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Mental illness, poverty and stigma in India: a case–control study

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ABSTRACT

Objective: To assess the effect of experienced stigma on depth of multidimensional poverty of persons with severe mental illness (PSMI) in Delhi, India, controlling for gender, age and caste.

Design: Matching case (hospital)–control (population) study.

Setting: University Hospital (cases) and National Capital Region (controls), India.

Participants: A case–control study was conducted from November 2011 to June 2012. 647 cases diagnosed with schizophrenia or affective disorders were recruited and 647 individuals of same age, sex and location of residence were matched as controls at a ratio of 1:2:1. Individuals who refused consent or provided incomplete interview were excluded.

Main outcome measures: Higher risk of poverty due to stigma among PSMI.

Results: 38.5% of PSMI compared with 22.2% of controls were found poor on six dimensions or more. The difference in multidimensional poverty index was 69% between groups with employment and income of the main contributors. Multidimensional poverty was strongly associated with stigma (OR 2.60, 95% CI 1.27 to 5.31), scheduled castes/scheduled tribes/other backward castes (2.39, 1.39 to 4.08), mental illness (2.07, 1.25 to 3.41) and female gender (1.87, 1.36 to 2.58). A significant interaction between stigma, mental illness and gender or caste indicates female PSMI or PSMI from 'lower castes' were more likely to be poor due to stigma than male controls (p<0.001) or controls from other castes (p<0.001).

Conclusions: Public stigma and multidimensional poverty linked to SMI are pervasive and intertwined. In particular for low caste and women, it is a strong predictor of poverty. Exclusion from employment linked to negative attitudes and lack of income are the highest contributors to multidimensional poverty, increasing the burden for the family. Mental health professionals need to be aware of and address these issues.

Strengths and limitations of this study

- There is little research on the effects of stigma and poverty in developing settings.
- Lack of employment and income are major contributors to multidimensional poverty for persons with severe mental illness (PSMI).
- Intensity of multidimensional poverty is higher for PSMI, particularly women with SMI and those from scheduled castes/scheduled tribes/other backward castes.
- Stigma was operationalised through a single-item question rather than a multiple-item scale, and we could not assess reliability of this item. SMI was diagnosed for persons attending a public psychiatric department; PSMI not receiving medical treatment might be more marginalised and at greater risk of poverty than those receiving healthcare.

INTRODUCTION

Mental health problems affect 450 million people worldwide, 80% in middle-income and low-income countries. In 2010, 2 319 000 persons died of mental and behavioural disorders.[1] Mental health conditions account for 13% of the total burden of disease, 31% of all years lived with disability and are one of the four main contributors to years lived with disability.[2 3] Schizophrenia and bipolar disorder represent 7.4% and 7.0% of disability-adjusted life years caused by mental and substance use disorders, respectively.[4] Severe mental illness (SMI) is a leading cause of disability, and the standard prevalent biomedical care model is neither an exclusive nor a comprehensive solution as it does not address the link between mental illness, stigma and poverty.[5]

While the literature on poverty, poor mental health[6] and disability[7–9] is emerging, little has been done to examine the compounding associations between experienced stigma (unfair treatment or discrimination due to having a mental health issue),[10] mental illness and poverty, especially in low-income countries. In high-income countries,[11] income deprivation is identified as a major risk factor for persons with mental health issues, even for common mental disorders.[12] Poor mental health linked to SMI has been associated with poverty during the recent economic crisis in middle-income and low-income countries,

particularly India and China.[13–15] People with mental disorders living in these countries are not only more likely to be poorer, but also unemployed and less educated.[16 17] Indisputably, a better understanding of the relationship between mental illness and poverty may yield useful knowledge to tailor public health interventions to complement biomedical treatment to improve outcomes.

Link and Phelan[18] defined stigma as a process with five interrelated components: discrimination through a process of separation based on negative attitudes and prejudice resulting from labelling and cultural stereotypes of society towards the stigmatised group leading to social, economic and political power differences. Thornicroft *et al*[19] identify three elements of stigma: ignorance or misinformation, prejudice and discrimination.

Our paper focuses on the process of experienced discrimination as the manifestation of public stigma.[20] The congruence of self-stigma and social exclusion may lead persons with SMIs (PSMIs) to face unfair treatment or discrimination and develop low self-esteem.[21–24] Such stigma may prevent mentally ill persons from improving their conditions[25] by creating a 'barrier to recovery'[26] and worsen their situation by pushing them into poverty through discriminatory practices.[27–29]

Stigma towards PSMI resulting in discrimination[30 31] is persistent in India.[32] Although the factors constituting poverty and discrimination linked to mental illness potentially can deprive persons of many resources,[33 34] the dynamics of poverty, discrimination and mental health have not been fully addressed. The clinical literature argues that stigma is caused by mental illness and treating the latter biomedically will weaken the associated stigma.[35 36] We argue instead that even treated PSMI are more likely to be multidimensionally poor due to discrimination resulting from stigma.

Many studies have focused on unidimensional effect of poverty on mental health, but have not explained how stigma towards mental illness can be an aggravating contributor to the intensity of poverty. We aimed to estimate the difference in incidence and intensity of poverty between PSMI and a comparable control group using a multidimensional poverty index (MPI) to explore deprivation in various dimensions of life.[37] Going beyond traditional welfare economics approaches to poverty (ie, income or per capita expenditure), we explored non-monetary dimensions of poverty such as education, health, quality of shelter, food intake and political participation. We assessed differences in intensity of poverty between PSMI and controls and explored how these differences vary as a function of discrimination resulting from stigma.

METHODS

Study design and setting

The primary objective was to assess differences in exposure to discrimination resulting from stigma and multidimensional poverty among cases compared with non-psychiatrically ill controls. Between November 2011 and June 2012, we carried out a case–control study based at the Department of Psychiatry of the Dr Ram Manohar Lohia (RML) Hospital in New Delhi (cases) and in the neighbourhood of residence of the cases (controls) to assess the impact of stigma associated to mental illness on poverty. The Department of Psychiatry at Dr RML hospital received respectively 10 881 and 19 528 new outpatients and 52 389 and 45 319 follow-ups of existing patients in 2012 and 2013. The department also has a 42-bed general psychiatry and de-addiction inpatient facility for men and women. It serves patients from the national Capital Region of Delhi.

