

## Prevalence and Correlates of Common Mental Disorders among the Rural Elderly in Puducherry, South India: A Cross-sectional Community-based Study

### Abstract

**Background:** Demographic transition has led to rethinking of strategies that are in place to address health issues of the elderly. A study was done to estimate the prevalence and correlates of common mental disorders (CMDs) among the rural elderly in Puducherry. This would help prioritize and plan opportunistic screening for CMDs among the elderly at the primary care level. **Materials and Methods:** A cross-sectional community-based study was conducted among all the elderly,  $n = 243$  (60 years and above), from one of the four villages catered by a rural health center in Puducherry. Data were collected at home from subjects using a questionnaire on (1) sociodemographic details and (2) CMDs using the general health questionnaire-12 (GHQ-12). Multivariable logistic regression was used to identify independent correlates of CMDs. **Results:** A total of 243 subjects were studied. Women constituted 63% of the study subjects. The univariable analysis showed that the odds of having CMDs was higher among women (odds ratio [OR] = 1.76 [1.03–2.97]), widowed elderly (OR = 2.44 [1.46–4.11]), and among those with a per capita per month income less than USD 19.6 (USD 19.6 to USD 9.9: OR: 4.02 [1.22–13.22]; less than USD 9.9: OR: 3.67 [1.008–13.34]). Elderly with an education of upper primary level (OR: 0.37 [0.33–0.15]) and above (OR: 0.22 [0.22–0.06]) had lower odds of having CMDs compared to those with no formal education. On multiple logistic regression analysis, after adjusting for other confounders, widowed elderly were found to have 2.1 times the odds of having MDs as opposed to elderly with living spouse (OR: 2.107 [CI: 1.09–4.06]). **Conclusions:** Fifty-one percent of the elderly in our sample suffered from CMD. Widowhood emerged as the single independent predictor of CMDs in this study population.

**Keywords:** *Aging, common mental disorders, general health questionnaire-12, older persons*

### Introduction

Globally, the population is aging rapidly. Projections show that elderly population will double by 2050.<sup>[1]</sup>

Demographic transition is happening in India as well and the number of older persons is expected to be three times the present value by 2050.<sup>[2]</sup> Mental disorders contribute to 6.6% of disability in older individuals and one-fifth of all elderly suffer from mental health problems.<sup>[3]</sup> Common mental disorders (CMD) “are a group of distress states manifesting with anxiety, depressive, and unexplained somatic symptoms and are the contemporary equivalent to the older concept of neurotic disorders.”<sup>[4]</sup>

Very few studies have been done to investigate CMD among the elderly in India, which show the prevalence range

from 30.6% to 41.3%.<sup>[5,6]</sup> Mental health is affected by not only biological factors but also others including social factors. However, these factors vary from region to region. Most of the studies show that sociodemographic factors such as gender, education status, socioeconomic status, occupation, and marital status were found as correlates of CMD.<sup>[4-6]</sup>

Most of the elderly in India live in rural areas. With rapid urbanization, there is a shift from joint families to nuclear families and elderly are often left to take care of themselves. Hence, the elderly in rural areas are likely to have a higher prevalence of mental health problems. Most of the elderly decline from seeking professional help for mental health problems due to social stigma. Health-care professionals are also not adequately trained to pick up mental health issues.<sup>[3]</sup> One of the strategies

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to deal with mental health problems is to train primary health-care professionals to identify the conditions early and start treatment or refer to a higher health center for management. Since the sociodemographic characteristics of the elderly are usually available in the registers maintained by the primary health centers in India, it would be a good idea to target screening programs for CMD at elderly with specific sociodemographic characteristics that are associated with CMD. With this background, the study was done among the elderly population in a rural region of Puducherry, South India:

- To estimate the prevalence of CMDs and
- To find the correlates of CMDs.

