

**Prevalence & Predictors of Depression in Elderly: A Community Based Study from Rural India**Bhuwan Sharma<sup>1</sup>, Anjali Arora<sup>2</sup>, Kashish Talwar<sup>3</sup>, Chetan Goyal<sup>4</sup><sup>1,2</sup>Associate Professor, Department of Community Medicine, Punjab Institute of Medical Sciences, Jalandhar, Punjab<sup>3,4</sup>Assistant Professor, Department of Orthopaedics, Punjab Institute of Medical Sciences, Jalandhar, Punjab

Received: 19-08-2023 / Revised: 26-09-2023 / Accepted: 28-10-2023

Corresponding Author: Chetan Goyal

Conflict of interest: Nil

**Abstract**

**Introduction:** Ageing is a natural phenomenon with opportunities and challenges. Depression is a treatable medical condition and not a normal part of aging. However older adults are at an increased risk for experiencing depression. Depression among the elderly population further complicates not only the existing morbidity conditions but also decreases the quality of life and functional ability. In present study, we aimed to estimate the prevalence of depression in the older adults and to investigate the epidemiological factors that contribute to it in rural areas of Jalandhar.

**Materials & Methods:** Present community based cross-sectional study included 250 cases chosen from the community based on systemic random sampling. A pre-formed questionnaire was used for collection of information. It was divided into two parts. The first part comprised of sociodemographic and clinical information while second part comprised of a scale known as geriatric depression scale (GDS) to quantify depression. Data was analysed using SPSS ver. 26.0.

**Results:** Overall prevalence of depression among elderly population of rural India was observed as 60.8% with 50.4% cases having mild depressive symptoms and 8.8% and 1.2% had moderate and severe symptoms respectively. On univariate and multi-variate analysis both, we observed that depression was significantly more among males (68.1% vs 50.5%; p=0.006), those who are dependent on others for daily activities (67.8% vs 57.5%; p=0.027) and those with associated co-morbidities i.e. either diabetes, hypertension or osteoarthritis (64.6% vs 25.9%; p<0.0001).

**Conclusion:** Depression was significantly more among males specifically in those who are dependent on others for daily activities and those with associated co-morbidities i.e. either diabetes, hypertension or osteoarthritis. All these three variables were also observed to be significant predictors for depression in elderly.

**Keywords:** Community, Co-morbidities, Depression, Elderly Population, Male gender.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

**Introduction**

Older people are a valuable resource for any society. Ageing is a natural phenomenon with opportunities and challenges. Older adults, those aged 60 or above, make important contributions to society as family members, volunteers and as active participants in the workforce. According to Census 2011, India has 104 million older people (60+ years), constituting 8.6% of total population. Amongst the elderly (60+), females outnumber males.

In the last few years, medical science has identified a new group within the senior citizen category, namely that of super-agers. The term refers to people in their 70s and 80s who have the mental or physical capability of their decades-younger counterparts. With the world ageing at a rapid rate, it is

estimated that by 2030 there will be 34 nations with over 20% population above 65 years.[1]

Depression is a treatable medical condition and not a normal part of aging. However older adults are at an increased risk for experiencing depression. As per the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), depression is a common psychiatric condition usually characterised by sadness, lack of interest, guilt or low self-esteem, disturbed sleep or food, exhaustion, and poor attention for at least two weeks [2]. Depressive disorders afflict 10 to 20% of older individuals globally, affecting over 300 million people in 2015 as reported by WHO [3].

A meta-analysis reported the worldwide prevalence rate of depressive disorders in elderly popula-

tion between 4.7 to 16% with comparatively higher prevalence of 21.9% in India.[4] Few authors have reported prevalence rate of 10 to 55% worldwide.[5] In Punjab Depression was diagnosed in 58.2% of the participants in a recent survey conducted by Post Graduate Institute of Medical Education and Research( PGIMER), Chandigarh.[6]The study was conducted in their rural field practice area in Fatehgarh Sahib.

