Prevalence of psychiatric morbidity amongst the community dwelling rural older adults in northern India

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Background & objectives: The population of elderly is growing globally and so are the physical illnesses and psychiatric morbidity. This study was planned to assess the prevalence and patterns of psychiatric morbidity amongst rural older adults in Lucknow, north India.

Methods: A survey was conducted in subjects aged 60 yr and above to identify the cases of psychiatric morbidity in rural population from randomly selected two revenue blocks of Lucknow district, Uttar Pradesh, India. All subjects were screened through Hindi Mental Status Examination (HMSE) and Survey Psychiatric Assessment Schedule (SPAS) to identify for the suspected cases of cognitive and the psychiatric disorders, respectively. The subjects screened positive on HMSE and SPAS were assessed in detail on Cambridge Mental Disorder of the Elderly Examination-Revised (CAMDEX-R) and Schedule for Clinical Assessment in Neuropsychiatry (SCAN), to diagnose cognitive disorders and psychiatric disorders (other than the cognitive), respectively on the basis of International Classification of Diseases-10 (ICD-10) diagnostic guidelines.

Results: The overall prevalence of psychiatric morbidity in rural older adults was found to be 23.7 per cent (95% CI=21.89-25.53). Mood (affective) disorders were the commonest (7.6%, 95% CI=6.51-8.80), followed by mild cognitive impairment (4.6%, 95% CI=3.72-5.53), mental and behavioural disorders due to substance use (4.0%, 95% CI=3.17-4.87) and dementia (2.8%) [Alzheimer's disease (2.4%, 95% CI=1.81-3.16) and vascular (0.4%, 95% CI=0.16-0.73)].

Interpretation & conclusions: Overall prevalence of psychiatric morbidity amongst rural elderly in this study was found to be less in comparison to those reported in earlier studies from India. However, prevalence pattern of different disorders was found to be similar. Therefore, it appears that a stringent methodology, refined case criteria for diagnosis and assessment by trained professionals restrict false diagnosis.

Key words Aged - CAMDEX-R - cognitive disorders - dementia - epidemiology - HMSE - mood disorders - northern India - prevalence

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The population of elderly is growing rapidly with the increase in life expectancy. Besides physical illnesses, psychiatric morbidity is also commonly seen in older adults. Hence, the burden of caregivers and health care professionals is increasing day by day[1]. The proportion of older adults in less developed countries is rising much faster than in developed countries[2]. The life expectancy of an average Indian has increased from 36.7 in 1951 to over 67.14 in 2012[3]. Also, the population of older adults (≥60 yr) in India increased to 102 millions in 2011[4]. The proportion of elderly persons in India rose from 5.3 per cent in 1961 to 7.5 per cent in 2001, and was currently 8.4 per cent in 2011[4].

Many epidemiological studies have been conducted in India to estimate the psychiatric morbidity in general population[5-7] but only a few have taken specifically the elderly population into consideration[8-12].

A couple of studies were conducted in institutional and hospital settings where prevalence of psychiatric morbidity in older adults was found to be 49.28 per cent[10] and 8.6 per cent in the geriatric population[13]. A study conducted by Tiwari[8], almost a decade ago using International Classification of Diseases-9 (ICD-9) diagnostic criteria, reported 43.32 per cent psychiatric morbidity in rural elderly. Another study[11] reported a prevalence of 49.2 per cent in New Delhi (Urban), and 19.3 per cent prevalence was reported in a Lucknow based study[12] in the urban elderly population.

Some of the community-based studies have focused only on specific disorders like depression or dementia in the elderly population. A study[14] reported 31 per cent prevalence of depression in elderly population aged 60 years and above. Another study[15] found 12.7 per cent prevalence of depression in the elderly. Shaji *et al*[16] reported 3.36 per cent dementia in elderly aged of 65 yr and above in urban areas of southern India. From rural south India, a study reported dementia prevalence to be 3.4 per cent in elderly population[15].

Although prevalence figures are available for developed regions of the world including Europe[17], North America[18-20], and Japan[21]; but this information is largely missing for developing countries. A brief review of the prevalence and incidence studies conducted in India revealed highly variable results because of the differences in settings, sampling process, type of tools used, and methods of ascertaining diagnosis (Table I).

This study was undertaken to determine the prevalence of psychiatric morbidity amongst the community dwelling rural elderly aged 60 yr and above in Lucknow, Uttar Pradesh, north India.