## Materials and Methods

### Study design and setting

A community-based cross-sectional study was done in Thondamanatham, the largest of the four villages under the care of the Jipmer Rural Health Centre (JIRHC) of the Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER). The health center is manned by a chief medical officer and his/her health team. One public health nurse along with one staff nurse/auxiliary nurse midwife is in charge of each village. In addition to providing comprehensive care to the people in their respective villages, they also enumerate all the villagers annually, and the details are entered in an enumeration register. The total population covered under these villages was 9101 as on 2012. The total number of elderly was 693 (7.6%).

### Participants

The study included individuals who were aged 60 years and above. Elderly who had difficulty in hearing or were unable to respond due to conditions such as stroke were excluded from analysis.

### Sample size and sampling

The prevalence of CMDs among the elderly from a previous study done in rural parts of Maharashtra was found to be 41.3%.<sup>[6]</sup> Using this prevalence and an absolute precision of 5%, the sample size was calculated using Open Epi version 3.01<sup>[7]</sup> as 243. Since the elderly population in the four villages was homogenous and the total number of elderly in Thondamanatham village was 288, all the elderly in Thondamanatham were included in the study.

### Brief procedure

Even though the list of elderly and their addresses was available in the enumeration register, each house in every street of Thondamanatham was visited and the presence of elderly in the house was inquired into and confirmed through the voter ID card. In this way, all the elderly were covered in the study. The houses which were either locked or where the elderly individual was not present at the

time of the visit were noted down in a register and were revisited at least three times. If at the end of three visits the elderly individual was not found, then that person was excluded from the study.

### Ethical considerations

The study was part of a postgraduate thesis and JIPMER Institute Ethics Committee had approved the project in the year 2011 (Project No: SEC/2011/4/43).

After the elderly individual was identified, informed consent was obtained and adequate time was spent to build rapport with the study subjects. The details were collected by a one to one interview conducted by the first author, in a place which offered privacy and efforts were taken to ensure that no family members were present at the time of the interview.

### Tools used

We had used a questionnaire that was structured and pretested to collect sociodemographic details. CMDs were screened for using General Health Questionnaire 12 (GHQ 12) which is validated in the local language. The sensitivity and specificity were found to be 87.4% and 79.2%, respectively. Cronbach's alpha was found to be 0.86.<sup>[8]</sup> Each of the 12 items in the GHQ 12 was scored on a Likert scoring style (0-1-2-3). The total scores range from 0 to 36. The threshold for screening positive for CMDs was taken as a total score of 12 and above. The investigator was trained in administering the questionnaire.

### Variables

#### Outcome variable

The outcome variable is the presence or absence of CMDs as determined from GHQ-12.

#### Exposure variables and operational definitions

1. Age: The elderly individuals were grouped into young-old, old-old, and oldest-old as follows:
  - Young-old: 60–69 years
  - Old-old: 70–79 years
  - Oldest-old: 80 years and above.
2. Gender
3. Education status was categorized as:
  - i. No formal education: 0 years of schooling
  - ii. Primary: Classes 1–5
  - iii. Upper primary: Classes 6–8
  - iv. Secondary and above: Classes 9 and 10 and higher education.
4. Occupation status was categorized as working and not working
5. Socioeconomic status was assessed using Modified Prasad's Classification (2011)<sup>[9]</sup>
  - Class I: Per capita per month income of international normalized ratio (INR) 4400 and above (equivalent to USD 65.8)

- Class II: Per capita per month income between INR 2200 to INR 4399 (USD 32.9-65.7)
- Class III: Per capita per month income between INR 1320 to INR 2199 (USD 19.7 to USD 32.8)
- Class IV: Per capita per month income between INR 660 to INR 1319 (USD 9.9 to USD 19.6)
- Class V: Per capita per month income less than INR 660 (less than USD 9.9).

6. Marital status categorized as married and widowed.

#### *Interaction variables*

There could be a potential interaction between gender and marital status.

#### **Data analysis**

Data were collected and entered in Microsoft Excel 2010 and were analyzed using IBM SPSS version. 21<sup>[10]</sup> and Open Epi software.<sup>[7]</sup> The prevalence is reported as a percentage, and continuous variables are reported as mean  $\pm$  standard deviation, univariable analysis to test the association between CMD and other categorical variables was done using simple logistic regression. All the factors which were significantly associated with CMD ( $P < 0.05$ ) in univariable analysis were included in the model for multiple logistic regression to find the independent predictors of CMD. Potential interactions were also tested using logistic regression.

