



Original Article

Prevalence and Correlates of Geriatric Depression in a Rural Community in Kerala, India

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Abstract

Background: Elderly constitutes a vulnerable group for depression, as they are especially prone to suffer adverse consequences of a depressive episode and have greater rates of completed suicides. This study aims to estimate the prevalence and determinants of geriatric depression.

Methods: A cross-sectional study was done among 250 elderlies from 1st January 2019 to 1st January 2020 in the different rural blocks of Ernakulam district, India. The multistage sampling technique and the Geriatric Depression Scale (GDS-30) were used to collect the data. A score of 0-9 is considered "normal", 10-19 is labeled as "mildly depressed", and 20-30 as "severely depressed". Statistical analysis was performed using the IBM SPSS software. The Chi-square test/Fisher's exact test was used to study the association between the socio-demographic and behavioral variables with depression.

Results: The mean age was 69.33 ± 7.41 years and male: female ratio was 0.55: 1. The overall prevalence of depression was 52.4%. Advanced age over 70 years [OR=2.04; 95% CI, 1.227 – 3.394; $P=0.006$], female gender [OR=2.844; 95% CI, 1.663-4.865; $P < 0.001$], lack of gainful employment [OR=3.504; 95% CI, 1.833–6.699; $P < 0.001$], physical dependence [OR=0.365; 95% CI, 0.162–0.821; $P=0.012$], financial dependence [OR=0.388; 95% CI, 0.219–0.687; $P < 0.001$], presence of medical co morbidities [OR=0.428; 95% CI, 0.212–0.866; $P=0.016$], poor lifestyle including the lack of regular exercise [OR =2.020; 95% CI, 1.174–3.473; $P=0.010$], addiction to alcohol [OR=4.932; 95% CI, 1.600-15.208; $P=0.004$] and addiction to tobacco smoking [OR=2.905; 95% CI, 1.273-6.628; $P=0.009$] and poor family support [OR= 5.180; 95% CI, 1.716–15.636; $P=0.002$] were found to be significantly associated with depression.

Conclusion: The prevalence of depression among the elderlies was high, and hence early diagnosis and prompt treatment are essential to reduce its burden in the community.

Keywords: Depression, Prevalence, Elderly, Geriatric, Rural, Kerala, India

Background

Depression is a leading cause of morbidity and reduced quality of life worldwide. Although depression can occur at any stage of life, the elderlies are especially prone to suffer adverse consequences. Older adults who are depressed are more likely to harbor suicidal thoughts and have greater rates of completed suicides than younger individuals. The elderly people are also rapidly becoming a predominant demographic in many countries and are projected to double their numbers as a proportion of the population by 2050 [1]. Hence, the issue of geriatric depression assumes immense significance in current

times. India faces specific challenges in addressing the growing problem of depression in its population. Sixty-five percent of Indians reside in rural areas, where there is limited knowledge about mental health, the significant stigma surrounding mental illness, and a dearth of access to mental health services. Overall, the problems of rural communities pertaining to identifying and managing depression have mainly been overlooked [2]. There is a need to learn more about the scope of depression in rural areas, especially in vulnerable groups like the elderly. A systematic review of fifty-six studies done on depression among the elderly Indians showed a prevalence of 34.4% and mainly among the females and rural residents. Such findings were attributed to several causes such as physical problems of aging leading to a limitation in daily activities, financial insecurities after retirement, loss of social recognition, death of spouse,

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urbanization, migration, and the concept of nuclear families [3]. The state of Kerala in south India has specific characteristics that set it apart in the realm of geriatric depression. Despite having some of the best healthcare indices in the nation, depression continues to be a challenging problem to contend with within the state. A recent survey conducted by the Kerala State Mental Health Authority and National Health Mission reported that around nine percent of Keralites suffered from clinical depression [4]. Moreover, Kerala has the maximum proportion of older people (12.6%) among all the states [5]. Notwithstanding the emotional toll on the suffering individual, geriatric depression can have wider ramifications on the immediate family and society. Hence, the study aimed to determine the prevalence and predictors of depression among the elderly in a rural population in Kerala.

