Cross-sectional study of depression and help-seeking in Uttarakhand, North India

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ABSTRACT

Objectives: This study sought to use a population-based cross-sectional survey to describe depression prevalence, healthcare seeking and associations with socioeconomic determinants in a district in North India.

Setting: This study was conducted in Sahaspur and Raipur, administrative blocks of Dehradun district, Uttarakhand, in July 2014.

Participants: A population-based sample of 960 people over the age of 18 years was selected in 30 randomised clusters after being stratified by rural:urban census ratios.

Primary outcome measures: The survey used a validated screening tool, Patient Health Questionnaire, to identify people with depression, and collected information regarding socioeconomic variables and help-seeking behaviours. Depression prevalence and health seeking behaviours were calculated, and multivariable logistic regression was used to assess associations between risk factors and depression.

Results: Prevalence of depression was 6% (58/960), with a further 3.9% (37/960) describing a depressive episode of over 2 weeks in the past 12 months. Statistically significant adjusted OR for depression of more than 2 were found for people who were illiterate, classified as Scheduled Caste/Tribe or Other Backward Castes, living in temporary material housing and who had recently taken a loan. While over three quarters of people with depression (79%) had attended a private or government general medical practitioner in the past 3 months, none had received talking therapy (100% treatment gap) and two people (3.3%) had been prescribed antidepressants.

Conclusions: There are clear associations between social, educational and economic disadvantage and depression in this population. Strategies that address the social determinants of depression, such as education, social exclusion, financial protection and affordable housing for all are indicated. To address the large treatment gap in Uttarakhand, we must ensure access to primary and secondary mental health providers who can recognise and appropriately manage depression.

INTRODUCTION

Depression, the most common mental disorder (CMD), accounts for 9.7% years lived with disability in the 2010 Global Burden of Disease study.1 Depression-related disability, compounded by lack of access to care, impacts on social and physical health. Prevalence estimates of depression in India have varied widely depending on the assessment tools used and the community’s socio-demographic profile.2 3 Ganguli5 reviewed 15 studies of psychiatric morbidity, and found a mean prevalence of 3.4%. Reddy and Chandrasekhar4 meta-analysis of 33572 participants described prevalence at 8.9%, with urban rates nearly double rural rates. Other studies in South Asia have shown even higher rates, for example, 15.1% in urban South India5 and 45.9% in urban Pakistan.6

Robust evidence from India and other low and middle income countries (LMIC) links socioeconomic deprivation with increased...
risk of depression. Other groups shown to be at higher risk for depression in India are women, the elderly, urban dwellers and people who are divorced or widowed.13, 14

India’s highly inequitable distribution of mental health resources means at least 90% of people with mental disorders (PWMDs) are undiagnosed and untreated.10 There are also huge disparities in access to mental health services particularly for people in rural areas.4 Barriers to help-seeking include unavailability of services, poor quality of the majority of existing services, lack of knowledge about mental illness, and fear of stigma and discrimination.11, 12 People with depression in India report distress primarily as unexplained somatic symptoms, and usually seek help from primary care rather than specialist mental healthcare providers.13, 14 Simultaneously, conceptual understandings of depression are not well captured by current disease classification systems15 and ongoing reflection is needed about when mental distress becomes a disorder.

There is an urgent need to understand the burden of disease in areas where prevalence studies have never before been conducted,16 and to understand the pathways to care currently utilised.17 Few studies of depression in India have examined the associations between depression and social determinants of health, and almost none have considered the association between depression and caste.2–5 7 There are very few studies of depression prevalence in the Hindi-speaking belt with existing studies predominantly from Southern and Eastern India.2–5 9 18 We could find no study on the prevalence or epidemiology of depression in Uttarakhand, a state with a population of 10 million. This study describes the prevalence of depression, sociodemographic associations and the help-seeking behaviours of people with depression.