Participants

We defined cases as outpatients diagnosed with schizophrenia or affective disorders by one of the 10 board-certified treating psychiatrists following International Classification of Diseases, 10th revision (ICD-10) criteria.[38] Outpatients were informed about the study, and if they consented, were referred to researchers for written informed consent and evaluation with no further contact with those who refused. Transportation costs and a meal were provided to maximise recruitment and reduce selection bias.

We used a non-psychiatrically ill control group composed of randomly selected individuals matching the patients according to gender, age (±5 years) and neighbourhood of residence. Matched controls were selected by spinning a pointer at the door of the case's home and randomly selecting one household among 30 in the pointed direction. In this household, a person of same age and gender with no reported history of a mental health disorder was interviewed. It was not possible to conduct detailed interviews for diagnosis of all controls due to logistics as well as stigma of revealing mental illness. We excluded controls when unable to obtain consent. Only two case patients were not matched. Investigators together with the team manager contributed to sensitisation and awareness raising in the neighbourhoods of interest to maximise controls' participation rates. Consent for patients and controls adolescent between 13 and 18 was obtained by asking the parent or the legal guardian of the study subjects.

We conducted face-to-face interviews with all PSMI or a caregiver during hospital visits, and controls at home. We obtained information on demographics, socioeconomic factors, health conditions and accessibility to services, education, employment, income, livelihoods and social participation. The instrument was translated by experts into *Hindi* with iterative back-translation and tested in a pilot survey in October 2011. Investigators trained 2 experienced supervisors and 10 masters-level students over 2 weeks on survey concepts and goals, mental illness awareness, interview techniques followed by review, test and debriefing.

Sample size

To determine sample size, we used a matched design with a control to case ratio of 1, the probability of

exposure to poverty among controls of 0.22 and the correlation coefficient for exposure between matched cases and controls of 0.18.[39] Considering the true OR for one dimension of poverty in exposed subjects relative to unexposed subjects as 2.2, we needed to enrol 205 case patients to be able to reject the null hypothesis that this OR equals 1 with probability of 0.9. The type 1 error probability associated with this test of this null hypothesis is 0.05. We enrolled 649 case patients to allow for subgroup analyses including impact on poverty of discrimination stratified by gender, age and caste.

Efforts to minimise bias

New patients were first interviewed by a junior psychiatrist who made a provisional diagnosis and discussed details with a board-certified psychiatrist who then diagnosed and managed the case. To minimise diagnosis bias, we trained all psychiatrists on the ICD-10 criteria. Information bias was minimised by reviewing the questionnaire about exposure to poverty to ensure accuracy, completeness and content validity with experts and by testing it with a sample group of patients and families. Investigators revised the content for relevance to poverty in order to maximise item appropriateness. They first defined the concept of multidimensional poverty and reviewed the empirical and theoretical literature to identify the right deprivation items to include in the instrument they were developing. They then checked whether the questions covered all dimensions of the concept of multidimensional poverty and whether the phrasing respectively in English and Hindi was accurately reflecting the underlying concept of deprivation we were looking for in each dimension. Two experts familiar with multidimensional poverty reviewed the initial list of items and made suggestions about adding items that were omitted. We then organised a focus group discussion (FGD) with seven experts, psychiatrists, psychologists and social workers from Dr RML hospital to establish whether the 17 domains of poverty selected were adapted and relevant for the context of New Delhi and were providing a comprehensive overview of the concept. They also ranked these domains by order of importance of deprivation. A similar focus group was organised with eight hospital outpatients with SMI. We finally tested the poverty questionnaire with a group of 20 outpatients at the Department of Psychiatry at Dr RML hospital. We prompted them with questions to check for their understanding of poverty to identify the language they used to explain the notion of poverty, as well as to ascertain their understanding of the questions in order to make sure the instrument's purpose made sense to them. Finally, two other experts revised the final version to make sure items illustrate the content of multidimensional poverty.[40]

We also carried out test–retest to test for recall bias and social desirability bias. Interviews with 71 respondents (both cases and controls) for test–retest reliability were carried out on two occasions with a gap of 10–15 days by the same enumerator to check to what degree a given respondent provided same responses for the poverty items. We compared the scores between the two sets of responses. Results show overall acceptable level of reliability (over 0.7 for interclass correlation) for the different poverty variables.

Quantitative variables

We selected 17 indicators of deprivation reflecting aspects of well-being (table 1) identified by literature review and validated through FGDs with experts and PSMI/caregivers. Both groups identified and agreed on deprivation cut-offs for each indicator through participatory deliberation.[41] Some standard dimensions were not included due to lack of relevance in Delhi. For instance, few respondents lacked access to diet staples.[1]

We classified the selected indicators in three major domains of deprivation: individual-level capabilities, household-level material well-being and individual-level psychosocial factors. The first domain was composed of nine indicators. Access to secondary school was the indicator for education; dropping out before reaching secondary school was the cut-off. Unemployment was a major source of vulnerability; deprivation of work was the cut-off. Food security was measured by access to three meals per day, and respondents eating less were considered deprived. Following the Unicef definitions, improved indoor air quality using cooking gas, improved drinking water by pipe into residence and improved sanitation by private flush toilet defined absence of deprivation for indicators 6–8. Finally, individual income constituted a monetary indicator.

Material well-being of the household was composed of two series of indicators. Three indicators outlined conditions of living: minimum space per person (deprivation threshold of 40 square feet per person); home ownership (renting was the cut-off); and poor quality housing was having either the flooring, walls or roof made of *Kutcha* (precarious or temporary) material. Material wealth was defined by three complementary indicators: the household average per capita income (threshold at the international poverty line of US$1.25 per day or 68 Indian rupees);[42] assets included typical goods owned by the household;[2] and monthly household expenditures.[3]

Finally, two psychosocial indicators were selected: physical safety, measured through an indicator of perception of unsafe environment, and political participation in the municipal elections.