Methods

Study Design and Sample

A community-based study using a cross-sectional study design was done in three rural blocks of Ernakulam district in Kerala, India (study setting). The study period was from 1st January 2019 to 1st January 2020 (one year). Study participants were elderly residents of the rural community.

Inclusion and exclusion criteria

Both genders aged 60 years and above who gave informed consent to participate in the study were included. While persons with a known history of cognitive impairment, sensory impairment, and those who were non-cooperative to questioning. Residents who could not be contacted even after two successive revisits were also excluded from the study.

Sample size

The sample size was calculated using the formula $n = 4pq/d^2$ (where $p = 59.6\%$, based on a previous study on the prevalence of elderly depression by Rose et al. [6], $q = 1 - p$, and the allowable error $d = 20\%$). The obtained sample size was 228, with a 95% confidence interval. By adding a non-response rate of 10%, the final sample size was taken to be 250.

Data collection and sampling method

Approval was taken from the Institutional Ethics Committee before beginning the study. Three out of 15 rural blocks were randomly selected. From these selected blocks, three panchayats were randomly chosen. From these selected panchayats, three wards were randomly selected. The principal investigator and her team of health workers visited each household to administer the questionnaire. Prior to collecting the requisite data, the study participants and the family members were elaborated on the purpose of the visit and written informed consent was collected. Finally, systematic random sampling was used to select the participants from the identified wards until the desired number of elderly individuals was obtained.

Study tool

A semi-structured questionnaire was employed to collect the relevant data. The first part of the questionnaire is related to the socio-demographic data and further information about the individual. Details were sought about the subject's physical

dependency, participation in household activities, number of meals taken, adequacy of sleep, time spent in daily exercise, history of any significant illness, concurrent medications, adverse events in the past one year, presence of domestic abuse, substance abuse, and the level of family support. The socioeconomic status was assessed using modified BG Prasad's classification, 2019 [7]. The next part of the questionnaire comprised of the Geriatric Depression Scale (GDS-30). The GDS 30 is a self-rated questionnaire that assesses the person's mood in the preceding week. It is a 30-item questionnaire comprising 'yes' or 'no' questions, with each item given a score of one point, bringing the total score to 30. On completion, all the affirmative items are added up to obtain the final tally. A score of 0-9 is considered "normal", 10-19 is labeled as "mildly depressed", and 20-30 as "severely depressed". The GDS 30 is used both as a screening tool and a measure of clinical change by comparing scores across a fixed period. The GDS has been used extensively in both clinical and research settings for over three decades. Since a version of the GDS-30 was not available in the local vernacular, the original English version of the scale was translated by the principal investigator into Malayalam, which was subsequently validated [8].

Definition of variables

Type of family was categorized according to "Nuclear Family" when the family consists of parents and siblings only and "Joint Family" when the family consists of several married couples and their children and men are all related by blood. The women are either their wives, unmarried girls, or widows of their family relatives. "Three Generation Family" refers to when the family consists of parents, grandparents, and siblings only. The socioeconomic status was classified into five categories based on the family's per capita monthly income and according to modified BG Prasad's classification, 2019. "Upper-class category" refers to income equal to or more than INR 7008. When the income was between INR 3504 and INR 7007, it is the "upper-middle-class category". When the income was between INR 2102 and INR 3503 is the "middle-class category". When the income was between INR 1051 and INR 2101, it is a "lower-middle-class category". "Lower-class category" refers to income below INR 1050. Polypharmacy in the elderly means use of 5 or more medicines in the elderly. Education status includes "Illiterate" and "Literate" (those who can read and write with understanding in any language). Type of occupation includes "professional" (jobs that require decision making, formulating and execution of policies, jobs that require creative works, jobs that require high organizational ability), skilled (jobs that require extended training in complicated work), unskilled (jobs that requires no education or training). Financial dependency refers to relying on someone financially for money, food, medicines/medical treatment, or clothes, whereas physical dependency refers to relying on someone for activities of daily living. Addictions to substances like alcohol and tobacco smoking are defined as a state of periodic or chronic intoxication detrimental to the individual and society produced by its repeated intake

