alcohol use disorders.²⁰ The use of MINI allowed a single-stage diagnosis and generated diagnoses compatible with the ICD-10. MINI was translated into local languages using a standard procedure to ensure sociocultural appropriateness. Subsequently, the National Institute of Mental Health and Neuro Sciences (NIMHANS) core team, investigators from the selected states, and field teams for data collection in each state were trained using a uniform standardised schema based on the principle of observe-practice-conduct-refine for 8 weeks. Data were collected on handheld tablets.

See Online for appendix

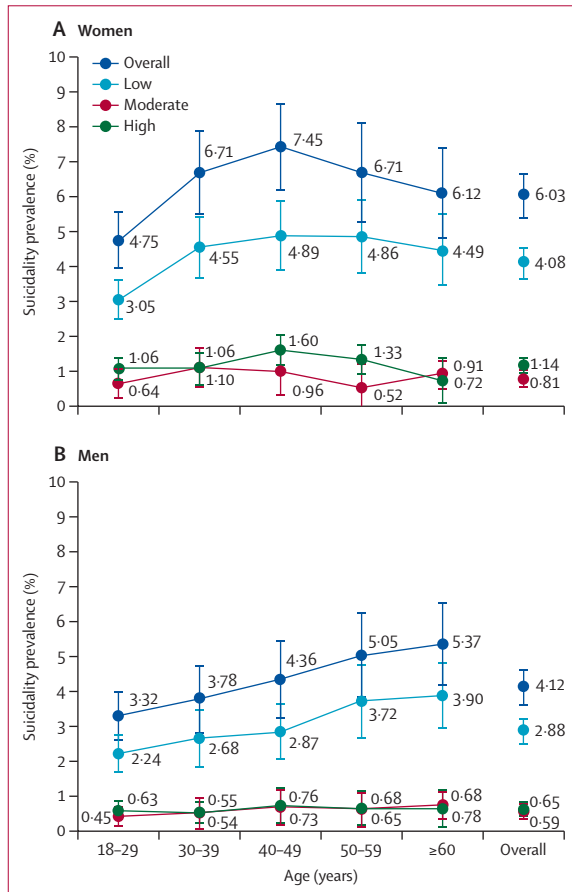


Figure 1: Weighted suicidality prevalence in men and women in India, by age and level of suicidality
 Error bars represent 95% CIs. Overall refers to any level of suicidality.

The study was approved by the ethics committee of NIMHANS, Bangalore, India, and from the respective authorities of participating sites. Written informed consent in the local language was obtained from the participants. To the best possible extent, all the interviews were done in private to ensure privacy and confidentiality. Participants who had any suicidality were referred to the nearest health-care facility.

Suicidality assessment

The suicidality module of MINI has 14 questions and is a yes-or-no interviewer administered questionnaire that was used to assess suicidality (in the preceding month). Each question had a different score. The first, second, and twelfth questions that focused on non-suicidal phenomena were excluded from the final scoring, and the remainder were summed and categorised as low (<9), moderate (9–16), or high (≥17) suicidality (appendix pp 4–5). Suicidal ideation was defined as a positive response to any of the three questions (questions 3–5) of the suicidality module (appendix p 4). Questions on sociodemographic characteristics included cluster type, family composition, age, gender, education, occupation, family income, and marital status.

Statistical analysis

Suicidality (in the preceding month) was categorised into low, moderate, high levels, and overall, as per MINI, for prevalence estimation. Overall suicidality represents suicidality in any form. Prevalence of key suicidality phenomena was also estimated on the basis of specific questions in the suicidality module of MINI. The stratum-specific prevalence was calculated for each level of suicidality using the entire and gender-segregated dataset to examine the variations among key sociodemographic

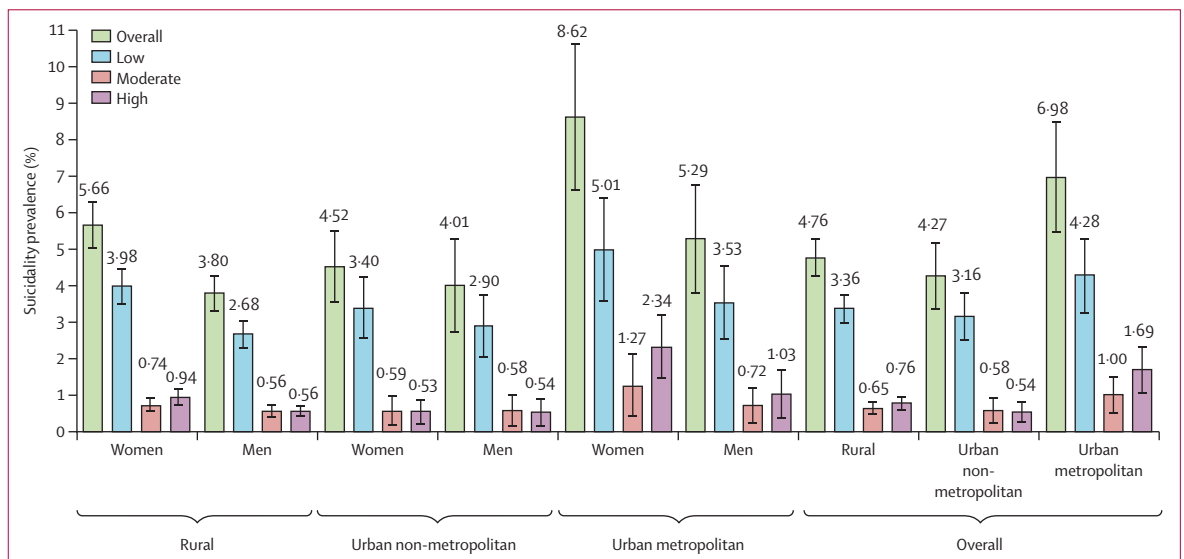


Figure 2: Weighted suicidality prevalence in men and women in India by area of residence and level of suicidality
 Error bars represent 95% CIs. Overall refers to any level of suicidality.

variables. All prevalence estimates were provided with 95% CIs. To increase the representativeness and to accommodate for non-response, normalised sampling weights were applied to calculate the national level estimates (appendix p 6). To account for clustering, all analyses were done using the “svy” command in Stata (version 12.0). Unless otherwise specified, suicidality refers to that during the past month.