METHODS
Setting
This study was conducted in two blocks (administrative unit with up to 200 000 inhabitants) in Dehradun district, Uttarakhand, as part of the baseline survey for Burans, a community mental health partnership project with the Emmanuel Hospital Association (http://www.eha-health.org) and the Uttarakhand Community Health Global Network (http://www.chgnukc.org). Burans is directed by the first author. Housing is an important indicator of socioeconomic status in this setting. Permanent materials housing refers to housing that is predominantly made with a sealed floor, walls of a solid material (eg, brick) and a corrugated iron roof. Temporary materials housing refers to housing with a dirt floor and/or walls and roofing constructed from straw/tarpaulin or plastic sheets. The National District Mental Health Plan had not been implemented in Uttarakhand at the time of this survey. During the survey period, there were two government psychiatrists and no government psychologists, with 10–15 private psychiatrists and psychologists across Uttarakhand. Government primary care services did not generally treat PWMDs, nor did they supply essential medicines such as antidepressants.

Sample selection
We selected 960 people from 30 randomised clusters. Cluster sampling was conducted in three phases: (1) ward or panchayat (administrative unit, approximately 5000 people); (2) household and (3) participant. We used STATA19 to calculate a sample size of n=480 (estimating depression prevalence at 10% (based on other Indian population-based studies)3, 5) and a sampling frame of 235 000 (population of 2 blocks of Dehradun district), 30 clusters and 95% CIs. To account for the effects of clustering, we allowed a design effect of 2, giving a final total of 960 persons.

Clusters were stratified based on rural:urban ratios in the district’s 2011 census,20 to require 21 urban and 9 rural clusters. These were selected by random number generation from the publicly available list of census panchayats and wards. To select at household level, the surveying team walked to the centre of the community, and spun a pen to ascertain which direction to start. Every 6th house on the right was surveyed, and at each junction, roads/alleys on the right were followed. If no one was present at a selected household, the team revisited that household later. If no one was present on the second visit, the first house to the right was selected. Only one person from each household was surveyed. Generally, male field staff surveyed male respondents, and female staff surveyed female respondents. Once the requisite 50% of female participants was reached, all survey staff surveyed male respondents. Inclusion criteria were that participants should be occupants of a household, 18 years or older, and able to comprehend and respond to a survey.

Data collection
Project Burans field staff, all from the district of Dehradun (equal numbers of males and females), collected data in July and August 2014. All were trained in sampling strategy, use of the survey tool, data recording and management, and ethical research, and were supervised and supported by KM.

A comprehensive survey tool was translated to Hindi, back translated to English and piloted extensively by the PRIME team in Madhya Pradesh.21 The survey was interviewer administered in Hindi. Components reported in this paper are:

- Sociodemographic information including indicators of housing quality, indebtedness, caste, marital status, highest education level attained and employment status, adapted from the Indian version of the demographic and health surveys.22 Proxy measures of socioeconomic status included housing quality, educational status and employment status. We used norms of the Government of India to assess housing
quality where permanent material housing referred
to classifications of ‘Pukka’ and ‘Semi-kaccha’ and
temporary material housing referred to the ‘Kaccha’
classification.23

- General health help-seeking behaviour and health
  service utilisation (including ‘Have you visited any
  health facility/provider in the last 3 months?’).23
- Adapted questions from the Client Service Receipt
  Inventory,24 used to ask participants about recent
  inpatient and outpatient services, including type of
  provider (government primary provider, government
  secondary provider, private medical sector or charity
  provider, mental health provider, traditional or reli-
  gious healer).
- Talking therapy or medication prescription received
  (generic or brand name, dose, duration and source).
- Patient Health Questionnaire (PHQ9)—a self-report
  screening tool assessing clinical depression (validated
  internationally and in India).25–27 This questionnaire
  comprises nine items, each is scored 0 to 3, which
  thus yields a severity score from 0 and 27. Response
categories, based on frequency of a particular
symptom over the last 2 weeks are scored 0, 1, 2 and
3, for ‘not at all’, ‘several days’, ‘more than half the
days’, and ‘nearly every day’, respectively. In our
study, a person with a PHQ9 score of 10 or higher
was assessed as having at least moderate depression,
in line with international norms for PHQ9.27
- Mental health service seeking behaviour among those
screening positive for depression using the same
codes as for general health seeking behaviour.

