Predictors, help-seeking behaviour and treatment coverage for depression in adults in Sehore district, India

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Background

National Mental Health Survey found that in India, the point prevalence of major depressive disorder (MDD) was 2.7% and the treatment gap was 85.2%, whereas in Madhya Pradesh the point prevalence of MDD was 1.4% and the treatment gap was 80%.

Aims

To describe the baseline prevalence of depression among adults, association of various demographic and socioeconomic variables with depression and estimation of contact coverage for the same.

Method

Population-based cross-sectional survey of 3220 adults in Sehore district of Madhya Pradesh, India. The outcome of interest was a probable diagnosis of depression that was measured using the Patient Health Questionnaire (PHQ-9) and the proportion of individuals with depression (PHQ-9>9) who sought care for the same. The data were analysed using simple and multiple log-linear regression.

Results

Low educational attainment, unemployment and indebtedness were associated with both moderate/severe depression (PHQ-9 score >9) and severe depression only (PHQ-9 score >14), whereas age, caste and marital status were associated with only moderate or severe depression. Religion, type of house, land ownership and amount of loan taken were not associated with either moderate/severe or only severe depression. The contact coverage for moderate/severe depression was 13.08% (95% CI 10.2–16.63).

Conclusions

There is an urgent need to bridge the treatment gap by targeting individuals with social vulnerabilities and integrating evidence-based interventions in primary care.

Declaration of interest

None.

Mental, neurological and substance use disorders (MNS) pose a serious and growing challenge to health systems across the world and are the leading cause of years lived with disability (YLD) worldwide.[1] Depression accounts for 40.5% of disability-adjusted life years (DALYs) caused by mental and substance use disorders,[1] and it also significantly contributes to the burden allocated to suicide and ischaemic heart disease, thus making it a public health priority.[2] This problem is compounded by the fact that most of the patients with depression do not receive evidence-based interventions resulting in a huge treatment gap. Kohn *et al* found that the treatment gap for mental disorders is large across the globe. The median treatment gap for depression was 56.3%, but the authors of this study mentioned that it is likely that the gap reported is an underestimate because of the unavailability of community-based data from low- and middle-income countries where services are scarcer.[3] *Disease Control Priorities-3* volume on MNS summarises the cost-effective interventions and outlines the strategies to address this burden which focus on developing, implementing and evaluating evidence-based practices that can be scaled up through various platforms of care.[4] India launched its National Mental Health Programme in 1982 with the objective of promoting community participation and accessible mental health services.[5] In practice, though, community mental health is very poorly developed, and mental healthcare is not available in primary healthcare for the vast majority of the population. Recently completed National Mental Health Survey found that in India, the point prevalence of major depressive disorder (MDD) was 2.7% (lifetime prevalence of 5.2%) and the treatment gap was 85.2%, whereas in Madhya Pradesh, the point prevalence of MDD was 1.4% and the treatment gap was 80%.[6] Two other population-based studies have reported worse figures: 96.7% treatment gap for depression in Uttarakhand (6% point prevalence and 9.9% 12-month prevalence of depression) and 95.7% in Vidarbha region of Central India (14.6% point prevalence).[7,8] Nevertheless, some of the recent national level initiatives have resulted in a robust policy context for designing and implementing a district-level Mental Health Care Plan that will help operationalise the rejuvenated District Mental Health Programme (DMHP) in India.[9] PRogramme for Improving Mental health carE (PRIME) is working in the district of Sehore in the central state of Madhya Pradesh in this particular context.[9,10] The key objective of PRIME is to generate evidence on the implementation and scaling up of integrated packages of care for priority mental disorders (depression, alcohol use disorders (AUD) and psychosis) in primary healthcare setting.[10] The evaluation of PRIME is designed to assess the impact of the programme on the contact coverage of evidence-based treatments for depression and AUD through a repeated survey design. We defined contact coverage as the proportion of people with a mental disorder who seek care for the symptoms of that disorder.[11] In this paper, we describe the findings of the baseline community survey for depression. The key research questions addressed are related to the prevalence of depression among adults, suicidal behaviour among adults, association of various demographic and socioeconomic variables with depression and estimation of contact coverage for the same. We hypothesised that female gender, low socioeconomic status, belonging to scheduled castes (SC)/scheduled tribes (ST) and indebtedness would be associated with the outcome of depression.

Method

Setting

Sehore is one of the five districts (out of a total of 51 districts) in Madhya Pradesh state where DMHP is being implemented. Sehore district has a population of 1.3 million (n=1 311 332)[12] and is a predominantly rural district covering an area of 6578 km². The literacy rate is 71.1%, and the gender ratio in the district is 918 females per 1000 males.[12] A detailed situational analysis of availability of general and mental health services and challenges for the implementation of DMHP in Sehore district is described elsewhere.[13] Baseline community survey was completed before the implementation of PRIME Mental Health Care Plan in three sub-district hospitals in Sehore district, and the endline community survey was completed in January 2017 (data are being analysed).

Study design and sample selection

Sample size calculation was based on the estimated effect of the intervention on contact coverage in adults with depression, and we assumed that approximately 10% of adults would have depression. The total sample size of 3220 in the baseline community survey provided 85% power to detect a 5–15% change in treatment-seeking among adults with depression with a two-sided alpha of 0.05. It must be noted that sample size calculation was not done specifically for this baseline survey, and hence, this sample was not powered to detect the association of specific demographic and socioeconomic variables with the outcome of depression. A conservative value of 0.10 for the intraclass correlation for treatment-seeking was assumed. Data from Census 2011[12] were used to recruit a sample from the district population using multistage sampling. Cluster sampling design was used to randomly select primary sampling units (villages for rural stratum and wards for urban stratum). We selected 70 villages from the rural stratum and 19 wards from the urban stratum, and this was proportional to the population distribution in the district.

Participants (age >18 years) were randomly selected (systematic random sampling) from the electoral polling station's voter list within each primary sampling unit (village/ward). Each village/ward has multiple polling booths, and there is one voter list per polling booth. We randomly selected one voter list from each village/ward for sampling of participants. Within the voter list, between 25 and 47 adults were selected, with the variation in allocation being a function of the field researchers' time availability.