Besides weighted suicidality prevalence, age-standardised suicidality prevalence was estimated for the state and national level, using the global reference population from GBD 2015.²¹ Subsequently, the men-to-women ratios of weighted suicidality prevalence were estimated and compared for variations in gender differences across the NMHS states. The ratios of suicidality to death by suicide and suicide attempt to death by suicide were then calculated for the state and national level using weighted suicidality prevalence, weighted suicide attempt prevalence, and weighted prevalence of deaths by suicide to assess the occurrence of suicidality and suicide attempts relative to suicide deaths. The weighted prevalence of death by suicide that was expected for the NMHS weighted sample was calculated using the observed suicide death rate from GBD 2015.²² When comparing suicidality with death by suicide, suicidality estimates were based on reporting for the past month and hence represent the minimum suicidality estimates for a given year.

Binomial logistic regression analysis was done to examine the influence of potential risk factors on overall suicidality using odds ratios (appendix pp 6–7). Multinomial logistic regression was used to examine the influence of potential risk factors on various levels of suicidality (low, moderate, and high) using relative risk ratios. All estimates were reported using 95% CI with significance at p value less than 0.05. Binomial and multinomial logistic regression models were done on the gender-segregated dataset to explore whether various risk factors would be associated with suicidality (overall and various levels) in men and women.

Role of the funding source

The funder of the study had no role in the study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Out of 39532 participants eligible for the study, 34748 (87.9%) participants completed the interview for suicidality. Over half of the participants were women (52.3%) and from rural areas (68.8%). Individuals aged 18–29 years formed the predominant age group (34%) and nearly 74.6% of participants were married. Other sociodemographic characteristics of the sample are depicted in table 1. 5.1% (95% CI 4.7–5.6) of participants

	Participants, n (%)	Low, % (95% CI)		Moderate, % (95% CI)		High, % (95% CI)		Overall, % (95% CI)	
		Weighted	Weighted and age-standardised	Weighted	Weighted and age-standardised	Weighted	Weighted and age-standardised	Weighted	Weighted and age-standardised
Overall	34 748 (100.00%)	3.50% (3.18–3.82)	3.61% (3.41–3.81)	0.71% (0.57–0.84)	0.72% (0.63–0.82)	0.90% (0.73–1.06)	0.90% (0.80–1.00)	5.11% (4.66–5.55)	5.24% (5.00–5.48)
North	6394 (18.40%)	3.86% (3.19–4.53)	4.11% (3.59–4.64)	0.79% (0.50–1.07)	0.84% (0.60–1.08)	0.83% (0.49–1.17)	0.90% (0.65–1.15)	5.48% (4.45–6.51)	5.81% (5.19–6.43)
Punjab	2891 (8.32%)	3.72% (2.63–4.80)	3.85% (2.62–5.09)	0.17% (0.02–0.33)	0.20% (0.00–0.48)	0.54% (0.28–0.79)	0.52% (0.06–0.97)	4.43% (3.16–5.70)	4.57% (3.23–5.91)
Uttar Pradesh	3503 (10.08%)	3.89% (3.11–4.66)	4.20% (3.61–4.78)	0.90% (0.57–1.24)	0.97% (0.69–1.26)	0.89% (0.48–1.29)	0.95% (0.67–1.24)	5.68% (4.49–6.86)	6.08% (5.38–6.77)
South	5526 (15.90%)	5.87% (4.93–6.82)	5.76% (5.02–6.51)	0.47% (0.25–0.69)	0.49% (0.26–0.71)	1.05% (0.74–1.37)	1.03% (0.70–1.36)	7.39% (6.29–8.50)	7.29% (6.45–8.12)
Kerala	2475 (7.12%)	7.68% (6.28–9.09)	7.29% (5.72–8.86)	0.87% (0.53–1.21)	0.94% (0.34–1.54)	2.23% (1.62–2.85)	2.13% (1.24–3.02)	10.78% (9.09–12.47)	10.44% (8.59–12.30)
Tamil Nadu	3051 (8.78%)	5.14% (3.98–6.29)	5.12% (4.28–5.96)	0.30% (0.03–0.57)	0.34% (0.12–0.56)	0.57% (0.25–0.89)	0.59% (0.29–0.88)	6.01% (4.74–7.27)	5.97% (5.06–6.87)
East	5658 (16.28%)	1.93% (1.41–2.44)	1.94% (1.64–2.23)	0.80% (0.42–1.17)	0.82% (0.62–1.02)	1.23% (0.76–1.70)	1.23% (1.00–1.47)	3.95% (3.03–4.88)	3.98% (3.56–4.40)
Jharkhand	3014 (8.67%)	1.67% (0.95–2.39)	1.62% (1.26–1.99)	0.61% (0.26–0.95)	0.68% (0.43–0.93)	0.77% (0.31–1.23)	0.72% (0.48–0.96)	3.05% (1.95–4.15)	3.02% (2.52–3.52)
West Bengal	2644 (7.61%)	2.21% (1.44–2.97)	2.30% (1.83–2.78)	1.01% (0.31–1.70)	1.00% (0.69–1.31)	1.74% (0.93–2.56)	1.80% (1.38–2.22)	4.96% (3.43–6.49)	5.08% (4.38–5.77)
West	6267 (18.04%)	3.76% (2.96–4.56)	3.97% (3.42–4.52)	0.54% (0.34–0.73)	0.56% (0.35–0.77)	0.74% (0.44–1.03)	0.77% (0.53–1.02)	5.03% (3.89–6.16)	5.29% (4.66–5.92)
Gujarat	3159 (9.09%)	2.47% (1.81–3.12)	2.54% (1.88–3.19)	0.38% (0.19–0.57)	0.40% (0.14–0.66)	0.35% (0.16–0.54)	0.36% (0.11–0.61)	3.20% (2.38–4.02)	3.20% (2.47–3.94)
Rajasthan	3108 (8.94%)	4.73% (3.45–6.01)	5.16% (4.31–6.02)	0.65% (0.33–0.97)	0.76% (0.42–1.10)	1.03% (0.54–1.51)	1.12% (0.71–1.53)	6.41% (4.56–8.25)	7.02% (6.03–8.01)
Central	5454 (15.70%)	3.64% (2.83–4.44)	3.75% (3.31–4.18)	0.80% (0.50–1.09)	0.80% (0.60–1.00)	0.65% (0.33–0.96)	0.64% (0.46–0.82)	5.08% (3.99–6.16)	5.19% (4.69–5.70)
Chhattisgarh	2840 (8.17%)	1.67% (0.75–2.58)	1.71% (1.18–2.23)	0.44% (0.13–0.74)	0.43% (0.17–0.69)	0.28% (0.02–0.54)	0.23% (0.06–0.41)	2.38% (1.24–3.53)	2.33% (1.73–2.93)
Madhya Pradesh	2614 (7.52%)	4.52% (3.45–5.60)	4.70% (4.12–5.29)	0.96% (0.55–1.36)	0.97% (0.70–1.24)	0.81% (0.37–1.24)	0.81% (0.57–1.05)	6.29% (4.83–7.75)	6.49% (5.81–7.16)
Northeast	5449 (15.68%)	3.60% (2.69–4.50)	3.53% (2.89–4.17)	0.66% (0.40–0.92)	0.69% (0.40–0.99)	0.85% (0.45–1.24)	0.81% (0.50–1.11)	5.10% (3.87–6.33)	5.24% (5.00–5.48)
Assam	2599 (7.48%)	3.32% (2.26–4.38)	3.23% (2.55–3.90)	0.61% (0.31–0.91)	0.60% (0.30–0.89)	0.75% (0.29–1.21)	0.70% (0.39–1.00)	4.68% (3.24–6.12)	4.57% (3.78–5.36)
Manipur	2850 (8.2%)	5.00% (4.03–5.98)	5.17% (3.27–7.08)	0.90% (0.52–1.28)	1.15% (0.24–2.06)	1.34% (0.87–1.81)	1.15% (0.24–2.06)	7.25% (6.05–8.45)	7.28% (5.95–9.51)

