Prevalence of mental disorders in Punjab: Findings from National Mental Health Survey

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ABSTRACT

Background: Knowledge of the prevalence of mental disorders is essential for setting up services and allocation of resources. Existing studies suffer from methodological problems which limit their utility and generalizability. There was a long felt need to conduct a scientifically robust study in different regions of India to have national prevalence rates.

Aims: This study aims to estimate the prevalence of mental disorders in a representative population of Punjab as a part of the National Mental Health Survey.

Settings and Design: Community-based survey carried out in rural and urban areas of Punjab using multistage, stratified, random cluster sampling technique and random selection was based on Probability Proportion to Size.

Materials and Methods: The survey was conducted in 60 clusters of 4 districts (Faridkot, Ludhiana, Moga, and Patiala) of Punjab. Mini-International Neuropsychiatric Interview adult version 6.0 for mental morbidity, case definition for generalized tonic–clonic seizure, an expansion of the Fagerström Nicotine Dependence Scale for tobacco use and screener for intellectual disability were used. Appropriate statistical methods were applied.

Results: A total of 2895 respondents aged >18 years from 719 households were interviewed. The prevalence of lifetime and current mental morbidity was 17.94% and 13.42%, respectively. Higher prevalence of mental morbidity was found among persons aged >60 years and those belonging to lower income group and rural population.

Conclusions: The prevalence of mental morbidity is high in the population. The findings give a clear picture of magnitude of the problem and will help policy planners to tackle the situation which looks grave and warrants immediate intervention.

Key words: Mental disorders, population, prevalence, Punjab State

INTRODUCTION

The prevalence of mental disorders has been of great interest to the clinicians, researchers, and policy planners.

Hence, large number of epidemiological studies have been carried out in India.¹⁻¹³ However, there are wide variations among the rates of mental disorders reported by different authors, and there has always been a dilemma to reach to an agreed prevalence rate. The major reasons for the variation in prevalence rates across various studies include factors

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In a recent review, the authors have reported that the prevalence of mental disorders reported in Indian epidemiological surveys is lower than the accurate reflections of the true prevalence in the population. Thus, these factors need to be kept in mind during mental health-care planning including allocation of resources. The authors further recommend the need of carrying out longitudinal and multicentric research on general population focusing on disability assessment, functioning, family burden, and quality of life of persons suffering from mental illness.

The current study is a part of the National Mental health Survey 2016, which was conducted in the state of Punjab as a part of larger survey in 12 states of India, to estimate the prevalence of mental disorders in a representative population in the state of Punjab.

**MATERIALS AND METHODS**

**Sample size**

The sample size was calculated after a pilot study on 3190 individuals above 13 years of age in Kolar district of Karnataka and as advised and guided by the national expert consultation. The sample size was computed with an absolute precision of 2% at 95% confidence level using the formula; \( n = \left( \frac{Z}{d} \right)^2 \frac{P\cdot (1-P)}{d^2} \), where \( n \) is the sample size, \( Z \) is the standard normal deviate, \( P \) is the prevalence, and \( d \) is the allowable error or absolute precision. The prevalence of any mental morbidity among adults was 7.5% in the pilot study and sample size required for a simple random sample was 666. The design effect was estimated to be 3 for the given intraclass correlation value of 0.05. Thus, 1998 \((666 \times 3)\) or about 2000 individuals needed to be interviewed. To obtain the final sample size, a 30% nonresponse \((2000/0.70 = 2857)\) was considered. Thus, at each study site or state, 50 individuals >18 years were to be interviewed in each cluster and in all 60 clusters were to be surveyed, providing a total of 3000 \((50 \times 60)\) respondents. In the present study, the sample comprised of 2895 respondents who were ≥18 years of age.