Material & Methods

Sample size: The two rural revenue blocks- *Malihabad* and *Bakshi Ka Talab* of Lucknow district of the State of Uttar Pradesh in north India were randomly selected for the study location. There were 215 villages in these two rural blocks with approximate population of 4,52,598 and 300 to 500 houses in each village. Of these, 30 villages were randomly selected for the complete enumeration of the elderly aged 60 yr and above. This study was conducted during 2008 to 2010. Assuming a prevalence of 43.3 per cent of psychiatric morbidity in rural elderly[8] and a precision of 2.5 per cent, the required sample size was calculated to be 2060 subjects.

A total of 2324 individuals aged ≥60 yr were included in the study. Of them, 178 refused to participate in the study. Thus, the study sample consisted of 2146 subjects (Figure). Written informed consent was obtained from all.

Study was approved by institutional ethical committee, King George's Medical University, UP, Lucknow.

Inclusion criteria: *(i)* Older adults (both males and females) aged 60 yr and above with age confirmation by an authentic document/certificate. *(ii)* Self & family assessment of the subject.

Any elderly with problems with speech, hearing and vision, which could impede the interview was excluded.

Tools used: Hindi translated versions of the standardized English tools were used in the study. The tools consisted of:

(i) Semi structured proforma for bio-socio-cultural information and other relevant family details (Socio-demographic proforma *i.e.* SDP).

(ii) Socio-economic status scale (SES)[35]: There are seven profiles in the scale to calculate the SES of a family. These profiles are: 1- House, 2- Material possessions, 3- Education, 4- Occupation, 5- Economic, 6- Possessed land/House cost, and 7- Social profile. On SES scale maximum score can be obtained 70 (10 scores in each profile). The scale is equally good to assess SES of urban and rural families. Cut-off scores 0-25.5 for lower; 25.6-47.5 for middle; and 47.6-70 for upper SES groups.

