

# National sample survey organization survey report: An estimation of prevalence of mental illness and its association with age in India

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## ABSTRACT

**Background:** The Indian population suffers with significant burden of mental illness. The prevalence rate and its association with age and other demographic indicators are needed for planning purpose. **Objective:** This study attempted to calculate age-wise prevalence of mental illness for rural and urban settings, and its association with age. **Materials and Methods:** Data published in National Sample Survey Organization (2002) report on disability is used for the analysis. Spearman correlation for strength of association, z-test for difference in prevalence, and regression statistics for predicting the prevalence rate of mental illness are used. **Result:** Overall population have 14.9/1000 prevalence of mental illness. It is higher in rural setting 17.1/1000 than urban 12.7/1000 ( $P < 0.001$ ). There is a strong correlation found with age in rural ( $\rho = 0.910$ ,  $P = 0.001$ ) and urban ( $\rho = 0.940$ ,  $P = 0.001$ ). **Conclusion:** Results of this study confirm other epidemiological research in India. Large-population epidemiological studies are recommended.

**Key words:** Age, India, mental illness, national sample survey organization report, prevalence, rural, urban

## Introduction

According to the US Department of Health and Human Services, mental illness is characterized by alterations in thinking, mood or behavior associated with distress and impaired function.<sup>[1]</sup> It could refer to one or more mental disorders at a time. Mental illness is a global public health concern. According to the World Health Organization, one out of four (25%) persons is affected with some kind of mental illness.<sup>[2]</sup> The prevalence of mental disorders is higher in developed countries, but the global burden of untreated mental disease is higher in developing nations.<sup>[2,3]</sup> Eighty percent (80%) of the population suffering with mental illness lives in low-and middle-income (LAMI) countries.<sup>[2,4,5]</sup> The presence of mental illness does not affect only the individual and

his personal, social, educational and occupational life, but it also makes his entire family to suffer from negative consequences.<sup>[6,7]</sup>

Considering the fact that India has 17.5% of the world's population<sup>[2]</sup>, the number of people suffering with mental illness is assumed to be huge. It is highly crucial for India to have a true estimate of the number or prevalence of mental illness in the nation. So far, several determinants of mental illness have been identified. Poverty, genetic and environmental factors: Stress and abuse in childhood stage are common associates of mental disorders in the nation.<sup>[2,8]</sup> Distribution of mental disorders also varies with age, socioeconomic status, gender and rural and urban settings.<sup>[9-11]</sup> Compared to urban settings, people in rural poor communities have higher accessibility and affordability challenges in receiving professional help.<sup>[12,13]</sup>

The prevalence of mental illness appears higher in children due to behavioral and emotional disorders. Those are often associated with learning difficulties, poor parenting and schooling, while age-related dementia, and other cognitive disorders increase with age.<sup>[14-19]</sup> Because mental disorders differ with age,

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the nature of psychiatric and psychological service requirements also vary. For the purpose of planning and provision of services, age-related prevalence of mental illnesses is very important. A high proportion of the Indian population resides in rural settings with significantly higher poverty rates than the urban setting. Because poverty is an important social determinant of mental disorders, the differences in prevalence between rural and urban settings also need to be studied for planning and development of services to the population.<sup>[11,20]</sup>

### Objective

This study examines the correlation between age and prevalence of mental illness, and compares rural and urban settings.

### Materials and Methods

Secondary data from the Indian National Sample Survey Organization (NSSO) 2002 are used for analysis. This report is named–NSS 58<sup>th</sup> round, report no. 485 (58/26/1), Disabled Person in India, 2002, and available in the public domain.<sup>[21]</sup> This was the first time mental illness and intellectual disability were covered by NSSO in the disability survey. Data on mental illness and intellectual disability are presented separately and in combination in this report, for planning purposes. This survey was performed by non-medical personnel. In designing the questionnaire, help from consultants with medical background was obtained with regard to diagnosis of mental illness.<sup>[21]</sup> This helped the survey personnel to identify accurately, the person with mental illness. The questionnaire was pre-tested before use. Geographically, the whole nation was covered in this survey except Leh and Kargil districts of Jammu Kashmir, interior villages of Nagaland, Andaman and Nicobar (which, together, constitute less than 1% of the total Indian population) due to challenges in accessibility. With the help of experts, multi-stage sampling was used and the sample size was calculated. The entire survey was conducted in 6 months, beginning from July to December 2002. Data in this report are presented by gender and rural or urban setting on several variables in many tables of the report and appendixes. Explanation on several variables is also offered in this report. For this research, data were taken from the text of this report, and used to develop tables for statistical analysis.