**Sampling design**

The overall study design was multistage, stratified, random cluster sampling technique and random selection was based on probability proportion to size (PPS) at each stage. To have a representative sample, the number of clusters chosen were in proportion to the proportion of rural, urban metro, and urban nonmetro population in the state as per Census 2011. Since there is a close relation of mental disorders with socioeconomic status and poverty, all the districts of Punjab were stratified on the basis of district-level poverty estimates into three strata and one district was randomly selected from each stratum. Using the strategy of PPS, community development block/taluk from each district was selected. From each cluster, households were selected randomly using sampling interval method and all individuals aged >18 years of age in each household were interviewed.

The three districts chosen were Faridkot, Moga, and Patiala and each of them had 12 rural clusters and 6 urban nonmetro clusters. In addition, 6 urban metro clusters were randomly selected from the district of Ludhiana. Thus, a total of 60 clusters were selected in this manner.

Informed consent was obtained individually from each informant before inclusion into the survey, and the study was approved by the research and ethics committee of the institute. In case an individual member was not available at the time of the first visit to the house, two more visits were paid and respondent was declared nonresponder in case the individual was not available even on the third visit. The data were collected by 8 master’s level field data collectors. The data collectors underwent 8 weeks extensive training in the survey methodology of the NMHS. Further, as a part of the training process, they demonstrated practical interviews using the hard copies of survey instruments as well as the handheld digital devices on a variety of patients with psychiatric disorders, substance use disorders, and normal individuals.

The diagnosis was automatically generated by the software installed on handheld digital devices. To assess the diagnostic authenticity, the investigators interviewed 5% of the sample interviewed by the field data collectors. Cohen’s kappa was used to measure the reliability of diagnosis by measuring the agreement between the interviews and reinterviews. The overall agreement between field data collectors and investigators was found to be fair (kappa 0.4). To ensure the quality of data collection and transmission, a robust three-tier monitoring mechanism was used. This included daily field-level monitoring by field coordinator, weekly monitoring by the principal investigator and co-principal investigator, and fortnightly monitoring by the National Institute of Mental Health and Neuro Sciences (NIMHANS) team through videoconference meeting. In addition, investigators conducted separate reinterview (at least 5% of total interview) to see the reliability of data collection by the field investigators.
For assessment of mental morbidity, Mini-International Neuropsychiatric Interview (MINI) adult version (version 6.0) was used.[21] In addition, case definition for generalized tonic–clonic seizure by Anand et al.,[22] an expansion of Fagerstrom test for nicotine dependence for tobacco[23] and semi-structured interview schedule routinely used at NIMHANS for screening intellectual disability[18] was used. The steps involved in methodology are listed in Table 1.

**Statistical analysis**
The survey adopted multistage sampling, and to increase the representativeness of the sample, appropriate weights were used for all the data analysis. Weights were calculated by considering the probability of selection of districts, tehsils, and nonresponse rate. Data are summarized using frequencies and proportions. Mental disorders were classified as per the International Classification of Diseases 10 (ICD-10) diagnostic criteria for research[24] and prevalence estimates with 95% confidence interval were obtained for individual conditions and overall mental morbidity. Since data were collected using a handheld device, data merging and cleaning was undertaken using Red Gate MySQL data compare software are (MySQL data compare Red Gate software Ltd, UK). All data analyses were done using SPSS 22.0 for windows (IBM Corp., 2013, Armonk, NY) version 22.

**RESULTS**
A total of 3158 eligible members (above 18 years) were enlisted, and out of them, 2895 respondents were interviewed. Thus, the overall response rate was 91.7%. Sociodemographic characteristics of the respondents are given in Table 2. There was almost equal representation of males and females. The predominant age group (approximately 33%) in the sample was of individuals between 18 and 29 years, nearly 60% respondents belonged to rural area, 80% had less than or equal to high school education, and nearly 70% were married. The sample had approximately 16% respondents who were engaged in agriculture.