The sociodemographic characteristics of the study population were also compared with the data from a nationwide representative sample using Chi-square test. All statistical tests were considered statistically significant at a  $P < 0.05$ .

#### **Results**

Out of the total 288 elderly individuals in Thondamanatham village, 243 (84.4%) were included in the study. Of the remaining, 25 (8.7%) could not be contacted despite three house visits, 19 (6.6%) complained of hearing difficulties, and 1 (0.3%) was mentally challenged. Among the elderly who were deaf, 6 (31.6%) were young-old, 4 (21%) were old-old, and the remaining 9 (47.4%) were from the oldest-old age group. Nearly two-third (73.6%) of the deaf elderly were women. Almost all of the elderly who were deaf (89.5%) had no formal education, and none of them were working.

Women constituted 63% of the study population. Most of the study population had no formal education and were from socioeconomic class IV. The demographic characteristics of the elderly are given in Table 1.

#### **Prevalence of common mental disorder**

The prevalence of CMDs among the elderly was 51.03% (95% confidence interval (CI): 47.78%–57.25%).

#### **Correlates of common mental disorder**

##### *Univariable analysis by simple logistic regression*

The odds of occurrence of CMD in elderly of different age group was not found to be statistically significant. The odds of women having CMD was 1.76 times that of men, and this was statistically significant ( $P = 0.037$ ). As compared to elderly with no formal education, those with upper primary (odds ratio [OR] = 0.37) and secondary level education and above (OR = 0.22) had lower odds for CMD ( $P < 0.05$ ). As compared to those from Class 1 socioeconomic status, those from Class 4 (OR: 4.02) and Class 5 (OR: 3.6) socioeconomic status had higher odds for CMD ( $P < 0.05$ ). As compared to married elderly, widowed elderly (OR = 2.44) had higher odds for CMD ( $P = 0.001$ ) [Table 2].

##### *Multivariable analysis by multiple logistic regression*

Univariable analysis showed that gender, education status, socioeconomic status, and marital status were significantly associated with CMD. All these factors were included in the multiple logistic regression model (model 1) as covariates.

The model was statistically significant  $\chi^2 (9) = 22.99$ ,  $P = 0.006$ . The model explained 12.0% (Nagelkerke  $R^2$ ) of the variance in CMDs and correctly classified 63.4% of cases. It was found that after adjusting for other covariates, widowed elderly had significantly greater odds for CMD (OR: 2.107 [CI: 1.09–4.06]) [Table 3].

To check if the results were affected by an interaction between gender and marital status, we included an interaction factor to the above model (model 2). However, the interaction between gender and marital status was not found to be significant, and the model  $R^2$  did not improve. Hence, model 2 was rejected.

The sociodemographic characteristics of the study population were compared with the data from a nationwide representative sample (Report of the Status of elderly in India),<sup>[11]</sup> and it was found that the sample included in the present study differed only based on marital status [Table 4]. The nationwide representative data showed that only 36% of the elderly were widowed as compared to 48.1% in the study.

#### **Discussion**

Two hundred and forty-three elderly individuals from Thondamanatham village were included in the study to assess the prevalence and correlates of CMD.

The prevalence of CMD was found to be 51.03% (95% CI: 47.78%–57.25%). The univariable analysis showed that women and widowed elderly had higher odds of having CMD compared to men and married elderly, respectively. It also showed that elderly with education status of the upper primary level and above had lower odds of having