At census enumeration and on birth registration,
Indians of Jain, Sikh and Hindu religion must identify
themselves as General Caste, Other Backward Classes
(OBC) or a member of a Scheduled Tribe/Caste (SC/
ST). The vast majority of Muslims are included under the OBC category. Christians and
Buddhists are classified into the General Caste category.

Analysis
Survey data were analysed using STATA V.13.1.19 Open
text was translated into English, group thematically
and coded. Univariable logistic regression analysis was
performed using all relevant socioeconomic variables and
significant variables (p<0.05) were considered in
the multivariable logistic regression analysis. The
dependent variable was dichotomised: no depression=0,
depression=1. The original interpretation defined a total
score of 5–9 as mild depression, and above 9 as
moderate-to-severe depression. In this study, we desig-
nated all respondents with a score of greater than 9 as
being ‘depressed’. χ² Test was used in analysis of tables 1
and 2. A p value <0.05 was considered statistically
significant.

All participants gave written consent to participate in
the study, and respondents who screened positively for
deression were given information on depression, and
advised on health services and other sources of help.

RESULTS
Within two contact attempts, 958 of 960 selected house-
holds were successfully surveyed and the remaining two
were surveyed on the third visit. Survey participants’
demographic characteristics are summarised in table 3.
Nearly one-quarter were lowest caste or had tribal status
(SC and ST). Thirty-five per cent had six or fewer years
of schooling.

The sampled survey population had a mean age of
39.4 years and a median age of 37.5 years. The mean
period of education completed was 8.0 years and the
median was 9 years. The sample differs significantly
from the wider Uttarakhand population20 by greater rep-
resentation of middle-aged people classified as SC/ST
and unschooled people.

Table 4 summarises the prevalence of depression,
sociodemographic characteristics and their association
with the PHQ9 depression score with crude and
adjusted ORs. Depression prevalence was 6%. The sig-
ificant association with increased risk of depression in
women disappeared when other confounding factors
such as educational status and economic deprivation
were accounted for. People in their middle years had a
slightly higher risk of depression than those under
30 years and over 50 years of age. People who lived in a
house made of temporary materials were almost twice as

| Table 1 Health service-seeking behaviour |
|----------------------------------------|
|                                      |
| Not depressed N (%)                  |
| Depressed N (%)                       |
| No depression in last 12 months, N (%)|
| Depression in last 12 months, N (%)   |
| Visited outpatient health provider in last 3 months | 138 (15.3) | 45 (77.6)* | 120 (13.8) | 63 (68.5)* |
| No visit to outpatient health provider in last 3 months | 764 (84.7) | 13 (22.4)* | 748 (86.2) | 29 (31.5)* |
| Hospital admission in last 12 months | 41 (4.5) | 15 (25.8)* | 35 (4.0) | 21 (22.8)* |
| No hospital admission in last 12 months | 860 (95.5) | 43 (74.2)* | 832 (96.0) | 71 (77.2)* |

*Signifies statistical significance.
likely to be classified as depressed, and those who had taken a loan recently were three times more likely. Those classified as SC or ST had three times the odds of being classified as depressed. A dose–response relationship was seen in educational status, with risk of depression increasing with decreasing years of completed schooling.

Table 1 shows the help-seeking behaviours of those screened as depressed (using PHQ9) or who self-reported a >2 week episode of depression in the last 12 months. People with depression were five times more likely to have visited outpatient or inpatient providers than people without depression. Separate analysis showed that all women, with and without depression, were significantly more likely than men to have visited a health provider in the prior 3 months.

Table 2 shows the type of health provider visited by the 183 people who made an outpatient visit in the previous 3 month. Depressed people, compared to non-depressed, consult health providers significantly more, and are far more likely to visit general health providers than to visit mental health services. Only two people had visited a mental health service provider in the previous 3 months. No one with depression had received talking therapy. Two people with depression at the time of the survey had been prescribed antidepressants through private practitioners, while one respondent who screened negatively for depression had been prescribed antidepressants.

