International Journal of Research in Medical Sciences
Sharma S et al. Int J Res Med Sci. 2026 Feb;14(2):500-505
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20260233

Original Research Article

Prevalence and correlates of depression and cognitive impairment among geriatric patients in a tertiary care hospital in Northern India: a cross-sectional study

Shweta Sharma, Abha Gupta, Satyam, Garima Chaudhary*

Department of Medicine, LLRM Medical College, Meerut, UP, India

Received: 08 October 2025
Revised: 12 November 2025
Accepted: 24 December 2025

***Correspondence:**
Dr. Garima Chaudhary,
E-mail: garimachaudharyllrm@gmail.com

ABSTRACT

Background: India's rapidly aging population faces a significant burden of neuropsychiatric disorders, which are often underdiagnosed in primary care due to atypical presentations and a focus on physical ailments. This study aimed to quantify the prevalence of depression and cognitive impairment and elucidate their socio-demographic and clinical correlates in geriatric patients at a tertiary care hospital in Northern India. A hospital-based, analytical cross-sectional study was conducted over six months in the Medicine Outpatient Department.
Methods: One hundred patients aged ≥60 years were recruited via consecutive sampling. Socio-demographic and clinical data were collected, and the geriatric depression scale-15 (GDS-15) and mini-mental state examination (MMSE) were used to assess depression and cognitive status, respectively.
Results: The mean age was 74.7±6.8 years, with 60% male participants. Multimorbidity was highly prevalent (80%). The prevalence of depressive symptoms (GDS-15 ≥5) was 57%, predominantly mild. Cognitive impairment (MMSE <24) was present in 45% of the cohort. Coronary artery disease (CAD) was significantly correlated with higher depression scores. Diabetes mellitus and recent hospitalization were significantly associated with poorer cognitive performance, while higher educational attainment was a protective factor for cognition.
Conclusions: There is a high burden of depression and cognitive impairment among geriatric outpatients, strongly linked with specific clinical conditions. Integrating routine screening for these disorders into primary care is essential for holistic geriatric health management.

Keywords: Geriatric depression, Cognitive impairment, Multimorbidity, GDS-15, MMSE, India

INTRODUCTION

The 21st century is witnessing a profound demographic transition globally, with India at the forefront of this change. The proportion of the population aged 60 years and above is projected to escalate from 8.6% in 2011 to nearly 20% by 2050, translating to over 300 million individuals.[1,2] This rapid aging, while a testament to improved life expectancy, presents a formidable challenge to a healthcare system historically oriented toward infectious diseases and maternal-child health.

Homeostenosis a progressive loss of physiological reserve in several organ systems, is a hallmark of ageing, an unavoidable biological process.[3] This makes non-communicable diseases (NCDs) more common in older persons, and in geriatric management, multimorbidity-the presence of two or more chronic conditions-is increasingly the rule rather than the exception.[4] In India, studies indicate that over 30% of the elderly experience multimorbidity, leading to complex polypharmacy, functional decline, and increased healthcare utilization.[5]

Concomitantly, the aging brain is vulnerable to a spectrum of neuropsychiatric disorders. Geriatric depression and cognitive impairment represent two of the most significant and often interlinked challenges. Depression in late life is frequently atypical, manifesting with somatic symptoms, irritability, or cognitive complaints, thereby masquerading as a physical illness and leading to underdiagnosis in primary care settings.[6] Its prevalence in Indian community-based studies ranges from 20% to 40%.[7,8] Cognitive impairment, spanning from mild cognitive impairment (MCI) to major neurocognitive disorders (dementia), profoundly impacts an individual's ability to manage chronic conditions, adhere to treatment, and maintain independence, thereby accelerating disability.[9]

The bidirectional relationship between physical and mental health is well-documented. Chronic conditions like cardiovascular disease and diabetes mellitus are established risk factors for depression through pathways involving chronic inflammation, hypothalamic-pituitary-adrenal (HPA) axis dysregulation, and psychosocial distress.[10] Similarly, these conditions contribute to cognitive decline via cerebrovascular damage and metabolic disturbances.[11] Despite this intricate interplay, geriatric healthcare in India remains largely syndromic and organ-specific, with psychological assessment often relegated to the background.

While national-level surveys like the longitudinal ageing study in India (LASI) provide macro-level data, there is a paucity of clinic-based studies from Northern India that utilize standardized instruments to dissect the relationship between specific chronic diseases and psychological morbidity in the elderly.