Table 2: Weighted and age-standardised suicidality prevalence for various levels of suicidality in the National Mental Health Survey of states of India, 2015–16

	Suicidality prevalence per 100 000*	Suicide attempts per 100 000*	Suicide deaths per 100 000†	Suicidality prevalence to suicide attempts ratio	Suicide attempts to suicide deaths ratio	Suicidality prevalence to suicide deaths ratio
India	5106.70	349.52	24.09	14.61	14.51	211.98
North	5480.82	448.04	21.00	12.23	21.34	260.99
Punjab	4426.35	115.42	12.54	38.35	9.20	352.98
Uttar Pradesh	5677.41	510.06	22.58	11.13	22.59	251.44
South	7393.97	256.03	35.26	28.88	7.26	209.70
Kerala	10783.40	498.61	27.20	21.63	18.33	396.45
Tamil Nadu	6007.66	156.81	38.56	38.31	4.07	155.80
East	3951.39	465.09	22.36	8.50	20.80	176.72
Jharkhand	3045.74	334.86	13.92	9.10	24.06	218.80
West Bengal	4956.91	609.68	31.72	8.13	19.22	156.27
West	5028.03	243.58	20.13	20.64	12.10	249.78
Gujarat	3200.10	200.50	22.53	15.96	8.90	142.04
Rajasthan	6407.58	276.10	18.32	23.21	15.07	349.76
Central	5077.04	291.70	26.52	17.41	11.00	191.44
Chhattisgarh	2383.88	245.76	28.32	9.70	8.68	84.18
Madhya Pradesh	6291.46	312.41	25.72	20.14	12.15	244.61
Northeast	5099.64	272.59	22.29	18.71	12.23	228.80
Assam	4678.65	274.89	23.04	17.02	11.93	203.07
Manipur	7248.00	260.85	18.43	27.79	14.15	393.27

*Crude prevalence was adjusted using sampling weight to enhance representativeness. The suicidality prevalence was based on reporting from the past month and hence represents the minimum estimates for the given year. †To ensure valid comparison, suicide deaths estimated from the Global Burden of Disease Study 2015 were adjusted for the National Mental Health Survey of India weighted sample.³¹

Table 3: Comparison of weighted suicidality, suicide attempts, and death by suicide for the National Mental Health Survey of states of India, 2015–16

had experienced suicidality in any form during the past month (appendix p 5; table 1). 3.5% (3.2–3.8) had low, 0.7% (0.6–0.8) had moderate, and 0.9% (0.7–1.1) had high suicidality.

The most prevalent suicidality phenomenon was suicidal ideation (3.5%, 95% CI 3.2–3.9). 0.9% (0.7–1.0) of the participants had a suicide method in mind, 0.6% (0.4–0.7) had a suicide plan, and 0.4% (0.3–0.5) had taken active steps for a suicide attempt in the past month (appendix p 8). 0.3% (0.2–0.4) reported attempting suicide in the past month.

