|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
PubMed (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Research Article
Volume 3, Issue 5; May: 2019; Page No. 36-44

DEPRESSION IN OLDER ADULTS- A STUDY ON PATIENTS VISITING A TERTIARY CARE CENTER IN NORTH INDIA

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Article Info: Received 24 April 2019; Accepted 5 May. 2019
Cite this article as: Gambhir, I., Sharma, A. R., Chakrabarti, S., Kaur, U., & Prakash, B. (2019). DEPRESSION IN OLDER ADULTS- A STUDY ON PATIENTS VISITING A TERTIARY CARE CENTER IN NORTH INDIA. *International Journal of Medical and Biomedical Studies*, *3*(5).
DOI: https://doi.org/10.32553/ijmbs.v3i5.238
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Conflict of interest: No conflict of interest.

Abstract

Background: Depression is the commonest psychiatric disorder in the elderly. We attempted to analyze the prevalence and correlates of depression in the north Indian elderly.

Methods: An observational study was carried out taking cases from patients attending the geriatric clinic for the first time. Depression was diagnosed by the Geriatric Depression Score short form (≥5). Various epidemiological parameters were assessed in 504 subjects (M = 304, F = 200; mean age = 66.47±13.71 years).

Results: Depression prevalence was 45%. A significant correlation was found between depression prevalence and gender (F>M, p=0.011), level of education (p=0.002), marital status (p<0.001) and insomnia (p<0.001) on univariate analysis. On binomial logistic regression analysis, marital status (widowed > married, p=0.008) and insomnia (present > absent, p<0.001) showed significant correlation with depression prevalence.

Conclusion: Our study highlights certain epidemiological aspects of depression in the aged Indian population presenting to the tertiary hospital. Spousal loss and insomnia are documented as possible depression risks but longitudinal studies are needed to confirm the same.

Keywords: Geriatrics, Depression, Epidemiology, Geriatric Depression Score, Prevalence, Logistic Regression

1. Introduction

The geriatric population of the world has quadrupled from 202 million in 1950 to 843 million in 2013. This is projected to increase three fold by 2050. The brunt of this old age population explosion has been borne by relatively less developed countries quite a few of which lie in south and south-east Asia. By 2050, these countries would account for nearly 80% of the world's geriatric population. [1] Depression is the commonest psychiatric disorder in the aged.[2] Unipolar depressive disorders contribute maximally to the burden of disease in both middle and high income countries and also are among the ten most important causes in low income nations. The burden of disease is a composite measure of life years lost due to premature death and a weighted measure of years spent with disability, pain or impairments. [3]

The DSM-IV defines major depressive disorder as depressed mood or a loss of interest or pleasure in daily activities for more than two weeks. [4] Depression is an especially significant problem in the aged on account of multiple factors such as physical disability, retirement from active life and changing social dynamics. The persistently declining old age support ratio is cause of concern as it means a smaller support group to deal with the varied needs of the depressed old adults. [1] The ill-effects of depression range from an increase in the rates of heart disease and stroke to suicidal tendencies in patients. [5,6]

Depression prevalence in the geriatric population has been reported to be between 8-20% at the community level and up to 37% in those receiving primary level care. [7] A retrospective analysis of 74 original studies on a combined strength of 487,275 subjects 60 years of age or more determined the median prevalence of depressive disorders in older adults to be 10.3 % (IQR 4.7%-16.0%). The median prevalence of depression among the Indian geriatric population was estimated to be 21.9% (IQR 11.6%-31.1%). [8] On the other hand, community based mental health studies conducted in India have reported depression prevalence in the aged varying widely from just above 10% up to as high as more than 50%. [9,10,11,12] Almost no data exists on depression prevalence and its correlates in the north Indian population presenting to tertiary centers. Considering the geriatric population at the point of higher medical care has an added advantage while appreciating the fact that the prevalence of depression in such a population would be more. Primary health care systems in north India suffer from unawareness among physicians about geriatric specific problems, the prevalence of untrained quacks imparting healthcare and many others. On the other hand, the population presenting to tertiary centers is amenable to intervention and compliance of patients with treatment is appreciable and hence it is this group which might be a prime target of therapy. The authors present an observational study on 504 older patients presenting at a tertiary care center in northern India. The study tries to gauge the prevalence of depression and other epidemiological attributes of depression in older adults visiting advanced care hospitals. The study tries to analyze the association of depression with gender, socio-economic status, occupation, marital status, place of residence, use of habit forming substances and insomnia. The study findings may lay the foundation for multi-center hospital based studies which would evaluate the causal role of various modifiable factors in depression and mark potential intervention sites.