[1]For vegan individuals, the diet staple included at least dal on a daily basis; for non-vegan individuals, it included dairy products on a daily basis. Meat for non-vegetarian individuals was not considered as a diet requirement and therefore deprivation of meat is not an indicator of poor diet.
[2]Assets include landline, mobile phones, wooden/steel sleeping cot, mattress, table, clock/watch, charpoy, refrigerator, radio/transistor, electric fan, television, bicycle, computer, moped/scooter/motorcycle, car.
[3]Expenditures include food, health, school, transportation, savings and personal care products.

Table 1 Dimensions, indicators and cut-off of deprivation

Dimensions	Indicators	Questions	Cut-off
Individual-level basic capabilities	Health access	Could you receive healthcare when sick?	Deprived of healthcare
	Education	What is your level of education?	Primary education completed
	Access to employment	What is your usual primary activity?	Not working
	Food security	How many meals are usually served in your household in a day?	1 or 2 meals
	Source of drinking water	What is the primary source of drinking water?	Pipe outside home/public pump tanker truck/cart with small tank water from a covered well unprotected well spring/river/dam/lake/pond/stream
	Indoor air quality	What is the primary source of cooking fuel?	Wood, coal/charcoal, dung, kerosene, straw/shrubs/grass/crop
	Type of sanitation	What type of toilet facilities do you use when at home?	Open field, pit latrine improved ventilated pit public latrine
	Type of lighting	What is your primary source of lighting?	Generator, kerosene lamp, petromax, candle, none
	Individual income	What is your income?	Less than $1.25 per day
Household-level material well-being	Crowded space	How many people live in the dwelling?	Less than 50 square feet per person
	Housing ownership	Does the family own the house?	Do not own the house
	Housing quality	Are the material used for walls, floor and roof in your house kutcha or pucca?	Any of walls, floor or roof is kutcha
	Assets ownership	Do you possess any of the following? Mobile phone, landline, wooden/steel sleeping cot, mattress, table, clock/watch, charpoy, refrigerator, radio/transistor, electric fan, television, bicycle, computer, moped/scooter/motorcycle, car	Lowest two asset quintiles
	Household per capita income	What is the family income?	Less than $1.25 per capita per day
	Household expenditures	What is the household's monthly expenditure?	Less than $1.25 per capita per day
Individual-level psychosocial dimensions	Physical safety	How safe is the place where you live?	Rather or very unsafe
	Political participation	Did you vote in the last municipal election?	Did not vote

Studies in India have shown that stigma resulting in discriminatory practices is perceived to be high in the family and the community.[43 44] As a result, we measured experienced discrimination as a dimension of stigma through self-evaluation of unfair treatment by the family. We asked all respondents whether they were excluded from family decision compared with other household members of the same generation. Unfair treatment within family is a feature of stigma in India.[44] We tested this through FGDs with PSMI of both genders. We found high association between SMI and exclusion from regular family decisions, particularly for women.

Other dimensions of participation did not show any discriminatory process. Inclusion in community activities showed similar 30% levels of participation between PSMI and controls. A possible explanation for participation is that where symptoms of mental illness are managed by treatment family develop coping strategies through symbolic social participation and selective disclosure to avoid rejection, stigma and avoidance by others associated with their relative's condition.[45–47] Finally, we enquired about participation in political activities such as 'gram sabhas' or local associations. We found generalised low participation in political activities,

which is a common feature in New Delhi and therefore not a good indicator of experienced discrimination.

Statistical analysis

Our primary aim was to explore the effect of mental illness and stigma on poverty. We used an unmatched MPI measure to identify differences in levels of poverty between PSMI and controls.[37] Dimensions were independently assessed and the method focused on dimensional shortfalls. This method allowed us to aggregate dimensions of multidimensional poverty measures and consisted of two different forms of cut-offs: one for each dimension and the other relating to cross-cutting dimensions. If an individual fell below the chosen cut-off on a particular dimension, he/she was identified as deprived. The second poverty cut-off determined the number of dimensions in which a person must be deprived to be deemed multidimensionally poor.

We first performed one-way analyses to assess differences in poverty levels and discrimination between PSMI and controls, by gender and caste adjusting for post hoc pairwise comparisons using the Scheffe method. We also carried out correlation analysis to assess overlap of dimensions of deprivation.

We then calculated three indicators of multidimensional poverty: (i) the headcount ratio (H), indicating how many people fall below each deprivation cut-off; (ii) the average poverty gap (A), denoting the average number of deprivations each person experiences; and (iii) the adjusted headcount (M0), which is the headcount ratio (H) by the average poverty gap (A) and indicates the breadth of poverty. We established the contribution of each dimension of poverty for cases and controls by dividing each of the two subgroups' poverty level by the overall poverty level, multiplied by the population portion of each subgroup.

To assess potential bias in our estimates of MPI, we carried out sensitivity analysis and compared three measures of poverty with: (i) equal weight for every indicator in each dimension, (ii) individual rankings of indicators done by experts at Dr RML hospital during FGDs transformed into individual weights and then taking the average of the individual weights,[48] and (iii) group ranking based on the mean of individual rankings of indicators during FGDs and taking the weight according to the group ranking.[49] We found consistency across measures (data not shown).