The extent and distribution of suicidality for key sociodemographic variables (gender, age-groups, area of residence, and income) varied notably. Overall suicidality was higher among women compared with men. For any suicidality level, women had a higher prevalence of suicidality than men among most of the age groups (figure 1). For high suicidality (representing the most severe end of the spectrum that requires urgent intervention), the prevalence among women was 1.75 times that of men. The prevalence of various levels of suicidality varied with age. The prevalence of overall, high, and moderate suicidality was highest in participants aged 40–49 years, and the prevalence of low suicidality was highest in those aged 50–59 years. Among women, the prevalence of overall and low suicidality was highest in those 40–49 years, and moderate suicidality was highest in those aged 30–39 years (figure 1). In men, the

prevalence of overall, low, and moderate suicidality was highest in those aged 60 years or older. In men and women, the prevalence of high suicidality was highest in those aged 40–49 years.

Among areas of residence, a higher prevalence of suicidality was observed in urban-metropolitan residents, followed by rural residents for any level of suicidality. Noticeably, the prevalence of high suicidality in urban metropolitan residents was more than twice that of rural residents and more than three times that of urban non-metropolitan residents. In men and women, suicidality was highest in urban metropolitan residents and lowest in urban non-metropolitan residents (figure 2).

For income categories, participants in the lowest income quintile had a higher prevalence of any level of suicidality when compared to their counterparts (table 1). A gradient with decreasing prevalence from lowest to highest income quintile was observed for low and overall suicidality (table 1). For other sociodemographic variables, the prevalence of various levels of suicidality was consistently higher among those who were widowed, separated, or divorced, when compared with those who were married or had never married (table 1). Compared with people who were employed, those who were unemployed had a higher prevalence for any level of suicidality. Largely, the prevalence of various levels of suicidality was found to be higher in those with lower educational attainment (table 1). The prevalence of

almost all suicidality phenomena and various levels of suicidality was higher for women than for men and was irrespective of the sociodemographic characteristics. The higher the level of suicidality, the less pronounced were the differences in prevalence between men and women (appendix pp 8–13).

Age-standardised suicidality prevalence varied substantially across states for all levels of suicidality (table 2). The prevalence of age-standardised suicidality in Kerala, Manipur, Rajasthan, and Uttar Pradesh was consistently higher than the estimate for the national level for all levels of suicidality. In men and women, we found wide variations in age-standardised suicidality prevalence between the states for various levels of suicidality (appendix pp 14–17). The age-standardised suicidality prevalence was higher in Kerala, Madhya Pradesh, Manipur, Rajasthan, Tamil Nadu, and Uttar Pradesh than the national estimates for men and women. At the national level, the age-standardised suicidality prevalence in women was consistently higher than in men for all levels of suicidality (appendix pp 14–17). The men-to-women ratio of overall suicidality prevalence for India was 0.68, with 1.5-times variation between the states (range 0.55–0.85; appendix p 32). Much wider variations in the men-to-women ratio were observed for other levels of suicidality (appendix p 32). For any level of suicidality, the men-to-women ratio was higher than that of the national estimate for Kerala, Madhya Pradesh, and Punjab (appendix p 32).

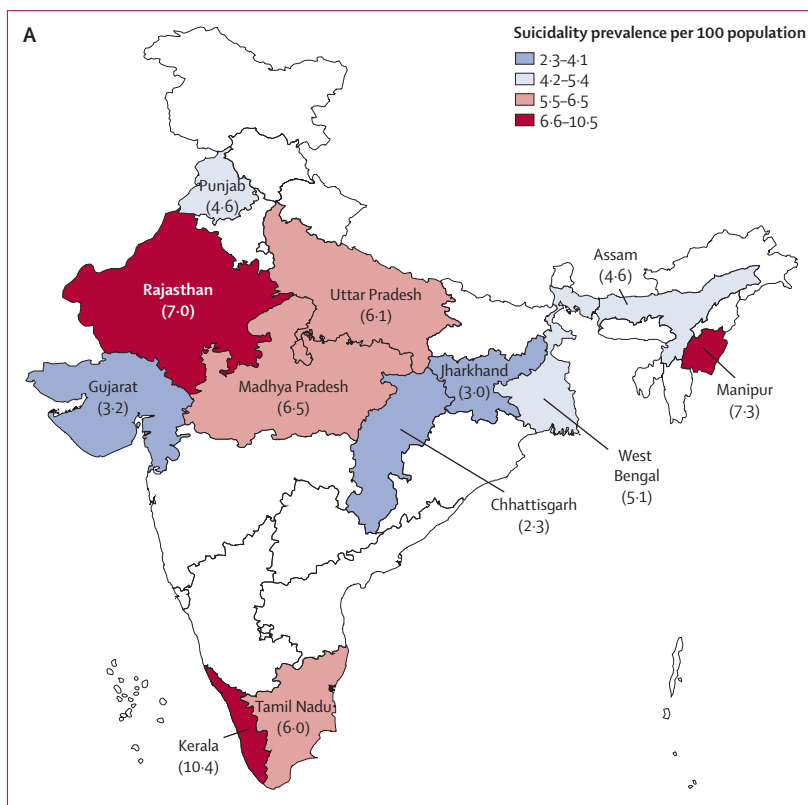
The ratio of suicidality to death by suicide for India was 211.98, indicating that for every death by suicide, more than 210 people had at least one suicidality phenomenon (table 3). Similarly, the ratio of suicide attempts to deaths by suicide was 14.51. These ratios differed across states, with distinct gender variations (appendix pp 33–37). Across states, the pattern of suicidality distribution also differed from that of deaths by suicide, indicating heterogeneity in the factors that affect and lead from suicidality to death by suicide (figure 3).