2. Material and methods:

A cross-sectional study was carried out at a tertiary care teaching and research hospital of north India from June 2009 to May 2011. Cases were taken from patients attending the geriatric clinic for the first time. Patients less than 60 years of age, those suffering from some acute illness or requiring hospitalization and those unable to participate in the study because of other physical limitations such as speech or hearing impairment or severe dementia were excluded from the study. The total number of newly registered geriatric outpatients during the period of study amounting to 1084 patients was assessed for eligibility. 280 patients were excluded as they did not fulfill the inclusion criteria or had one or more of the exclusion points: 30 were between 55-60 years age, 221 needed hospitalization or were suffering from some acute illness and 29 had severe dementia. Out of the rest, 300 did not give consent. The response rate of the study was thus 62.7%. The study proper included 304 male and 200 female patients. General information was collected including name, age, gender, socio-economic status, place of living, educational status, occupation, marital status, insomnia and habit forming substance use, using a pre-decided standard questionnaire. The questionnaire was filled by resident doctor posted in the Geriatric unit on the basis of verbal interview of the patient in patient's local dialect. All patients were interviewed by the same interviewer over the period of study. Patients were segregated into various socio-economic groups based on the modified Prasad classification proposed for the year 2004 (Table 1). [13,14] Furthermore, categories I and II, III and IV, V and VI in the classification scheme were combined to form high, middle and low socio-economic groups. Habit forming substance use was defined as the almost daily consumption of tobacco by smoking or chewing irrespective of the quantity or the almost daily consumption of alcohol irrespective of the quantity.

TABLE 1: PROPOSED INDIAN SOCIAL CLASSIFICATION FOR 2004 [13, 14]

Social class	Per capita monthly income limits (Rupees: 1 Indian Rupee = 0.016 $) Prasad (1970)	Suggested modification (2004)	
I. Upper high	100 and above	10000 and above	HIGH
II. High	50-99	5000-9999	
III. Upper middle	30-49	3000-4999	MIDDLE
IV. Lower middle	15-29	1500-2999	
V. Poor	15	500-1499	LOW
VI. Very poor or Below poverty line (BPL)	-	Below 500	

2.1 Diagnosis of depression:

Depression was diagnosed by the Geriatric depression score (GDS short form, 15 questions). [15] This scale was administered to the participants of the study in translated form in Hindi. A score of greater than or equal to 5 was diagnostic of depression. The validity of the GDS in depression diagnosis in the aged compared to standard diagnostic tools such as the ICD-10 and DSM-IV has been established previously. [16,17,18,19]

2.2 Sample size determination:

Considering the widely variable prevalence values for depression in the Indian aged, [9,10,11,12] a mean prevalence of 25% was assumed. With a 5% allowable error, the sample size required for our study was determined to be 300. [20]

2.3 Statistical analysis:

The data was analyzed using Statistical Package for Social Sciences 16.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were performed. Univariate comparison of variables was done between depressed and non-depressed group using Chi-square test for categorical variables. The variables with a p-value of < 0.05 on univariate analysis were further subjected to binary logistic regression analysis to determine which factors were independent determinants of depression. A p-value of <0.05 was taken as the criterion for significance. It is noteworthy that the study was not of a cohort design and hence causality assessment was not possible in terms of relative risks. The final model was subjected to the Hosmer and Lemeshow goodness of fit test and the Omnibus tests of model co-efficients.

3. Results:

504 patients (M=304, F=200) were analyzed. The mean age of the subjects was 66.47 ± 13.71 years. Majority of the patients (40.8%) were in 60-64 years age group. Depression prevalence was 45.0% (M: 40.5% , F: 52%). (Table 2)

TABLE 2: AGE AND SEX DISTRIBUTION OF GERIATRIC SUBJECTS WITH GDS SCORES (percentage of total subjects in brackets, rounded up to nearest whole number: numbers don't add to 100)