This study, therefore, aims to fill this critical gap by systematically investigating the prevalence and correlates of depression and cognitive impairment among geriatric patients presenting to a tertiary care hospital's general medicine OPD. The findings will provide empirical evidence to advocate for the integration of mental health screening into routine geriatric care, ultimately aiming to improve the quality of life for this vulnerable population.

METHODS

Study design and setting

Over the course of six months (July 1, 2023, to December 31, 2023), this hospital-based, analytical cross-sectional study was carried out in the medicine outpatient department of Swami Vivekananda Polyclinic (SVBP) Hospital, which is connected to Lala Lajpat Rai Memorial (LLRM) Medical College in Meerut, Uttar Pradesh. The hospital is a tertiary care government institution that caters to a large, socioeconomically diverse population from urban and rural areas of Western Uttar Pradesh, making it an ideal setting for studying a representative geriatric cohort.

Study participants and sampling

A total of 100 consecutive geriatric patients (aged ≥60 years) attending the medicine OPD during the study period were enrolled after assessing for eligibility. The sampling was consecutive, ensuring minimal selection bias and a representative sample of the clinic population on the days of data collection.

The study enrollment was limited to patients aged 60 years or older who were attending the medicine OPD and were capable of providing verbal informed consent. However, individuals were excluded if they had severe auditory or visual impairments preventing reliable assessment, were in severe distress or required urgent medical attention, had a known severe psychiatric disorder that could confound the results, or were simply unwilling to participate.

Sample size calculation

Using the formula for cross-sectional studies, the sample size was determined:

$N=(Z^2\times P\times(1-P))/d^2$

Where:

Z=Z statistic for a 95% confidence level (1.96)

P=Anticipated prevalence of morbidity (depression/ cognitive impairment) among the geriatric population. As per previous Indian studies, this was assumed to be 50% to yield the maximum sample size.[12]

d=Absolute precision or margin of error (set at 10%). The calculation yielded a sample size of approximately 96, which was rounded up to 100.

Data collection tools and technique

Data collection was performed through a face-to-face interview in a quiet room within the OPD, conducted by the principal investigator to ensure consistency. The assessment package consisted of:

A structured proforma

A structured proforma was captured.

Sociodemographic details

Age, gender, education, occupation, marital status, living arrangements, monthly income, and socioeconomic status classified using the Modified Kuppuswamy scale.[13]

Clinical profile

Detailed history of present and past illnesses, with a specific checklist for common chronic conditions

(Hypertension, diabetes mellitus, CAD, stroke, chronic kidney disease (CKD), COPD/asthma, osteoarthritis, etc.). History of hospitalization in the preceding 6 months and treatment compliance (assessed via self-report and pill count/medical records when possible) were also recorded.

Standardized assessment instruments

GDS-15

A validated, 15-item self-report questionnaire specifically designed for screening depression in the elderly. It focuses on cognitive and affective symptoms, minimizing confounding somatic items. Scores are interpreted as follows: 0-4 (Normal), 5-8 (Mild depression), 9-11 (Moderate depression), and 12-15 (Severe depression).[14] The Hindi version was used for non-English speaking participants.

MMSE

A widely used 30-point screening tool for cognitive function, assessing orientation, registration, attention, recall, language, and visuospatial skills. A score below 24 is generally indicative of cognitive impairment. Scores are often adjusted for education level.[15] The MMSE was administered in the participant's preferred language (Hindi or English).

Ethical considerations

The LLRM medical college institutional ethics committee (IEC) examined and approved the study protocol. All possible participants were given an explanation of the study's goals, methods, risks, and advantages in Hindi, their native tongue. Prior to enrolment, written informed permission was acquired. On all data collecting forms, unique identification numbers were used in place of names to ensure confidentiality.

Statistical analysis

The meticulously documented data was analysed in a Microsoft excel spreadsheet using the statistical package for the social sciences (SPSS) version 26.0. Descriptive statistics were computed for each variable; continuous variables were presented as mean and standard deviation (SD), while categorical data were summarised as frequencies and percentages. The association between continuous variables (such psychological scores and clinical features) was examined using Pearson's correlation coefficient. A p value of less than 0.05 was considered statistically significant for all analyses.

RESULTS

Socio-demographic and clinical characteristics

A total of 100 geriatric patients were included in the final analysis. The mean age of the participants was 74.7 years (±6.8 SD), with the largest proportion (36%) belonging to the 80-89 years age group, indicating a study population of "old-old" and "oldest-old" adults. The cohort was predominantly male (60%) and married (81%). A significant majority (72%) had low educational attainment (primary education or illiterate). Socioeconomic status assessment revealed that 70% belonged to the 'lower' class according to the Kuppuswamy scale, and 50% reported a monthly income of less than ₹12,000, reflecting a economically disadvantaged sample.