**DISCUSSION**

This study shows a 6% prevalence of depression using a depression screening tool in a randomly sampled

**Table 2** Type of health providers visited in the last 3 months

| Type of outpatient provider | Not depressed N (%) | Depressed N (%) |
|-----------------------------|---------------------|-----------------|
| Government provider (CHC or PHC) | 54 (40.3) | 22 (47.8) |
| Community level government provider (PHC or ANM) | 7 (5.0) | 2 (4.3) |
| Private health provider | 70 (52.2) | 18 (41.8) |
| Mental health provider | 1 (0.7) | 1 (2.3) |
| Traditional healer | 6 (4.4) | 2 (4.3) |
| Total | 138 (16.2% of non-depressed) | 45 (79% of total depressed) |
| Prescribed antidepressants | 1 (0.7) | 2 (4.3) |
| Supported with talking therapy | 0 | 0 |

ANM, Auxiliary Nurse Midwife; CHC, community health centres; PHC, primary health centres.

**Table 3** Demographic characteristics of participants

| Variables | Female N (%) | Male N (%) | Total N (%) |
|-----------|--------------|------------|-------------|
| Total     | 480          | 480        | 960         |
| Age (years) |             |            |             |
| 18–29     | 159 (33.1)   | 121 (25.2) | 280 (29.2)  |
| 30–39     | 145 (30.2)   | 101 (21.0) | 246 (25.6)  |
| 40–49     | 100 (20.8)   | 101 (21.0) | 201 (20.9)  |
| 50–59     | 44 (9.2)     | 80 (16.7)  | 124 (12.9)  |
| 60+       | 32 (6.7)     | 77 (16.1)  | 109 (11.2)  |
| Marital status |          |            |             |
| Married   | 366 (50.4)   | 360 (49.6) | 726 (75.6)  |
| Divorced/separated | 48 (10.0) | 13 (2.7) | 61 (6.4) |
| Single    | 66 (13.7)    | 107 (22.3) | 173 (18.0)  |
| Rural/urban |          |            |             |
| Rural     | 145 (30.2)   | 143 (29.8) | 288 (30.0)  |
| Urban     | 335 (69.8)   | 337 (70.2) | 672 (70.0)  |
| Education |             |            |             |
| None/incomplete primary | 109 (22.7) | 51 (10.6) | 160 (16.7) |
| Primary completion | 88 (18.3) | 90 (18.7) | 178 (18.5) |
| Secondary completion | 199 (41.5) | 273 (56.9) | 472 (49.2) |
| Graduate  | 84 (17.5)    | 66 (13.7)  | 150 (15.6)  |
| Religion  |             |            |             |
| Hindu     | 401 (83.5)   | 308 (82.9) | 799 (83.2)  |
| Muslim    | 71 (14.8)    | 70 (14.6)  | 141 (14.7)  |
| Other     | 8 (1.7)      | 11 (2.5)   | 19 (2.1)    |
| Caste     |             |            |             |
| Scheduled Caste/Tribe | 122 (25.4) | 116 (24.2) | 238 (24.8) |
| Other Backward Caste | 74 (15.4) | 73 (15.2) | 147 (15.3) |
| General   | 284 (59.2)   | 291 (60.6) | 575 (59.9)  |
population in Dehradun district, Uttarakhand. Some studies suggest prevalence in India may be higher. In this study, no one had received talking therapy, indicating a treatment gap of 100% for the recommended first-line treatment of mild or moderate depression. Antidepressants are the recommended second-line treatment for depression, and although we cannot ascertain how many of the 96.3% people would have benefited from these medicines, it is likely this also represents a large treatment gap. Extrapolating these findings to Uttarakhand’s adult population of 6.6 million, we estimate 400 000 people may have depression, of whom just 4000 may have access to antidepressants and almost no one is likely to have access to talking therapy—a huge mismatch between disease burden and health service provision.