GDS AGE GROUP	<5		5-9		≥10	
	Male	Female	Male	Female	Male	Female
60-64	76 (15)	47 (9)	20 (4)	21 (4)	19 (4)	23 (4)
65-69	43 (8)	27 (5)	14 (3)	19 (4)	19 (4)	14 (3)
70-74	34 (7)	12 (2)	15 (3)	11 (2)	10 (2)	6 (1)
≥75	28 (5)	10 (2)	10 (2)	6 (1)	16 (3)	4 (1)

Table 3 shows the univariate comparison of various socio-demographic and lifestyle variables between depressed and non-depressed groups. The mean age of the depressed patients was 66.98 ± 14.02 years and that of non-depressed patients was 66.05 ± 13.42 years; thus there was no significant age variation between the two groups (p=0.129). The variables that showed significant p-values on univariate analysis were gender, occupation, educational level, marital status, insomnia and use of habit forming substances.

TABLE 3: UNIVARIATE COMPARISON OF CATEGORICAL VARIABLES AMONG DEPRESSED AND NON-DEPRESSED SUBJECTS:

VARIABLES	DEPRESSED		p-value
	YES	NO	
SEX			
Male	123	181	**0.011**
Female	104	96	
SOCIO-ECONOMIC STATUS			
HIGH	18	18	**0.173**
MIDDLE	83	124	
LOW	126	135	
OCCUPATION			
BUSINESSMAN	14	39	
FARMER	55	67	**0.027**
HOUSEWIFE	102	92	
LABORER	14	19	
PENSIONER	21	31	
SERVICE	21	29	
EDUCATION			
ILLITERATE	108	109	
MIDDLE	55	46	**0.002**
HIGH	38	81	
GRADUATE	26	41	
MARITAL STATUS			
MARRIED	174	248	**<0.001**
UNMARRIED	1	1	
WIDOW/WIDOWER	52	28	
PLACE OF LIVING			
RURAL	164	183	**0.136**
URBAN	63	94	
INSOMNIA			
PRESENT	97	64	**<0.001**
ABSENT	130	213	
USE OF HABIT FORMING SUBSTANCES			
YES	84	79	**0.043**
NO	143	198	

These variables were further used to develop a model of depression using binomial logistic regression analysis. Table 4 shows the analysis results for significant variables. The variables which were significant as independent predictors of depression were marital status and insomnia. The model was statistically significant (χ^2=59.042, p<0.001). The model explained 14.8% of the variance in depression and correctly classified 65.9% of the cases.

TABLE 4: MULTIPLE LOGISTIC REGRESSION ANALYSIS SHOWING INDEPENDENT PREDICTORS OF DEPRESSION IN THE SUBJECTS:

VARIABLES	DEPRESSED n (%)	ADJUSTED OR	95% CI	p-value
MARITAL STATUS				
MARRIED	**174(41.2)**	**1**		
UNMARRIED	**1(50)**	**2.050**	**0.121-34.603**	
WIDOW	**52(65)**	**2.293**	**1.349-3.896**	**<0.01**
INSOMNIA				
NO	**130(37.9)**	**1**		
YES	**97(60.2)**	**2.512**	**1.668-3.784**	**<0.001**

In addition, the commonest systemic co-morbidity in the depressed patient population was cardiovascular disease including coronary artery disease and hypertension (n=56; 24.67%). The further analysis of systemic co-morbidities in depressed patient population could not be done as study design did not permit.

4. DISCUSSION:

The present study evaluated the various attributes of depression in the older adult population presenting to the tertiary care hospital level. In developing countries this is often the first level of dedicated geriatric care where a detailed neuropsychological assessment of the patient is performed.

The study involved the use of the GDS for diagnosis of depression. With a cut-off point of ≥5, the GDS has a high sensitivity 0f 92% and specificity of 81% in diagnosing geriatric depression.[21] This form of diagnosis was preferred owing to the atypical presentation of depression in the aged which makes the use of gold standard diagnostic tools such as the DSM-IV and ICD-10 difficult. A similar approach has been adopted by Stek and others in an earlier study. [21] Yokoyama and others in a study of the association of depression and insomnia in Japan made use of the CES-D scale short form for depression diagnosis. Hence, the use of a screening instrument for diagnosis is a valid concept. [22] The study sample had more males than females which fits the usual pattern of health care seeking in this predominantly rural belt with a patriarchal society.