Measures

Participants were interviewed using a structured interview schedule that was developed specifically for baseline community survey. The details about this schedule can be found elsewhere.[11] The interview schedule was first designed in English by the cross-country collaborators, and this was then translated in Hindi and piloted in the field to test the practicability of the interview schedule and to assess the time required for the respondent to answer the questions. Based on the challenges faced during the pilot study, the schedule was appropriately modified and the method of interview finalised. The interviewers orally administered a structured interview in Hindi, using a questionnaire application programme on a tablet device (mobile computer with a touch screen, circuitry and battery in a single unit). The interview schedule contained sections on socio-demographic characteristics (details below); in-patient and out-patient healthcare service utilisation; screening for depression using the Patient Health Questionnaire (PHQ-9); help-seeking for depression (if screened positive); screening for AUD using the Alcohol Use Disorders Identification Test (AUDIT); help-seeking for AUD (if screened positive); suicidality; mental health-related knowledge, attitudes and behaviours; and disability severity.

The following explanatory variables were explored in the analyses presented in this article, based on our hypotheses.

Demographic variables

Age, gender, marital status, religion and caste were included. Caste variable had four levels: SC, ST, other backward castes (OBCs) and general (neither SC, ST nor OBC). SC and ST are groups recognised as socially and economically disadvantaged.

Socioeconomic variables

Education, occupation, type of house, ownership of land, indebtedness and employment with Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA)[14] were included. Education was treated as a categorical variable with three levels (illiterate/did not complete primary education, completed primary education (grade 6–grade 11) and completed secondary education (grade 12 and above)). Participants were engaged in a wide range of occupations; based on the responses, we adapted an occupation classification system to create four groups reflecting unemployed, non-income work (e.g. household work and student), lower income work (e.g. agriculture and unskilled manual) and higher income work (e.g. teacher, police/military and skilled manual),[15] as well as whether they had signed up to receive work assignments through a national employment programme.[14] MNREGA is a national scheme which aims at enhancing the livelihood security of people in rural areas by guaranteeing 100 days of wage-employment in a financial year to a rural household whose adult members volunteer to do unskilled manual work.[14] Type of house was categorised in a similar way as done in National Family Health Survey-III.[16] 'Kachha' houses were made from mud, thatch or other low-quality materials, 'semi-pucca' houses used partly low-quality and partly high-quality materials and houses made with high-quality materials throughout, including the floor, roof and exterior walls, were categorised as 'pucca' houses. The assessment of indebtedness was based on the self-report by the participants. The participants were asked whether they had any current loan (termed as variable 'indebtedness') and the amount of loan which they need to repay.

Outcome variable

The outcome of interest was a probable diagnosis of depression which was measured using the PHQ-9. PHQ-9 is a screening questionnaire widely used in research and practice to screen patients for depression.[17] A cut-off score of 10 or higher is found to have a sensitivity of 88% and a specificity of 88% for detecting depression.[18] A systematic review further supports the psychometric properties of PHQ-9 and reports that there are no significant differences in sensitivity or specificity at a cut-off score of 10 compared with other cut-off scores within the interval (8–11).[19] PHQ-9 is widely used as an instrument to assess primary outcome in various trials in Goa (PREMIUM,[20] SHARE[21]) and studies in Maharashtra, India.[8] The Hindi version of PHQ-9 was validated and used in the PREMIUM trial.[20,22] We used the same Hindi version of PHQ-9 for our study in Madhya Pradesh. Moderate/severe depression was defined as PHQ-9 score of >9 and only severe depression as PHQ-9 score of >14. Participants who screened positive on PHQ-9, that is, who scored >9, were further asked questions related to seeking help for the problems because of depression from a range of providers, including non-formal providers. Details about the treatment received, medications and costs of care were also addressed. In the end, participants were also asked questions on suicidal ideation, which were adapted from the Mini

International Neuropsychiatric Interview (MINI), a semi-structured interview for the assessment of mental disorders.[23]

Data collection

Recruitment of participants was conducted by trained field researchers through face-to-face interviews. Eligibility criteria for participation were fluency in Hindi and absence of any cognitive impairment which was severe enough to interfere with the informed consent procedure or survey (e.g. severe intellectual disability). Field researchers located the adult's household and contacted the adult, scheduled a return visit through another household member (if the selected adult was not present) or moved to the next adult of the same gender on the voter list (if the originally selected adult no longer resided at that address). All adults received a verbal introduction to the study by the field researcher and were provided with an information sheet, and then approached for consent to participate in the study. Field researchers were male and female, mostly residents of Sehore district and their minimum qualification was a Bachelor degree from a university. They received a week-long intensive training led by an experienced researcher. The field researchers were recruited only for the baseline survey and were independent of the PRIME implementation team. An overview of the PRIME project was included in their training but they were not aware of the detailed intervention packages. The field researchers orally administered a structured interview in Hindi, using a questionnaire application programmed on a tablet device.[24]

Analysis

A conceptual framework was used to guide the analyses in which the explanatory variables were categorised into three levels of hierarchy: (1) the most distal being demographic variables such as age, gender, religion, caste and marital status; (2) socioeconomic variables such as education and occupation; and (3) the most proximal being variables related to recent socioeconomic living conditions such as employment with MNREGA, type of house, land ownership and indebtedness. The association of each of the explanatory variable with the outcome of moderate/severe and only severe depression was first assessed using simple log-linear regression (univariable analysis).

The multivariable analysis was carried out using the following steps:

(1) Age and gender considered as *a priori* variables were included in all the multivariable models irrespective of whether statistical significance was reached or not.
(2) In addition to age and gender, model 1 included demographic variables that showed an association at *P*<0.1 in univariable analyses.
(3) Model 2 included age, gender, all variables from model 1 (caste and marital status) that remained statistically significant at *P*<0.1 and the socioeconomic variables that were significant (*P*<0.1) in the univariable analyses.
(4) The final multivariable model (model 3) included age, gender, significant variables (*P*<0.1) from model 2 and variables related to recent socioeconomic conditions that were statistically significant in the univariable analyses. The inclusion of variables in the final multivariable model was based on the stepwise selection method.

