ORIGINAL RESEARCH ARTICLE

Depression and its Association with Insomnia among Geriatric Population of Selected Slums of Bankura Municipality, West Bengal

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ABSTRACT

Background: While depression is a major health concern among older people, sleep disorders are also very common among them and often persist simultaneously. The study was conducted to assess the prevalence of depression and insomnia, and any correlation of association between them, in the geriatric people living in study area.

Methodology: A cross-sectional analytical study was conducted among 186 older people living in three selected slums of Bankura Municipality, West Bengal, India. A pre-tested, structured interviewer-administered-questionnaire including Geriatric Depression Scale-Short form and Insomnia Severity Index were used for data collection.

Results: The prevalence of geriatric depression and insomnia in the study setting were 54.3% and 37.6% respectively. While illiteracy, complete financial dependency and taking sedative were associated with geriatric depression, history of smoking was associated with insomnia among participants. Geriatric depression was significantly associated with insomnia. There was statistically significant positive correlation between GDS-S score and ISI score.

Conclusions: A significant proportion of elderly population suffers from depressive disorders and sleep disorders. Early detection and management of these conditions will provide the society with healthy 'senior citizens.

Keywords: Elderly, depression, geriatric, insomnia, GDS-S, Geriatric Depression Scale – Short, Insomnia Severity Index

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INTRODUCTION

Sleep disorders are common across all age-groups. One of such common sleep disorders is insomnia. People with insomnia may have trouble falling asleep or staying asleep or getting good quality of sleep. Insomnia may be associated with fatigue, drowsiness, lethargy, depression, irritability, inability to focus etc.[1] Although insomnia is not considered a normal part of ageing process, its prevalence increases with age. This can be attributed to different factors including changes in circadian rhythm, co-morbidities, drug history, mental and neurological disorders etc.[2,3,4] On the other hand, depression is a mental illness that negatively affect the way one feels, thinks or acts. Depression can cause the feeling of sadness and loss of interest in activities that once one enjoyed.[5] According to WHO, between the years 2015 and 2050, the proportion of elderly population will nearly double from 12% to 22%. Approximately 15% of elderly population suffers from mental disorders. As reported by WHO in December, 2017, the commonest mental disorder among geriatric people was depression with 7% prevalence.[6] In India also, multiple studies have revealed varying degree of depression among elderly people. Sahni B et al, in their study, observed 40.7% prevalence of geriatric depression in Northern India.[7] Another study by Konda PR et al. found 23% prevalence of geriatric depression in South Indian urbans.[8] Different factors like social isolation and loneliness, lack of exercise or physical activity, sleep problems, functional limitation, addictions have been considered as risk factors for depression in older people. On the other hand, sleep disturbance including sleep difficulty, early morning waking and even over-sleeping are common clinical features among people with depression.[9]

Studies evaluating the association between depression and insomnia among elderly people are lacking in eastern India. In this background the present study was conducted with the objectives -1) to assess the prevalence of depression and insomnia among the geriatric people, 2) to find the association of different variables with geriatric depression and insomnia and 3) to find out the correlation of association between geriatric depression and insomnia. Findings from this study may provide valuable information about the burden of depression and insomnia in the elderly population and help us to deliver interventions targeted towards the geriatric people for improving their quality of life in terms of healthy sleep habit and mental health.

METHODOLOGY

A community based cross-sectional analytical study was done in three selected slums (Chameri, Bokultala and Patpur) of Bankura Municipality, Bankura, West Bengal, in the months of January – March 2024. Study population included all people aged 60 years and above, living in the aforementioned slums for not less than one year. Any person, who was seriously ill, or could not be approached after three visits, were excluded from our study. Considering the prevalence of insomnia (subclinical or clinical) among elderly people to be 75% (as found in the study conducted by Inba R.A in Arkhali, North 24 Parganas, West Bengal[10]), absolute precision of 7% and non-response rate of 20%, the minimum sample size calculated using the formula $n = z^2pq/l^2$ was 184. In our study, probability proportional to size (PPS) method of sampling was followed to randomly select study subjects from each slum until a total of 186 elderly people were included in our study as participants.

