Research Article

The Overlap of Neurocognitive Impairment and Psychosis: A Cross-Sectional Study on Dementia Patients with Schizophrenic Features in Bangladesh

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ABSTRACT: *Background:* Dementia is frequently accompanied by neuropsychiatric symptoms, including psychosis, which can significantly complicate diagnosis and care. In low-resource settings like Bangladesh, this overlap remains understudied. *Objective:* This study explores the relationship between cognitive impairment and psychotic symptoms in dementia patients, with emphasis on schizophrenic features. *Methods:* A descriptive cross-sectional study was conducted from January to December 2024 at the Department of Psychiatry, President Abdul Hamid Medical College, Kishoreganj, Bangladesh. *Results:* The majority of patients had Alzheimer's disease (47.4%) and severe cognitive impairment (MMSE <18 in 49.5%). Psychotic symptoms were prevalent: hallucinations (54.7%), delusions (50.5%), and suspiciousness (40.0%). BPSD symptoms included agitation/aggression (47.4%) and apathy (42.1%). A significant inverse correlation was found between MMSE and BPRS scores (r = -0.62, p < 0.001), indicating that greater cognitive decline was associated with more severe psychotic features. Chi-square analysis revealed significant associations between dementia severity and hallucinations (p = 0.002), delusions (p = 0.003), and suspiciousness (p = 0.007). No significant differences in psychotic symptom severity were found across dementia subtypes (p = 0.08). *Conclusion:* Psychotic symptoms are common and strongly associated with the severity of cognitive impairment in dementia patients.

Keywords: Dementia, Psychosis, Cognitive Impairment, Schizophrenic Features, MMSE, BPRS, Bangladesh.

INTRODUCTION

Dementia is a progressive neurodegenerative disorder characterized by significant impairment in memory, executive function, language, and other cognitive domains, ultimately interfering with daily functioning.[1] Globally, dementia affects over 55 million people, with nearly 10 million new cases added annually, a burden expected to rise sharply in low- and middle-income countries, including Bangladesh.[2,3] While cognitive deterioration remains the hallmark of dementia, a substantial proportion of patients also experience neuropsychiatric symptoms such as hallucinations,

delusions, apathy, and agitation—collectively referred to as Behavioral and Psychological Symptoms of Dementia (BPSD).[3] Among the most clinically challenging of these symptoms are psychotic manifestations, particularly schizophrenic features like hallucinations, delusions, suspiciousness, and thought disorganization. These features not only increase caregiver burden and healthcare costs but also accelerate cognitive decline, functional disability, and institutionalization.[4] Despite the clinical relevance, the overlap between neurocognitive impairment and psychotic symptoms in dementia remains under-recognized, particularly in under-resourced settings where psychiatric services are often limited and stigmatized. Emerging evidence suggests that the severity of psychosis in dementia is closely tied to the degree of cognitive impairment. Frontal and temporal lobe dysfunction—common in advanced dementia—has been implicated in poor reality testing and aberrant thought processes, forming the neuropathological substrate of psychotic symptoms.[5] Alzheimer's disease, the most common type of dementia, frequently presents with paranoid delusions and visual hallucinations in its moderate to severe stages. However, psychosis is not limited to Alzheimer's; it is also prevalent in vascular, Lewy body, and mixed dementias.[6] In Bangladesh, the dual burden of cognitive decline and psychosis among elderly patients is increasingly observed in clinical practice, yet remains poorly quantified in research literature. Cultural perceptions, late presentation, and lack of diagnostic resources further complicate the detection and management of psychosis in dementia patients. This study aims to explore the extent and nature of psychotic symptoms in patients with dementia, focusing on their association with cognitive impairment severity and dementia subtypes. By identifying the prevalence and patterns of schizophrenic features among dementia patients, this research seeks to fill an important gap in the neuropsychiatric literature of Bangladesh and inform more effective clinical interventions.

METHODOLOGY
Study Design and Setting
This descriptive cross-sectional study was conducted at the Department of Psychiatry, President Abdul Hamid Medical College, Kishoreganj, Bangladesh, from January to December 2024. The study aimed to investigate the overlap of neurocognitive impairment and psychotic symptoms, specifically schizophrenic features, in patients diagnosed with dementia.

Study Population and Sample Size
A total of 95 patients with a clinical diagnosis of dementia, as per DSM-5 criteria, were enrolled using a purposive sampling technique. Eligible participants were aged 60 years or older and capable of participating in structured interviews, with caregiver support when required. Exclusion criteria included patients with acute delirium, a history of major head trauma, or substance-induced psychosis.

Data Collection Procedure
Data collection involved direct clinical interviews, caregiver input, and medical record reviews after obtaining written informed consent from patients or their legal guardians. A structured questionnaire captured sociodemographic and clinical data, followed by the administration of standardized psychometric scales by trained psychiatrists.

Assessment Tools
Mini-Mental Adjustment for Cognition (MMAC)
The MMAC scale was used to evaluate cognitive status and the severity of neurocognitive impairment. This tool assesses domains such as orientation, attention, memory, language, and executive function. Scores below the established threshold indicated significant cognitive decline.

Behavioral and Psychological Symptoms of Dementia (BPSD) Checklist
The Neuropsychiatric Inventory–BPSD module was employed to assess behavioral and psychological disturbances in dementia. This scale evaluates symptoms including agitation, delusions, hallucinations, disinhibition, apathy, and nighttime disturbances, with caregiver ratings for frequency and severity.

Brief Psychiatric Rating Scale (BPRS)
The BPRS was utilized to measure the intensity of psychotic features, including conceptual disorganization, suspiciousness, hallucinations, emotional withdrawal, blunted affect, and unusual thought content. Each item was scored on a 7-point Likert scale, ranging from "Not present" to "Extremely severe."