Table I. Mental health morbidity studies on elderlies conducted in India						
Author and location	Sample	Instrument used	Diagnostic criteria	Design	Prevalence	Remarks
Dube[6] Uttar Pradesh	329	Simple survey, no specific tools were administered	-	Epidemiological study on rural & urban general population	2.23%	Study not focused on elderlies
Nandi et al[22] West Bengal	54	Simple survey, no specific tools were administered	Operational definition as per WHO Technical Report Series (1960)	General rural population	33.3%	Study not focused on elderlies
Ramchandran et al[7] Tamil Nadu	861	Self developed proforma was used to assess physical and mental symptoms	-	Suburban geriatric population	35%	A field survey
Venkoba Rao & Madhavan[23] Tamil Nadu	686	Simple survey, no specific tools were administered	-	Semi urban geriatric population	Overall prevalence of psychiatric illnesses- 89/1000. Age-wise prevalence per 1000: 71.5 in 60-69 years olds 124 in 70-79 yr 155 in 80 & above	The study was not having representative sample as only semi-urban elderlies were studied
Rajkumar and Kumar[24] Madras	750 subjects ≥60 yr from rural, and 1,300 subjects ≥ 65 yr from urban	Geriatric Mental State Schedule (GMS)	-	-	3.5% in the rural and 2.7% in the urban setting and increased exponentially with age	Different age of sample from rural (60 yr) and urban (65 yr) area
Nandi et al [25] Rural geriatric population, West Bengal	183 subjects 60 yr and above	None	Operational definition as per WHO Technical Report Series (1960)	Rural geriatric population	61% Women- 77.6% Men- 42.4%	Majority of the subjects were from class IV families
Rajkumar et al[15] south India	750 elderly 60 yr of age and older	Geriatric Mental State Schedule (GMS)	-	-	3.5% dementia	
Chandra et al[26] Ballabgarh in northern India	5,126 individuals aged 55 yr and older	Hindi cognitive and functional screening instruments, developed for and validated in this population, were used to screen the cohort	DSM-IV, Clinical Dementia Rating Scale (CDR), and National Institute of Neurological and Communicative Disorders and Stroke-Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) criteria for probable and possible AD	To determine the prevalence of AD and other dementias in a rural elderly	Overall prevalence rate of 0.84% for all dementias in 55 yr and older, and an overall prevalence rate of 1.36% in 65 yr and older. The overall prevalence rate for AD was 0.62% in 55+ and 1.07% in aged 65+	Older age was associated significantly with higher prevalence of both AD and all dementias, but neither gender nor literacy was associated with prevalence
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Author and location	Sample	Instrument used	Diagnostic criteria	Design	Prevalence	Remarks
Tiwari[8] Uttar Pradesh	561 subjects 60 yr and above	Mental health item sheet developed and validated by Verghese *et al*[34] for screening psychiatric illnesses	ICD-9	Rural geriatric and non -geriatric population	43.3% in geriatric group and 4.7% in non-geriatric group	Rural population based study
Nandi *et al*[27] West Bengal	Total subjects: 3488 60 years and above: 210 (in 1992) and 118 (in 1972)	Simple survey, no specific tools were administered	Operational definition as per WHO Technical Report Series (1960)	Two stage Cross-sectional study in 1972 and 1992	Total morbidity 10.5% Men: 7.3% Women: 13.8% Morbidity amongst 60 years and above : 27.5% (1992) and 16.2 (1972) Dementia: 0.1%	Not focused on elderly population No definite diagnostic criteria
Shaji *et al*[16] Kerala	1934 subjects aged 65 years and above	Vernacular adaptation of Mini Mental State Examination (MMSE)	DSM-IV and ICD-10		Dementia- 33.6/1000 Maximum AD followed by Vascular Dementia (VD)	
Tiple *et al*[9] Varanasi	60 yr and above patients of old age home (*Mumukshu Bhavan*), Varanasi		DSMIV	Cross-sectional study from September 1998 to September 1999	Depressive disorder was the most common psychiatric illness	Old age home
Jacob *et al*[28] Vellore, Tamil Nadu	1000 subjects aged 60 yr and above	Community Screening Instrument for Dementia (CSID), GMS, Modified CERAD-10- word list learning task, History and aetiology schedule dementia diagnosis and subtype	DSM-IV	10/66 Dementia research group of Alzheimer's Disease International	0.8% Dementia	
Rajkumar *et al*[29] south India	1000 aged 65 yr and above	MHS, CSID, Modified CERAD 10 word list learning task, History and Aetiology Schedule Dementia Diagnosis and Subtype, WHO Disability Assessment Scale II, and NPI	ICD-10	Cross-sectional study	Geriatric depression (ICD-10) within the previous one month was 12.7% (95% CI 10.64-14.76%)	

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Author and location	Sample	Instrument used	Diagnostic criteria	Design	Prevalence	Remarks
Poongothai et al[30] Chennai Urban Rural Epidemiology Study (CURES)	26,001 subjects	Self-reported and previously validated instrument, the Patient Health Questionnaire (PHQ) 12		Epidemiological study	Depression- 15.1%. females -16.3% males -13.9%. low income group-19.3%. higher income group- 5.9%. divorced- 26.5%, widowed- 20% currently married- 15.4%	
Tiwari et al[31] Urban Lucknow, Uttar Pradesh	1836 subjects aged 60 yr and above	CAMDEX-R and SCAN 2.1 version	ICD-10 diagnostic criteria	Cross-sectional study	Syndromal problems:17.3% Sub syndromal: 4.2%	Detailed psychiatric assessment was done by trained research staff
Tiwari et al[32] Lucknow, Uttar Pradesh	Subjects aged 55 yr and above Urban=1216 Rural= 227	CAMDEX-R and SCAN 2.1 version for diagnosis	ICD-10		Total psychiatric morbidity: Rural-42.8% Urban-21.0% Functional disorders: Urban=14.5% Rural= 25.6%	Detailed psychiatric assessment was done by trained research staff
Mathuranath et al[33] Kerala	2466 aged 55 yr and above	Screening (Phase I) using instrumental activity of daily living scale for the elderly (IADL-E) and the Addenbrooke's cognition examination (ACE)	-		4.86% dementia in 65 yr and above	

(iii) Hindi Mental Status Examination (HMSE)[36]: This scale was developed specifically to counter the education and language bias while screening rural illiterate elderly people for cognitive impairment in India. A cut-off score of 24 was considered on HMSE for identification of suspects or cases of cognitive impairment.