We finally calculated the crude and adjusted ORs with associated 95% CIs using a logistic regression model to identify association between stigma, SMI and multidimensional poverty. We used 'no participation' as the reference category. We defined a binary outcome for poverty (poor/non-poor) using the adjusted headcount ratio (M0) for a cut-off k=6 corresponding to the highest gap between PSMI and controls. This cut-off corresponds to a prevalence of poverty of 30.7% above the recent estimates of 13.7% of urban Indians below the poverty line fixed at 28.65 Indian rupees by the Indian Planning Commission,[50] which has been criticised for being unrealistic. This cut-off is in line with World Bank recent estimate that 33% of India's population lives below the international poverty line established at $1.25 per capita per day.[51] We characterised how SMI results in higher intensity of multidimensional poverty due to stigma. Aware that stigma and discrimination may also affect women[52] and members of lower castes,[53] we adjusted the model for potential confounders significantly associated with poverty and family discrimination: caste (in case of difference within the family), gender and age. We carried out sensitivity analysis for different values of the cut-off k and found robustness in our model (data not shown). For all analyses, a p value of <0.05 was considered significant. Missing values were treated as being missing completely at random. We used Stata (V.12.0) for database processing and all analysis.

RESULTS

Participants

We interviewed 649 case patients and 647 controls. Of these, we excluded 110 (17%) cases and 151 (23%) controls, respectively, who did not complete the interview or for whom the data were incomplete. The final analysis included 537 cases and 496 controls (figure 1). The

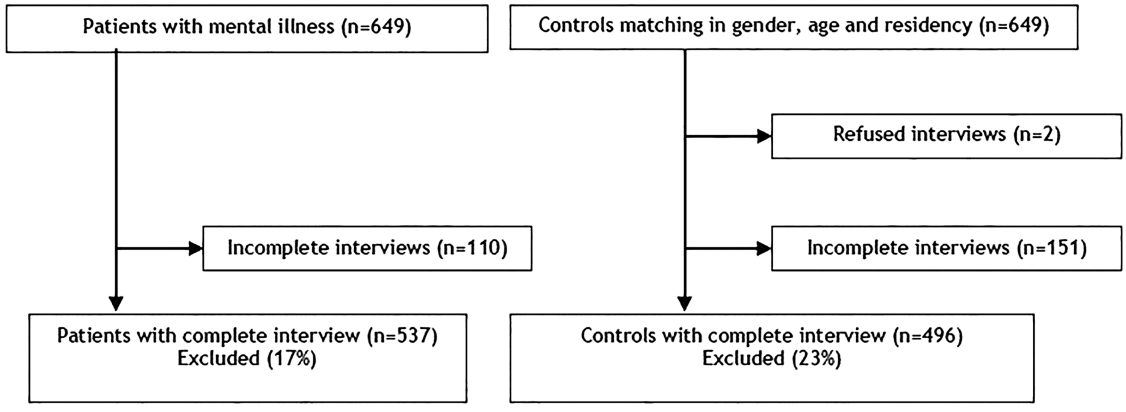

Figure 1 Flow chart depicting enrolment of patients with mental illness and controls without mental illness.

Table 2 Characteristics of poverty and discrimination comparing patients and controls and by gender and caste

Dimension	PSMI (n=647)	Control (n=649)	p Value	Male PSMI (n=411)	Male controls (n=408)	p Value	Other castes PSMI	Other castes controls	p Value	Female PSMI (n=238)	Female controls (n=238)	p Value	ST/SC/ OBC PSMI	ST/SC/ OBC controls	p Value
Health access	26 (4.0)	16 (2.9)	0.281	13 (3.2)	4 (1.0)	0.802	17 (4.8)	10 (2.5)	0.630	13 (5.5)	12 (5.0)	1.0	9 (3.3)	6 (2.5)	0.995
Education	155 (23.9)	129 (19.9)	0.086	70 (17.0)	52 (12.8)	0.511	61 (17.3)	59 (14.9)	0.879	85 (35.7)	77 (32.4)	0.843	82 (29.9)	65 (26.8)	0.850
Employment	396 (61.0)	252 (39.0)	<0.0001	188 (45.7)	68 (16.7)	<0.0001	222 (63.1)	151 (38.1)	<0.0001	208 (87.4)	184 (77.3)	<0.0001	164 (59.9)	96 (39.5)	<0.0001
Food security	343 (52.9)	250 (38.6)	0.103	213 (51.8)	155 (38.0)	0.789	165 (46.9)	133 (33.6)	0.413	130 (54.6)	95 (39.9)	0.613	163 (59.5)	113 (46.5)	0.964
Source of water	122 (18.8)	118 (18.2)	0.724	86 (20.9)	74 (18.1)	0.732	62 (17.6)	61 (15.40)	0.881	36 (15.1)	44 (18.5)	0.837	55 (20.1)	56 (23.1)	0.893
Indoor air quality	48 (7.4)	38 (5.9)	0.271	35 (8.5)	24 (5.9)	0.515	17 (4.8)	13 (3.3)	0.861	13 (5.4)	14 (5.9)	0.998	27 (9.9)	24 (9.9)	1.0
Type of sanitation	215 (33.1)	180 (27.8)	0.040	147 (35.8)	60 (25.2)	0.271	93 (26.4)	104 (26.3)	1.0	68 (28.6)	66.7 (29.4)	0.897	112 (40.9)	72 (29.6)	0.050
Type of lighting	7 (1.1)	10 (1.6)	0.458	4 (1.0)	8 (2.0)	0.674	0 (0)	4 (1.0)	0.675	3 (1.3)	2 (0.8)	0.984	6 (2.2)	6 (2.5)	0.994
Individual income	369 (68.7)	238 (47.9)	<0.0001	176 (53.3)	74 (24.3)	<0.0001	199 (68.9)	138 (45.5)	0.932	193 (93.2)	164 (85.9)	<0.0001	154 (68.1)	95 (52.8)	0.241
Crowded space	206 (31.7)	164 (25.4)	0.010	130 (32.0)	94 (23.3)	0.059	89 (25.3)	70 (17.7)	0.131	76 (32.3)	70 (29.7)	0.938	104 (38.0)	91 (37.5)	0.999
Housing ownership	223 (41.5)	148 (29.8)	<0.0001	160 (39.7)	119 (29.2)	0.028	152 (43.2)	75 (30.9)	0.002	99 (42.1)	78 (32.7)	0.264	99 (36.2)	119 (30.1)	0.667
Housing quality	39 (6.3)	13 (2.2)	<0.0001	29 (7.1)	7 (1.67)	0.001	13 (3.7)	6 (1.5)	0.493	10 (4.2)	6 (2.5)	0.830	23 (8.4)	7 (2.9)	0.007
Assets ownership	294 (45.3)	214 (33.1)	<0.0001	201 (48.9)	125 (30.6)	<0.0001	131 (37.2)	94 (23.7)	0.002	93 (39.1)	89 (37.4)	0.986	148 (54.0)	116 (47.7)	0.531
Household income	287 (44.2)	239 (36.9)	0.002	176 (42.8)	142 (34.8)	0.082	132 (37.5)	116 (29.3)	0.096	111 (46.6)	97 (40.8)	0.553	141 (51.5)	119 (49.0)	0.907
Household expenditures	373 (57.5)	393 (60.7)	0.978	238 (58.0)	239 (58.6)	0.799	180 (51.1)	209 (52.8)	0.947	135 (56.7)	154 (64.7)	0.571	178 (65.0)	180 (74.0)	0.4291
Physical safety	117 (18.0)	134 (20.7)	0.221	80 (19.6)	80 (19.6)	0.907	51 (14.5)	68 (17.2)	1.0	53 (22.3)	53 (22.3)	0.824	62 (22.6)	65 (26.8)	1.0
Political participation	265 (40.8)	209 (32.3)	0.001	163 (39.7)	122 (29.9)	0.030	152 (43.2)	125 (31.6)	0.005	102 (42.9)	86 (36.1)	0.506	102 (37.2)	80 (32.9)	0.760
Discrimination in family decisions	178 (27.4)	116 (17.9)	<0.0001	71 (17.3)	12 (2.9)	<0.0001	92 (26.1)	71 (17.9)	0.042	107 (45.0)	104 (43.7)	0.988	78 (28.5)	43 (17.7)	0.020