Depression among the elderly population further complicates not only the existing morbidity conditions but also decreases the quality of life and functional ability. Manifestation of depressive disorders in geriatric population is different from adult population with more prominent cognitive and somatic symptoms, which makes detection more difficult and interferes with appropriate help seeking[7,8].

The majority of depressive disorders remain undiagnosed and untreated because of false beliefs and perceived social stigma. The mental health gap in the elderly, in terms of manpower and infrastructure requirement, is huge to meet the service demands posed by the psychiatrically ill older adults in the country. Understanding the epidemiology of depression in older persons is crucial to lessen the harmful impact of depression on daily functioning and quality of life (QOL) [3].

The study aims to bridge gaps and provide evidence which can help in policy formulation for elderly in terms of improvement of quality of life and management of depressive disorders. This research was conducted to estimate the prevalence of depression in the older adults and to investigate the epidemiological factors that contribute to it in rural areas of Jalandhar.

### Materials and Methods

Study was commenced after approval from institutional ethical committee. Present study was a cross-sectional study, carried out in the community of rural field practice area of Department of Community Medicine (RHTC, Pasla) of PIMS Medical College Jalandhar. Based of the prevalence of depression as 50% among elderly [6] and using formulae:

$$n = (Z\alpha/2)^2 * (PQ) / E^2$$

Where;

- n- Sample size
- $Z\alpha/2$  – Z value at 5% error (1.96)
- P – Taken as 50% (prevalence of Depression in elderly) [6]
- Q- 1-P

- E – Absolute error (taken as 10%)
- $n - (1.96)^2 * (0.34*0.66)$
- $(0.01)^2$
- n- 170 (approx.)

To further increase the power of study, we decided to take a sample of 250 elderly cases. So final sample size was 250 cases chosen from the above community based on systemic random sampling.

To be included in the study, the study participants should be >60 years old of either gender and cooperative for physical and mental status examination, who provided the written informed consent. Patients who refused to give consent and were severely ill, had a history of mental illness, were on psychotropics, or had severe visual and auditory impairment to interfere in the formal assessment were excluded.

A pre-formed questionnaire was used for collection of information. It was divided into two parts. The first part comprised of sociodemographic information covering a diverse set of parameters as age, sex, marital status, education, area of residence, occupation, activity levels and presence of comorbidities. The second part comprised of a scale known as geriatric depression scale (GDS).

The GDS is a 30-item self-report assessment used to identify depression in the elderly. The scale was first developed in 1982 by JA Yesavage and others [20]. The GDS questions are answered 'yes' or 'no', instead of a five-category response set. This simplicity enables the scale to be used with ill or moderately cognitively impaired individuals. One point is assigned to each answer and the cumulative score is rated on a scoring grid. The grid sets a range of 0–9 as 'normal', 10–19 as 'mildly depressed', and 20–30 as 'severely depressed'.

### Statistical Analysis

All the data was noted down in a pre-designed study proforma. Qualitative data was represented in the form of frequency and percentage. Quantitative data was represented using Mean  $\pm$  SD. Association between qualitative variables and presence of depression was assessed by Chi-Square test.

Multivariate analysis was done for all parameters observed as significant predictors of depression univariate analysis. A p-value < 0.05 was taken as level of significance. SPSS Version 21.0 was used for analysis.

### Results

**Table 1: Distribution of patients as per baseline data**

Baseline Variable (n-250)		N	%
Age (yrs)	61-70	178	71.2%
	71-80	62	24.8%
	>80	10	4.0%
Gender	Female	109	43.6%
	Male	141	56.4%
SES	Lower	63	25.2%
	Upper Lower	97	38.8%
	Lower Middle	45	18.0%
	Upper Middle	28	11.2%
	Upper	17	6.8%
Education	Illiterate	58	23.2%
	Upto Primary	106	42.4%
	Higher Secondary	50	20.0%
	Graduation & above	6	2.4%
Occupation	Working	89	35.6%
	Non-Working	103	41.2%
	Home-maker	58	23.2%
Marital Status	Unmarried	8	3.2%
	Married	217	86.8%
	Divorced/ Separated	11	4.4%
Activity	Independent	129	51.6%
	Dependent	121	48.4%
Type of Family	Nuclear	62	24.8%
	Joint	188	75.2%
Staying with children	No	25	10.0%
	Yes	217	86.8%
Co-morbidities	No	27	10.8%
	Yes	223	89.2%
Depression (GDS>9)	No	99	39.6%
	Yes	152	60.8%
Severity of Depression	No Depression	99	39.6%
	Mild	126	50.4%
	Moderate	22	8.8%
	Severe	3	1.2%