(iv) Survey Psychiatric Assessment Schedule (SPAS)[37] and Mood Disorder Questionnaire (MDQ)[38]: SPAS consists of 51 items divided into three sections: (1) organic disorders, (2) affective disorders/ psychoneurosis, and (3) schizophrenia/ paranoid disorders. For identification of 'cases' each section of SPAS was scored independently as given below:

Section-1: A simple additive score of the 12 responses classified the subjects as 'suspects' in different categories. The following cut-off points were used: No organic disorder - 9-12, Mild organic disorder- 7-8, and Severe organic disorder- 0-6.

Section-2: The 44 responses were summed up and the following cut-off points were used to identify 'suspected cases' and 'non cases': 'Non case'- 0-10, and 'Case'- 11-65.

Section-3: In this section any positive answer indicated possible case.

However, in this study, SPAS was used as screening instrument to identify suspects for neuropsychiatric disorders. Subjects found positive on one or more than one sections using the above cut-off score and/ or MDQ positive subjects (cut-off=7) were considered as SPAS+ve. MDQ was used as a safeguard against 'false negative' classification of possible mood disorder cases on SPAS.

(v) Schedule for Clinical Assessment in Neuropsychiatry (SCAN) 2.1 version[39]: Positive symptoms on SCAN based clinical interview were used to make diagnosis according to ICD-10 criteria[40] in the study.
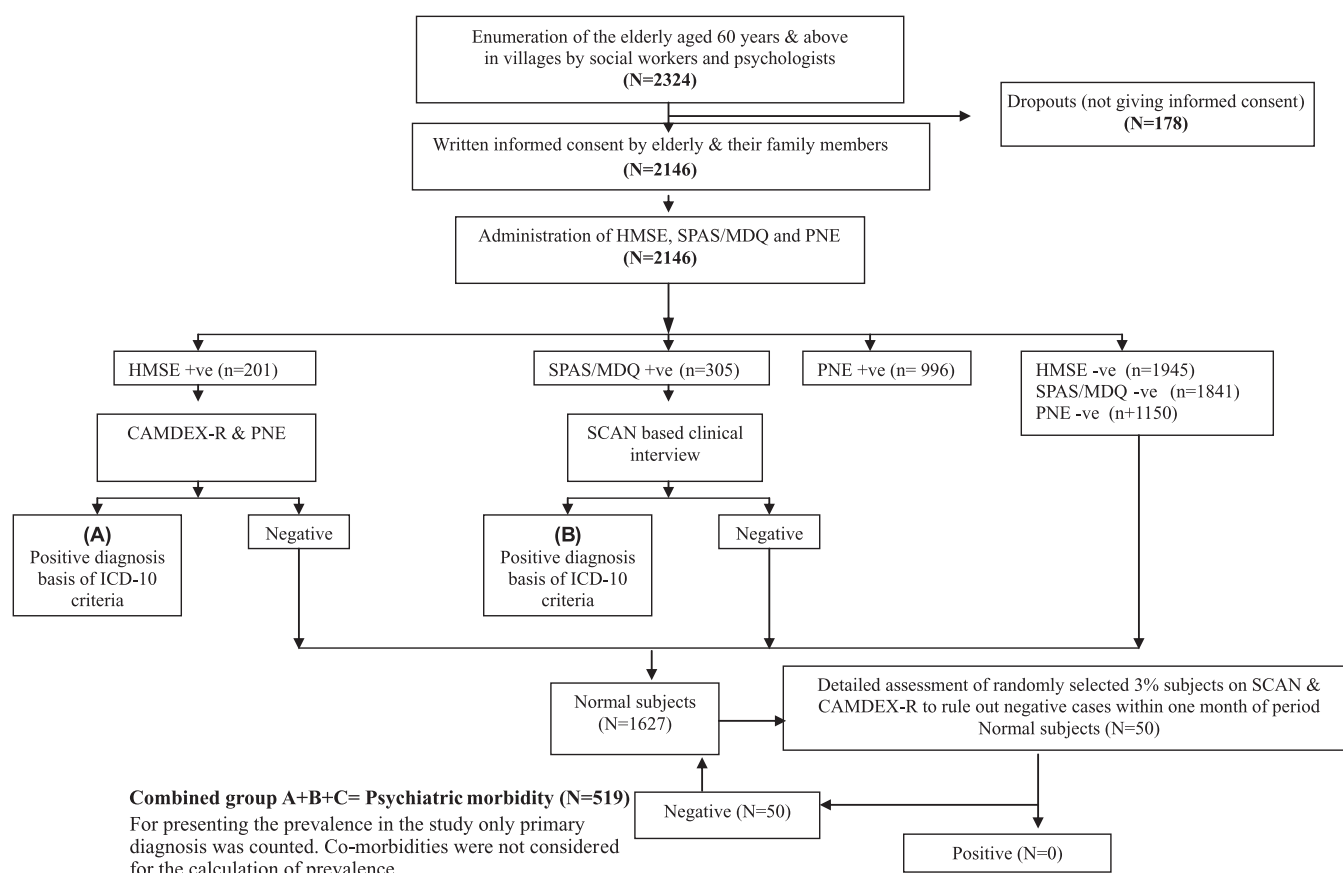
Fig. Flow chart of the study procedure. HMSE, Hindi Mental State Examination; SPAS, Survey Psychiatric Assessment Schedule; MDQ, Mood Disorder Questionnaire; PNE, Physical and Neurological Examination; SCAN, Schedule for Clinical Assessment of Neuropsychiatric Disorders; CAMDEX-R, Cambridge Examination for Mental Disorders of the Elderly - Revised.