The binomial logistic regression showed that women (compared with men), urban metropolitan residents (compared with rural residents), and those who were widowed, separated, or divorced (compared with never married) had a higher risk for overall suicidality (table 4). Belonging to any household income quintile other than the lowest and having high school education and above (compared with no formal education) was associated with a lower risk for overall suicidality (table 4). The risk for suicidal ideation increased with age in men and women and was significantly higher in men aged 60 years or older (appendix pp 18–20). In the multinomial logistic regression, women (compared with men) and urban metropolitan residents (compared with rural residents) had a higher risk for low and high levels of suicidality, and those in the lowest income quintile (compared with other income quintiles) had an increased risk for high suicidality (appendix pp 23–25). Women aged 60 years or older had a decreased risk for high suicidality, compared

with those aged 18–29 years (appendix p 30). Having a high-school education was associated with a decreased risk for low and high level of suicidality, compared with having no formal education (appendix pp 23–25). Occupation status did not show a significant association with any level of suicidality (appendix pp 23–25). Those who were widowed, separated, or divorced had 1.5 times the risk for low suicidality of those who had never married (appendix p 23). Further, being widowed, separated, or divorced and having a lower educational attainment was an important risk for overall suicidality in women, and being in the lowest income quintile, compared with being in other quintiles, was a risk for overall suicidality in men (appendix pp 21–22). Being widowed, separated, or divorced as a risk for suicidality in women became less significant and being poor as a risk for suicidality in men became more significant from low to high suicidality (appendix pp 26–31). Additionally, those with depressive disorders (odds ratio 28.78 [95% CI 20.04–41.33]; $p < 0.0001$) and those with alcohol use disorders (6.52 [3.83–11.10]; $p < 0.0001$) had an increased risk for high suicidality as compared with their corresponding counterparts (appendix p 39).

Discussion

This was the first comprehensive population-based study to assess suicidality and its correlates in a representative



(Figure 3 continues on next page)

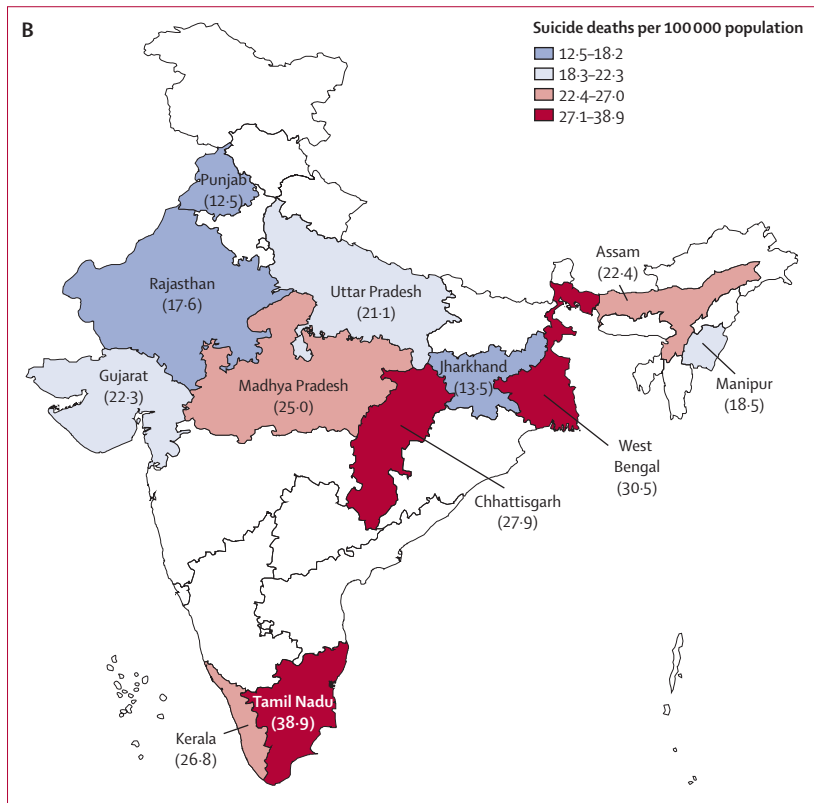


Figure 3: Weighted and age-standardised prevalence of suicidality and suicide deaths by state in India, 2015 (A) Suicidality prevalence per 100 population and (B) suicide deaths per 100 000 population. Quartile distribution was used to categorise the data. Because we have reported findings from 2015, the map shows the state of Jammu and Kashmir in 2015.

sample in India using robust and standardised methodology for data collection, while overcoming the limitations of previous studies. The findings revealed that about 5% of adults were reported to have had at least one suicidality phenomenon in the past month, and about 1% were reported to have high suicidality that requires urgent intervention. For every death by suicide in India, there were more than 200 people with suicidality and more than 15 suicide attempts, with large variations across the states and other sociodemographic characteristics.

Globally, wide variation in the prevalence of suicidal ideation, plans, and attempts has been documented (appendix pp 40–41).⁶ The difficulties in comparing general population studies on suicidality because of various settings, populations, definitions, and applied measures are well documented.^{17,23} Notably, the prevalence of suicide ideations, plans, and attempts in the past month in our study were similar to the lower limits of 12-month prevalence that were reported in previous studies, possibly because of non-accountability of suicidality recurrences for the 12-month prevalence estimations (appendix pp 40–41). With almost a fifth of the world's population residing in India, the overall suicidality rate shows that more than 44 million people aged 18 years or older could have had

suicidality in 2015 in India. Thus, addressing suicidality in India is crucial to make a global difference in suicide prevention.

Substantiating the gender paradox for suicide (women being more likely to experience suicidality and less likely to die from suicide than men are), we found a higher prevalence of various suicidality phenomena for women than for men in most states.^{17,24} Our finding contrasted with a higher prevalence of death by suicide reported for men in previous studies.^{2,12,14} Differences in causes, underreporting, availability and choice of means for suicide, differences in care seeking, availability of care, cultural differences in perceiving suicidality or suicide as a method of coping with stress or conflict, and differences in the gendered social roles between men and women have been proposed as reasons for this paradox.^{2,6,14,25,26} We found that gender differences were less pronounced the higher the level of suicidality was. Social factors such as being single after marriage posed high risk for low suicidality in women and economic factors such as being poor posed high risk for high suicidality among men. These complex relationships between gender, socio-economic factors, and suicidality emphasise the need to further examine these influences on suicidality to inform gender-specific suicide prevention strategies.^{16,26}

Distress and the causes, manifestations, and suicidality levels are likely to change with age. The increased suicidality prevalence found in people aged 40 years or older in men and women is quite different from other studies that reported a higher suicidality prevalence among relatively younger age groups.^{24,27} This finding also contrasted with the previous reports of an increased suicide death rate among people aged 15–39 years in India.⁹ This finding is unlikely to be due to the non-inclusion of an adolescent age group because we found a steady increase in suicidality prevalence up to the 40–49 years age group in men and women. A second peak in suicidality prevalence was found in men older than 60 years, posing additional challenges in recognition and care delivery for older people. Integration of suicide prevention interventions with the ongoing national programmes that targets various age groups in multiple settings (schools, colleges, workplaces, etc) on a continuum would bring a life-course perspective in suicide prevention to accommodate the variability of contextual factors that influence suicidality across the age groups (appendix pp 40–41).