This study shows much greater risk of depression for three groups—the poorest (those in houses constructed from temporary materials and who had taken a recent loan); those who self-identify as OBC, SC or ST; and the unschooled/illiterate. Each of these associations has an adjusted OR for depression of at least twice that of their reference group. A systematic literature review in LMIC shows depression to be strongly associated with socioeconomic deprivation, supporting the WHO Commission on the Social Determinants of health concept of mediating pathways that link poverty with lack of access to political recognition and economic power. Other Indian studies also suggest socioeconomic factors as the key determinants of depression. Similar to a ‘canary in a coal mine’, depression may be conceptualised as an indicator of social inequity and vulnerability.

Although mental health has been linked with socioeconomic disadvantage and social exclusion, caste, a key indicator of social identity in India, has not been well investigated as a risk factor. One Indian study of the prevalence of CMDs among rural women found no

| Descriptive variable | Non-depressed | Depressed | p Value | Crude OR (95% CI) | Adjusted OR (95% CI) |
|----------------------|---------------|-----------|---------|-------------------|----------------------|
| Total                | 902 (94.0)    | 58 (6.0)  |         |                   |                      |
| Sex                  |               |           |         |                   |                      |
| Male                 | 460 (95.8)    | 20 (4.2)  | <0.001  | 2.0 (1.1 to 3.5)  | 0.6 (0.3 to 1.2)    |
| Female               | 442 (92.1)    | 38 (7.9)  |         |                   |                      |
| Age (years)          |               |           |         |                   |                      |
| 18–29                | 270 (96.4)    | 10 (3.6)  | 1.0     |                   |                      |
| 30–39                | 230 (93.5)    | 16 (6.5)  | 1.9     | 0.8 (4.2)         |                      |
| 40–49                | 183 (91.0)    | 18 (7.0)  | 2.7*    | 1.2 (5.9)         |                      |
| 50–59                | 116 (93.5)    | 8 (6.5)   | 1.9     | 0.7 (4.8)         |                      |
| 60 and over          | 103 (94.5)    | 6 (5.5)   | 1.6     | 0.6 (4.4)         |                      |
| Caste                |               |           |         |                   |                      |
| General              | 557 (96.9)    | 18 (3.1)  | 1.0     |                   |                      |
| OBC                  | 137 (93.2)    | 10 (6.8)  | 2.3*    | 1.0 (5.0)         | 2.1 (0.9 to 4.8)    |
| SC/ST                | 208 (87.4)    | 30 (12.6)| <0.001  | 4.5* (2.4 to 8.2) | 3.2* (1.7 to 6.2)  |
| Religion             |               |           |         |                   |                      |
| Hindu                | 755 (94.5)    | 44 (5.5)  | 1.0     |                   |                      |
| Non-hindu            | 147 (91.3)    | 14 (8.7)  | 1.6     | 0.9 (3.0)         |                      |
| House type           |               |           |         |                   |                      |
| Permanent            | 760 (96.0)    | 32 (4.0)  | 1.0     |                   |                      |
| Temporary            | 142 (84.5)    | 26 (15.5)| <0.001  | 3.3* (1.9 to 5.7) | 1.9 (1.0 to 3.5)   |
| Loan in last 6 months|               |           |         |                   |                      |
| No                   | 845 (95.1)    | 44 (4.9)  | 1.0     |                   |                      |
| Yes                  | 57 (80.3)     | 14 (19.7)| <0.001  | 4.7* (2.4 to 9.1) | 3.0* (1.4 to 6.2)  |
| Education status     |               |           |         |                   |                      |
| Unschooled           | 135 (84.4)    | 25 (15.6)| 6.8     | 2.3 (19.9)        | 3.7* (12.0)         |
| Primary              | 168 (94.4)    | 10 (5.6)  | 2.2     | 0.7 (7.0)         | 2.0 (0.6 to 7.1)   |
| Secondary            | 453 (96.0)    | 19 (4.0)  | 1.5     | 0.5 (4.6)         | 1.5 (0.5 to 4.7)   |
| Graduate             | 146 (97.3)    | 4 (2.7)   | <0.001  | 1.0               |                      |
| Employment           |               |           |         |                   |                      |
| Professional/military| 102 (92.7)    | 8 (7.3)   | 1.0     |                   |                      |
| Self-employed        | 231 (97.5)    | 6 (2.5)   | 0.3*    | 0.1 (0.98)        |                      |
| Unskilled manual     | 341 (93.9)    | 22 (6.1)  | 0.8     | 0.4 (1.9)         |                      |
| Unemployed           | 228 (91.2)    | 22 (8.8)  | <0.05   | 1.2               | 0.5 (2.9)           |

*Signifies statistical significance.