We report prevalence ratios (PRs) and 95% confidence intervals (CIs) for all associations. Data were analysed using STATA/IC version 14.[25]

Results

Characteristics of the sample

We selected 5170 adults from the voter list for recruitment, of whom we were able to contact 3233 (62.5% of 5170) as the rest of the individuals could not be located as they had either migrated permanently or temporarily or they had died. The informed consent was provided by 3220 (99.6% of 3233) individuals aged between 18 and 95 years with an average age of 40.08 years (s.d.=15.04) and just over half of them were males (54.65%). Most of the participants (78%) were recruited from the rural stratum and the remainder (22%) from the urban stratum which is consistent with the overall population distribution of Sehore district. The sample predominantly comprised of Hindus (89.77%), and most of the adults were currently married (84.52%). More than a fourth of the sample was illiterate (28.09%) and another 28.10% did not complete primary school. Few participants (9.21%) had a higher income occupation. As per the Census 2011 data, the adult population of Sehore (age >18 years) comprises of 52% males, 78% of the adults are Hindus, 79% are currently married and almost half of the adults (49%) are either illiterate or have not completed primary school.[12] The socio-demographic characteristics of the sample (Table 1) are thus similar to the socio-demographic characteristics of Sehore population.

The outcome of moderate/severe depression was observed in 17.66% of the sample (95% CI 16.29–19.12). The prevalence of only severe depression (defined as PHQ-9 >14) was 4.43% (95% CI 3.66–5.17).

Univariable analysis of associations with moderate/severe and only severe depression

Age, education, occupation and indebtedness were associated with moderate/severe and only severe depression, whereas marital status, caste, type of house and amount of loan were associated only with moderate/severe depression in univariable analysis (Table 2). No association was found between gender, religion and ownership of land with moderate/severe or only severe depression.

Multivariable analysis of associations with moderate/severe depression

In model 1, age, caste and marital status retained an independent association with moderate/severe depression, whereas in model 2, education and occupation were strongly associated with the outcome. In the final multivariable model (model 3), all the previous variables along with indebtedness were associated with moderate/severe depression (Table 3). There was a monotonic increase in the risk of moderate/severe depression with increasing age, and individuals above 50 years of age had almost double the risk (PR=2.07; 95% CI 1.51–2.82) compared with individuals aged 18–29 years. Individuals who were widowed/separated/divorced/deserted had 41% increased risk of moderate/severe depression compared with currently married (PR=1.41; 95% CI 1.08–1.83). Individuals from general caste (neither SC/ST nor OBC) had a protective effect on moderate/severe depression (PR=0.71; 95% CI 0.53–0.96). A very strong inverse relationship was observed between higher educational attainment, high-income generating occupation and the outcome of moderate/severe depression. Risk of depression increased by 26% in individuals who reported indebtedness (PR=1.26; 95% CI 1.01–1.58).

Multivariable analysis of associations with only severe depression

In model 1, age retained an independent association with only severe depression after adjusting for gender. In model 2, education and occupation were strongly associated with risk of only severe depression after adjusting for age and gender and both the later variables were not associated with outcome. In the final

Table 1 Demographic and socioeconomic characteristics of the sample

Variables	Overall (N=3220)	Moderate/severe depression (N=576)	Only severe depression (N=139)
	n (%)	n (%)	n (%)
Demographic variables			
Age, years			
18–29	905 (27.56)	89 (10.11)	20 (2.46)
30–49	1501 (46.99)	279 (18.26)	61 (4.13)
50+	814 (25.45)	208 (24.72)	58 (6.82)
Gender			
Male	1776 (54.65)	298 (16.78)	71 (4.05)
Female	1444 (45.35)	278 (18.72)	68 (4.72)
Religion			
Hindu	2891 (89.77)	515 (17.59)	126 (4.42)
Muslim	327 (10.18)	61 (18.39)	13 (3.82)
Buddhist/Sikh	2 (0.05)	0 (0.00)	0 (0.00)
Caste			
Scheduled caste	586 (19.72)	114 (19.30)	25 (4.17)
Scheduled tribe	152 (5.05)	22 (14.68)	8 (6.01)
OBC	2043 (62.08)	384 (18.46)	92 (4.47)
General	439 (13.15)	56 (12.54)	14 (3.43)
Marital status			
Currently married	2713 (84.52)	480 (17.54)	119 (4.39)
Widowed/separated/divorced/deserted	163 (5.01)	57 (32.49)	12 (7.01)
Unmarried	344 (10.47)	39 (11.55)	8 (2.75)
Socioeconomic variables			
Education			
Illiterate/did not complete primary education	1782 (56.28)	394 (21.51)	104 (5.77)
Completed primary education	1026 (31.14)	149 (14.96)	26 (2.82)
Completed secondary education	412 (12.58)	33 (7.09)	9 (1.83)
Occupation			
Unemployed	137 (4.09)	36 (25.67)	16 (11.63)
Non-income work	1081 (33.59)	183 (16.65)	41 (3.82)
Low income	1705 (53.11)	315 (18.33)	71 (4.25)
High income	297 (9.21)	42 (13.91)	11 (3.67)
Variables related to recent socioeconomic condition			
Employed with MNREGA			
Yes	217 (7.49)	38 (17.53)	9 (4.24)
No/not applicable	3003 (92.51)	538 (17.67)	130 (4.36)
Type of house			
Kuccha	1330 (43.62)	250 (18.70)	64 (4.77)
Semi-pucca	866 (26.24)	125 (13.63)	30 (3.26)
Pucca	1023 (30.11)	201 (19.68)	45 (4.71)
Own land			
Yes	875 (27.05)	153 (17.47)	42 (4.80)
No	2345 (72.95)	423 (17.73)	97 (4.19)
Taken loan (Indebtedness)			
Yes	751 (23.80)	161 (21.98)	48 (6.73)
No	2469 (76.20)	415 (16.31)	91 (3.61)
Loan amount			
First tertile	296 (40.42)	72 (25.03)	23 (8.03)
Second tertile	220 (29.28)	48 (22.33)	12 (6.19)
Third tertile	240 (3030)	41 (17.10)	13 (5.37)

OBC, other backward caste; MNREGA, Mahatma Gandhi National Rural Employment Guarantee Act.