Suicidality (especially low and high) was found to be higher in urban metropolitan residents than in rural and urban non-metropolitan residents. This pattern contrasts with that of the high suicide death rate in rural Indian residents.¹⁴ This high suicide death prevalence, with a lower suicidality prevalence in rural residents, could be attributed to easier access to lethal means and limited access to health-care services.^{28,29} Poverty, unemployment, poor literacy, and poor health and social-support systems, with rapid and unplanned urbanisation, lead to several

poor health outcomes (including suicidality).^{14,30,31} With rapid urbanisation in the past decade, prioritising suicidality in the ongoing urban health policies and programmes (eg, the National Urban Health Mission) with integration across social policies (eg, social security net) would improve suicidality prevention among urban residents of India.

Variations in suicidality among men and women, the men to women ratio, and suicidality to death by suicide ratio across states indicates the state-level variations that were masked earlier by national-level estimates in India. However, the pattern of state variations differed strikingly between prevalence of suicidality and suicide deaths, indicating differential influence of regional factors on suicidality and death by suicide. These variations and the variations in case fatality for the suicidality prevalence across the states could be attributed to differences in literacy attainment between men and women, geographical heterogeneity in culture, caste, and religious composition, modernisation, urban and rural composition, agricultural employment, socioeconomic development, access to means, the health-care system, and registration of death by suicide.^{14,31} Although the national-level data are crucial for developing the larger framework for a national suicide prevention strategy and guidelines, the implementation of state-level and community-level actions should be informed by state-specific factors derived from state level data.

Consistent with previous studies, suicidality was positively associated with poverty, lower educational attainment, and being widowed, divorced, or separated.^{32–34} Our findings also reaffirmed the well-established strong association between depression or alcohol-use disorders and suicidality, thereby indicating the need to strengthen the assessment and management of depression and alcohol use disorders (especially in primary-care settings) for suicidality prevention (appendix pp 38–39). Although this association cannot be overlooked for inclusion in interventions suggested by WHO, we reported it as supplementary finding to emphasise the importance of an inclusive socio-developmental model for suicidality and suicide prevention.^{11,35,36}

One study suggested that nearly 18% of people who had attempted suicide had re-attempted suicide at least once, and 1.2% had died by suicide during the 2-year follow-up.³⁷ Although not all suicidality ends in death by suicide, the huge morbidity associated with suicidality should not be ignored (while weighing the huge mortality burden of death by suicide), especially in light of promoting wellness through universal health coverage and the National Health Protection Mission in India.³⁸ Despite suicidality having a substantially higher prevalence than psychotic, affective, and neurotic disorders, suicidality and suicide prevention have often been a low public health priority in India.³⁸ With stigma associated with suicidality and help-seeking expected to reduce with the decriminalisation of suicide attempts in India,³⁹ improved access to and quality

	Unadjusted odds ratio (95% CI)	p value	Adjusted odds ratio* (95% CI)	p value
Gender				
Men	Ref	..	Ref	..
Women	1.50 (1.33–1.68)	<0.001	1.54 (1.31–1.81)	<0.0001
Age, years				
18–29	Ref	..	Ref	..
30–39	1.31 (1.10–1.56)	0.01	1.12 (0.94–1.34)	0.21
40–49	1.49 (1.27–1.76)	<0.001	1.13 (0.92–1.37)	0.24
50–59	1.48 (1.19–1.84)	<0.001	1.06 (0.82–1.36)	0.66
≥60	1.43 (1.18–1.73)	<0.001	0.96 (0.76–1.22)	0.76
Area of residence				
Rural	Ref	..	Ref	..
Urban non-metropolitan	0.89 (0.70–1.14)	0.36	0.91 (0.72–1.15)	0.42
Urban metropolitan	1.50 (1.17–1.93)	0.01	1.75 (1.30–2.35)	0.0002
Education				
None	Ref	..	Ref	..
Primary	0.93 (0.78–1.11)	0.43	1.07 (0.89–1.29)	0.46
Secondary	0.79 (0.65–0.96)	0.02	0.98 (0.79–1.21)	0.83
High School	0.59 (0.49–0.72)	<0.001	0.73 (0.58–0.92)	0.0083
Pre-university and vocational	0.57 (0.44–0.73)	<0.001	0.75 (0.56–1.00)	0.047
Graduate and above	0.57 (0.44–0.73)	<0.001	0.72 (0.53–0.98)	0.038
Occupation				
Employed	Ref	..	Ref	..
Unemployed	1.04 (0.92–1.18)	0.54	0.98 (0.84–1.15)	0.82
Income quintile				
Lowest quintile	Ref	..	Ref	..
Second quintile	0.76 (0.63–0.91)	0.01	0.77 (0.64–0.93)	0.0076
Middle quintile	0.73 (0.58–0.90)	0.01	0.77 (0.62–0.95)	0.013
Fourth quintile	0.71 (0.58–0.87)	0.01	0.78 (0.64–0.96)	0.021
Highest quintile	0.68 (0.55–0.83)	<0.001	0.81 (0.66–0.99)	0.039
Marital status				
Never married	Ref	..	Ref	..
Married	1.37 (1.14–1.64)	0.01	1.04 (0.84–1.29)	0.74
Widowed, or divorced, or separated	2.64 (2.00–3.47)	<0.001	1.56 (1.10–2.20)	0.012

*Odds ratio adjusted for depression, alcohol use disorders, and state variations in addition to other sociodemographic variables in the table.