At first, the purpose and the procedure of the study were explained to the participants. Upon receiving informed written consent, they were interviewed using the pre-structured, pretested, interviewer-administered questionnaire. Necessary measurements like height, weight was taken following the Standard Operating Procedure and review of records were done for the relevant medical history.[11] Any kind of addiction in last three months was enquired about. The depression and insomnia among the geriatric people were assessed using Geriatric Depression Scale – Short (GDS-S) and Insomnia Severity Index (ISI) tools respectively. For the purpose of further analysis, level of depression was categorized into a binary variable as depression absent (normal) and depression present (mild, moderate and severe depression) in Table 2. Similarly, in Table 3, the level of insomnia was categorized into binary variable as insomnia absent (no insomnia) and insomnia present (sub-threshold insomnia, moderate critical insomnia and severe critical insomnia).

Geriatric Depression Scale - Short (GDS-S)[12,13]: GDS, first created by Yesavage, is a 30-item scale to assess depression among elderly people. A Short Form GDS consisting of 15 questions was developed in 1986. Presence of depression is indicated when of these 10 out of the 15 items were answered positively, while the rest (item numbers 1, 5, 7, 11, 13) were answered negatively. Scores are interpreted as: 0 - 4 = normal, 5 – 8 = mild depression, 9 – 11 = moderate depression and 12 – 15 = severe depression.

Insomnia Severity Index[14]: The ISI is a self-administered tool with 7 questions that assesses the nature, severity and impact of insomnia in the last 2 weeks. A score of < 7 denotes 'no insomnia', 8 - 14 denotes 'subthreshold insomnia', while 15 - 21 denotes 'moderate clinical insomnia' and 22 – 28 denotes 'severe clinical insomnia'.

Data were entered in Microsoft Excel Spreadsheet and were checked for completion, duplication or validity. Analysis was done using IBM SPSS Trial version 22. Chi-square test was done to find out association between geriatric depression with different factors, between insomnia with different factor and between geriatric depression and insomnia. To test the correlation between GDS-S and ISI scores, Spearman's rank correlation was done. Simple linear

regression was done to identify relationship between GDS-S and ISI scores.

RESULTS

The sociodemographic variables show geriatric subjects belonged to the age groups of 60-70 years (68.8%), 70-80 years (27.4%) and 80-90 years (3.8%). A little more than half (54.8%) of the subjects were female. Only three subjects (1.6%) followed Islam while the rest were Hindu by religion. About 47.8% of the participants were married and 49.5% were widowed, while the rest were unmarried (1.6%) or separated (1.1%). Almost 53.2% elderly subjects belonged to nuclear families. Majority of the subjects were either illiterate (44.6%) or just literate (24.4%). More than 80% of the subjects belonged to lower socioeconomic status according to Modified B G Prasad's SES scale, updated for October 2023 (37.1% Cass IV and 43.0% Class V).[15]

Table 1: Level of depression and insomnia among study participants (N = 186)

Variables	Participants (%)
Level of depression, based on Geriatric Depression Scale – Short score	
Normal	85 (45.7)
Mild	49 (26.3)
Moderate	29 (15.6)
Severe	23 (12.4)
Level of insomnia based on Insomnia Severity Index score	
No insomnia	116 (62.4)
Sub-threshold insomnia	44 (23.6)
Moderate critical insomnia	24 (12.9)
Severe critical insomnia	2 (1.1)

Table 2: Relationship between depression and different variables (N=186)