Table 2 Univariable association of demographic and socioeconomic variables with moderate/severe and only severe depression		
Variables	Moderate/severe depression	Only severe depression
	Unadjusted PR (95% CI)	Unadjusted PR (95% CI)
Demographic variables		
Age, years		
18–29	1	1
30–49	1.81 (1.45–2.25)	1.68 (0.91–3.10)
50+	2.44 (1.96–3.05)	2.77 (1.61–4.77)
Gender		
Male	1	1
Female	1.11 (0.97–1.28)	1.16 (0.86–1.58)
Religion		
Hindu	1	1
Muslim	1.04 (0.83–1.32)	0.86 (0.50–1.48)
Caste		
Scheduled caste	1	1
Scheduled tribe	0.76 (0.51–1.12)	1.44 (0.71–2.90)
OBC	0.96 (0.81–1.13)	1.07 (0.73–1.56)
General	0.64 (0.48–0.87)	0.82 (0.42–1.60)
Marital status		
Currently married	1	1
Widowed/separated/divorced/deserted	1.85 (1.50–2.28)	1.59 (0.90–2.83)
Unmarried	0.66 (0.49–0.87)	0.63 (0.32–1.22)
Socioeconomic variables		
Education		
Illiterate/did not complete primary education	1	1
Completed primary education	0.69 (0.58–0.84)	0.49 (0.32–0.74)
Completed secondary education	0.33 (0.23–0.47)	0.32 (0.17–0.61)
Occupation		
Unemployed	1	1
Non-income work	0.65 (0.48–0.87)	0.33 (0.19–0.56)
Low income	0.71 (0.56–0.91)	0.36 (0.23–0.58)
High income	0.54 (0.38–0.78)	0.31 (0.15–0.65)
Variables related to recent socioeconomic condition		
Employed with MNREGA		
No/not applicable	1	1
Yes	0.99 (0.74–1.32)	0.97 (0.44–2.14)
Type of house		
Kuccha	1	1
Semi-pucca	0.73 (0.58–0.91)	0.68 (0.46–1.01)
Pucca	1.05 (0.90–1.23)	0.99 (0.67–1.46)
Own land		
No	1	1
Yes	0.98 (0.84–1.16)	1.15 (0.80–1.64)
Taken loan (indebtedness)		
No	1	1
Yes	1.35 (1.12–1.62)	1.86 (1.29–2.68)
Loan amount		
First tertile	1	1
Second tertile	0.89 (0.65–1.21)	0.77 (0.41–1.45)
Third tertile	0.68 (0.49–0.96)	0.67 (0.36–1.26)
PR, prevalence ratio; CI, confidence interval; OBC, other backward caste; MNREGA, Mahatma Gandhi National Rural Employment Guarantee Act.		

Table 3 Multivariable associations of socio-demographic variables with moderate/severe depression

Variables	Model 1		Model 2		Model 3	
	PR (95% CI)	*P*	PR (95% CI)	*P*	PR (95% CI)	*P*
Demographic variables						
Age, years						
18–29	1		1		1	
30–49	1.86 (1.42–2.44)	<0.001	1.71 (1.29–2.27)	<0.001	1.70 (1.27–2.28)	<0.001
50+	2.39 (1.82–3.14)	<0.001	2.05 (1.52–2.76)	<0.001	2.07 (1.51–2.82)	<0.001
Gender						
Male	1		1		1	
Female	1.03 (0.89–1.20)	0.651	1.08 (0.89–1.31)	0.415	1.16 (0.95–1.42)	0.149
Caste						
Scheduled caste	1		1		1	
Scheduled tribe	0.74 (0.49–1.12)	0.158	0.70 (0.46–1.04)	0.082	0.71 (0.47–1.07)	0.099
OBC	0.92 (0.78–1.09)	0.347	0.93 (0.78–1.11)	0.456	0.94 (0.79–1.13)	0.531
General	0.62 (0.46–0.83)	0.002	0.69 (0.51–0.91)	0.011	0.71 (0.53–0.96)	0.025
Marital status						
Currently married	1		1		1	
Widowed/separated/divorced/deserted	1.51 (1.18–1.93)	0.001	1.42 (1.10–1.85)	0.008	1.41 (1.08–1.83)	0.010
Unmarried	1.11 (0.78–1.57)	0.568	1.28 (0.87–1.86)	0.203	1.32 (0.91–1.92)	0.139
Socioeconomic variables						
Education						
Illiterate/did not complete primary education			1		1	
Completed primary education			0.86 (0.71–1.06)	0.159	0.89 (0.72–1.1)	0.269
Completed secondary education			0.40 (0.26–0.6)2	<0.001	0.44 (0.29–0.66)	<0.001
Occupation						
Unemployed			1		1	
Non-income work			0.51 (0.37–0.72)	<0.001	0.50 (0.36–0.69)	<0.001
Low income			0.61 (0.45–0.82)	0.002	0.57 (0.42–0.77)	<0.001
High income			0.55 (0.39–0.79)	0.001	0.54 (0.38–0.77)	0.001
Variables related to recent socioeconomic conditions						
Type of house						
Kuccha					1	
Semi-pucca					0.83 (0.66–1.05)	0.116
Pucca					1.08 (0.90–1.26)	0.302
Taken loan (indebtedness)						
No					1	
Yes					1.26 (1.01–1.58)	0.045

PR, prevalence ratio; CI, confidence interval; OBC, other backward caste.

multivariable model (model 3), education, occupation and indebtedness retained significant association with only severe depression (Table 4). The risk of only severe depression was a third in individuals who had completed secondary education (PR=0.34; 95% CI 0.21–0.74) as well as in high-income generating individuals (PR=0.33; 95% CI 0.16–0.66) compared with individuals who were illiterate/did not complete primary education and individuals who were unemployed respectively. Risk of depression doubled in individuals who reported indebtedness (PR=2.05; 95% CI 1.32–3.17).

Contact coverage

Contact coverage for moderate/severe depression was 13.08% (95% CI 10.2–16.63), whereas it was 19.02% (95% CI 13.00–26.98) for only severe depression.

Age, gender, religion, caste, marital status, education, employment with MNREGA, type of house, indebtedness and amount of loan taken were not associated with contact coverage for either moderate/severe depression or only severe depression (Table 5). Individuals in higher income occupation category (PR=7.17; 95% CI 1.23–41.70) and those who owned land (PR=1.83; 95% CI 1.21–2.76) had higher contact coverage for moderate/severe depression, but the association between these variables and contact coverage for only severe depression was not statistically significant.