Missing values are missing completely at random and there was no significant statistical difference. Incidence of poverty expressed as a percentage is given in parentheses. All p values are corrected for multiple comparisons using Scheffe method.
OBC, other backward castes; PSMI, persons with severe mental illness; SC, scheduled castes; ST, scheduled tribes.

distribution between cases and controls was similar for gender (305 and 330 men, respectively, 61.5% in both cases) and age (15–74 and 13–74 and median 35 and 36, respectively).

Table 2 reports the headcount ratios (H) or incidence of deprivation in each dimension. There were statistically significantly higher numbers of deprived PSMI than controls in nine dimensions. Differences were very high for access to employment (28.1% difference), individual income (20.7%) and relatively high for food security (15.1%) and house ownership (11.7%). In only one dimension—perception of physical safety—was there a reverse non-significant difference as the number of controls was higher than the number of PSMI.

Table 2 also show results by gender and caste. Compared with male PSMI, the proportion of deprived female PSMI was significantly higher (10 of 17 dimensions). Similarly, a higher number of PSMI (vs controls) from 'scheduled castes' (SC), 'scheduled tribes' (ST) or 'other backward castes' (OBC) were poorer on 13 (vs 16 dimensions) compared with PSMI (vs controls) from unreserved castes.

To investigate possible overlap of dimensions of poverty, we calculated the estimates for the Spearman's rank correlation coefficients between each pair of dimensions of deprivation (table 3). We found no evidence of strong correlation between dimensions, illustrating absence of association except for household income and expenditures. We nevertheless kept both indicators to calculate MPI to account for information bias (particularly recall bias) often associated with measures of income in household surveys.[54 55] Significantly, this result demonstrates that a unique welfare indicator of poverty such as income cannot represent all aspects of deprivation.

Multidimensional poverty

Results in table 4 report the multidimensional headcount ratio (H), the average deprivation shared across the poor (A) and the adjusted headcount ratio (M0) for all possible cut-offs and for the two groups. Depending on the chosen cut-off, the proportion of PSMI and controls who were multidimensionally poor varied greatly. For a cut-off of 1, 97.2% of PSMI and 91.7% of controls were deprived: taking a union approach of deprivation in one dimension, this translates into quasi-universal poverty. On average, PSMI were deprived on 5 dimensions and controls on 3.9. If multidimensional poverty requires deprivation in four, five or six dimensions simultaneously, the proportion of poor PSMI (compared with poor controls) becomes 68.5% (compared with 48.6%), 51.6% (35.9%) or 38.5% (22.2%). Conversely, if we adopt the intersection approach where being poor implies being deprived in all 17 dimensions, nobody in the sample is poor and <1% of the sample is deprived in 13.

The adjusted headcount ratio (M0) shows that PSMI were worse off than controls for a cut-off (k) value between 1 and 12 dimensions. This difference is significant (p<0.001) for (k)=1 to (k)=10 dimensions and