### Statistical analyses

Spearman correlation ( $\rho$ ) was computed for age and prevalence, z-test between rural and urban, and least square regression model were used to determine the

association of prevalence rate with age in rural and urban populations. Statistical Package for Social Sciences (SPSS) version-21, for statistical analysis was used.

### Results

Our analysis indicated that the prevalence of mental illness was strongly correlated with the age in rural ( $\rho=0.910$ ,  $P = 0.001$ ), and urban ( $\rho=0.940$ ,  $P = 0.001$ ) population groups [Table 1]. However, the rural prevalence rate was significantly different from the urban population ( $z = 8.10$ ,  $P = 0.001$ ) [Table 2]. The estimated cumulative mean prevalence of mental illness was 1,490.5 cases/100,000 in the nation. The rural population had significantly higher rate of mental illness compared to the urban [Table 2 and Figure 1]. In the ANOVA,  $F = 49.486$ ,  $P = 0.001$  indicate a statistically significant strong association between age and mental illness in rural populations in India, where  $R^2 = 0.81$ , demonstrates that 81% of the variance in prevalence of mental illness is explained by age the rural model. However, with ANOVA of  $F = 79.954$ ,  $P = 0.001$ , in the urban setting, age is also strongly associate with mental illness, while an  $R^2 = 0.87$ , indicates 87% of the variance in the prevalence is explained by age. In further predicting prevalence of mental illness based on age, the least-square regression equation was obtained. According to this statistical

**Table 1: Correlation with age separated by rural and urban setting**

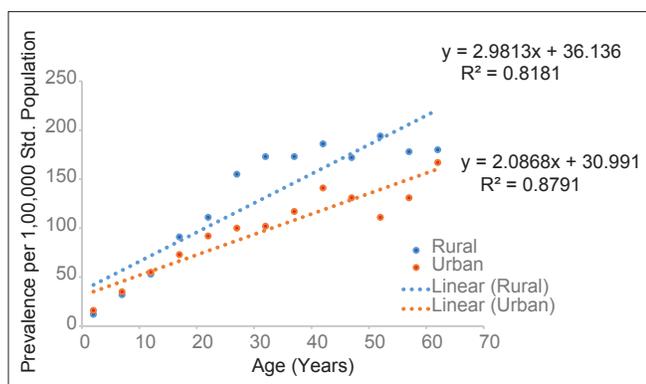
Categories	Age		Prevalence		
	Mean±SD	Settings	Mean±SD	$\rho$	P
Overall	32.00±19.47	Rural	131.54±64.18	0.910	0.001
		Urban	97.77±43.34	0.940	0.001

SD: Standard deviation

**Table 2: Prevalence of mental illness in different age groups data from NSSO report: Case per 100,000**

Age groups	Mean age	Rural	Urban	Total	Mean	z-value	P
0-4	2	12	16	28	14	-0.756	0.447
5-9	7	32	35	67	33.5	-0.366	0.711
10-14	12	53	55	108	54	-0.192	0.849
15-19	17	91	73	164	82	1.406	0.158
20-24	22	111	92	203	101.5	1.334	0.183
25-29	27	155	100	255	127.5	3.446	0.0005
30-34	32	173	102	275	137.5	4.284	0.000
35-39	37	173	117	290	145	3.290	0.001
40-44	42	186	141	327	163	2.490	0.012
45-49	47	172	131	303	151.5	2.357	0.018
50-54	52	194	111	305	152.5	4.756	0.000
55-59	57	178	131	309	154.5	2.675	0.007
60 above	62	180	167	347	173.5	0.698	0.483
Total	Overall	1,710	1,271	2,981	1490.5	8.101	0.000

NSSO: National sample survey organization



**Figure 1:** Prevalence of mental illness in rural and urban India by age (constructed from table 1)

predictive model, age increase of one year predicted an increase in prevalence of 2.98 persons per 100,000 rural population. However, in the urban population, the same increase in age predicts a 2.087 persons per 100,000 thousand increase in prevalence [Table 3 and Figure 1].