Tables 3 and 4 show the mental morbidity in the sample. The findings showed that overall lifetime prevalence of mental morbidity was 17.94% and the current mental morbidity was 13.42%. Projected population of Punjab for 2016 is 30,491,159 and above 18 population would be 9,566,148. Current mental morbidity of 13.42% means that as of 2016, there are 12,83,000 persons living with mental illnesses in Punjab. The number of persons with high and moderate suicidal risk is approximately 51,600 and 28,700, respectively. About 62,200 persons are screener positive for epilepsy and 51,600 for autism spectrum disorder and intellectual disability. Lifetime and current prevalence of schizophrenia and other psychotic disorders was 0.72% and 0.30%, respectively, and lifetime and current prevalence of mood disorders was 7.58% and 1.95%, respectively. Among

**Table 1: Sampling framework of National Mental Health Survey in Punjab**

| Total number of districts as per census 2011 | 20 |
| Number of districts selected | 4 |
| Total number of CDB/talukas in the selected districts | 17 |
| Number of CDB/talukas selected | 7 |
| Total number of clusters in the selected CDB/taluka | 1103 |
| Number of clusters selected | 60 (5.4%) |
| Total number of households in the selected clusters | 76161 |
| Total number of households contacted | 723 |
| Total number of households interviewed | 719 (99.4%) |
| Total number of eligible Individuals in the selected households (>18 years) | 3158 |
| Total number of eligible individuals interviewed | 2895 |

CDB – Community development block

**Table 2: Sociodemographic characteristics of respondents**

| Males, n (%) | Females, n (%) | Total, n (%) |
|-------------|---------------|--------------|
| Age group   |               |              |
| 18-29       | 521 (35.58)   | 448 (31.3)   | 969 (33.47) |
| 30-39       | 266 (18.16)   | 275 (19.21)  | 541 (18.68) |
| 40-49       | 222 (15.16)   | 258 (18.02)  | 480 (16.58) |
| 50-59       | 179 (12.22)   | 191 (13.34)  | 370 (12.78) |
| 60 and above| 276 (18.85)   | 259 (18.09)  | 535 (18.48) |
| Place of residence | | | |
| Rural       | 874 (59.69)   | 861 (60.16)  | 1735 (59.93) |
| Urban nonmetro | 457 (31.21)   | 433 (30.25)  | 890 (30.74) |
| Urban metro  | 133 (9.08)    | 137 (9.57)   | 270 (9.32) |
| Education   |               |              |              |
| Illiterate  | 273 (18.64)   | 428 (29.9)   | 701 (24.21) |
| Primary     | 265 (18.1)    | 252 (17.61)  | 517 (17.85) |
| Secondary   | 216 (14.75)   | 163 (11.39)  | 379 (13.09) |
| High school | 454 (31.01)   | 351 (24.52)  | 805 (27.8) |
| Preuniversity | 148 (10.1)   | 145 (10.13)  | 293 (10.12) |
| Vocational  | 23 (1.57)     | 16 (1.11)    | 39 (1.34) |
| Graduate    | 29 (1.98)     | 36 (2.51)    | 65 (2.24) |
| Postgraduate| 19 (1.29)     | 16 (1.11)    | 35 (1.2) |
| Professional| 20 (1.36)     | 17 (1.18)    | 37 (1.27) |
| Not known   | 17 (1.16)     | 7 (0.48)     | 24 (0.82) |
| Occupation  |               |              |              |
| Cultivator  | 249 (17)      | 3 (0.2)      | 252 (8.7) |
| Agricultural laborer | 199 (13.59) | 7 (0.48) | 206 (7.11) |
| Employer    | 69 (4.71)     | 19 (1.32)    | 88 (3.03) |
| Employee    | 216 (14.75)   | 54 (3.77)    | 270 (9.32) |
| Single worker | 93 (6.35)   | 8 (0.55)     | 101 (3.48) |
| Family worker | 62 (4.23)   | 7 (0.48)     | 69 (2.38) |
| Other worker | 230 (15.71)  | 16 (1.11)    | 246 (8.49) |
| Student     | 129 (8.81)    | 114 (7.96)   | 243 (8.39) |
| Household duties | 38 (2.59) | 1101 (76.93) | 1139 (39.34) |
| Dependent   | 76 (5.19)     | 41 (2.86)    | 117 (4.04) |
| Pensioner   | 74 (5.05)     | 57 (3.98)    | 131 (4.52) |
| Other       | 18 (1.22)     | 1 (0.06)     | 19 (0.65) |
| Not known   | 11 (0.75)     | 3 (0.2)      | 14 (0.48) |
| Marital status |            |              |              |
| Never married| 413 (28.21)  | 215 (15.02)  | 628 (21.69) |
| Married     | 996 (68.03)   | 1048 (73.23) | 2044 (70.6) |
| Widowed/divorced/separated | 55 (3.75) | 168 (11.74) | 223 (7.7) |
Table 3: Prevalence of mental morbidity among the respondents