Statistical analysis

Statistical analysis was performed using the IBM SPSS software version 20.0. Descriptive statistics were reported as

mean and standard deviation for continuous variables and as frequency and percentage for categorical variables. The Chi-square test / Fisher's exact test was used to study the association between the socio-demographic and behavioral variables with depression. The significant predictors at p -value < 0.05 in univariate analysis were deemed to be associated risk factors.

Results

Social and demographic characteristics

Two hundred and fifty elderly individuals were included in the study sample with a mean age of 69.33 (\pm 7.41) years. More than half (55.6%) of the sample lies in the age group 60 to 69 years, 34.0% of them aged between 70 and 79 years, and the remaining 10% of the subject was over 80 years of age. Most participants were female (64.4%), married (57.6%), housewives (43.2%), primary school education (40.8%), Hindu (51.2%), and living in three-generation family (43.2%). More than seventy percent of respondents were financially dependent and belonging to the broad middle class; however, 86.8% were physically independent (Table 1).

Table 1 Baseline characteristics of respondents (n=250)

Characteristics	Categories	N(%)
Age in years	60-70	139 (55.6)
	70-80	85 (34.0)
	>80	26(10.4)
Gender	Male	89(35.6)
	Female	161(64.4)
Religion	Hindu	128(51.2)
	Muslim	35(14)
	Christian	87(34.8)
	Others	0(0.0)
Type of family	Nuclear	73(29.2)
	Joint	57(22.8)
	3 Generation	108(43.2)
	Staying alone	12(4.8)
Marital status	Married	144(57.6)
	Unmarried	8(3.2)
	Widow	88(35.2)
	Widower	10(4)
Education	Illiterate	34(13.6)
	Primary school	102(40.8)
	Middle school	68(27.2)
	High school	35(14)
	Higher secondary	8(3.2)
	Diploma	1(0.4)
Occupation after 60 years	Graduate	1(0.4)
	Postgraduate	1(0.4)
	Professional	2(0.8)
	Skilled	6(2.4)
	Unskilled	47(18.8)
	Unemployed	87(34.8)
Socioeconomic status*	Housewife	108(43.2)
	Upper class	27(10.8)
	Upper middle class	71(28.4)
	Middle class	60(24)
	Lower middle class	57(22.8)
Financial Dependency	Lower class	35(14)
	Yes	180(72)
	No	70(28)
Physical Dependency	Yes	33(13.2)
	No	217(86.8)

(*as per modified BG Prasad classification, 2019)[7]

The overall prevalence of depression in an elderly population was found to be 52.4%. Mild depression was seen in 37.2% and severe depression in 15.2% of the sample (Table 2).

Table 2 Prevalence of depression in the respondents (n=250)

GDS -30 scores	N (%)
Normal (0-9)	119(47.6)
Mild (10-19)	93(37.2)
Severe (20-30)	38(15.2)

Our study also attempted to delineate the determinants of geriatric depression. Older age [OR=2.04; 95% CI, 1.227–3.394; P =0.006] and female gender [OR=2.844 ; 95% CI, 1.663-4.865; P =<0.001] were significantly associated with depression in the elderly, as was the lack of gainful employment [OR=3.504; 95% CI, 1.833–6.699; P =<0.001]. Poor lifestyle choices, such as the lack of regular exercise [OR =2.020; 95% CI, 1.174–3.473; P =0.010] and subsequent medical co morbidities [OR=0.428; 95% CI, 0.212–0.866; P =0.016] promoted affective illness in this age group.