Service utilisation

Almost two-thirds of individuals who sought care did so within the primary healthcare system. Most of them consulted a general

Table 4 Multivariable associations of socio-demographic variables with only severe depression

Variables	Model 1		Model 2		Model 3	
	PR (95% CI)	*P*	PR (95% CI)	*P*	PR (95% CI)	*P*
Demographic variables						
Age, years						
18–29	1		1		1	
30–49	1.67 (0.90–3.05)	0.100	1.34 (0.69–2.60)	0.379	1.22 (0.62–2.40)	0.568
50+	2.75 (1.06–4.71)	<0.001	1.75 (0.91–3.33)	0.090	1.59 (0.82–3.06)	0.163
Gender						
Male	1		1		1	
Female	1.13 (0.83–1.52)	0.427	1.16 (0.77–1.72)	0.472	1.41 (0.94–2.11)	0.094
Socioeconomic variables						
Education						
Illiterate/did not complete primary education			1		1	
Completed primary education			0.58 (0.36–0.93)	0.024	0.57 (0.36–0.92)	0.022
Completed secondary education			0.31 (0.14–0.69)	0.005	0.34 (0.21–0.74)	0.007
Occupation						
Unemployed			1		1	
Non-income work			0.24 (0.13–0.45)	<0.001	0.22 (0.12–0.40)	<0.001
Low income			0.31 (0.18–0.52)	<0.001	0.26 (0.15–0.45)	<0.001
High income			0.34 (0.17–0.70)	0.004	0.33 (0.16–0.66)	0.002
Variable related to recent socioeconomic condition						
Taken loan (indebtedness)						
No					1	
Yes					2.05 (1.32–3.17)	0.002

PR, prevalence ratio; CI, confidence interval.

physician (48.21%), whereas 15.99% contacted a community health worker or accredited social health activist (ASHA). Quite a significant proportion of individuals also consulted a specialist (psychiatrist: 21.53% and psychologist: 4.22%). Individuals who had consulted a psychologist reported of receiving counselling, whereas everyone else received some sort of medication. Only 10.35% of individuals reported of visiting a traditional healer for the problems related to depression. Compared with these proportions which suggest seeking care from different service providers (formal health services as well as traditional healers), 46.05% of the individuals with depression had spoken about their problems with at least one person in their social network. Among these individuals, 61.60% discussed the problem with their spouse, whereas 15.05, 13.57, 37.23 and 11.56% discussed this with their parents, siblings, relatives and friends respectively.

Costs of care

The estimates for treatment costs for the last 12 months are based on the data from 78 individuals. The total cost of treatment varied from USD 0 to 966.29, with a mean of USD 55.04 (s.d.=131.60) and median of USD 22.19. Costs for medication were highest (mean USD 27.72) followed by costs for consultation (mean USD 22.97).

Among those who had the outcome of moderate/severe or only severe depression, the internal consistency of the PHQ-9 screening tool was high (Cronbach's alpha=0.792). The intraclass correlation for PHQ scores was 0.015: although the mean PHQ-9 score for participants across Sehore district was 5.27, the cluster-specific means (for individual villages or wards) ranged from 2.90 to 7.67.

Suicidality

The prevalence of suicidal thoughts in the past 12 months was 11.79%. Of these adults, 10.45% had made a plan for a suicide attempt. Nearly half of these individuals (45.40%) did attempt suicide in the past 12 months. The overall prevalence of suicide attempt in the entire study population was 0.52% (*n*=17/3220).

Discussion

We report the findings of a population-based survey of the prevalence, predictors, help-seeking behaviour and treatment coverage for depression from a predominantly rural population in Central India. Our main findings are that there is independent association between age, education, occupation, caste, marital status and indebtedness with moderate/severe depression, whereas only education, occupation and indebtedness are independently associated with only severe depression. We found that although contact coverage with formal healthcare was low, a large proportion of affected persons had discussed their problems with either a family member or someone in their social network. Most of the individuals who went to a healthcare provider had consulted a general physician.

Prevalence of depression

The point prevalence of moderate/severe depression from our study is very close to the point prevalence reported by one of the largest population-based study from South India (15.9%)[26] and two other population-based studies from Central India which report point prevalence of 13%[27] and 14.6[8] respectively. A recent meta-analysis (*n*=14 760 adults) has reported a pooled prevalence of 14.3%

Table 5 Univariable association of demographic and socioeconomic variables with contact coverage for moderate/severe and only severe depression

Variables	Contact coverage: depression (moderate/severe)		Contact coverage: depression (only severe)	
	n/N (%)	Unadjusted PR (95% CI)	n/N (%)	Unadjusted PR (95% CI)
Demographic variables				
Age, years				
18–29	10/89 (10.12)	1	5/20 (21.13)	1
30–49	38/279 (13.42)	1.32 (0.69–2.52)	14/61 (22.96)	1.04 (0.39–2.76)
50+	30/208 (13.94)	1.4 (0.81–2.35)	9/58 (14.92)	0.70 (0.27–1.82)
Gender				
Male	42/298 (13.7)	1	16/71 (21.16)	1
Female	36/278 (12.42)	0.91 (0.60–1.36)	12/68 (16.80)	0.79 (0.39–1.62)
Religion				
Hindu	69/515 (12.83)	1	26/126 (19.15)	1
Muslim	9/61 (15.24)	1.19 (0.60–2.35)	2/13 (17.74)	0.93 (0.21–43.99)
Caste				
Scheduled caste	12/114 (9.97)	1	6/25 (19.72)	1
Scheduled tribe	5/22 (19.10)	1.91 (0.71–5.17)	2/8 (19.88)	1.00 (0.25–4.10)
OBC	52/384 (13.35)	1.34 (0.64–2.78)	18/92 (19.88)	1.00 (0.41–2.49)
General	9/56 (15.73)	1.58 (0.65–3.84)	2/14 (11.92)	0.60 (0.12–2.96)
Marital status				
Currently married	72/480 (14.48)	1	27/119 (21.55)	1
Widowed/separated/divorced/deserted	5/57 (8.49)	0.59 (0.23–1.51)	1/12 (7.90)	0.37 (0.06–2.53)
Unmarried	1/39 (2.19)	0.15 (0.02–1.01)	0/8 (0.00)	NA
Socioeconomic variables				
Education				
Illiterate/did not complete primary education	49/394 (12.23)	1	18/104 (17.02)	1
Completed primary education	25/149 (15.29)	1.25 (0.81–1.94)	8/26 (24.91)	1.46 (0.67–3.20)
Completed secondary education	4/33 (13.18)	1.08 (0.46–2.53)	2/9 (24.77)	1.45 (0.42–5.07)
Occupation				
Unemployed	1/36 (2.46)	1	1/16 (5.44)	1
Non-income work	23/183 (11.68)	4.74 (0.70–32.24)	6/41 (13.29)	2.44 (0.30–19.51)
Low income	46/315 (14.43)	5.85 (0.85–40.30)	18/71 (24.31)	4.47 (0.60–32.20)
High income	8/42 (17.68)	7.17 (1.23–41.70)	3/11 (24.56)	4.51 (0.77–26.30)
Variables related to recent socioeconomic condition				
Employed with MNREGA				
No/not applicable	74/538 (13.36)	1	27/130 (19.89)	1
Yes	4/38 (9.69)	0.72 (0.27–1.96)	1/9 (7.96)	0.40 (0.06–2.85)
Type of house				
Kuccha	38/250 (14.67)	1	17/64 (23.67)	1
Semi-pucca	14/125 (10.70)	0.73 (0.40–1.32)	4/30 (13.08)	0.55 (0.22–1.37)
Pucca	26/201 (12.34)	0.84 (0.52–1.36)	7/45 (15.79)	067 (0.31–1.42)
Own land				
No	48/423 (10.70)	1	17/97 (16.10)	1
Yes	30/153 (19.60)	1.83 (1.21–2.76)	11/42 (25.88)	1.61 (0.84–3.06)
Taken loan (indebtedness)				
No	48/415 (11.43)	1	15/91 (15.74)	1
Yes	30/161 (17.02)	1.49 (0.98–2.26)	13/48 (24.66)	1.57 (0.83–2.99)
Loan amount				
First tertile	15/72 (18.90)	1	9/23 (34.98)	1
Second tertile	5/48 (9.55)	0.50 (0.20–1.28)	0/12 (0.00)	NA
Third tertile	10/41 (22.78)	1.20 (0.60–2.44)	4/13 (31.55)	0.90 (0.35–2.30)