| Characteristics | Lifetime | Current |
|----------------|----------|---------|
| Total          | 17.9 (17.52-18.33) | 13.4 (13.03-13.75) |
| Age group      |          |         |
| 18-29          | 12.77 (12.16-13.37) | 10.15 (9.60-10.69) |
| 30-39          | 20.40 (19.42-21.38) | 15.13 (14.26-16.00) |
| 40-49          | 16.58 (15.63-17.53) | 13.30 (12.43-14.17) |
| 50-59          | 20.94 (19.74-22.15) | 13.91 (12.89-14.94) |
| 60 and above   | 24.51 (23.42-25.60) | 17.76 (16.78-18.73) |
| Gender         |          |         |
| Female         | 12.65 (12.15-13.15) | 6.59 (6.22-6.97) |
| Male           | 23.14 (22.52-23.77) | 20.12 (19.53-20.72) |
| Place of residence |      |         |
| Rural          | 20.84 (20.25-21.44) | 15.00 (14.48-15.52) |
| Urban nonmetro | 14.68 (13.95-15.40) | 10.37 (9.75-11.00) |
| Urban metro    | 14.87 (14.05-15.69) | 13.38 (12.60-14.17) |
| Education      |          |         |
| Illiterate     | 21.28 (20.34-22.21) | 15.54 (14.72-16.37) |
| Primary        | 23.29 (22.25-24.33) | 17.99 (17.04-18.94) |
| Secondary      | 22.39 (21.17-23.61) | 16.79 (15.69-17.88) |
| High school    | 14.01 (13.33-14.69) | 10.68 (10.07-11.28) |
| Preuniversity and vocational | 10.23 (9.31-11.15) | 6.72 (5.96-7.48) |
| Graduate and above | 13.97 (12.35-15.60) | 10.48 (9.04-11.92) |
| Not applicable/not known | 18.96 (14.27-23.64) | 18.96 (14.27-23.64) |
| Occupation     |          |         |
| Workers        | 23.06 (22.38-23.74) | 19.93 (19.29-20.58) |
| Nonworkers     | 14.16 (13.68-14.65) | 8.64 (8.25-9.03) |
| Others         | 9.94 (5.32-14.56) | 0.00 (0.00-0.00) |
| Marital status |          |         |
| Never married  | 11.21 (10.50-11.92) | 9.03 (8.39-9.68) |
| Married        | 19.12 (18.62-19.62) | 14.90 (14.45-15.35) |
| Widowed/divorced/separated | 26.37 (24.71-28.03) | 12.65 (11.40-13.90) |

CI – Confidence interval

the patients of mood disorders, nearly 95% had depression and rest had bipolar disorder. Neurotic and stress-related disorders had lifetime prevalence of 3.45% and the current prevalence was 3.25%. The prevalence of any substance use disorder was 11.34%, and out of them, the prevalence of alcohol use disorder and other substance (other than tobacco) was 7.90% and 2.48%, respectively. Any substance use disorder denotes a person having either “alcohol use disorder” or “tobacco use disorder” or “other illegal substance use disorders.” Other illegal substance use disorders included all substances listed in ICD-10 apart from alcohol and tobacco. The prevalence of epilepsy and intellectual disability was 0.7% and 0.5%, respectively. Among the respondents, highest prevalence of mental morbidity was among persons who were >60 years of age. Further, the results showed that lifetime and current prevalence of mental disorders was higher among individuals belonging to lower income group and rural population.