## Discussion

This study finds that age is an important predictor of mental illness in the population irrespective of where people live, rural or urban. Mental illness is linearly associated with age and these findings agree with prevalence studies conducted previously.<sup>[10,22]</sup> However, in another epidemiological study, the association of age with psychiatric illness among young children below the age of 3 years was found higher than for children in age range of 12-16 years.<sup>[9]</sup>

This study found that the cumulative prevalence rate in rural (17.10/1,000), urban (12.7/1,000) and in combined population in the nation was 14.90 persons per 1,000. This is also consistent with several studies.<sup>[8,9,10,14,15,19,23,24]</sup> An epidemiological review of prevalence studies of psychiatric disorders from, 1960 to 2009 conducted by Math and Srina, *et al.* (2010) found that the prevalence of mental illness falls in the range of 9.5-370 persons per 1000. The wide variation in prevalence rate is attributed to several factors such as diagnostic criteria, methodology adapted in survey, lower sample size, and the type of instruments used in screening.<sup>[23,25]</sup> The prevalence estimated in this study falls in the lower side of the spectrum found by Math and Srinivasaraju.<sup>[24]</sup> Only two studies have found such low prevalence rates of mental illness in India. Both were conducted in South India. Mehta, *et al.* (1985)<sup>[26]</sup> estimated prevalence of 14.5/1000 in rural population in Vellore; Shaji, *et al.* (1995)<sup>[27]</sup> also observed closely similar prevalence rate of 14.57/1000 in Ernakulum.<sup>[27]</sup> A prevalence study conducted by Surya (1964),<sup>[28]</sup> also in southern India has

**Table 3: Regression analysis of age with mental illness in rural and urban settings of India**

Age groups <sup>a</sup>	Setting <sup>b</sup>	Model (ANOVA)		Regression			
		F	P	R <sup>2</sup>	B <sub>0</sub>	B <sub>1</sub>	P
Overall	Rural	49.48	0.001	0.818	36.13	2.98	0.000
	Urban	79.954	0.001	0.879	30.991	2.087	0.000

<sup>a</sup>Predictor variable=Mean age group; <sup>b</sup>Dependent variable=Rural, urban settings. ANOVA: Analysis of variance

estimated a low prevalence of mental illness (9.5/1000) in urban population in Pondicherry.

Compared to urban population in India, this study found significantly higher prevalence of mental illness in rural population. Considering the fact that larger proportions of the rural population live in poverty, poverty may be a significant determinant of mental illness. The findings of this study can be supported with other studies conducted in low and middle income countries.<sup>[11,29-32]</sup> However, the difference in prevalence rate based on rural and urban settings is not well supported in many Indian epidemiological studies,<sup>[23,25,33]</sup> except one, that estimated psychiatric morbidity in children and adolescents.<sup>[9]</sup>

The findings of this study agree with other studies. Researchers have reported that the prevalence rate of psychiatric disorders is underreported in India as compared to the developed nations.<sup>[25]</sup> Until now, most of the prevalence studies are conducted with the average population of 5,000 or less,<sup>[23]</sup> with many of the southern states of India, overrepresented in survey than any other study in the nation. Under this survey, 45,571 households, in 4637 randomly selected villages, and 24,731 in urban blocks were interviewed for mental illness. Random selection of villages and urban blocks in different states of the country makes the research data and its findings, representative of the different socioeconomic groups, and caste. Despite the fact that this survey is much more representative of the entire population of the country, its findings have limited scope in representing true estimation of prevalence rate, association with the age, and difference in two settings, because of the limitations of the survey itself.

The NSSO report, on which this study is based, does not provide information on which ICD standards definitions were used, how surveyors were prepared for survey, what were their trainings and how mental disorders were confirmed. What instruments were used, and what was the reliability of those instruments. Case definition used in the survey was also vague, which might have covered few persons with intellectual disabilities by chance or excluded mentally ill people mistakenly, considering them intellectually disabled. To keep balance, this survey

identified more people with severe mental illness, while people with mild mental illness might have remained unidentified and uncounted.

## Conclusion

Despite its limitations, the findings of this study identified high prevalence rates of mental illness in India and its association with age and rural settings. Compared to other studies, this study is based on larger sample size. In future, large epidemiological population studies are suggested to identify psychosocial determinants of mental illness more precisely.

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