The depression prevalence in our study was 45.03%. As has been mentioned earlier, multiple studies from the Indian sub-continent have reported highly variable figures of geriatric depression. [9,10,11,12] A depression prevalence similar to our study was quoted in the AGED study. 46.2% of older nursing home patients were found to be suffering from depression. [23] A study by Rajkumar and others involving 1000 participants aged over 65 years from Kaniyambadi block, Vellore in southern India brought up a depression prevalence of 12.7%.[24] The WHO Study on global ageing and adult health (SAGE) including adults from China, Ghana, India, Mexico, Russia, and South Africa report even lower depression prevalences of only around 6% in males and up to 8% in females.[25] Although these figures are grossly low as compared to the data of the current study, the studies are essentially different in construction. The authors propose that the prevalence of depression in the aged population visiting hospitals is more significant from a therapeutic view point especially in resource starved developing nations where health-care fails to reach the bulk of the population.

Depression is a major concern in older adults and its development depends on multiple social and life-style parameters as well as the existence of systemic co-morbidities. This study mainly analyzed the former. The variables that showed significant p-values on univariate analysis were gender, occupation, educational level, marital status, insomnia and use of habit forming substances. In contrast, Rajkumar et al's work from south India earmarked low income, hunger, cardiac illnesses, transient ischemic attack, past head injury and diabetes as risk factors for

geriatric depression.[24] The variables which were significant on multivariate analysis (marital status, insomnia) and those that were expected to affect depression profile based on earlier literature (age, gender, education, use of habit forming substances) are individually discussed. Whereas income is a significant determinant of depression in the WHO study on global ageing, the univariate analysis of depression with respect to socio-economic status in the current work did not find similar results.[25]

Non-modifiable physical correlates:

Age: In this study, variation in depression prevalence with age was not evident. This implies that in the older population, depression rates do not vary in specific age sub-groups. The observation may be confounded by the fact that in the older age groups, fewer patients come for treatment to a tertiary center as evident at our center. Hence, depression cases in the very old may be missed. Further, patients with severe dementia were excluded from our study and a higher number of such patients in the older age groups may lead to bias. These explain the apparent conflict of our results with findings published elsewhere where the oldest old have been shown to be at high risk of chronic depression.[21] None of the studies conducted in India have addressed this unique problem of varying depression rates among different subgroups of the elderly population and it needs to be addressed separately in cross-sectional and cause-effect designs.

Gender: 52% of the female patients were depressed compared to 40.5% of the male patients. Female gender was a significant risk factor for depression on univariate analysis. Sherina reported similar results.[26] Even higher gender differences in depression prevalence have been reported in a study similar to ours from a tertiary center in neighboring Pakistan.[27] Relative lack of care for the female gender in patriarchal societies such as in northern India may be a contributor. The fact that gender was not a significant determinant on multi-variate analysis may stem from the fact that the gender differences are affected by various other socio-economic differentials such as education, relative accessibility of resources.

Although age and gender are non-modifiable factors in depression prevalence, much of the female gender specific rise in depression is due to socio-economic factors such as differential access to healthcare, social rights and finances. This is an area where administrative and social institutions can intervene more than the healthcare setup to reduce this added burden in females.

Socio-personal correlates:

Education: Illiteracy was found to have a significant association with depression in a study on slum dwelling older adults in Mumbai.[28] The design of this study was greatly different from the present one. We found those having studied up to the middle school level to be most depressed. Further cause-effect studies need to be performed before any significance can be attached to this finding.

Use of habit forming substances: The use of tobacco (chewable/ smokable) and alcohol showed positive association with depression on univariate analysis. Jain et al reported a 58.13% prevalence of depression among older individuals inclined towards substance abuse.[28] Recent research has highlighted the epidemic status of substance abuse among older populations. The present study did not use specific diagnostic criteria for substance abuse problems and only considered whether habit forming substances were being used by the subjects. Different levels of use may hence have been clubbed together. This stays a short-coming of the study. Also prescription drug abuse data was not collected. In the Indian subcontinent, chewable tobacco use is very common especially among rural people in the northern part of the country. In some social strata, it is perfectly acceptable for older females to smoke tobacco in the form of 'beedis', often as a remedy for constipation. Alcohol use is less common but still many older individuals carry over this habit from their young adult life. Habit forming substance use is associated with a feeling of loneliness and lower life satisfaction.[29] The complications of habit forming substance use such as COPD, malignancies and coronary artery disease set in by the time a person reaches the 60+ age group. These may be additives in the pathogenesis of depression. On the other hand, depressed older people may more often resort to intoxicating substance use. However, substance abuse data was recorded using crude criteria and any interpretation with regards to these should be guarded.