**DISCUSSION**

The current study was conducted using sound methodology, standardized instruments, and robust monitoring during data collection. The quality of data collection was ensured through extensive training of the field investigators (lasted for 2 months) and multiple rechecking at the site, state and national level. Since the districts, talukas, villages, and households were chosen on the basis of PPS and using randomization, the results can be easily generalized to the whole population of Punjab.

The overall lifetime prevalence of mental morbidity was 17.94% and the current mental morbidity was 13.42%. These figures include schizophrenia and psychotic disorders, depression and bipolar affective disorders, substance use disorders (except tobacco), panic disorders, social and agoraphobia, obsessive–compulsive disorders, posttraumatic stress disorder, generalized anxiety disorder, anorexia and bulimia, suicide risk, and antisocial personality disorders. However, the figures do not include epilepsy and intellectual disability. The NMHS was also conducted on adolescent (13–17 years) in four states of India (Gujarat, Tamil Nadu, Kerala, and Uttar Pradesh) using MINI Kid and the prevalence varied from 5.8%–8.7%. Furthermore, the prevalence of tobacco dependence (5.5%), epilepsy (0.7%) and intellectual disability (0.5%) is not included in the current prevalence of 13.42%. Thus, if these figures are included, the overall mental morbidity will go up.

The prevalence of mental morbidity in the current study is much higher than the earlier estimated figures by Reddy and Chandrashekar[14] (58.2/1000) and Ganguli[15] (73.1/1000). However, a recent review of 16 Indian studies published in a scientific journal stated that the prevalence reported in the published studies is not only variable but also largely under-reported.[16] In another recent exploratory study through door-to-door survey in a village close to Mysore on 3033 population where MINI plus and MINI kid was used, the authors found that 24.40% of participants had one or more diagnosable disorders.[13] Since the study was conducted in a small segment, the findings have very little relevance in terms of generalizability of the findings.

Since the earlier studies have been carried out using different methodologies, it may not be appropriate to compare the findings with the earlier studies. However, the NMHS[18] was simultaneously carried out in 12 states using same methodology and thus it is possible to compare the prevalence across different regions of the country. As compared to 13.42% current mental morbidity in Punjab, the national morbidity was 10.6% (range 5.8% to 14.1%), lowest being in Assam (5.8%) and highest being in Manipur (14.1%) followed by Madhya Pradesh and Punjab.[19] Higher prevalence of alcohol (7.9%) and substance abuse (2.4%) is the major factor for higher prevalence of mental morbidity in Punjab. Despite the sound methodology and collection of data on handheld tablets, the interrater reliability between the field investigators and the principal and coprincipal investigators was just fair (kappa 0.39). There is a possibility that the symptoms of some of common...
mental disorders (CMDs) which constitute >97% might have improved. Furthermore, the reinterview was conducted by senior faculty and respondents might have had a fear of medicolegal consequences in cases of substance abuse. Furthermore, the difference might have occurred as the reinterviews were conducted by the psychiatrists.

In this study, in addition to higher rates of drug and alcohol use disorders, the findings reported higher mental morbidity among the rural population (15.0%) as compared to urban nonmetro (13.37%) and urban metro (13.38%). On the other hand, the findings from other states showed highest prevalence among urban metro population. These two findings, that is, high mental morbidity among persons living in the villages and among elderly should be a major cause of worry for the state government. The villages which used to be healthy and happy are not healthier anymore and require urgent attention. Although the factors responsible for higher prevalence among rural population were not assessed, it is possible that those factors such as crop failure, ever increasing debt, higher cost of cultivation, poor yield, and unemployment might be responsible for higher mental morbidity in the rural population. Although Punjab is perceived primarily an agricultural state, however, the findings showed that only 8.7% respondents have agricultural land and another 7.1% worked as farm laborers and thus only 15.8% Punjab population is engaged in agricultural activity. In recent years, the manual work in the farms has been reduced to a large extent and majority of the work is carried out by the machines and thus the need of farm laborers has declined. Census 2011 reported that as compared 2001 Census, 8.6 million people have abandoned farming.