Variables	Depression present (%)	Depression absent (%)	OR (95% CI)
Age group			
60-70 years	68 (53.1)	60 (46.9)	0.859 (0.460-.604)
70 years and above	33 (56.9)	25 (43.1)	Ref
Gender			
Female	51 (50.0)	51 (50.0)	0.680 (0.379-1.219)
Male	50 (59.5)	34 (40.5)	Ref
Marital status			
Married	47 (52.8)	42 (47.2)	1.122 (0.630-2.000)
Other	54 (55.7)	43(44.3)	Ref
Type of family			
Nuclear	54 (54.5)	45 (45.5)	0.979 (0.549-1.746)
Joint	47 (54.0)	40 (46.0)	Ref
Level of education			
Illiterate	53 (63.9)	30 (36.1)	**3.068 (1.493-6.307)**
Just literate	29 (56.9)	22 (43.1)	**2.289 (1.038-5.050)**
Literate	19 (36.5)	33 (63.5)	Ref
SES (BG Prasad, October 2023)			
Class II	4 (33.3)	8 (66.7)	0.300 (0.083-1.082)
Class III	13 (52.0)	12 (48.0)	0.650 (0.263-1.608)
Class IV	34 (49.3)	35 (50.7)	0.583 (0.303-1.121)
Class V	50 (62.5)	30 (37.5)	Ref
Financial dependency			
Independent	9 (32.1)	19 (67.9)	Ref
Partially dependent	52 (56.5)	40 (43.5)	**2.744 (1.123-6.709)**
Completely dependent	40 (60.6)	26 (39.4)	**3.248 (1.276-8.267)**
Nutritional status			
CED (BMI < 18.5)	6 (46.2)	7 (53.8)	0.596 (0.183-1.941)
Normal (BMI 18.5-22.9)	46 (59.0)	32 (41.0)	Ref
Overweight (BMI 23-24.9)	20 (50.0)	20 (50.0)	0.696 (0.323-1.497)
Obese (BMI ≥ 25	29 (52.7)	26 (47.3)	0.776 (0.387-1.556)
Alcohol consumption			
Yes	10 (50.0)	10 (50.0)	0.824 (0.326-2.085)
No	91 (54.8)	75 (45.2)	Ref
Smoking			
Yes	20 (58.8)	14 (41.2)	1.252 (0.589-2.661)
No	81 (53.3)	71 (46.7)	Ref
Chewing tobacco			
Yes	48 (51.1)	46 (48.9)	0.768 (0.431-1.369)
No	53 (576)	39 (42.4)	Ref
Taking any sedative			
Yes	22 (88.0)	3 (12.0)	**7.612 (2.191-26.441)**
No	79 (49.1)	82 (50.9)	Ref

SES = Socio-economic status, CED = Chronic energy deficiency, BMI = Body mass index, CI = Confidence interval

Table 3: Relationship between insomnia and different variables (N=186)

Variables	Depression present (%)	Depression absent (%)	OR (95% CI)
Age group			
60-70 years	44 (34.4)	84 (65.6)	0.645 (0.342-1.214)
70 years and above	26 (44.8)	32 (55.2)	Ref
Gender			
Female	38 (37.3)	64 (62.7)	0.965 (0.532-1.751)
Male	32 (38.1)	52 (61.9)	Ref
Marital status			
Married	33 (37.1)	56 (62.9)	1.046 (0.578-1.895)
Other	37 (38.1)	60 (61.9)	Ref
Type of family			
Nuclear	43 (43.4)	56 (56.6)	0.586 (0.320-1.072)
Joint	27 (31.0)	60 (69.0)	Ref
Level of education			
Illiterate	27 (32.5)	56 (67.5)	0.563 (0.276-1.147)
Just literate	19 (37.3)	32 (62.7)	0.693 (0.315-1.522)
Literate	24 (46.2)	28 (53.8)	Ref
SES (BG Prasad, October 2023)			
Class II	5 (41.7)	7 (58.3)	1.327 (0.385-4.566)
Class III	13 (52.0)	12 (48.0)	2.012 (0.810-4.994)
Class IV	24 (34.8)	45 (65.2)	0.990 (0.504-1.947)
Class V	28 (35.0)	52 (65.0)	Ref
Financial dependency			
Independent	11 (39.3)	17 (60.7)	Ref
Partially dependent	34 (37.0)	58 (63.0)	0.906 (0.380-2.159)
Completely dependent	25 (37.9)	41 (62.1)	0.942 (0.380-2.334)
Nutritional status			
CED (BMI < 18.5)	7 (53.8)	6 (46.2)	2.625 (0.797-8.644)
Normal (BMI 18.5-22.9)	24 (30.8)	54 (69.2)	Ref
Overweight (BMI 23-24.9)	13 (32.5)	27 (67.5)	1.083 (0.478-2.455)
Obese (BMI ≥ 25)	26 (47.3)	29 (52.7)	2.017 (0.987-4.124)
Alcohol consumption			
Yes	11 (55.0)	9 (45.0)	2.217 (0.869-5.655)
No	59 (35.5)	107 (64.5)	Ref
Smoking			
Yes	18 (52.9)	16 (47.1)	**2.163 (1.020-4.590)**
No	52 (34.2)	100 (65.8)	Ref
Chewing tobacco			
Yes	32 (34.0)	62 (66.0)	0.733 (0.404-1.330)
No	38 (41.3)	54 (58.7)	Ref
Depression			
Present	13 (15.3)	72 (87.7)	**7.175 (3.529-14.588)**
Absent	57 (56.4)	44 (43.6)	Ref