**Table 2: Risk Factors for depression in elderly cases**

Variable		N	Depression				p-value
			No		Yes		
Age (yrs)	61-70	178	69	38.8%	109	61.2%	0.772
	71-80	62	25	40.3%	37	59.7%	
	>80	10	5	50.0%	5	50.0%	
Gender	Female	109	54	49.5%	55	50.5%	0.006
	Male	141	45	31.9%	96	68.1%	
SES	Lower	63	18	28.6%	45	71.4%	0.155
	Upper Lower	97	43	44.3%	54	55.7%	
	Lower Middle	45	17	37.8%	28	62.2%	
	Upper Middle	28	15	53.6%	13	46.4%	
	Upper	17	6	35.3%	11	64.7%	
Education	Illiterate	58	30	51.7%	28	48.3%	0.378
	Upto Primary	106	49	46.2%	57	53.8%	
	Higher Secondary	50	18	36.0%	32	64.0%	
	Graduation & above	6	2	33.3%	4	66.7%	
Occupation	Working	89	35	39.3%	54	60.7%	0.136
	Non-Working	103	35	34.0%	68	66.0%	
	Home-maker	58	29	50.0%	29	50.0%	
Marital Status	Unmarried	8	3	37.5%	5	62.5%	0.209

	Married	217	82	37.8%	135	62.2%	
	Divorced/ Separated	25	14	56.0%	11	44.0%	
Activity	Independent	129	60	46.5%	69	53.5%	0.027
	Dependent	121	39	32.2%	82	67.8%	
Type of Family	Nuclear	62	29	46.8%	33	53.2%	0.231
	Joint	188	70	37.2%	118	62.8%	
Staying with children	No	25	8	32.0%	17	68.0%	0.518
	Yes	217	89	41.0%	128	59.0%	
Co-morbidities	No	27	20	74.1%	7	25.9%	<0.001
	Yes	223	79	35.4%	144	64.6%	

**Table 3: Multivariate analysis for predictors of depression in elderly**

Binary Logistic Regression Model							
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.
Male Gender	-0.718	0.286	6.306	1	0.012	0.488	0.278 0.854
Dependent	0.730	0.272	7.216	1	0.007	2.075	1.218 3.535
Co-morbidity Present	-1.770	0.480	13.627	1	0.000	0.170	0.067 0.436
Constant	0.568	0.219	6.750	1	0.009	1.765	

Mean age of the study cases was 67.22 years with 71.2% cases in the age range of 61 to 70 years and 4% above 80 years of age. A total of 56.4% cases were males and 43.6% were females. Overall prevalence of depression among elderly population of rural India was observed as 60.8% with 50.4% cases having mild depressive symptoms and 8.8% and 1.2% had moderate and severe symptoms respectively. The baseline data of the study participants was shown in Table 1. On univariate analysis, we observed that depression was significantly more among males (68.1% vs 50.5%;  $p=0.006$ ), those who are dependent on others for daily activities (67.8% vs 57.5%;  $p=0.027$ ) and those with associated co-morbidities i.e. either diabetes, hypertension or osteoarthritis (64.6% vs 25.9%;  $p<0.0001$ ) (Table 2). All these three variables were also observed to be significant predictors for depression in elderly population even on multi-variate analysis (Table 3).

### Discussion

The present study was conducted in rural field practice area of Department of Community Medicine, PIMS Jalandhar to estimate the prevalence and predictors of depression in the elderly population, the mean age of the study cases was 67.22 years with 71.2% cases in the age range of 61 to 70 years and 4% above 80 years of age. A total of 56.4% cases were males and 43.6% were females.