SC, Scheduled Caste; ST, Scheduled Tribe; OBC, Other Backward Caste.
association with caste. A further study in rural Nepal found that caste-based disparities in mental health are mediated by poverty, lack of social support and stressful life events. However, Sen’s capabilities approach emphasises rights and command over goods, recognises the relational roots of deprivation, and underscores the importance of agency and participation for genuine social inclusion. This view is supported by others describing psychosocial and biological pathways between social exclusion and health. It seems likely, therefore, that social exclusion, marked by caste, increases the risk of depression.

For decades, Indian national policy has sought to legislatively benefit SC and ST, for example, the Reservation in Admission Act 2006 and the Protection of Civil Rights Act 1955. Despite such measures, and even after controlling for socioeconomic status (years of schooling, housing quality, indebtedness), members of SC and ST groups in this study had more than twice the risk for depression compared to the General Caste. It is likely that persisting social structures of exclusion and discrimination are more penetrating than legislation, and that they continue to create relative deprivation, reduce agency and exclude people.

Associations between poverty and CMDs in LMIC countries and in India are well described. This study found that depression prevalence among people who had taken a recent loan was thrice that of those who had not. Two other studies from India show indebtedness as a risk factor for primary care attenders diagnosed with a CMD. Links between personal debt and mental health are well described, although there have been no prospective longitudinal studies to show the direction of association. Possible mediating pathways between depression and indebtedness include shame, stress of financial insecurity and less capacity to earn income due to depression.

Another strong risk factor for depression in this study is educational status. People who had not completed primary schooling had almost four times greater risk after controlling for caste, housing, indebtedness and employment status. Our results show a striking dose-response relationship: increasing years of education provide increasing protection. A meta-analysis examining the associations between socioeconomic inequality and depression also reported this finding. Education status has been described in India and other LMICs as predictive of mental health outcomes. Social consequences of low levels of education are multiple and move beyond schooling as a marker of deprivation, including reduced opportunity to access resources, and to develop protective social and cognitive skills, and increased risk for mental distress. Reverse causality is unlikely to be a factor, as primary education occurs at an age when CMDs are uncommon.

Although people with depression were seeking care, they were not getting the help they needed. This study shows that most people with depression had attended primary healthcare providers in the previous 3 months, in the Government as well as in the private sectors. The somatisation of depression among people with depression in Asian cultures, particularly women, is well described. Many health providers are unable to recognise somatisation, leading to excessive, costly and often inappropriate investigation and treatment. Also noteworthy is that only eight people in this sample reported consultations with traditional healers. Others have described up to two-thirds of people with severe mental disorders in India seeking help from traditional healers during their illness. The strong association between somatoform disorders and CMDs highlights the need for primary care providers to be equipped with knowledge and skills to recognise and manage the diverse presentations of CMDs.

This study shows depression as a community outcome of macroeconomic and political decisions that can lead to mental distress and suffering for communities as well as for individuals. There are several important implications for policy and practice. Foremost, since social determinants of health almost certainly contribute to depression, macropolicies that address determinants such as poor housing, caste, indebtedness and low education, will also reduce depression disease burden. Policies to improve mental health must seek to reduce poverty and social exclusion and actively include communities.

Second, action is urgently required to increase provision of mental health services and medicines, as strongly advocated by the Lancet mental health group and series. However, perhaps more importantly, primary care doctors in India, being the healthcare providers most commonly consulted by people with depression, need the knowledge, skills and perception to recognise the diverse presentations of CMDs such as depression and anxiety, and to treat them appropriately with both talking and pharmaceutical therapies.