SES = Socio-economic status, CED = Chronic energy deficiency, BMI = Body mass index, CI = Confidence interval

Majority of the study participants were financially dependent on others, either partially (49.5%) or completely (35.5%). Based on Asian-Indian classification of BMI, 7.0% had chronic energy deficiency, 21.5% were overweight and 29.6% were obese.[16] Majority (98.9%) of the elderly subjects had one or more co-morbidities during the period of study. Only 13.4% subjects were taking sedative medications. Different addictions found among these subjects were alcohol (10.8%), smoking (18.3%) and chewing tobacco (50.5%).

Based on GDS-S scoring, the different levels of depression among the elderly subjects were mild depression (26.3%), moderate depression (15.6%) and severe depression (12.4%), while 45.7% had no depression. On the other hand, based on Insomnia Severity Index scoring, 62.4% participants had no insomnia, while 23.6%, 12.9% and 1.1% study participants had subthreshold insomnia, moderate critical insomnia and severe critical insomnia respectively [Table 1].

The relationship between different variables with depression and insomnia in geriatric population were explored in our study. Different variables like level of education (higher among illiterates), financial dependency (higher among those who were completely financially dependent on family members or others), practice of sedative medicine intake (higher among those taking sedatives) was found to be associated with geriatric depression, and the findings were statistically significant [Table 2]. On the other hand, only smoking (at least once in last three months) was found to have statistically significant association with geriatric insomnia [Table 3]. Our study also revealed that that higher proportion of people with depression also had insomnia, as com-

pared to proportion of people without depression. This finding was also found to be statistically significant [Table 3].

For both GDS-S scoring and ISI scoring, lower scores indicate absence or low level of the condition under discussion, while higher scores denote higher or more severe level of the condition. A Spearman's correlation was conducted to evaluate the relationship between ISI score and GDS-S score. There was a significant positive relationship between ISI score and GDS-S score, $r_s = 0.569$, $P < 0.001$. Liner regression analysis was done and the R for the regression model was significant. R^2 of 0.376 indicated that about 37.6% of the variance in GDS-S score is explained by their ISI score [Figure 1]. The final regression model was as follows:

GDS-S score = 2.964 + 0.415 x ISI score.