Table 3 Spearman's correlations between dimensions

Dimensions	Health access	Education	Access to work	Food security	Source of water	Indoor air quality	Type of sanitation	Type of lighting	Individual income	Crowded space	Housing ownership	Housing quality	Assets ownership	Household/ capital income	Household spending	Physical safety	Political participation
Health access	1																
Education	0.021	1															
Access to work	0.1047*	0.1771*	1														
Food security	0.0016	0.1309*	0.0878*	1													
Source of water	-0.0277	0.1669*	0.0412	0.1263*	1												
Indoor air quality	0.0341	0.1907*	0.0732*	0.1077*	0.1519*	1											
Type of sanitation	-0.0103	0.1514*	0.0369	0.1045*	0.3026*	0.2440*	1										
Type of lighting	0.0193	0.0728*	0.0217	0.0642*	0.1079*	0.3018*	0.1550*	1									
Individual income	0.0801*	0.1865*	0.7373*	0.0788*	0.0534	0.0875*	0.0199	-0.0134	1								
Crowded space	-0.0356	0.2471*	0.0521	0.1031*	0.1807*	0.1743*	0.2709*	0.0786*	0.0800*	1							
Housing ownership	0.0145	0.0138	0.029	0.0518	0.0553	-0.0029	0.0207	0.0272	-0.0123	0.1442*	1						
Housing quality	0.0087	0.1739*	0.0764*	0.0558	0.2384*	0.2767*	0.3345*	0.0534	0.0824*	0.1969*	0.0182	1					
Assets ownership	0.0581	0.2727*	0.0751*	0.2544*	0.2364*	0.2820*	0.2330*	0.1634*	0.0797*	0.3079*	0.2926*	0.2753*	1				
Household/capitalincome	0.0472	0.1949*	0.1623*	0.1513*	0.1989*	0.2070*	0.1597*	0.0805*	0.2066*	0.2712*	0.0443	0.1511*	0.2715*	1			
Household spending	0.0428	0.1667*	0.1062*	0.1483*	0.2377*	0.1568*	0.1409*	0.0760*	0.1381*	0.2792*	0.037	0.1533*	0.2331*	0.5360*	1		
Physical safety	0.044	0.0406	0.0413	0.0596	0.1026*	0.0602	0.1223*	0.0609	0.0441	0.1723*	-0.0252	0.0834*	0.0932*	0.1136*	0.1254*	1	
Political participation	0.0188	-0.0167	0.0386	0.0815*	0.1538*	0.031	0.1426*	0.0411	0.0125	0.1077*	0.2296*	0.0365	0.1617*	0.0714*	0.0735*	0.0493	1

*All Spearman correlation coefficients significant at the 5% level or lower.

Table 4 Multidimensional poverty measures for persons with severe mental illness (PSMI) and controls and by gender and caste

	All			PSMI			Controls				
Cut-off k	H†	A	M0	H	A	M0	H	A	M0	T-value for M0‡	% difference in M0*
1	0.946	0.276	0.261	0.972	0.302	0.293	0.917	0.247	0.227	−6.574	29.3
2	0.849	0.301	0.256	0.901	0.321	0.289	0.792	0.277	0.219	−6.583	31.7
3	0.739	0.328	0.243	0.834	0.337	0.281	0.635	0.316	0.201	−7.051	39.9
4	0.590	0.367	0.216	0.685	0.372	0.255	0.486	0.359	0.175	−6.378	46.0
5	0.440	0.411	0.181	0.516	0.417	0.215	0.359	0.403	0.145	−5.210	48.5
6	0.307	0.462	0.142	0.385	0.458	0.177	0.222	0.471	0.104	−5.297	69.2
7	0.224	0.503	0.113	0.277	0.499	0.138	0.165	0.511	0.084	−4.062	64.0
8	0.144	0.553	0.080	0.175	0.550	0.096	0.111	0.559	0.062	−2.791	55.2
9	0.090	0.603	0.054	0.112	0.595	0.066	0.067	0.619	0.041	−2.334	61.6
10	0.055	0.650	0.036	0.069	0.636	0.044	0.040	0.676	0.027	−1.776	60.6

	PSMI		Controls		T-value	PSMI		Controls		T-value
Cut-off k	H	M0	H	M0	for M0	H	M0	H	M0	for M0
	Female					Male				
1	0.990	0.327	0.917	0.227	−2.237	0.961	0.272	0.879	0.185	−6.797
2	0.981	0.327	0.792	0.219	−2.322	0.852	0.265	0.702	0.175	−6.717
3	0.942	0.322	0.635	0.201	−2.585	0.767	0.255	0.508	0.152	−7.140
4	0.783	0.294	0.486	0.175	−2.157	0.624	0.230	0.364	0.127	−6.652
5	0.628	0.257	0.359	0.145	−1.947	0.445	0.188	0.256	0.101	−5.323
6	0.473	0.212	0.222	0.104	−2.191	0.330	0.154	0.148	0.069	−5.263
7	0.343	0.166	0.165	0.084	−1.415	0.236	0.121	0.105	0.054	−4.302
8	0.184	0.100	0.111	0.062	−0.396	0.170	0.094	0.079	0.043	−3.438
9	0.116	0.068	0.067	0.041	−0.458	0.109	0.065	0.049	0.030	−2.752
10	0.068	0.043	0.040	0.027	−0.157	0.070	0.044	0.030	0.019	−2.266
	SC/ST/OBC					Other castes				
1	0.987	0.320	0.972	0.280	−2.437	0.958	0.264	0.884	0.194	−5.532
2	0.942	0.317	0.900	0.276	−2.458	0.862	0.258	0.723	0.185	−5.510
3	0.863	0.308	0.783	0.262	−2.496	0.799	0.251	0.545	0.164	−6.097
4	0.748	0.288	0.628	0.235	−2.574	0.623	0.220	0.396	0.137	−5.246
5	0.606	0.254	0.494	0.203	−2.262	0.426	0.174	0.274	0.109	−3.927
6	0.460	0.211	0.306	0.148	−2.680	0.304	0.138	0.162	0.076	−3.843
7	0.336	0.168	0.233	0.122	−1.917	0.215	0.106	0.125	0.063	−2.788
8	0.217	0.118	0.161	0.092	−1.160	0.131	0.072	0.086	0.047	−1.809
9	0.133	0.079	0.100	0.064	−0.757	0.090	0.053	0.050	0.030	−1.864
10	0.075	0.048	0.061	0.043	−0.308	0.055	0.034	0.030	0.019	−1.459

Rows 11–17 are omitted as very few are deprived in >10 dimensions, no one is deprived in >15 dimensions.
†H is the percentage of the population that is poor H=*($M0_{PSMI}$ $M0_{controls}$)/$M0_{PSMI}$.
‡ Adjusted Wald test for difference in adjusted headcount ratio between patients and controls. The average poverty gap (A) is not presented for gender and caste but can be easily calculated dividing the adjusted headcount (M0) by the headcount ratio (H).

highest (69% difference) for (k)=6. The average deprivation share (A) is higher among PSMI for a value of (k) between 1 and 5 and highest for (k)=1 (22% difference). For a (k) between 6 and 14, the total number of deprivations faced by poor PSMI is slightly lower on average than for controls. Less than 30% of people were poor in six dimensions or more, and the difference between PSMI and controls was the highest for a (k) value of 14 (7%).