A lack of independence, both financial [OR= 0.388; 95% CI, 0.219 - 0.687; P =<0.001] and physical [OR= 0.365; 95% CI, 0.162–0.821; P =0.012], was also found to be a contributory factor. Addictions to substances like alcohol [OR=4.932; 95% CI, 1.600-15.208; P =0.004] and tobacco smoking [OR=2.905; 95% CI, 1.273-6.628; P =0.009] were also found to be significantly associated with depression scores. Finally, the absence of family support [OR= 5.180; 95% CI, 716–15.636; P = 0.002] in circumnavigating the difficulties associated with advancing age was noted to be linked to higher depression scores. (Table 3 & Table 4).

Discussion

The prevalence of depression in an elderly rural population obtained in our study (52.4%) is similar to the findings obtained by Rose et al.[6] in north Kerala (58.4%) and Bineetha et al. [9] in central Kerala (53.2%). Sandhya et al.[10] and Nakulan et al.[11] found the prevalence of depression in rural communities of south and north Kerala to be in the range of 24.7% to 39.4% [10,11]. Another study done in north Kerala in a rural community reported a 72.4% prevalence of geriatric depression, which was higher than the value obtained in our study [12]. Studies done in different states in India and Pakistan have documented prevalence varying from 9.5% to 62.16% [13-24].

A systematic review and meta-analysis of 51 Indian studies had undertaken by Pilana et al. noted the prevalence of depression among the elderly in India to be 34.4% [3]. These differences in the prevalence of depression could be due to differences in the socio-demographic, cultural, and economic factors, which vary among different belts in the state and different states in the country. In our study, being female was a statistically significant factor predisposing to the onset of a depressive episode. A similar finding has been noted in previous studies carried out in Kerala [7,9-11], other Indian states [25,15], and other countries [26-30]. Such findings could be attributed to the genetic predisposition, varying coping styles, and the existing perceptions about a woman's role in a family and society.

Table 3 Association of baseline characteristics with depression (n=250)

Baseline characteristics	Categories	Total N (%)	Depression Present N (%)	Depression Absent N (%)	Unadjusted Odds ratio	(95% C.I)	p-value
Age in years	60-69	139(55.6)	62 (44.6)	77 (55.4)	2.040	(1.227 – 3.394)	0.006*
	>70	111(44.4)	69 (62.2)	42 (37.8)			
Gender	Male	89(35.6)	32 (36 .0)	57 (64.0)	2.844	(1.663 - 4.865)	<0.001*
	Female	161(64.4)	99 (61.5)	62 (38.5)			
Type of family	Nuclear+ Staying alone	85(34)	50 (58.8)	35 (41.2)	0.675	(0.398 – 1.146)	0.144
	Joint & 3 Generation	165(66)	81 (49.1)	84 (50.9)			
Marital status	Married& Widow/Widower	242(96.8)	127 (52.5)	115 (47.5)	0.906	(0.221 – 3.704)	1†
	Unmarried	8(3.2)	4 (50.0)	4 (50.0)			
Education	Illiterate	34(13.6)	19 (55.9)	15 (44.1)	0.850	(0.411 – 1.76)	0.662
	Literate (those who can read and write with understanding)	216(86.4)	112 (51.9)	104 (48.1)			
Occupation	Professional, Skilled & Unskilled	55(22)	16 (29.1)	39 (70.9)	3.504	(1.833 – 6.699)	<0.001*
	Unemployed & Housewife	195(78)	115 (59.0)	80 (41.0)			
Socio-Economic status	Upper class, Upper middle class &Middle class	158(63.2)	78 (49.4)	80 (50.6)	1.394	(0.83 – 2.34)	0.208
	Lower middle class & Lower class	92(36.8)	53 (57.6)	39 (42.4)			
Financial Dependency	Yes	180(72)	106 (58.9)	74 (41.1)	0.388	(0.219 - 0.687)	<0.001*
	No	70(28)	25 (35.7)	45 (64.3)			

A balanced diet, regular exercise, and staying intellectually stimulated can stave off the onset of depression with advancing age which has been amply established in research conducted over the years, and these findings were replicated in our study [24,25]. Specifically, regular and daily exercise was found to have a protective effect on the mood of elderly persons. Along the same lines, the lack of a healthy lifestyle often leads to medical disorders such as diabetes, hypertension, and coronary heart disease.