(vi) Cambridge Examination for Mental Disorders of the Elderly - Revised (CAMDEX-R)[41]: CAMDEX-R consists of eight sections for complete assessment of an older adults: Section A- Clinical information about current condition, past history and family history of the patient; B-Cognitive function Cambridge cognitive (CAMCOG); C- Interviewer's observation on the patients appearance and behaviour; D- Physical and neurological examination; E- Results of laboratory tests; F- Medication received by the patient; G- Additional information; H- Structured interview with the relative/caregiver. Inter-rater reliability of the CAMDEX ranged from 0.83 to 0.94 for the patient interview.

It also gives diagnosis based on the criteria of ICD-10 and Diagnostic and Statistical Mannual of Mental Disorders - 4th Edition (DSM-4).

(vii) Physical and Neurological Examination (PNE)

Procedure of translation of the tools: Three translators well versed in English and Hindi, translated the original English versions of SPAS[37] and CAMDEX-R[41] into Hindi independently and then discussed and compared the translation item by item to agree upon a pre-final translated Hindi version (PFHV) of the tools preserving the originality of the items. PFHV tools were administered to 10 literate and 10 illiterate persons aged 60 yr and above, drawn from another community to know the comprehensibility of the items. The final translated Hindi versions (FHVs) of the tools were validated by three bilingual mental health professionals.

Training of the research staff: Clinical psychologist, psychologists, social workers and Bachelor of Ayurvedic Medicine and Surgery (BAMS) graduates were involved in data collection. They were appropriately trained. Clinical psychologist was trained for SCAN based clinical interview and for administration of CAMDEX-R (Except PNE section). BAMS graduates

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were trained to conduct PNE, clinical psychologist, psychologists and social workers were trained to administer HMSE, SPAS/MDQ, SES and for socio-demographic data collection.

Study procedure: All subjects had initial screening through HMSE and SPAS/MDQ to identify 'probable cases' for cognitive and neuropsychiatric disorders, respectively. The screened positive subjects on HMSE and SPAS/MDQ were assessed in detail on CAMDEX-R, SPAS/MDQ and SCAN, to diagnose cognitive disorders, and psychiatric disorders other than cognitive disorders, respectively. The included subjects were seen for comprehensive physical and neurological examination.

Three per cent of the total subjects who were found negative on HMSE/SPAS were administered CAMDEX-R for cognitive disorders and SCAN for neuropsychiatric disorders other than cognitive disorders to rule out false negative cases. These assessments were done within one month period. None of these subjects had a symptom profile to lead to a diagnosis. Following this, the older adults were categorized as per their mental and physical health status in different categories. Mild cognitive impairment (MCI) was diagnosed in individuals who had cognitive impairments beyond that expected for their age and education, but that did not interfere significantly with their daily activities[42].

Statistical analyses: The inter-rater reliability between clinical psychologists for administering the CAMDEX-R and SCAN based clinical interview and trainer yielded a positive correlation between 0.71 to 0.83. Between psychologists and trainer it was found 0.78 to 0.92 for administering SPAS/MDQ and HMSE.