To further investigate the association between poverty and mental illness, analysis was repeated for all possible cut-offs and for gender and caste (table 4). Multidimensional poverty was significantly higher for female PSMI compared with female controls for any threshold between one and seven dimensions ($p<0.001$) but also for male PSMI for any threshold between one and nine dimensions. On average, 62.8% of female PSMI were deprived on five dimensions or more compared with 35.9% of female controls, 44.5% of male PSMI and 25.6% of male controls. For female PSMI and controls—and male PSMI and controls, respectively—the difference is particularly pronounced and significant for highest cut-off values, and maximum for six and seven dimensions, respectively. The adjusted headcount ratio (M0) shows that SC/ST/OBC PSMI are worse off regardless of the value of (k) 1 through 10 than SC/ST/OBC controls and other caste PSMI or controls. (M0) for SC/ST/OBC controls is higher than for other caste PSMI for all (k) values.

Table 5 Percentage contribution of each dimension to poverty for persons with severe mental illness (PSMI) and controls for k 1–8

Cut-off k		Health access	Level of education	Access to employment	Food security	Source of drinking water	Indoor air quality	Type of sanitation	Type of lighting	Individual income	Crowded space	Housing ownership	Housing quality	Assets ownership	Household income	Household expenses	Physical safety	Political participation
1	PSMI	0.86	4.63	11.62	10.87	3.74	1.31	4.37	0.22	13.79	4.56	8.33	1.27	4.82	8.86	12.63	3.59	4.52
	Controls	0.78	5.33	7.74	10.15	4.86	1.57	3.50	0.47	12.45	4.71	7.74	0.58	3.92	9.62	16.42	5.75	4.39
2	PSMI	0.87	4.70	11.79	10.58	3.75	1.33	4.32	0.23	13.91	4.62	8.04	1.29	4.89	8.95	12.62	3.60	4.51
	Controls	0.76	5.41	8.00	9.68	5.03	1.62	3.62	0.49	12.43	4.86	7.19	0.59	4.05	9.95	16.43	5.57	4.32
3	PSMI	0.86	4.79	11.77	10.44	3.86	1.36	4.29	0.23	13.64	4.72	8.07	1.33	4.99	9.00	12.51	3.55	4.60
	Controls	0.77	5.61	8.15	9.33	5.31	1.77	3.54	0.47	12.16	5.14	6.85	0.65	4.43	10.45	15.58	5.55	4.25
4	PSMI	0.95	4.94	11.05	10.49	3.91	1.46	4.47	0.26	12.77	4.99	7.78	1.46	5.42	9.42	12.55	3.57	4.51
	Controls	0.68	5.77	7.95	8.83	5.57	1.90	4.01	0.54	11.14	5.57	6.66	0.75	4.82	10.80	14.95	5.50	4.55
5	PSMI	0.87	5.25	10.30	10.24	4.33	1.63	4.59	0.31	11.67	5.30	7.54	1.68	6.17	9.73	12.18	3.72	4.49
	Controls	0.74	6.39	7.79	8.36	5.90	2.05	4.26	0.66	10.49	6.15	6.48	0.90	5.33	10.82	13.77	5.41	4.51
6	PSMI	0.99	5.46	9.86	9.99	4.65	1.86	5.09	0.25	11.10	5.58	6.95	2.05	6.45	9.74	11.85	3.66	4.47
	Controls	0.80	7.05	7.27	7.50	6.59	2.73	4.66	0.91	9.32	7.05	6.59	1.25	6.36	9.89	12.05	5.57	4.43
7	PSMI	1.11	5.62	9.65	9.57	4.91	2.14	5.22	0.32	10.76	5.70	6.41	2.37	7.04	9.57	11.16	3.88	4.59
	Controls	0.42	7.44	7.02	7.16	6.60	3.37	5.06	1.12	9.13	7.72	6.18	1.40	6.74	9.55	11.38	5.62	4.07
8	PSMI	0.91	5.23	8.65	9.22	5.46	2.62	5.80	0.34	9.90	6.37	7.05	2.73	7.96	8.76	10.35	3.98	4.66
	Controls	0.38	7.07	6.12	6.88	6.88	4.21	5.93	1.34	8.22	7.65	6.12	1.91	7.65	9.56	10.52	5.54	4.02

Table 5 presents the percentage contribution of each dimension to (M0) for different (k). Deprivations in individual income household expenditures and employment were contributing each >10% to the overall (M0) for PSMI, whatever the value (k) between 1 and 8. For controls, employment was a less salient contributor while the contribution from household income was among the highest.

Poverty and stigma

Association between multidimensional poverty and stigma was strong even when controlling for SMI, gender, caste and age (table 6; all p<0.0001). We included interaction of stigma, SMI with caste and found that this term was strongly and positively associated with a high level of poverty: the OR of being multidimensionally poor for PSMI from SC/ST/OBC compared with controls from unreserved castes was 7.36 (95% CI 3.94 to 13.7). Similarly, we allowed for differential gender effects by including interaction of stigma and SMI with the gender of the respondent and found high effect on poverty: female PSMI were 9.61 (95% CI 5.58 to 16.5) more likely to be poor compared with male controls.

DISCUSSION

Our findings establish that intensity of multidimensional poverty is higher for PSMI than the rest of the population. They also indicate that it is higher for women with SMI and for SC/ST/OBC with SMI. Deprivation of employment and income appear to be major contributing factors to MPI. Lack of employment and income appears to aggravate mental illness. Finally, our findings suggest that stigma linked to SMI, compounded with others (particularly SC/ST/OBC and women), negatively impact poverty.