Methodological considerations

A major strength of this study is that its data are from a randomly selected population covering rural, semiurban and urban populations typical for a district in North India, in 2014. Multivariable analysis ensured that potentially confounding factors were considered. However, there are some methodological limitations: self-reported measures may risk recall bias and cultural factors. PHQ9 is a screening—not diagnostic—tool constructed using a definition of depression (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition and International Classification of Diseases 10th Revision); it has been critiqued as being over simplistic and risks labelling components of normal human experience as a disorder. This cross-sectional study cannot attribute causality to apparent risk factors. The survey tool excluded three key risk factors—stressful life events, chronic illness and disability. The lower than expected prevalence of depression (6%) may be related to the
emphasize in the PHQ9 on cognitive manifestations of depression possibly missing the somatic features common in Asian cultures. 44

CONCLUSION
Depression in Dehradun district of Uttarakhand, with a prevalence of at least 6%, is two or three times more common among people who are economically deprived, who are part of the most excluded caste group or those who have had little education. Almost no one with depression accesses effective primary or secondary mental healthcare. Social policy and health service responses must urgently address this preventable and treatable disease burden and treatment gap. CMDs are indeed common, and disproportionately affect the most vulnerable.

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REFERENCES
1. Whiteford HA, Degenhardt L, Rehm J, 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. Math S, Chandrashekar C, Bhugra D. Psychiatric epidemiology in India. Indian J Med Res 2007;126:183–92.
3. Ganguli H. Epidemiological findings on prevalence of mental disorders in India. Indian J Psychiar 2000;42:14–20.
4. Reddy VM, Chandrashekar C. Prevalence of mental and behavioural disorders in India: a meta-analysis. Indian J Psychiar 1998;40:149.
5. Poongothai S, Pradeepa R, Ganesan A, et al. Prevalence of depression in a large urban South Indian population—the Chennai Urban Rural Epidemiology Study (CURE–7). PLoS ONE 2009;4: e7185.
6. Muhammad Gadit A, Mugford G. Prevalence of depression among households in three capital cities of Pakistan: need to revise the mental health policy. PLoS ONE 2007;2:e209.
7. Shidhaye R, Patel V. Association of socio-economic, 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.
8. Lund C, Breen A, Fisher AJ, et al. Poverty and common mental disorders in low and middle income countries: a systematic review. Soc Sci Med 2010;71:517–28.
9. Grover S, Dutt A, Avasthi A. An overview of Indian research in depression. Indian J Psychiatry 2010;52(Suppl 1):S78–88.
10. World Health Organisation. Mental health atlas 2011. Geneva: WHO, 2011.
11. Raguram R, Weiss MG, Chennabasavanna SM, et al. Stigma, depression, and somatization in South India. Am J Psychiatry 1996;153:1043–9.
12. Kermode M, Bowen K, Arole S, et al. 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.
13. Pothen M, Kunuvilla A, Philip K, et al. Common mental disorders among primary care attenders in Vellore, South India: nature, prevalence and risk factors. Int J Soc Psychiatry 2003;49:119–25.
14. Pattanayak RD, Sagar R. Depressive disorders in Indian context: a review and clinical update for physicians. J Assoc Physicians India 2008;56:297–302.
15. Jacob K, Patel V. Classification of mental disorders: a global mental health perspective. Lancet 2014;383:1433–5.
16. De Silva MJ. Impact evaluations of mental health programmes: the missing piece in global mental health. J Epidemiol Community Health 2015;69:405–7.
17. Lahariya C, Singhal S, Gupta S, et al. Pathway of care among psychiatric patients attending a mental health institution in central India. Indian J Psychiatry 2010;52:333–8.
18. Nandi DN, Banerjee G, Mukherjee SP, et al. Psychiatric morbidity of a rural Indian community. Changes over a 20-year interval. Br J Psychiatry 2000;176:351–6.
19. STATA Corp LP. STATA 13.1. Texas, USA: STATA Corp, 2013.
20. Government of India. Census 2011 Secondary Census 2011. 2011. http://www.census2011.co.in/census
21. PRIME Programme for Improving Mental Health Care. Secondary Programme for Improving Mental Health Care. 2013. http://www.centreforglobalmentalhealth.org/projects-research/prime-programme-improving-mental-health-care
22. International Institute for Population Sciences Mt. Indian National Family Health Survey (NFHS–3) 2005–6, Mumbai: International Institute for Population Sciences, 2007.
23. Anant T, Das S. Housing report. 44th edn. New Delhi: Housing [Internet], 2011.
24. Beecham JK, Knapp MRJ. Costing psychiatric interventions. In: Thornicroft G, ed. Measuring mental health needs. London: Gaskell, 2001:200–24.
25. Poongothai S, Pradeepa R, Ganesan A, et al. Reliability and validity of a modified PHQ9 item inventory (PHQ12) as a screening instrument for assessing depression in Asian Indians (CURES–65). J Assoc Physicians India 2009;57:147–52.
26. Kochhar PH, Rajadyaksha SS, Suvarna VR. Translation and validation of brief patient health questionnaire against DSM IV as a tool to diagnose major depressive disorder in Indian patients. J Postgrad Med 2007;53:102–7.
27. Kroenke K, Spitzer R, Williams J. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 2001;16:606–13.
28. Mukherjee S. Conceptualisation and classification of caste and tribe by the Census of India. J Anthropol Surv India 2013;42:905–20.
29. Prince M, Patel V, Saxena S, et al. No health without mental health. Lancet 2007;370:859–77.
30. NICE. Depression: the treatment and management of depression in adults (update). NICE Clinical Guideline 90. London: NICE, 2011.
31. World Health Organisation. Social commission on the social determinants of health. Geneva: WHO, 2006.
32. Kohrt BA, Speckman RA, Kunz RD, et al. Culture in psychiatric epidemiology: using ethnography and multiple mediator models to assess the relationship of caste with depression and anxiety in Nepal. Ann Hum Biol 2009;36:261–80.
33. Sen AK. Social exclusion: Concept, application, and scrutiny. Manila: Office of Environment and Social Development, Asian Development Bank, 2000.
34. Slavich GM, O’Donovan A, Epel ES, et al. Black sheep get the blues: a psychobiological model of social rejection and depression. Neurosci Biobehav Rev 2010;35:39–45.
35. Ahmed AT, Mohammed SA, Williams DR. Racial discrimination & health: pathways & evidence. Indian J Med Res 2007;126:318–27.