Marital status: Depression was most evident in widows/ widowers. The odds of a widowed older subject having depression was 2.293 times that of a married older individual (p=0.008). This was explicable as spousal loss may trigger off a feeling of loneliness and helplessness in older adults. The

findings are similar to previous studies which have highlighted that death of the spouse may hasten the onset of depression. [30] Multiple Indian studies in different settings have also demonstrated similar findings.[28, 31, 32] The major shortcoming of this study was in not analyzing the time of spousal death i.e. the duration of being alone as an attribute of depression. Support from one's partner is especially significant in these times of rapid shrinkage of family size and adoption of the nuclear family pattern in developing nations. It is of note that there were no divorced subjects in our study emphasizing that the phenomenon of divorce is still uncommon in the Indian subcontinent in rural and semi-urban areas. In such a situation, death of the spouse may be even more eventful for the older individual.

The role of medical social workers in providing support to elderly who are having substance abuse issues or suffering from recent spousal loss cannot be undermined.

Medical correlates:

This is the domain where the geriatrician is the core caregiver. Effective management of chronic co-morbidities ensuring adequate quality of life for geriatric patients can lead to decreases in the prevalence of depression.

Insomnia: Insomnia was seen to have a positive correlation with depression. The odds of a patient with insomnia having depression was 2.5 times that of one with unimpaired sleep (p=0.000). Yokoyama et al reported an association between difficulty initiating sleep and depression in community dwelling older individuals in Japan. [22] Sanjay and others found the odds of depression to be nearly 16 times higher in elderly with insomnia.[33] Many studies have proven that insomnia is a risk factor for new onset major depressive disorder. Persistent middle insomnia has been shown to trigger new onset depression. [34] Research has also emphasized that insomnia may perpetuate depression. [35] Alternatively insomnia has been long regarded as a symptom rather than a cause of depression. Since, this study was not of a longitudinal design, cause-effect relationship could not be ascertained but patients with insomnia were identified as a high risk group for co-existent depression.

Comorbidities: Cardiovascular comorbidities including hypertension and coronary artery disease were the commonest observed in patients with depression. (n=56; 24.67%) Diabetes was also a common association. (n=36; 15.86%) These findings are in concordance with previous literature. Depression prevalence has been shown to be as high as 45% in coronary artery disease patients. [36] A meta-analysis of 42 published studies comprising 21,351 adults found the prevalence of clinically relevant depression in people with diabetes to be 31%. Undiagnosed depression in diabetics was reported to be as high as 45%.[37] The reasons for depression in patients with systemic comorbidities are manifold ranging from physical distress to social stigma to the inability to carry on many activities which the person was accustomed to earlier in life.

4.1 LIMITATIONS OF THE STUDY:

The present study suffers from a relatively small sample size which despite reaching statistical significance, dealt with only a subgroup of patients who seek tertiary care. The non-longitudinal design of the study impedes any interpretation of cause-effect relationships between the various socio-demographic variables and depression. The use of the GDS short form is a different approach from using gold standard tools such as the DSM-IV or the ICD-10. The cut-off point of 5 on the GDS short form has been validated in other populations but not in a predominantly less educated rural and semi-urban population. This may introduce bias in the results. The data regarding substance abuse, type of insomnia and systemic comorbidities could have been expanded to analyze further how these variables may affect depression in the aged. Other parameters such as family structure, elder abuse, visits by children, retirement and financial independence were not judged.

5. CONCLUSION:

The present study revealed spousal loss and insomnia as red flag signs in the older adults for a more detailed evaluation of depression. Several other variables such as female gender, education up to the middle school level and use of habit forming substances were found to have minor effect on depression occurrence in the aged on univariate analysis. The prevalence of depression in the geriatric population in our study was moderately high and emphasizes the importance of specialized counseling and pharmacotherapeutic approaches in older patients presenting to the tertiary hospital set-up. General practitioners must also have a high index of suspicion in detecting geriatric depression, considering that somatic manifestations are more

common in this patient group. Overall, this study lays the foundation for larger cause finding cohort studies of old age depression.

Funding Acknowledgement: This research was funded partially by the National Programme for Healthcare of the Elderly, Ministry of Health & Family Welfare, Government of India.

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