Table 4: Binomial logistic regression showing the association between sociodemographic factors and overall suicidality (any level of suicidality)

of care for all suicidality phenomena should become a priority agenda.³⁹ Expansion, coverage, and improved delivery of mental health services, with a strong thrust towards implementation is essential to address suicidality in India.⁴⁰ Thus, resourcing and equipping the primary health-care workforce to provide early recognition and care for suicidality would be a feasible strategy for suicide prevention in India and in other LMICs. A real-time data surveillance system for suicidality should be implemented to inform suicide prevention strategies.⁴¹

Although the study did not include all the states and union territories of India, the sample was similar to the population of India as per the 2011 census, with regard

to key sociodemographic variables.¹⁸ Suicidality being sensitive to report, the possibility of underreporting due to stigma cannot be ruled out. The field team were trained to avoid embarrassing questions. To build comfort and confidentiality, suicidality was assessed after the assessment of other mental disorders. Because the timeframe for assessment was the past month, recall bias was likely to be minimal. We did not collect data on caste, religion, and tribal status, which are important correlates for death by suicide in India (appendix pp 41). Despite high participation rates, selective non-response from high-risk individuals leading to underestimation of suicidality prevalence cannot be ruled out. Notwithstanding these limitations, the nature and size of the study provides robust, realistic, and actionable data for suicide prevention in India. This study complements earlier comprehensive assessments of suicide death by providing more context for various research agendas on suicidality that are crucial for supporting the national suicide prevention policy and plan.^{9,14} From a prevention and management perspective, future studies should also explore methods, immediate context, and communications of suicidality with family members and service providers.

In conclusion, this study is the most comprehensive effort so far to understand the epidemiology of suicidality in India. Suicidality is more prevalent than death by suicide and most other priority mental disorders.³⁵ Because only sociodemographic differentials (not risk factors) differed strikingly between people with suicidality and people who died by suicide, public health interventions for both cannot be compartmentalised. For a country such as India, which is yet to have a systematic response for death by suicide and suicidality, a national suicide prevention strategy that is comprehensive and systematically combines universal, selective, and indicated interventions through multisectoral public health approaches is needed to account for these multidimensional determinants and differentials (appendix pp 40–41). Our findings and suggested measures also have implications for other LMICs that, like India, need to meet the SDG 2030 for suicide reduction.

Contributors

GG, MV, VB, GN and other authors conceived and planned the National Mental Health Survey of India in close collaboration with the Office of Ministry of Health and Family Welfare, Government of India. All authors contributed to the implementation and acquisition of data for the study. GG and SA did all the analyses. All authors contributed to data interpretation and critical revisions of the paper and approved the final version. GG is the guarantor of the paper. The corresponding author (GG) attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Declaration of interests

DVS reports personal fees from various entities in the bio-medical arena as member of an advisory board and consultant, outside of the submitted work. However, none of them could be perceived to influence, or give the appearance of potentially influencing the submitted work. DVS also has a patent for many psychiatric rating scales and structured diagnostic interviews and is the author and copyright holder of MINI, which was used in this study but he was not compensated for the use of MINI in the NMHS 2015–16 and in the submitted work. All other authors declare no competing interests.

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References

- 1 Institute for Health Metrics and Evaluation. GBD results tool. Global Health Data Exchange. <http://ghdx.healthdata.org/gbd-results-tool> (accessed Feb 26, 2019).
- 2 WHO. Preventing suicide: a global imperative. Geneva: World Health Organization, 2014.
- 3 Tidemalm D, Beckman K, Dahlin M, et al. Age-specific suicide mortality following non-fatal self-harm: national cohort study in Sweden. *Psychol Med* 2015; 45: 1699–707.
- 4 Sheehan DV, Giddens JM. Suicidality: a roadmap for assessment and treatment. Tampa, FL, USA: Harm Research Press, 2015.
- 5 Silverman MM, Berman AL, Sanddal ND, O'carroll PW, Joiner TE. Rebuilding the tower of Babel: a revised nomenclature for the study of suicide and suicidal behaviors. Part 2: suicide-related ideations, communications, and behaviors. *Suicide Life Threat Behav* 2007; 37: 264–77.
- 6 Nock MK, Borges G, Bromet EJ, Cha CB, Kessler RC, Lee S. Suicide and suicidal behavior. *Epidemiol Rev* 2008; 30: 133–54.
- 7 Gururaj G, Isaac MK, Subbakrishna DK, Ranjani R. Risk factors for completed suicides: a case-control study from Bangalore, India. *Inj Control Saf Promot* 2004; 11: 183–91.
- 8 Indian Council of Medical Research, Public Health Foundation of India, and Institute for Health Metrics and Evaluation. India: health of the nation's states—the India state-level disease burden initiative. New Delhi, India: ICMR, PHFI, and IHME, 2017.
- 9 Dandona R, Kumar GA, Dhaliwal RS, et al. Gender differentials and state variations in suicide deaths in India: the Global Burden of Disease Study 1990–2016. *Lancet Public Health* 2018; 3: e478–89.
- 10 UN Department of Economic and Social Affairs. Sustainable Development Goal 3: ensure healthy lives and promote well-being for all at all ages. <https://sustainabledevelopment.un.org/sdg3> (accessed Feb 4, 2019).
- 11 WHO. National suicide prevention strategies: progress, examples and indicators. Geneva: World Health Organization, 2018.
- 12 National Crime Records Bureau. Accidental deaths & suicides in India 2015. New Delhi, India: Ministry of Home Affairs, Government of India, 2016.
- 13 WHO. Global Health Estimates 2016: disease burden by cause, age, sex, by country and by region, 2000–2016. Geneva: World Health Organization, 2018. www.who.int/healthinfo/global_burden_disease/GHE2016_Deaths_2015-country.xls (accessed July 21, 2018).
- 14 Patel V, Ramasundarahettige C, Vijayakumar L, et al. Suicide mortality in India: a nationally representative survey. *Lancet* 2012; 379: 2343–51.
- 15 Dandona R, Bertozzi-Villa A, Kumar GA, Dandona L. Lessons from a decade of suicide surveillance in India: who, why and how? *Int J Epidemiol* 2017; 46: 983–93.
- 16 Vijayakumar L. Indian research on suicide. *Indian J Psychiatry* 2010; 52: S291–96.
- 17 Jordans M, Rathod S, Fekadu A, et al. Suicidal ideation and behaviour among community and health care seeking populations in five low- and middle-income countries: a cross-sectional study. *Epidemiol Psychiatr Sci* 2017; 27: 393–402.
- 18 Gururaj G, Varghese M, Benegal V, et al. National mental health survey of India, 2015–16. Prevalence pattern and outcomes. Bengaluru, India: National Institute of Mental Health and Neuro Sciences, 2016. <http://indianmhms.nimhans.ac.in/Docs/Report2.pdf> (accessed Nov 4, 2019).