Clinically, hypertension (45%) and diabetes mellitus (35%) were the most prevalent chronic conditions. Other common morbidities included anaemia (27%), chronic obstructive pulmonary disease (COPD)/asthma (25%), and osteoarthritis (25%). The burden of multimorbidity was substantial, with 80% of the participants having two or more chronic conditions. A significant proportion (35%) had a history of hospitalization within the last six months, suggesting a subgroup with recent acute health deteriorations.

Table 1: Socio-demographic profile of the study participants (n=100).

Age group (in years)	N	Percentage (%)
60-69	32	32
70-79	32	32
80-89	36	36

Table 2: Clinical profile and prevalence of chronic conditions (n=100).

Chronic illness	N	Prevalence (%)
Hypertension	45	45
Diabetes mellitus	35	35
Anemia	27	27
COPD/asthma	25	25
Osteoarthritis	25	25
CAD	20	20
CKD	15	15
Stroke (Cerebrovascular acc.)	15	15
Tuberculosis (pulmonary)	5	5
Chronic liver disease	5	5
Cancer (any type)	1	1

Prevalence of depression and cognitive impairment

Assessment with the GDS-15 revealed that 57% of the participants scored above the cutoff for depressive symptoms (≥5). The majority of these cases (56% of the total sample) were in the mild range (GDS score 5-8), while only 1% had moderate depression. Severe depression was not identified in any participant.

Cognitive assessment using the MMSE indicated that 45% of the cohort had scores suggestive of cognitive impairment (<24). This impairment was predominantly mild (37% of total sample, MMSE 18-23), while 8% had moderate impairment (MMSE 10-17). No participant was found to have severe cognitive impairment (MMSE <10).

Table 3: Prevalence of depression (GDS-15) and cognitive impairment (MMSE) among participants.

GDS-15 depression category	GDS score range	N	%
Normal (no depression)	0-4	43	43%
Mild depression	5-8	56	56%
Moderate depression	9-11	1	1%
Severe depression	12-15	0	0%

Correlates of depression and cognitive impairment

Bivariate correlation analysis was performed to identify factors associated with depression (GDS-15 score) and cognitive impairment (MMSE score).

Depression

A statistically significant positive correlation was found between the presence of CAD and higher depression scores (r=0.263, p=0.008). Notably, male gender was also significantly associated with higher depression scores (r=0.282, p=0.004).

The total number of chronic illnesses (multimorbidity) showed a positive but non-significant trend (r=0.165, p=0.101).

Cognitive impairment

A strong negative correlation was observed between diabetes mellitus and MMSE scores (r=-0.305, p=0.002), indicating poorer cognitive performance in diabetic patients.

A history of recent hospitalization was also significantly associated with lower MMSE scores (r=-0.274, p=0.006). As expected, the level of educational attainment demonstrated a significant positive correlation with cognitive scores (r=0.197, p=0.050).

Table 4: Correlation matrix of clinical and socio-demographic factors with depression (GDS-15) and cognition (MMSE) scores.

Sociodemographic factor	Depression, (GDS-15) r (p)	Anxiety (GAD-7) r (p)	Cognition (MMSE-30) r (p)	Sleep quality (PSQI) r (p)	Quality of life (QOL) r (p)
Age (in years)	0.018 (p=0.858)	-0.069 (p=0.498)	0.159 (p=0.113)	0.140 (p=0.165)	0.074 (p=0.465)
Gender (Male=1, Female=0)	0.282 (p=0.004)	0.105 (p=0.296)	-0.033 (p=0.745)	0.060 (p=0.554)	-0.043 (p=0.668)
Marital status (Married=1)	-0.019 (p=0.848)	-0.127 (p=0.206)	-0.041 (p=0.684)	-0.047 (p=0.642)	-0.083 (p=0.409)
Education level (Illiterate=0, Higher secondary=3)	-0.103 (p=0.307)	0.189 (p=0.059)	0.197 (p=0.050)	0.023 (p=0.822)	-0.094 (p=0.354)
Monthly income (in INR, ₹)	0.055 (p=0.588)	-0.020 (p=0.840)	-0.115 (p=0.255)	-0.014 (p=0.893)	0.042 (p=0.676)
Socioeconomic status (SES score)	0.034 (p=0.734)	-0.081 (p=0.426)	-0.153 (p=0.129)	-0.035 (p=0.729)	0.044 (p=0.662)

DISCUSSION

This cross-sectional study provides a detailed clinic-psychological profile of geriatric outpatients in a North Indian tertiary care setting. The findings paint a concerning picture of high psychological morbidity tightly interwoven with physical disease burden.