**Table 1: Sociodemographic characteristics of study population**

Sociodemographic characteristics	60-69 years, n (%)	70-79 years, n (%)	≥80 years, n (%)	Total, n (%)
<b>Gender</b>				
Men	57 (41)	23 (30.3)	10 (35.7)	90 (37)
Women	82 (59)	53 (69.7)	18 (64.3)	153 (63)
<b>Education status</b>				
No formal education	79 (56.8)	54 (71.0)	15 (53.6)	148 (60.9)
Primary (Class I-V)	24 (17.3)	12 (15.8)	10 (35.7)	46 (18.9)
Upper primary (Class VI-VIII)	24 (17.3)	5 (6.6)	3 (10.7)	32 (13.2)
Secondary and above (≥ Class IX)	12 (8.6)	5 (6.6)	0	17 (7)
<b>Occupational status</b>				
Not working	96 (69.1)	61 (80.3)	24 (85.7)	181 (74.5)
Working	43 (30.9)	15 (19.7)	4 (4.3)	62 (25.5)
<b>Socioeconomic status</b>				
Class I	11 (7.9)	4 (5.3)	1 (3.6)	16 (6.6)
Class II	15 (10.8)	5 (6.6)	0	20 (8.2)
Class III	33 (23.7)	13 (17.1)	4 (14.3)	50 (20.6)
Class IV	63 (45.3)	38 (50)	16 (57.1)	117 (48.1)
Class V	17 (12.2)	16 (21)	7 (25)	40 (16.5)
<b>Marital status</b>				
Married	87 (62.2)	30 (39.5)	9 (32.1)	126 (51.9)
Widow/widower	52 (37.4)	46 (60.5)	19 (67.9)	117 (48.1)
<b>Total</b>	<b>139 (57.2)</b>	<b>76 (31.3)</b>	<b>28 (11.5)</b>	<b>243 (100)</b>

**Table 2: Univariable analysis for correlates of common mental disorder among rural elderly by simple logistic regression**

Sociodemographic factors	CMD present	OR (95% CI)	P
<b>Age categories</b>			
60-69 (n=139)	66 (47.5)	Reference	-
70-79 (n=76)	40 (52.6)	1.22 (0.70-2.15)	0.471
≥80 (n=28)	18 (64.3)	1.99 (0.86-4.61)	0.109
<b>Gender</b>			
Men (n=90)	38 (42.2)	Reference	-
Women (n=153)	86 (56.2)	1.76 (1.03-2.97)	0.036*
<b>Education</b>			
No formal education (n=148)	86 (58.1)	Reference	-
Primary (n=46)	24 (52.2)	0.79 (0.41-1.52)	0.479
Upper primary (n=32)	10 (31.2)	0.37 (0.33-0.15)	0.007*
Secondary and above (n=17)	4 (23.5)	0.22 (0.22-0.06)	0.011*
<b>Occupation status</b>			
Not working (n=181)	98 (54.1)	Reference	-
Working (n=62)	26 (41.9)	0.61 (0.34-1.1)	0.098
<b>Socioeconomic status*</b>			
Class I (n=16)	4 (25)	Reference	-
Class II (n=20)	7 (35)	1.615 (0.38-6.94)	0.519
Class III (n=50)	24 (48)	2.769 (0.79-9.76)	0.113
Class IV (n=117)	67 (57.3)	4.020 (1.22-13.22)	0.022*
Class V (n=40)	22 (55)	3.667 (1.008-13.34)	0.049*
<b>Marital status</b>			
Married (n=126)	51 (40.5)	Reference	-
Widow/widower (n=117)	73 (62.4)	2.440 (1.46-4.11)	0.001*

\*Significant. CMD=Common mental disorder, CI=Confidence interval, OR=Odds ratio

**Table 3: Multivariable analysis for independent predictors of common mental disorder among rural elderly by multiple logistic regression**

Determinants	OR (Exp β)	95.0% CI for Exp(β)		P
		Upper	Lower	
Marital status				
Married	Reference			
Widow/widower	2.11	1.09	4.06	0.026*
Gender				
Male	Reference			
Female	0.838	0.407	1.729	0.633
Education status				
No formal education	Reference			
Primary	0.871	0.427	1.776	0.705
Upper primary	0.423	0.178	1.004	0.051
Secondary and above	0.410	0.104	1.621	0.204
Socioeconomic status				
Class I	Reference			
Class II	1.208	0.247	5.907	0.815
Class III	1.677	0.430	6.547	0.457
Class IV	2.356	0.624	8.900	0.206
Class V	1.846	0.437	7.806	0.405

\*Significant. OR=Odds ratio, CI=Confidence interval

CMD as opposed to elderly with no formal education. Further, the elderly from Class I socioeconomic status was found to have lower odds for having CMD as compared to elderly from Class IV and Class V socioeconomic status. Multivariable analysis showed that after adjusting for gender, education status, and socioeconomic status widowed elderly were found to have higher odds of having CMD as opposed to married elderly.