Overall prevalence of depression among elderly population as observed by present study using GSD15 was 60.8% with 50.4% cases having mild depressive symptoms and 8.8% and 1.2% had moderate and severe symptoms respectively.

Depression in the elderly in India varies between 6% to 50%. WHO states that the overall prevalence rate of depressive disorders among the elderly ranges from 10% and 20% depending on the cultural situations of the area. [9-11] In different studies conducted, as by Nair et al. in Dharwad, the

prevalence reported was 32.4%, while it was reported to be 39% by Vishal et al. in the urban poor locality of Surat.[12,13] The prevalence of geriatric depression in the studies by Naveen et al. at Allahabad and Sahani et al. at Jammu and Kashmir was 19.7%, and 40.3%, respectively.[14,15] While Sahoo et al. has reported it to be 59% in their study conducted in eastern India.[8] These findings are also congruent with that of a community-based cross-sectional study done in Chitradurga, India where they observed the prevalence to be 60%.[16]

The high prevalence in our study sample is disturbing and alarming. Most of the elderly in this area of Punjab are residing without their children because of the emigration of the youth to western countries which can be one of the reasons for it. Although it cannot be concluded via GDS score but it is definitely indicative of a high prevalence of depressive disorders in the community-dwelling elderly of this area. This warrants further deep evaluation to diagnose depressive disorders and initiation of appropriate treatment. However differential idioms of expression used and cultural variations of the area might also account for such a high prevalence of depressive symptoms detected.

On univariate analysis, present study observed that depressive symptoms were significantly more among males (68.1% vs 50.5%;  $p=0.006$ ) especially those who are dependent on others for daily activities (67.8% vs 57.5%;  $p=0.027$ ) and also those who have associated co-morbidities i.e. either diabetes, hypertension or osteoarthritis (64.6% vs 25.9%;  $p<0.0001$ ). On multi-variate analysis, all these three variables were further observed to be significant and major predictors of depression in elderly population of this area. In developing countries like India, the prevalence of NCDs (Non communicable diseases) in the elderly population is increasing rapidly and so are its potential consequences. The present study observed that these diseases majorly

Diabetes, Hypertension and osteoarthritis are the predominant factors associated with depression in elderly. There are previous studies from India, which have evaluated prevalence of CI (cognitive impairment) in elderly (aged >65 years) by using the HMSE or modified MMSE, reported prevalence ranging from 3.5 to 11.5%, however they have been not done specifically among the patients with non-communicable diseases. While the present data from other parts of the world indicates that the prevalence of dementia in patients with NCD ranges from 2.34 to 38.6% [17-19].

Recently a cross-sectional study was conducted among the patients attending the NCDs clinic of a community RHC run in collaboration with the Postgraduate Institute Medical Education and Research (PGIMER), Chandigarh. This study reported that the psychiatric morbidity was found in 39.51% of the patients, with depression in 35.5% and anxiety disorder in 29.9% of cases, with a majority of them having comorbid depression and anxiety and most of the patients had diabetes and hypertension.[6]

These findings suggest that patients with non-communicable diseases form a high-risk group for depressive disorders. Therefore, there is a need for screening policy for these patients routinely for cognitive functioning and psychiatric disorders. These patients must also be provided information about the condition and factors contributing to the same, lifestyle changes, and cognitive exercises to prevent depression and its early detection.

### Conclusion

To conclude the present study observed that depression was significantly more among males specifically in those who are dependent on others for daily activities and those with associated comorbidities i.e. either diabetes, hypertension or osteoarthritis. All these three variables were also observed to be significant predictors for depression in elderly.

Hence, it should be considered that patients with NCDs are routinely screened for cognitive functioning and they must be made aware about the development of depression, factors contributing to the same, lifestyle changes and cognitive exercises to prevent depression and early detection. Similarly, these patients must also be routinely screened for psychiatric morbidity and this must be treated adequately.