Similarly, the mental morbidity was higher among persons who are >60 years of age (17.76%) as compared to the national prevalence of 15.1%.[19] The factors like concern about use of drugs by the adolescents within the family, unemployment, migration by younger and productive members to other countries, and leaving the elderly parents behind and financial burden might be possible factors for higher prevalence among the elderly. This finding needs further exploration.

Out of the total prevalence of mental morbidity, approximately 97% are CMD which include depression, anxiety disorders, and substance use disorders [Figure 1]. Thus, CMDs is a larger category that is responsible for huge burden due to mental disorders and these disorders can be managed at a low cost in the primary health-care settings. The strategies like improving undergraduate psychiatry training, training of in-service doctors and primary health-care staff, community awareness, school mental health program, and life skill training can play important role in primary prevention, early identification, and treatment.

Despite using robust methodology for sampling, data collection, and analysis, the study has some limitations. The sample may be sufficient for calculation of mental morbidity in general, however, the disease-specific total cases are small in number, and thus, calculation of the prevalence of

| ICD-10 DCR | Lifetime | Current |
|-----------|---------|---------|
| Any mental morbidity | 17.94 (17.53-18.34) | 13.42 (13.07-13.78) |
| F10-F19-mental and behavioral problems due to psychoactive substance use | 11.34 (11.01-11.67) | |
| F10 alcohol use disorder | 7.90 (7.62-8.19) | |
| F11-F19, except F17 other substance use disorder | 2.48 (2.31-2.64) | |
| F17 Tobacco use disorders | 5.50 (5.26-5.75) | |
| F20-F29 schizophrenia and other psychotic disorder | 0.72 (0.63-0.81) | 0.30 (0.24-0.35) |
| F30-F39 mood (affective) disorders | 7.58 (7.30-7.86) | 1.95 (1.81-2.10) |
| F30-F31 bipolar affective disorders | 0.33 (0.27-0.39) | 0.14 (0.10-0.18) |
| F32-F33 depressive disorder | 7.26 (6.99-7.54) | 1.83 (1.69-1.97) |
| F40-F48 neurotic- and stress-related disorders | 3.45 (3.26-3.65) | 3.25 (3.06-3.43) |
| F40 phobic anxiety disorders | | 1.57 (1.44-1.70) |
| F40.0 agoraphobia | 1.45 (1.32-1.57) | |
| F40.1 social phobia | 0.32 (0.26-0.38) | |
| F41 other anxiety disorder | 1.35 (1.23-1.47) | 1.14 (1.03-1.25) |
| F41.0 panic disorder | 0.31 (0.25-0.37) | 0.09 (0.06-0.12) |
| F41.1 generalized anxiety disorder | | 0.29 (0.23-0.34) |
| F41.9 panic disorder with limited symptoms | 0.77 (0.68-0.86) | |
| F42 OCD | 0.72 (0.63-0.80) | |
| F42.0-42.8 OCD current | 0.27 (0.21-0.32) | |
| F42.9 OCD NOS | 0.72 (0.63-0.80) | |
| F43 Reaction to severe stress and adjustment disorders (PTSD) | 0.20 (0.15-0.24) | |

PTSD – Posttraumatic stress disorder; CI – Confidence interval; ICD – International classification of diseases; DCR – Diagnostic criteria for research; OCD – Obsessive compulsive disorders; NOS – Not otherwise specified
severe mental disorders will have limitation. The study has also not looked at the psychosocial, cultural, and religious factors which might be important in the causation and treatment-seeking behavior. Data for prevalence of certain disorders like somatoform and dissociative disorders are not available. Nevertheless, this mammoth study does provide a baseline scenario of the various mental health problems prevailing in the state of Punjab in recent times.

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Conflicts of interest
There are no conflicts of interest.

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