n, individuals who sought care; N, total number of individuals with moderate/severe or only severe depression; PR, prevalence ratio; CI, confidence interval; OBC, other backward caste; MNREGA, Mahatma Gandhi National Rural Employment Guarantee Act.

(95% CI 11.3–17.7) in primary care.[28] Prevalence of depression in India ranges between 2% and 57%[29] with a pooled prevalence of 8.9% reported in one meta-analysis.[30] The findings from the World Mental Health Surveys have shown that the prevalence of depression and other common mental disorders varies widely between populations cross-nationally.[31] It must also be noted that the prevalence of depression reported in this article is based on the assessment of depression using PHQ-9. PHQ-9 has good clinical utility and can be used as a first-step assessment in primary care, but it cannot be relied on for case finding or confirmatory diagnosis of depression and it can also overestimate prevalence of depression as compared to structured diagnostic tools.[28] Interestingly, we also found that the mean PHQ-9 scores varied greatly between villages and urban wards in our study site which suggests that multiple demographic, socioeconomic and other unknown ecological variables are key drivers for depression.

Social correlates of depression

There is a very strong evidence base supporting the association of lower socioeconomic position with depression. There is high level of inequity in the distribution of common mental disorders across socioeconomic strata within societies, with significantly increased rates of depression among lower socioeconomic groups.[32–34] Our finding of independent associations between lower levels of education, unemployment, indebtedness and depression is consistent with the global literature. In addition to the above socioeconomic predicators, we also found an independent association between socially disadvantaged subgroups (SC and ST) and widowed/separated/divorced/deserted and moderate/severe depression. In India, caste particularly plays a very important role in determining social stratification and resultant social position. There is a strong association between caste and indicators of socioeconomic disadvantage, but there are very few studies that have explored the association of caste with common mental disorders.[7,35] Other studies from India have reported significantly increased risk of common mental disorders in individuals who are widowed, divorced or separated compared with those who are married, especially in women.[26,36] Our findings are consistent with these reports. We observed a monotonic increase in the prevalence of moderate/severe and only severe depression with age which is contrary to the literature from high-income countries which suggest that depression peaks in middle age. However, our findings are consistent with other studies from India.[8,26,37] Higher prevalence of risk factors such as chronic diseases, loss of spouse and economic deprivation in older people may be associated with the difference in the age distribution, and it requires further context-specific epidemiological exploration. We did not find statistically significant association between gender and moderate/severe or only severe depression in either univariable or multivariable analysis, although there was a 12% and 16% increased risk of moderate/severe and only severe depression, respectively, in women. This might be because the sample for the baseline survey was not powered to detect the association of specific demographic and socioeconomic variables with the outcome of depression. Nevertheless, this finding is quite contrary to the global literature,[38,39] but consistent with other studies from India which have found either a slight increase in risk of depression in females[26,37] or no difference at all.[40–43]

Treatment gap for depression

There are very few population-based studies from India which have assessed the treatment gap for depression using the metric of contact coverage.[8] The contact coverage for moderate/severe depression in our study was 13.08% which is very close to 12.5% coverage for depression reported in the World Health Survey,[44] but lower than 20% coverage reported in the most recently completed National Mental Health Survey.[6] Another study from Central India using the same tool has found a much lower contact coverage of 4.3%, although there was large intra-site variation, and the contact coverage of 13.8% from one of the sites in the study is very similar to our findings.[8] Majority of individuals with moderate/severe depression had sought care from general physicians which is consistent with the findings from two other studies conducted in India using the same tool and similar methodology.[7,8] Help-seeking for mental disorders is highly influenced by the way the 'illness' is conceptualised and the beliefs about the effectiveness of treatments. In India, especially in the rural population, depression is conceptualised mainly as a social and economic problem rather than a mental health problem.[45] Many studies have also described somatisation of depression in Asian cultures, specifically in females.[46] On the contrary, severe mental disorders such as psychosis and epilepsy are considered to be equivalent to mental disorders with an accompanying stigma associated with accessing care from mental health professionals.[47] All these factors might have resulted in predominant help-seeking for depression in primary care. We did observe relatively high contact coverage with mental health specialist compared with other Indian studies, and this might be because of the presence of DMHP in Sehore since 2007 and the geographical proximity to Bhopal (capital of Madhya Pradesh) where specialist services are widely available.