Studies were done by Kamble *et al.* (2012) and Seby *et al.* among elderly in rural Maharashtra and Pune, show that the prevalence of CMD varies between 31% and 43%.<sup>[5,6]</sup> Studies done in other countries have found a lower prevalence of CMD (18%–38.3%) as compared to this study.<sup>[6,12]</sup> These differences are due to the varied socioeconomic milieu in the study regions.

In the present study, it was found that the odds of having CMD was higher among women, widowed elderly, those without any formal education and those from class 4 and 5 socioeconomic statuses. Similar results were found in studies done in rural Maharashtra and Pune.<sup>[5,6]</sup>

Loss of spouse leads to emotional and social isolation, and this may lead to CMD. The educated elderly may have better awareness about health facilities. Elderly with better

**Table 4: Comparison of the study population with a nationally representative data on elderly in India**

Sociodemographic characteristics	Study subjects (%)	Nation - wide representative data on elderly in India# (%)	P
Age categories			
60-69	57.2	60.3	0.4952
70-79	31.3	27.8	
80-89	11.5	11.9	
Gender			
Men	37	47.7	0.001†
Women	63	52.3	
Education status			
No formal education	61.7	57.8	0.1004
<5 years	14.8	12.9	
5-7 years	11.5	11.2	
8 years and above	11.9	17.8	
Occupational status			
Not working	74.5	73.8	0.8130
Working	25.5	26.2	
Socioeconomic status			
Class 1 (≥4400)	6.6	Not available*	
Class 2 (2200-4399)	8.2	Not available*	
Class 3 (1320-2199)	20.6	Not available*	
Class 4 (660-1319)	48.1	Not available*	
Class 5 (<660)	16.5	Not available*	
Marital status			
Married	51.9	61.6	0.002†
Widow/widower	48.1	36	
Others	0	2.4	

The P value is based on Chi-square test. #Data were obtained from “the Status of Elderly in Select States of India” report,<sup>[11]</sup> \*The status of elderly in India survey gives information on the individual income of the elderly and not the per capita income using total family income which was used in the present study, †Significant

education and those from Class 1 socioeconomic status tend to enjoy the respect of their family and community and hence may not be vulnerable to suffer from CMD.

Some of the strengths of the study include the use of a standard validated questionnaire to screen for CMD, adequate training of the investigator for administering the questionnaire, and that more than 85% of the elderly were included in the study.

The study population significantly differed from a nationally representative survey<sup>[11]</sup> conducted among elderly on the distribution of gender and marital status. The study population had a significantly higher proportion of women and widows/widowers [Table 4]. This could limit the generalizability of the study results. The higher proportion of women and widowers in this study could be because of the differential mortality rates among men and women in the middle age groups in Thondamanatham. In an unpublished study done in the service areas of JIRHC, it was found that the age-specific mortality rate in the 46–50, 51–55, and 56–60 years' age categories were 1090, 1764, and 2649 deaths/100,000 population for men and only 362, 0, and 574 deaths/100,000 population for women, respectively.

## Conclusions

The prevalence of CMD among the rural elderly in the study was 51%. Loss of spouse emerged as an independent predictor for CMD. The evidence from the study should be interpreted keeping in view the cross-sectional nature of the study design. Analytical study designs such as case control/cohort study need to be done in future to study the correlates of CMD. However, as a first step in integrating mental health of elderly in the primary health-care services, widows/widowers who attend the outpatient departments could be targeted for opportunistic screening of CMD.

## Agreement

We agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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## Conflicts of interest

There are no conflicts of interest.

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