All included subjects were categorized into two broad categories on the basis of screening and detailed assessments, *i.e.* Normal (screen negatives and SCAN and/or CAMDEX-R negative) and psychiatric morbidity group (SCAN and/or CAMDEX-R positive). Three per cent of the normal subjects were reassessed in detail on CAMDEX-R and SCAN to see for false negative cases within one month of the assessment. None of these subjects had enough symptoms to qualify for a diagnosis. The cases with primary diagnosis only were included to calculate the prevalence. Co-morbid psychiatric disorders were not included in the calculation of prevalence. Calculations of confidence interval (CI) for the prevalence and lower and upper

limits of the CI explain that the prevalence of disorder lies between these limits for a population. Only point prevalence in this cross-sectional study is presented here. Thus, screened positive cases (not meeting diagnostic levels) were not included to calculate the prevalence.

Results

Table II shows age, sex and socio-economic status distribution of study subjects (N=2146). There were more females (52.6%) than males (47.4%). More subjects belonged to lower SES (53.4%) in comparison to middle SES (46.6%). There was no subject from upper SES.

The overall prevalence of psychiatric morbidity was found to be 23.7 per cent (508/2146) (95% CI=21.89-25.53) in the rural older adults, of which mood (affective) disorders was the commonest (7.6%, 95% CI=6.51-8.80), followed by mild cognitive impairment (4.6%, 95% CI=3.72-5.53), behavioural and mental disorders due to substance abuse (4.0, at 95% CI=3.71-4.87), dementia (2.8%) [Alzheimer's disease (2.4%, 95% CI=1.81-3.16) and vascular (0.4%, 95% CI=0.16-0.73)], neurotic, stress related and somatoform disorders (2.0%, 95% CI=1.49-2.74), sleep disorders (1.7, 95% CI=1.22-2.37), psychoses (0.6%, 95% CI= 0.35-1.10), organic amnestic syndrome (0.1%, 95% CI=0.02-0.40) and mental retardation (0.2%, 95% CI=0.05-0.48) (Table III).

Table IV shows age, sex and SES-wise prevalence of psychiatric morbidities (excluding mental retardation) amongst rural elderlies aged 60 yr and above. Total psychiatric morbidity was found to be higher in the age group of 60-69 yr (11.6%, 95% CI=10.32-13.08) than 70-79 yr (8.1%, 95% CI=6.98-9.34) and 80 yr and above (4.1%, 95% CI=3.34-5.08). However, prevalence of Alzheimer's disease (60-69 yr: 0.65%, 70-79 yr: 0.88%, and >80 yr: 1.2%) and vascular (60-69 yr:

Table II. Age, sex and socio-economic status (SES)-wise distribution of study sample (N=2146)

Variables		N	%
Age (yr) (Mean age- 67.8±5.9 yr)	60-69	1302	60.7
	70-79	636	29.6
	80 and above	208	9.7
Sex	Male	1018	47.4
	Female	1128	52.6
SES	Middle	1000	46.6
	Lower	1146	53.4

Table III. Prevalence of psychiatric disorders (single primary diagnosis) in subjects (N=2146)

Major categories	Disorder	Total No.	Prevalence in percentages	95% Confidence intervals
Cognitive disorders	Alzheimer's disease (F00)	52	2.4	1.8 - 3.16
	Vascular dementia (F01)	8	0.4	0.16 - 0.73
	Organic amnestic syndrome (F04)	3	0.1	0.02 - 0.40
	*Mild cognitive Impairment	98	4.6	3.72 - 5.53
Psychiatric disorders other than the cognitive disorders	Substance abuse (F10-19)	85	4.0	3.17 - 4.87
	Psychosis (F20-29)	14	0.6	0.35 - 1.10
	Mood (affective) disorders (F30-39)	163	7.6	6.51 - 8.79
	Neurotic, stress related & somatoform disorders (F40-F48)	44	2.0	1.49 - 2.74
	Non-organic sleep disorder (F51)	37	1.7	1.22 - 2.37
Mental subnormalities	Mental retardation (F70-79)	4	0.2	0.05 - 0.48
Total		508	23.7	21.89 - 25.53

*As per Peterson's criteria[42]
F numbers are the classification codes of different psychiatric disorders in ICD-10 (International Classification of Diseases tenth version)

0.04%, 70-79 yr: 0.13%, and ≥80 yr: 1.9%) dementia was found to be increasing with advancing age.