Limitations

One of the important limitations of this study is the inability to comment on effective coverage for depression which is defined as the proportion of individuals with depression who receive health gain from an intervention if they need it.[48] Thus, the findings of this study focus only on seeking care for depression and are unable to provide details regarding the outcomes/improvements in the individuals who sought care. We were also unable to contact 37.5% of the individuals sampled from the voter list because of temporary/permanent migration or death of these individuals. This might have resulted in selection bias; although we had very minimal non-response rate as those who we were able to contact, 99.6% provided the consent to participate in the study. We are also unable to unpack the causal inferences about the associations we observed because of the cross-sectional design of the study. Some of the key social determinants of depression especially related to women's mental health, such as intimate partner violence and husband's alcohol intake, were not part of the questionnaire. Nevertheless, this study does address key research questions related to social correlates of depression in rural India and is one of the very few recent population-based studies to have assessed the treatment coverage for depression in rural India.

Implications for policy and practice

There are severe economic consequences of mental disorders. It was estimated that in 2010, mental disorders globally resulted in $8.5 trillion loss in terms of total economic output lost. This is expected to nearly double by 2030 unless a concerted response is mounted.[49] A population-based study in India reported that depression was associated with increased healthcare costs and markedly increased the risk of catastrophic health expenditure.[8] The cost of care was primarily for consultation fees of the doctor. High cost of care is not just a barrier to access healthcare services, but it also pushes millions of Indians into a poverty trap because of lack of adequate protection against financial risks.[50] It is therefore imperative to integrate mental health services in primary care in order to ultimately achieve the goal of universal health coverage.

This study demonstrates the association of socioeconomic variables with depression and also highlights the treatment gap for the same. From the policy perspective, it is imperative to close this treatment gap by improving access to quality mental healthcare. This can be done by adopting a collaborative stepped care model of delivering mental health in primary care.[51] Primary care physicians as well as other service providers in the public health system and private sector need to be trained to identify, provide first-line pharmacological treatment and psychosocial interventions and refer severe cases to specialists. In addition to this, community-based health workers can raise awareness about depression being a treatable condition and encourage people to seek care.

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Availability of data and materials

Interested parties may notify the PRIME investigators of their interest in collaboration, including access to the data set analysed here, through the following website: https://docs.google.com/forms/d/1–4oNm5xdEPlq-RjL_4GUyCPMpVWtyaNVcfDewnx-iL4/viewform

References

1 Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet* 2013; **382**: 1575–86.

2 Ferrari AJ, Charlson FJ, Norman RE, Patten SB, Freedman G, Murray CJ, et al. Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. *PLoS Med* 2013; **10**: e1001547.

3 Kohn R, Saxena S, Levav I, Saraceno B. The treatment gap in mental health care. *Bull World Health Organ* 2004; **82**: 858–66.

4 Patel V, Chisholm D, Parikh R, Charlson FJ, Degenhardt L, Dua T, et al. Addressing the burden of mental, neurological, and substance use disorders: key messages from Disease Control Priorities, 3rd edition. *Lancet* 2016; **387**: 1672–85.

5 Murthy RS. Mental health initiatives in India (1947–2010). *Natl Med J India* 2011; **24**: 98–107.

6 Gururaj G, Varghese M, Benegal V, Rao GN, Pathak K, Singh LK, et al. *National Mental Health Survey of India, 2015–16: Summary*. National Institute of Mental Health and Neuro Sciences, NIMHANS, 2016.

7 Mathias K, Goicolea I, Kermode M, Singh L, Shidhaye R, Sebastian MS. Cross-sectional study of depression and help-seeking in Uttarakhand, North India. *BMJ Open* 2015; **5**: e008992.

8 Shidhaye R, Gangale S, Patel V. Prevalence and treatment coverage for depression: a population-based survey in Vidarbha, India. *Soc Psychiatry Psychiatr Epidemiol* 2016; **51**: 993–1003.

9 Shidhaye R, Shrivastava S, Murhar V, Samudre S, Ahuja S, Ramaswamy R, et al. Development and piloting of a plan for integrating mental health in primary care in Sehore district, Madhya Pradesh, India. *Br J Psychiatry* 2016; **208** (suppl 56): s13–20.

10 Lund C, Tomlinson M, De Silva M, Fekadu A, Shidhaye R, Jordans M, et al. PRIME: A programme to reduce the treatment gap for mental disorders in five low- and middle-income countries. *PLoS Med* 2012; **9**: e1001359.

11 Rathod SD, De Silva MJ, Ssebunnya J, Breuer E, Murhar V, Luitel NP, et al. Treatment contact coverage for probable depressive and probable alcohol use disorders in four low- and middle-income country districts: the PRIME cross-sectional community surveys. *PLoS One* 2016; **11**: e0162038.

12 Census. *Sehore District: Census 2011 Data*. (http://www.census2011.co.in/census/district/312-sehore.html)

13 Shidhaye R, Raja A, Shrivastava S, Murhar V, Ramaswamy R, Patel V. Challenges for transformation: a situational analysis of mental health care services in Sehore District, Madhya Pradesh. *Community Ment Health J* 2015; **51**: 903–12.

14 NREGA. *The Mahatma Gandhi National Rural Employment Guarantee Act 2005* (http://www.nrega.nic.in/netnrega/home.aspx).

15 Rathod SD, Nadkarni A, Bhana A, Shidhaye R. Epidemiological features of alcohol use in rural India: a population-based cross-sectional study. *BMJ Open* 2015; **5**: e009802.

16 National Family Health Survey. *International Institute for Population Sciences (IIPS) and Macro International. National Family Health Survey (NFHS-3), 2005–06: India*. Volume II. IIPS, 2007.

17 Kroenke K, Spitzer RL, Williams JB, Lowe B. The Patient Health Questionnaire Somatic, Anxiety, and Depressive Symptom Scales: a systematic review. *Gen Hosp Psychiatry* 2010; **32**: 345–59.

18 Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001; **16**: 606–13.

19 Manea L, Gilbody S, McMillan D. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. *CMAJ* 2012; **184**: E191–6.

20 Patel V, Weobong B, Weiss HA, Anand A, Bhat B, Katti B, et al. The Healthy Activity Program (HAP), a lay counsellor-delivered brief psychological treatment for severe depression, in primary care in India: a randomised controlled trial. *Lancet* 2017; **389**: 176–85.

21 Sikander S, Lazarus A, Bangash O, Fuhr DC, Weobong B, Krishna RN, et al. The effectiveness and cost-effectiveness of the peer-delivered Thinking Healthy Programme for perinatal depression in Pakistan and India: the SHARE study protocol for randomised controlled trials. *Trials* 2015; **16**: 534.