- 19 Pradeep BS, Gururaj G, Varghese M, et al. National mental health survey of India, 2016—rationale, design and methods. *PLoS One* 2018; **13**: e0205096.
- 20 Sheehan DV, Lecrubier Y, Sheehan KH, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry* 1998; **59** (suppl 20): 22–33; quiz 34–57.
- 21 Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Population Estimates 1950–2017. Seattle, WA, USA: Institute for Health Metrics and Evaluation, 2018.
- 22 India State-Level Disease Burden Initiative Collaborators. GBD India Compare. IHME Viz Hub. <http://vizhub.healthdata.org/gbd-compare/india> (accessed Feb 3, 2019).
- 23 Burlless C, De Leo D. Methodological issues in community surveys of suicide ideators and attempters. *Crisis* 2001; **22**: 109–24.
- 24 Botega NJ, Barros MB de A, Oliveira HB de, Dalgalarondo P, Marín-León L. Suicidal behavior in the community: prevalence and factors associated with suicidal ideation. *Braz J Psychiatry* 2005; **27**: 45–53.
- 25 Canetto SS, Sakinofsky I. The gender paradox in suicide. *Suicide Life Threat Behav* 1998; **28**: 1–23.
- 26 Vijayakumar L. Suicide in women. *Indian J Psychiatry* 2015; **57**: S233–38.
- 27 Borges G, Nock MK, Haro Abad JM, et al. Twelve-month prevalence of and risk factors for suicide attempts in the WHO world mental health surveys. *J Clin Psychiatry* 2010; **71**: 1617–28.
- 28 Hirsch JK, Cukrowicz KC. Suicide in rural areas: an updated review of the literature. *J Rural Ment Heal* 2014; **38**: 65–78.
- 29 Behera P, Amudhan RS, Gupta R, Majumdar A, Kokane AM, Bairwa M. Adapting the stepped care approach for providing comprehensive mental health services in rural India: tapping the untapped potential. *Indian J Community Fam Med* 2018; **4**: 5–10.
- 30 Ministry of Health and Family Welfare, Government of India. National urban health mission framework for implementation. 2013. http://www.nhm.gov.in/images/pdf/NUHM/Implementation_Framework_NUHM.pdf (accessed Feb 2, 2019).
- 31 Arya V, Page A, River J, Armstrong G, Mayer P. Trends and socio-economic determinants of suicide in India: 2001–2013. *Soc Psychiatry Psychiatr Epidemiol* 2018; **53**: 269–78.
- 32 Olfson M, Blanco C, Wall M, et al. National trends in suicide attempts among adults in the United States. *JAMA Psychiatry* 2017; **74**: 1095–103.
- 33 Iemmi V, Bantjes J, Coast E, et al. Suicide and poverty in low-income and middle-income countries: a systematic review. *Lancet Psychiatry* 2016; **3**: 774–83.
- 34 Roškar S, Podlesek A, Kuzmanić M, Demšar LO, Zaletel M, Marušič A. Suicide risk and its relationship to change in marital status. *Crisis* 2011; **32**: 24–30.
- 35 Armstrong G, Vijayakumar L. Suicide in India: a complex public health tragedy in need of a plan. *Lancet Public Health* 2018; **3**: e459–60.
- 36 Jacob KS. Suicide in India: part perceptions, partial insights, and inadequate solutions. *Natl Med J India* 2017; **30**: 155–58.
- 37 Parra-Urbe I, Blasco-Fontecilla H, Garcia-Parés G, et al. Risk of re-attempts and suicide death after a suicide attempt: a survival analysis. *BMC Psychiatry* 2017; **17**: 163.
- 38 Bhargava B, Paul VK. Informing NCD control efforts in India on the eve of Ayushman Bharat. *Lancet* 2018; published online Sept 12. [http://dx.doi.org/10.1016/S0140-6736\(18\)32172-X](http://dx.doi.org/10.1016/S0140-6736(18)32172-X).
- 39 Mental health care act 2017. New Delhi, India: Ministry of Law and Justice, Government of India, 2017. <http://www.prsindia.org/uploads/media/Mental%20Health/Mental%20Healthcare%20Act,%202017.pdf> (accessed April 2, 2019).
- 40 Gupta S, Sagar R. National mental health programme—optimism and caution: a narrative review. *Indian J Psychol Med* 2018; **40**: 509–16.
- 41 Vijayakumar L, Armstrong G. Surveillance for self-harm: an urgent need in low-income and middle-income countries. *Lancet Psychiatry* 2019; **6**: 633–34.