Overall prevalence of psychiatric morbidity was found to be more amongst females (13.6%, 95% CI= 12.18-15.13) than males (9.9%, 95% CI=8.65-11.22). Similar pattern was observed for prevalence of Alzheimer's disease (females: 1.72%, 95% CI= 1.22-2.37 and males: 0.69%, 95% CI= 0.39-1.15) and vascular (females: 0.23%, 95% CI= 0.07-0.54 and males: 0.13%, 95% CI= 0.03-0.41) dementia, mild cognitive impairment (females: 2.74%, 95% CI= 2.09-3.53 and males: 1.81%, 95% CI=1.29-2.47), psychosis (females: 0.37%, 95% CI= 0.16-0.73 and males: 0.27%, 95% CI= 0.10-0.61), mood (affective) disorders (females: 5.07%, 95% CI=4.19-6.09 and males: 2.51%, 95% CI= 1.89-3.27), neurotic, stress related and somatoform disorders (females: 1.2%, 95% CI= 0.83-1.82 and males: 0.79%, 95% CI= 0.46-1.26) and non-organic sleep disorder (females: 1.02%, 95% CI= 0.64-1.55 and males: 0.69%, 95% CI=0.39-1.15) except mental and behavioural disorders due to substance use (females: 1.07%, 95% CI= 0.68-1.60 and males: 2.88%, 95% CI= 2.22-3.68).

Prevalence of psychiatric morbidity amongst elderlies belonging to lower SES (13.6%, 95% CI=12.18-15.13) was found to be higher than middle SES (9.9%, 95% CI=8.65-11.22). This pattern was found similar for all other disorders except non organic sleep disorders (lower SES: 0.74%, 95% CI=0.43-1.21; middle SES: 1.97%, 95% CI= 0.61-1.49). Mood (affective) disorders were more prevalent amongst elderlies belonging to lower SES (4.33%, 95% CI=3.51-5.28) compared to middle SES (3.26%, 95% CI=2.55-4.1).

Discussion

The present study attempted to find out the prevalence of psychiatric morbidity in the community dwelling older adults in the rural northern India. Overall psychiatric morbidity in the present study amongst the rural older adults aged 60 yr and above was found to be 23.6 per cent which is less than reported in other studies (27.5 to 43.3%) in rural areas[7,8,25,27,32] and in urban areas (13.0 to 49.2%)[11,12]. The reason for this variation might be due to the use of different tools and different diagnostic guidelines for ascertaining the diagnosis. Tiwari[8], and Chowdhury and Rasania[11] used ICD-9 and DSM III, respectively. In the present study ICD-10 was used. Though Tiwari *et al*[32] reported high prevalence (42.8%) using ICD-10 diagnostic criteria in rural area but they added co-morbidities also to calculate the prevalence. The sample size of this study

Table IV. Age, sex and SES wise prevalence of psychiatric morbidity with confidence interval (CI) (excluding mental retardation) amongst rural elderlies (N=2146)