Mathias K, et al. BMJ Open 2015;5:e008992. doi:10.1136/bmjopen-2015-008992
36. Development MoHR. Central educational institutions (reservation in admission) act. India: Ministry of Human Resource Development, 2006.

37. Empowerment MoSJa. Protection of Civil Right Act. PCR 1955. India, 1955.

38. Patel V, Pereira J, Coutinho L, et al. Poverty, psychological disorder and disability in primary care attenders in Goa, India. Br J Psychiatry 1998;172:533–6.

39. Reading R, Reynolds S. Debt, social disadvantage and maternal depression. Soc Sci Med 2001;53:441–53.

40. Richardson T, Elliott P, Roberts R. The relationship between personal unsecured debt and mental and physical health: a systematic review and meta-analysis. Clin Psychol Rev 2013;33:1148–62.

41. Lorant V, Deliege D, Eaton W, et al. Socioeconomic inequalities in depression: a meta-analysis. Am J Epidemiol 2003;157:98–112.

42. Chatterjee S, Pillai A, Jain S, et al. Outcomes of people with psychotic disorders in a community-based rehabilitation programme in rural India. Br J Psychiatry 2006;195:433–9.

43. Patel V, Kleinman A. Poverty and common mental disorders in developing countries. Bull World Health Organ 2003;81:609–15.

44. Shidhaye R, Mendenhall E, Sumathipala K, et al. 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.

45. Lund C, De Silva M, Plagerson S, et al. Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. Lancet 2011;378:1502–14.