An amalgamated approach with the family as an important unit of care and awareness through field health care staff can act as a mental health resource. In addition, designing sustainable policies on palliative care and developing elderly-friendly services, living conditions, and the environment can ameliorate the escalating burden.

### References

1. Ageing and Health. WHO Factsheet. Available at <https://www.who.int/india/health-topics/ageing>.
2. Diagnostic A. statistical manual of mental disorders fifth edition DSM-5. Edisi ke-5 Washington DC: American Psychiatric Association. 2013.
3. Depression W. Other common mental disorders: global health estimates. Geneva: World Health Organization. 2017:1–24.
4. Barua A, Ghosh MK, Kar N, Basilio MA. Prevalence of depressive disorders in the elderly. *Ann Saudi Med* 2011; 31:620-4.
5. Roh HW, Hong CH, Lee Y, Oh BH, Lee KS, Chang KJ, et al. Participation in physical, social, and religious activity and risk of depression in the elderly: a community-based three-year longitudinal study in Korea. *PLoS one*. 2015;10(7):e0132838.
6. Mehra A, Sangwan G, Grover S, Kathirvel S, Avasthi A. Prevalence of Psychiatric Morbidity and Cognitive Impairment among Patients Attending the Rural Noncommunicable Disease Clinic. *J Neurosci Rural Pract*. 2020 Oct;11(4):585-592.
7. Fiske A, Wetherell JL, Gatz M. Depression in older adults. *Ann Rev Clin Psychol* 2009; 5:363-89.
8. Sahoo SS, Panda UK, Bhatia V. Elderly depression: A public health dilemma; challenges and opportunities. *Community Fam Med* 2017; 3:12-5.
9. Sengupta P, Benjamin AI. Prevalence of depression and associated risk factors among the elderly in urban and rural field practice areas of a tertiary care institution in Ludhiana. *Indian J Public Health* 2015; 59:3-8.
10. Goyal A, Kajal KS. Prevalence of depression in elderly population in the southern part of Punjab. *J Fam Med Prim Care* 2014; 3:359-61. Rangaswamy SM. *World Health Report: Mental Health: New Understanding New Hope*. Geneva, Switzerland: The World Health Organization; 2001.
11. Wig NN. World health day, 2001. *Indian J Psychiatry* 2001; 43:1-4.
12. Nair SS, Hiremath S, Nair SS. Depression among geriatrics: Prevalence and associated factors. *Int J Cur Res Rev*. 2013; 8:110–2.
13. Vishal J, Bansal RK, Swati P, Bimal T. A study of depression among aged in Surat city. *Natl J Community Med*. 2010; 1:47–9.
14. Naveen KH, Goel AD, Dwivedi S, Hassan MA. Adding life to years: Role of gender and social and family engagement in geriatric depression in rural areas of Northern India. *Fam Med Prim Care*. 2020; 9:721–8.
15. Sahni B, Bala K, Kumar T, Narangyal A. Prevalence and determinants of geriatric de-

- pression in North India: A cross-sectional study. *Fam Med Prim Care*. 2020; 9:2332–6.
16. BKA AM, NG MR. Prevalence of cognitive impairment and depression among elderly population in urban Chitradurga. *Journal of Preventive Medicine and Holistic Health*. 2020; 6(1):22–6.
  17. Ren L, Bai L, Wu Y et al. Prevalence of and risk factors for cognitive impairment among elderly without cardio- and cerebrovascular diseases: a population-based study in Rural China. *Front Aging Neurosci*. 2018; 10:62.
  18. Gao Y, Xiao Y, Miao R et al. The prevalence of mild cognitive impairment with type 2 diabetes mellitus among elderly people in China: a cross-sectional study. *Arch Gerontol Geriatr*. 2016; 62:138–142.
  19. Ji Y, Shi Z, Zhang Y. Prevalence of dementia and main subtypes in rural northern China. *Dement Geriatr Cogn Disord* 2015; 39(5-6):294–302.
  20. Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: A preliminary report. *J Psychiatr Res*. 1982; 17:37–49.