The observed prevalence of depressive symptoms (57%) and cognitive impairment (45%) is substantial and aligns with the upper ranges reported in previous Indian studies.[7,16] This high prevalence underscores the silent epidemic of mental health issues in the elderly, which often remains unaddressed in the context of an overburdened healthcare system focused on acute physical complaints. The predominance of mild depressive symptoms is particularly noteworthy. While not meeting the criteria for major depressive disorder, these sub-syndromal symptoms significantly impair quality of life, increase functional disability, and are a known risk factor for the development of major depression.[17] Their high prevalence calls for early detection and low-intensity interventions.

The study's most significant contribution lies in elucidating specific disease-psychology correlations. The strong association between CAD and depression (p=0.008) reinforces the well-established concept of the "heart-brain axis." Potential mechanisms include shared pathophysiological pathways like endothelial dysfunction,

platelet activation, and chronic inflammation, alongside the psychological burden of living with a chronic, life-limiting illness.[18] The unexpected finding of higher depression scores among males warrants further investigation. It may be attributed to culturally constructed masculine norms that discourage emotional expression, leading to internalized distress, or to unique psychosocial stressors faced by elderly men in this region, such as loss of the provider role post-retirement.[19]

The robust correlation between diabetes mellitus and cognitive impairment (p=0.002) highlights the concept of "diabetic cognopathy" or vascular cognitive impairment. Chronic hyperglycemia, insulin resistance, and microvascular damage can lead to cerebral hypoperfusion and white matter lesions, accelerating cognitive decline.[11] The link between recent hospitalization and cognitive deficits (p=0.006) is consistent with the phenomenon of "post-hospitalization cognitive decline," potentially triggered by a combination of the acute illness itself, sedating medications, sleep disruption, and the stressful hospital environment.[20]

The positive correlation between education and MMSE scores (p=0.050) provides support for the "cognitive reserve" hypothesis. Higher educational attainment is thought to create more efficient neural networks, providing a buffer against the clinical manifestation of brain pathology.[21] This finding also underscores the necessity of interpreting MMSE scores in the context of the patient's educational background to avoid over diagnosis of cognitive impairment in illiterate individuals.

A critical, and somewhat counterintuitive, finding was the lack of a significant correlation between the sheer number of chronic illnesses (multimorbidity) and psychological scores. This suggests that the *qualitative nature* of the illness (e.g., the symptomatic burden of CAD or the central nervous system impact of diabetes) may be more psychologically salient than the quantitative count. It may also reflect the role of resilience, coping strategies, and social support in mitigating the psychological impact of multiple comorbidities in some individuals.

Strengths and limitations

The strengths of this study include the use of validated, geriatric-specific screening tools, a systematic consecutive sampling method minimizing selection bias, and a comprehensive assessment of both clinical and sociodemographic correlates. Nonetheless, a number of restrictions must be noted. Any conclusion of causality is precluded by the cross-sectional design. Although sufficient for primary correlations, the small sample size may restrict the findings' generalisability and ability to identify weaker connections.

The participants in the study were people who sought care, which may have made them sicker than the elderly who live in the community. The study was carried out in a single tertiary care facility. Furthermore, the assessment relied on screening tools rather than definitive diagnostic criteria for depression and dementia.

CONCLUSION

In conclusion, this study reveals a high and clinically significant burden of depression and cognitive impairment among geriatric patients in a North Indian outpatient setting. More importantly, it identifies specific, modifiable risk factors-namely, CAD, diabetes mellitus, and recent hospitalization-that are strongly correlated with these psychological conditions.

These findings have profound implications for clinical practice and public health policy. They argue compellingly for a shift from a purely organ-based, syndromic approach to a more holistic, person-centred model of geriatric care. The routine integration of brief, validated screening tools like the GDS-15 and MMSE into the general medicine OPD is not just advisable but essential. Patients with CAD, diabetes, or a recent hospital discharge should be considered a high-priority group for such screening. Early identification would enable timely interventions, such as patient education, counseling, pharmacological management, and caregiver support, which could significantly improve functional outcomes, enhance quality of life, and reduce the overall burden of disease. Future research should focus on longitudinal studies to establish causality and on designing and testing the efficacy of integrated care models in resource-constrained settings like India.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sharma S, Gupta A, Satyam, Chaudhary G. Prevalence and correlates of depression and cognitive impairment among geriatric patients in a tertiary care hospital in Northern India: a cross-sectional study. Int J Res Med Sci 2026;14:500-5.