22 Patel V, Araya R, Chowdhary N, King M, Kirkwood B, Nayak S, et al. Detecting common mental disorders in primary care in India: a comparison of five screening questionnaires. *Psychol Med* 2008; **38**: 221–8.

23 Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (MINI): 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.

24 Mobenzi (http://mobenzi.com/researcher/home).

25 STATA-14. StataCorp. *Stata Statistical Software: Release 14*. StataCorp LP, 2015.

26 Poongothai S, Pradeepa R, Ganesan A, Mohan V. Prevalence of depression in a large urban South Indian population – the Chennai Urban Rural Epidemiology Study (CURES-70). *PLoS One* 2009; **4**: e7185.

27 Jonas JB, Nangia V, Rietschel M, Paul T, Behere P, Panda-Jonas S. Prevalence of depression, suicidal ideation, alcohol intake and nicotine consumption in rural Central India. The Central India Eye and Medical Study. *PLoS One* 2014; **9**: e113550.

28 Mitchell AJ, Yadegarfar M, Gill J, Stubbs B. Case finding and screening clinical utility of the Patient Health Questionnaire (PHQ-9 and PHQ-2) for depression in primary care: a diagnostic meta-analysis of 40 studies. *BJPsych Open* 2016; **2**: 127–38.

29 Patel V. The epidemiology of Common Mental Disorders in South Asia. *NIMHANS Journal* 1999; **17**: 307–27.

30 Reddy VM, Chandrashekar CR. Prevalence of mental and behavioural disorders in India: a meta-analysis. *Indian J Psychiatry* 1998; **40**: 149–57.

31 Demyttenaere K, Bruffaerts R, Posada-Villa J, Gasquet I, Kovess V, Lepine JP, et al. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 2004; **291**: 2581–90.

32 Lund C, Breen A, Flisher AJ, Kakuma R, Corrigall J, Joska JA, et al. Poverty and common mental disorders in low and middle income countries: a systematic review. *Soc Sci Med* 2010; **71**: 517–28.

33 Araya R, Rojas G, Fritsch R, Acuna J, Lewis G. Common mental disorders in Santiago, Chile: prevalence and socio-demographic correlates. *Br J Psychiatry* 2001; **178**: 228–33.

34 Ludermir AB, Lewis G. Links between social class and common mental disorders in Northeast Brazil. *Soc Psychiatry Psychiatr Epidemiol* 2001; **36**: 101–7.

35 Shidhaye R, Patel V. Association of socioeconomic, gender and health factors with common mental disorders in women: a population-based study of 5703 married rural women in India. *Int J Epidemiol* 2010; **39**: 1510–21.

36 Patel V, Kirkwood BR, Pednekar S, Weiss H, Mabey D. Risk factors for common mental disorders in women. Population-based longitudinal study. *Br J Psychiatry* 2006; **189**: 547–55.

37 Cheng HG, Shidhaye R, Charlson F, Deng F, Lyngdoh T, Chen S, et al. Social correlates of mental, neurological, and substance use disorders in China and India: a review. *Lancet Psychiatry* 2016; **3**: 882–99.

38 Kessler RC, Berglund P, Demler O, Jin R, Koretz D, Merikangas KR, et al. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *JAMA* 2003; **289**: 3095–105.

39 Mirza I, Jenkins R. Risk factors, prevalence, and treatment of anxiety and depressive disorders in Pakistan: systematic review. *BMJ* 2004; **328**: 794.

40 Fernandes AC, Hayes RD, Patel V. Abuse and other correlates of common mental disorders in youth: a cross-sectional study in Goa, India. *Soc Psychiatry Psychiatr Epidemiol* 2013; **48**: 515–23.

41 Pillai A, Patel V, Cardozo P, Goodman R, Weiss HA, Andrew G. Non-traditional lifestyles and prevalence of mental disorders in adolescents in Goa, India. *Br J Psychiatry* 2008; **192**: 45–51.

42 Ganguli M, Dube S, Johnston JM, Pandav R, Chandra V, Dodge HH. Depressive symptoms, cognitive impairment and functional impairment in a rural elderly population in India: a Hindi version of the geriatric depression scale (GDS-H). *Int J Geriatr Psychiatry* 1999; **14**: 807–20.

43 Barua A, Kar N. Screening for depression in elderly Indian population. *Indian J Psychiatry* 2010; **52**: 150–3.

44 Raban MZ, Dandona R, Kumar GA, Dandona L. Inequitable coverage of non-communicable diseases and injury interventions in India. *Natl Med J India* 2010; **23**: 267–73.

45 Kermode M, Bowen K, Arole S, Joag K, Jorm AF. Community beliefs about causes and risks for mental disorders: a mental health literacy survey in a rural area of Maharashtra, India. *Int J Soc Psychiatry* 2010; **56**: 606–22.

46 Shidhaye R, Mendenhall E, Sumathipala K, Sumathipala A, Patel V. Association of somatoform disorders with anxiety and depression in women in low and middle income countries: a systematic review. *Int Rev Psychiatry* 2013; **25**: 65–76.

47 Kermode M, Bowen K, Arole S, Joag K, Jorm AF. Community beliefs about treatments and outcomes of mental disorders: a mental health literacy survey in a rural area of Maharashtra, India. *Public Health* 2009; **123**: 476–83.

48 De Silva MJ, Lee L, Fuhr DC, Rathod S, Chisholm D, Schellenberg J, et al. Estimating the coverage of mental health programmes: a systematic review. *Int J Epidemiol* 2014; **43**: 341–53.

49 Bloom D, Cafiero E, Jane-Llopis E, Abrahams-Gessel S, Bloom L, Fathima S, et al., editors. *The Global Economic Burden of Noncommunicable Diseases. 2011.* World Economic Forum, 2014.

50 Patel V, Parikh R, Nandraj S, Balasubramaniam P, Narayan K, Paul VK, et al. Assuring health coverage for all in India. *Lancet* 2015; **386**: 2422–35.

51 Shidhaye R, Lund C, Chisholm D. Closing the treatment gap for mental, neurological and substance use disorders by strengthening existing health care platforms: strategies for delivery and integration of evidence-based interventions. *Int J Ment Health Syst* 2015; **9**: 40.