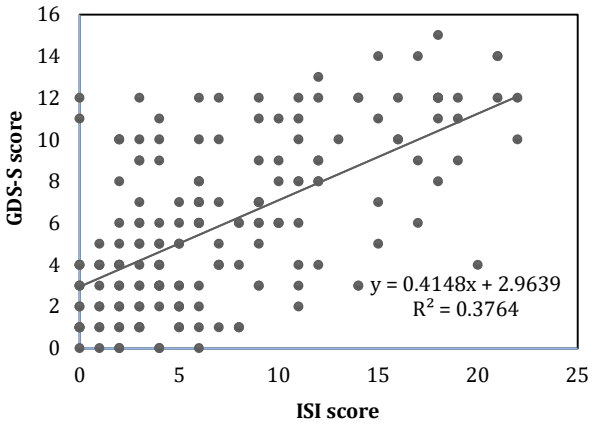

Figure 1: scatter graph showing relation between GDS-S score and ISI score with trend line

Discussion

Prevalence of depression and insomnia: In our study, more than half (54.3%) of the subjects had depression, including mild depression (26.3%), moderate depression (15.6%) and severe depression (12.4%). A study conducted in Bankura district of West Bengal, India showed the prevalence of geriatric depression to be 59.1%.[17] Another study conducted in Purba Bardhaman district of West Bengal, India revealed 67.2% depression.[18] All these studies show that a significant proportion of geriatric people has depression of different levels, and thus needs special attention. On the other hand, our study also revealed that more than one-third (37.6%) of the study population were suffering from insomnia including subthreshold insomnia (23.6%), moderate critical insomnia (12.9%) and severe critical insomnia (1.1%). In a study by Muhammad T et al, using the longitudinal ageing study in India (LASI) data, revealed prevalence of insomnia symptoms to be 36.3% and 41% in India and state of West Bengal respectively.[19] In some other studies, conducted in different parts of India, the prevalence of insomnia were ranging from 20.2% to 68.9%.[20,21,22,23] Hence, a large portion of the elderly population are affected by insomnia, as found in different studies, including ours.

Geriatric depression: Our study revealed illiteracy, complete financial dependence and practice of taking sedatives to be associated with presence of depression among the older people. People having lower level of education may face different mental health issues including loneliness, depression etc. The elderly people belonging to lower socioeconomic class might have to be financially dependent on other family members and this sense of financial insecurity may lead to depression among them. Those who were taking sedatives were probably having sleep problems including insomnia, and its relation to depression is well established, as found in different studies including ours. In a study by Banerjee A et al., depression was found to have association with illiteracy, financial dependency and many other factors.[17] In another study by Maulik S et al., association was found between depression and illiteracy, lack of personal income etc.[24]

Insomnia in elderly population: Although higher proportion of elderly population with addiction to smoking and alcohol consumption had insomnia, only smoking was found to be associated with insomnia and the finding was statistically significant. Smoking may possibly lead to insomnia by different mechanisms like nicotine craving associated restlessness, alteration in sleep architecture, upper airway inflammation leading to obstructive sleep apnoea, alteration of circadian rhythm etc. The association of addictions of different kind with insomnia is well-documented in different research articles.[3,19,23,25]

Geriatric depression and insomnia: Our study revealed significant association between geriatric depression and insomnia. Sleep deprivation can lead to mood swing, may make it harder for the subjects to interact with other people. On the other hand, depression may shorten the amount of sleep a person gets every night and may alter the sleep architecture. Two different studies by Pigeon et al. and Perlis ML et al. respectively revealed persistent insomnia is a risk factor for new-onset and recurrent depressive disorder.[26,27] The severity symptoms of depression and insomnia were found to be moderately correlated in a study by Brouwer A et al.[28] All these studies, including ours, show that depressive disorders can lead to insomnia of different levels, which again can lead to further depression, and the vicious cycle continues.

Conclusion

The prevalence of depression and insomnia among the geriatric people, based on GDS-S scoring and ISI scoring respectively, was quite high in the study area. In older people, depression and insomnia go hand-in-hand. While lack of education, lack of sense of financial security and history of taking sedatives

might be attributed to depression, history of smoking and depression itself was found to have significant association with insomnia among the elderly study participants.

Recommendations

The early detection and management of depressive disorders and sleep disorders is a necessity in an ageing population, so as to improve the general well-being and quality of life of the 'senior citizen' of the nation.

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