In our study, older individuals with these comorbidities were found to be more prone to depressive episodes, as has been robustly recorded in the available literature[6,9,12,13,21,25,28,31]. Elderly individuals who were staying alone, and those who were widowed, were noted to be more depressed, a finding which has been amply recorded in the existing literature. [6,15-18,30-33] Being physically dependant on a family member for mobilization and performing activities of daily living due to frailty contributed to depressive symptoms in the elderly, as noted in previous research[6,19,20]. The previous studies reported that older people who were financially dependent on their relatives were also found to have a higher prevalence of depression than those financially independent [12,15,18,19]. Hence, the lack of independence, whether physical or financial, contributed to affective disturbances in older individuals.

In our study, addictions to alcohol and tobacco smoking were associated with lower depressive scores. Similar findings have been cited in studies conducted by Chen Zhu et al. in China [34] and Kara Zivin et al. in the United States of America and England[35]. The findings could be attributed to the transient psychological benefits of stress reduction and mood enhancement resulting from substance usage.

Moreover, as the elderly have limited scope for entertainment and stress busters, the temporary euphoric effects of drinking and tobacco smoking may have helped in masking their depressive symptoms. However, this protective association of substance addiction to depression is still under debate and should be interpreted with caution until further studies are conducted supporting its evidence. Finally, the role of family and social support systems in maintaining mental well-being is well-known [9,10,33,36,37]. Similarly, in our study, we noted that the lack of emotional support from family members in tackling the difficulties associated with old age played a significant role in precipitating depression in the elderly.

Limitations of this study were the cross-sectional study design, small sample size, and involvement of only one district. Therefore, the results were not generalizable to the state of Kerala. There was also a problem of recall bias due to the old age of our study participants.

Table 4 Association of risk factors for depression (n=250)

Risk variables	Categories	Total N (%)	Depression Present N (%)	Depression Absent N (%)	Unadjusted Odds ratio	(95%, C.I)	p-value
Physical dependency (dependency for activities of daily living)	Yes	33(13.2)	24 (72.7)	9 (27.3)	0.365	(0.162 – 0.821)	0.012*
	No	217(86.8)	107 (49.3)	110 (50.7)			
Participation in household activities (cooking, cleaning and washing)	Yes	211(84.4)	108 (51.2)	103 (48.8)	1.371	(0.686 – 2.741)	0.371
	No	39(15.6)	23 (59.0)	16 (41.0)			
Major illness (Diabetes, Hypertension, Ischaemic heart disease, Arthritis)	Yes	210(84)	117 (55.7)	93 (44.3)	0.428	(0.212 – 0.866)	0.016*
	No	40(16)	14 (35.0)	26 (65.0)			
Polypharmacy (≥ 5 types of medicines)	Yes	192(76.8)	95 (49.5)	97 (50.5)	1.671	(0.916 – 3.048)	0.092
	No	58(23.2)	36 (62.1)	22 (37.9)			
Regular exercise (at least 30 minutes per day for 5 days a week)	Yes	79(31.6)	32 (40.5)	47 (59.5)	2.020	(1.174 – 3.473)	0.010*
	No	171(68.4)	99 (57.9)	72 (42.1)			
Adequate Sleep (at least 6 hrs sleep at night)	Yes	165(66)	80 (48.5)	85 (51.5)	1.594	(0.938 – 2.709)	0.084
	No	85(34)	51 (60.0)	34 (40.0)			
Abuse (physical and verbal abuse)	Yes	11(4.4)	8 (72.7)	3 (27.3)	0.398	(0.103 – 1.535)	0.222†
	No	239(95.6)	123 (51.5)	116 (48.5)			
Addictions							
Alcohol use	Yes	20(8)	4 (20.0)	16 (80.0)	4.932	(1.600 – 15.208)	0.004*†
	No	230(92)	127 (55.2)	103 (44.8)			
Tobacco smoking	Yes	30(12)	9 (30.0)	21 (70.0)	2.905	(1.273 – 6.628)	0.009*
	No	220(88)	122 (55.5)	98 (44.5)			
Number of meals per day	≤ 3	107(42.8)	61 (57.0)	46 (43.0)	0.723	(0.437 – 1.197)	0.207
	> 3	143(57.2)	70 (49.0)	73 (51.0)			
The adverse event in the past one year (Death of near and dear ones, divorce, financial crisis)	Yes	33(13.2)	22 (66.7)	11 (33.3)	0.505	(0.233 – 1.091)	0.078
	No	217(86.8)	109 (50.2)	108 (49.8)			
Family Support (having at least one caring and supporting family member)	Yes	226(90.4)	111 (49.1)	115 (50.9)	5.180	(1.716 – 15.636)	0.002*†
	No	24(9.6)	20 (83.3)	4 (16.7)			