| Variables | | Alzheimer's disease N (%) | Vascular dementia N (%) | Organic amnestic syndrome N (%) | *Mild cognitive impairment | Psychiatric disorders | | | | | |
						Mental & behavioral disorders due to substance use	Psychosis	Mood (affective disorders)	Neurotic, stress related & somatoform disorders	Non-organic sleep disorder	Total
Age in years	60-69	14 (0.65)	1 (0.04)	2 (0.09)	32 (1.49)	60 (2.79)	5 (0.23)	84 (3.91)	32 (1.81)	20 (0.93)	250 (11.64)
	CI (%)	0.35 - 1.09	0.001 - 0.25	0.011 - 0.33	1.02 - 2.09	2.14 - 3.584	0.075 - 0.54	3.13 - 4.82	1.02 - 2.098	0.57-1.43	10.32 - 13.0829
	70-79	19 (0.88)	3 (0.13)	0 (0%)	47 (2.19)	23 (1.07)	6 (0.27)	57 (2.65)	10 (0.46)	9 (0.41)	174 (8.10)
	CI (%)	0.53 - 1.37	0.028 - 0.40	0 - 0.17	1.61 - 2.90	0.68 - 1.60	0.102 - 0.607	2.017 - 3.42	0.22 - 0.85	0.19 - 0.79	6.98 - 9.34
	80 & above	26 (1.21)	4 (1.9)	1 (0.04)	21 (0.97)	2 (0.09)	3 (0.13)	22 (1.02)	2 (0.09)	8 (0.37)	89 (4.14)
	CI (%)	0.79 - 1.77	0.05 - 0.47	0.001 - 0.25	0.60 - 1.49	0.01 - 0.33	0.02 - 0.40	0.64 - 1.55	0.01 - 0.33	0.16 - 0.73	3.343 - 5.078
Sex	Male	15 (0.69)	3 (0.13)	1 (0.04)	39 (1.81)	62 (2.88%)	6 (0.27)	54 (2.51)	17 (0.79)	15 (0.69)	212 (9.87)
	CI (%)	0.39 - 1.15	0.029 - 0.41	0.001 - 0.26	1.29 - 2.47	2.22 - 3.68	0.10 - 0.61	1.89 - 3.27	0.46 - 1.26	0.39 - 1.15	8.65 - 11.22
	Female	37 (1.72)	5 (0.23)	2 (0.09)	59 (2.74)	23 (1.07)	8 (0.37)	109 (5.07)	27 (1.25)	22 (1.02)	292 (13.60)
	CI (%)	1.22 - 2.37	0.07 - 0.54	0.01 - 0.33	2.09 - 3.53	0.68 - 1.60	0.16 - 0.73	4.19 -6.09	0.83 - 1.82	0.64 - 1.55	12.18 - 15.13
SES	Middle	20 (0.93)	3 (0.13)	1 (0.04)	40 (1.86)	30 (1.39)	8 (0.37)	70 (3.26)	19 (0.88)	21 (0.97)	212 (9.87)
	CI (%)	0.57 - 1.43	0.03 - 0.41	0.001 - 0.25	1.33 - 2.53	0.94 - 1.99	0.16 - 0.73	2.55 - 4.10	0.53 - 1.38	0.61 -1.49	8.65 - 11.22
	Lower	32 (1.49)	5 (0.23)	2 (0.09)	58 (2.70)	55 (2.56)	6 (0.27)	93 (4.33)	25 (1.16)	16 (0.74)	292 (13.60)
	CI (%)	1.02 - 2.09	0.07 - 0.54	0.01 - 0.33	2.06 -3.48	1.93 - 3.32	0.10 - 0.61	3.51 - 5.28	0.75 - 1.71	0.43 -1.21	12.18-15.13

*As per Petersen's criteria[41]

was small and study subjects were aged 55 yr and above in comparison to present study.

Mood (affective) disorders were found to be the commonest diagnosis. Depression was found to be the most prevalent disorder amongst them in the study. Similar findings have been reported by others[9,29,30]. Mild cognitive impairment was the second highest problem followed by mental and behavioural disorders due to substance abuse and dementia. For substance use disorders one epidemiological study in India on elderly[8] reported slightly higher prevalence (4.5%) than this study. Shaji *et al*[16] reported dementia in 3.4 per cent of elderly population (60 yr and above) in rural population of south India[15]. In other Indian studies prevalence of dementia has been reported 0.1 per cent in West Bengal[27]; 4.9 per cent in Kerala[33] and 0.8 per cent in Vellore[28]. The variability in the prevalence of dementia in India may be due to sample size, age of the subjects, instruments used for assessment and diagnostic criteria.

Prevalence of psychosis (0.6%) in the present study was almost equal to that reported by Tiwari[8] (0.5%). In the study 1.7 per cent rural older adults had sleep disorder and 0.2 per cent were found to have mild mental retardation. Almost similar prevalence of mental retardation (0.3%) amongst rural older adults was reported earlier[9].

Age-wise prevalence of dementia in the study was found to be consistent was supported by the fact that dementia or cognitive disorders increase with advancing age[32]. In our study, more females suffered from psychiatric illness in comparison to males as supported by other studies[25,27,30]. More rural older adults belonging to lower socio-economic status had psychiatric illnesses than middle SES; this was similar to as reported by Tiwari[8] and Poongothai *et al*[30].

In conclusion, overall prevalence of psychiatric morbidity amongst rural elderly in this study was found to be less in comparison to those reported in previous studies from India. However, prevalence pattern of different disorders was almost similar. The study revealed that depression was the most common psychiatric morbidity, followed by mild cognitive impairment, substance abuse and dementia amongst the rural older adults.

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