The congruence of SMI and poverty, in a context of high prejudice against mental illness, compromises improvement. Mental illness in India is linked to lack of knowledge and pervasive negative assumptions, the most common being that PSMI are violent and unable to work.[18 31 44] Not surprisingly, deprivation of employment and income contributes highly to multidimensional poverty of PSMI compared with controls. This finding ties in with a study on employment for Indian men with schizophrenia, which found that employment provided not just an essential social role but was also a condition for rehabilitation, enhanced confidence and self-esteem.[44]

Although there is evidence of differences in mental health outcomes between men and women, analyses of gender disparities are lacking in literature on poverty and mental health in low-income countries.[44 56 57] In our sample, women with SMI were systematically more deprived in higher numbers of dimensions. Similarly, SC/ST/OBC SMI–poverty associations were found to be consistent across dimensions of poverty regardless of the threshold for multidimensional poverty. These findings

Table 6 Logistic model for association between multidimensional poverty, stigma and severe mental illness (SMI)

	Unadjusted model		Adjusted model	
	OR	95% CI	OR	95% CI
Family participation (no participation)	2.92	2.16 to 3.93	2.61	1.27 to 5.31
SMI (controls)	2.20	1.67 to 2.89	2.07	1.25 to 3.41
Women (men)	2.17	1.65 to 2.83	1.88	1.36 to 2.58
SC/ST/OBC (higher caste)	2.06	1.56 to 2.70	2.39	1.39 to 4.08
Age (in year)	0.99	0.97 to 0.99	0.98	0.96 to 0.99
Interaction terms				
No participation×SMI (participation×controls)			6.38	3.49 to 11.6
No participation×SC/ST/OBC (participation×high caste)			4.86	2.19 to 10.7
No participation×women (participation×men)			4.63	2.60 to 8.21
No participation×women×SMI (participation×male×controls)			9.62	5.58 to 16.5
No participation×SC/ST/OBC×SMI (participation×high caste×controls)			7.36	3.94 to 13.7

SC scheduled castes; ST, scheduled tribes; OBC, other backward castes.

strongly suggest that stigma linked to various marginalised groups have the power to accelerate and intensify exclusion and related discrimination. For women, SMI can negatively impact well-being in two ways. First, SMI limits women from fulfilling family and social roles, leading to these women being considered a burden for the family. This is true despite studies such as the Indian study of women with schizophrenia abandoned by their husbands who expressed the desire to work to support themselves.[58] Second, traditional beliefs (punishment for previous lives, evil eye/curse), as well as negative lay attitudes on causes and behaviours, lead to increased discrimination of and sometimes violence against SMIs, particularly for women.[59]

Our study finds that SC/ST/OBC and poverty further compound SMI. Discrimination linked to caste in accessing education or employment has been a leitmotif in modern India and only partially addressed through constitutional provisions and reservation policies. Caste discrimination still results in scant employment opportunities, less access to secondary and higher education—key for salaried public and private jobs, perpetuating powerlessness, traditional forms of dominance and oppression, inequalities, lower living standards among SC/ST/OBC as a entrenched social identity in India.[60 61] This situation is even more catastrophic for PSMI from SC/ST/OBC.

It is clear that a 'negative feedback loop' exists: stigma against SMI, particularly for SC/ST/OBC and women, is a strong predictor of persistent poverty. Moreover, stigma strongly bears on intensity of poverty. Stigma leads to difficulty for PSMI in finding and keeping a job, and this also increases the perceived burden of SMI by family members. In turn, this deprivation on various dimensions erodes self-esteem and brings shame and acceptance of discriminatory attitudes.[62] These compounding factors may result in a worsening of mental illness.

Beyond the PSMI, stigma and discrimination have a negative effect on family members and caregivers who often feel ashamed, embarrassed or unable to cope with the stigma.[58 63–67] While there have been campaigns and policies to address discrimination against SC/ST/OBC and women in India, no large-scale awareness campaign has ever addressed the prejudice and discrimination faced by PSMIs.

This study has some limitations. First, a potential limitation is that we measured experienced discrimination with a single-item question on exclusion from family decision rather than a multiple-item scale. There was not a specific formalised psychometrically validated measure of experienced stigma available focusing on the scope and content of discrimination before the Discrimination and Stigma Scale made available after our study was carried out.[10] Other factors may also explain exclusion from family decisions, particularly symptomatic patients' disruptive behaviour. To account for this issue, we selected a large sample of PSMI at Dr RML hospital representing a wide variety of severity of symptoms. Yet all outpatients were successfully treated and mostly in follow-up, and therefore not symptomatic at the time of the survey. Despite treatment, SMI in cases was significantly associated with our measure of stigma compared with controls, showing that 'pre-existing beliefs' or stereotypes linked to past experience with the mental illness were critical to the activation of the discrimination process rather than the current mental health status of the person.[68] Second, it was not possible to establish the direction of the association between poverty and SMI; poverty can be a cause as well as a consequence of SMI. Third, SMI was diagnosed within a psychiatric department of a free government hospital. Research indicates the poorest members of society may still not access such services, even when free, possibly introducing a selection bias in our sample.[69] Additionally, PSMI not receiving medical treatment might be even more marginalised, at greater risk of poverty than those receiving healthcare. Thus the sampling bias might have underestimated association between SMI, stigma and poverty. Finally, due to the large sample size we could not evaluate each control using detailed diagnostic psychiatric questionnaires but only screen them for major mental disorders.

CONCLUSION

Our study provides evidence that mental health professionals must incorporate an understanding of multidimensional poverty stressors as well as address family and community dynamics. Where resources are limited, medical professionals would benefit from working with public health and disability networks to weaken persistent stigma against SMI. Policies promoting employment support for PSMI (notably through reservations or fair employment policies, and access to credit) are critically important. The implications of our findings go beyond medical and public health and link mental health to international development. Promoting employment and fighting social stigma for PSMI not only mitigates the impact of illness for some but appears to be a central concern of global poverty.

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