*Statistically significant ($p < 0.05$), † Fisher's exact test

Conclusion

Our study determined a high prevalence of depression among the elderly in a rural community in Kerala. The prevalence of 52.4% reveals that geriatric depression is rampant in rural areas, and steps need to be taken imminently to address the problem. Our research also identified factors that contribute to affective illness in the elderly. These include an advanced age over 80 years, female gender, lack of gainful employment, physical and financial dependence, medical co-morbidities, poor lifestyle, lack of regular exercise and substance dependence, and poor family support. These findings can be taken as starting points to put in place measures to prevent depressive disorders in this vulnerable population.

Recommendations

- Family members need to pay special attention to developing depressive symptoms in older relatives, especially women. Awareness programs need to be planned for the community to enable them to identify depressive symptoms at an early stage and seek treatment.
- Younger members of families must be informed about the nature of depression and the protective role of a robust support system in preventing the onset of depressive symptoms.
- Efforts need to be made to address the stigma surrounding mental illness by disseminating accurate information in the

community. Local leaders and health workers may be roped in for these efforts.

- d. Mental health services need to be made available and accessible in rural areas. Community mental health teams need to be formed to deliver care at the homes of elderly persons with mobility issues who may not reach distant mental health clinics.
- e. Awareness about the need to plan for retirement, and to create a corpus to ensure financial stability and independence in old age, should be promoted among working individuals.
- f. Healthy lifestyle habits, such as a balanced diet, regular exercise, and refraining from alcohol and tobacco, must be encouraged in rural communities. Educational campaigns regarding the same should be organized at regular intervals.

Abbreviation

GDS-30 (Geriatric depression scale-30)

Declaration

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Availability of data and materials

Data will be available by emailing marykuncheria@gmail.com

Authors' contributions

Ann Mary Thomas (AMT) conceptualized the study, designed the survey, drafted the manuscript, and reviewed it. Babita Susan Kuruvilla (BSK) assisted in manuscript preparation, reviewed and edited it. Jacob Davies Kalliath (JDK) did a literature review and drafted the manuscript. Vinu Cherian (VC) did the editing of the manuscript, Brilly M Rose (BMR) did data acquisition, data analysis, statistical analysis, and interpreted the data. Anuradha Kizhatil (AK) and Alexander John (AJ) critically reviewed and revised the manuscript. All authors substantially contributed to the study and approved its submission.

Ethics approval and consent to participate

We conducted the research following the Declaration of Helsinki, and the protocol was approved by the Institutional Ethical Committee (Sree Narayana Institute of Medical Sciences IEC/14/01, April 2019). Written informed consent was obtained from participants before data collection as well.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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