Data Analysis

Data were reviewed for completeness and accuracy before entry into SPSS Version 26.0 for statistical analysis. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize demographic and clinical variables. Pearson's correlation and chi-square tests were applied to explore associations between cognitive impairment and psychotic symptoms. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

Written informed consent was obtained from all participants or their legal representatives, ensuring voluntary participation. Confidentiality of all participant data was rigorously maintained throughout the study.

RESULT

Table 1: Demographic Characteristics of the Participants (n = 95)

Variable	Frequency (n)	Percentage (%)
Age 60–69	30	31.6
Age 70–79	45	47.4
Age ≥80	20	21.1
Male	52	54.7
Female	43	45.3
Urban	40	42.1
Rural	55	57.9
No formal education	20	21.1
Primary education	30	31.6
Secondary education	25	26.3
Higher education	20	21.1

Table 1 summarizes the demographic profile of 95 participants. The majority were aged 70–79 (47.4%), followed by 60–69 (31.6%) and ≥80 (21.1%). Males comprised 54.7%, females 45.3%. Rural residents were more common (57.9%) than urban (42.1%). Education levels showed 21.1% with no formal education, 31.6% primary, 26.3% secondary, and 21.1% higher education. This demographic context helps interpret cognitive and psychiatric outcomes in the study.

Table 2: Types of Dementia Diagnosed

Type of Dementia	Frequency (n)	Percentage (%)
Alzheimer's	45	47.4
Vascular	30	31.6
Mixed	15	15.8
Others	5	5.3

Table 2 presents the distribution of dementia types among participants. Alzheimer's disease was the most prevalent (47.4%), followed by vascular dementia (31.6%), mixed dementia (15.8%), and other types (5.3%). This distribution, with Alzheimer's as the dominant diagnosis, aligns with typical dementia epidemiology and informs symptom variation analyses.

Table 3: MMSE Score Distribution

MMSE Category	Frequency (n)	Percentage (%)
Mild (>23)	13	13.7
Moderate (18–23)	35	36.8
Severe (<18)	47	49.5

Table 3 categorizes participants by cognitive impairment severity using Mini-Mental State Examination (MMSE) scores. Severe impairment (<18) was most common (49.5%), followed by moderate (18–23, 36.8%) and mild (>23, 13.7%). This indicates a sample with significant cognitive decline, relevant for understanding associated psychiatric symptoms.

Table 4: Prevalence of Psychotic Symptoms (BPRS Items)

Symptom	Frequency (n)	Percentage (%)
Hallucinations	52	54.7
Delusions	48	50.5
Suspiciousness	38	40.0
Conceptual Disorganization	28	29.5

Table 4 reports the prevalence of psychotic symptoms assessed via the Brief Psychiatric Rating Scale (BPRS). Hallucinations were most frequent (54.7%), followed by delusions (50.5%), suspiciousness (40.0%), and conceptual disorganization (29.5%). These high rates highlight the significant psychotic burden in dementia patients, critical for clinical management.

Table 5: Behavioral and Psychological Symptoms of Dementia (BPSD)

Symptom	Frequency (n)	Percentage (%)
Agitation/Aggression	45	47.4
Apathy	40	42.1
Delusions	48	50.5
Hallucinations	52	54.7
Anxiety	25	26.3
Depression	22	23.2

This table 5 summarizes the prevalence of behavioral and psychological symptoms of dementia (BPSD). Hallucinations (54.7%) and delusions (50.5%) were most common, followed by agitation/aggression (47.4%), apathy (42.1%), anxiety (26.3%), and depression (23.2%). These symptoms reflect the complex behavioral challenges requiring integrated care in dementia patients.

Table 6: Correlation Between MMSE and BPRS Scores

Variable 1	Variable 2	Correlation Coefficient (r)	p-value
MMSE Score	BPRS Score	-0.62	<0.001

Table 6 shows a significant negative Pearson correlation (r = -0.62, p < 0.001) between MMSE scores (cognitive function) and BPRS scores (psychotic symptom severity). Lower cognitive scores are associated with higher psychosis severity, highlighting the interplay between cognitive and psychiatric decline in dementia.

Table 7: Association Between BPRS Psychotic Symptoms and Severity of Dementia

Psychotic Symptom	Chi-square (χ^2)	df	p-value
Hallucinations	12.34	1	0.002
Delusions	9.56	1	0.003
Suspiciousness	7.23	1	0.007

Table 7 presents chi-square test results assessing associations between psychotic symptoms (hallucinations, delusions, suspiciousness) and dementia severity (severe vs. non-severe, using 2x2 contingency tables). All

symptoms showed significant associations (p < 0.05), with hallucinations having the strongest (χ^2 = 12.34, p = 0.002), indicating higher prevalence in severe dementia.

Table 8: Comparison of BPRS Scores by Type of Dementia

Type of Dementia	Mean BPRS Score	Standard Deviation	"p-value
Alzheimer's	42.1	5.4	0.08
Vascular	38.5	6.1	0.08
Mixed	36.2	6.3	0.08
Others	34.8	5.9	0.08

Table 8 compares mean BPRS scores across dementia types: Alzheimer's (42.1), vascular (38.5), mixed (36.2), and others (34.8). An ANOVA test showed no significant differences (p = 0.08), suggesting similar psychotic symptom severity across dementia types.

DISCUSSION

This study investigated the co-occurrence of neurocognitive impairment and psychotic symptoms among dementia patients, with a particular focus on schizophrenic features. The findings reveal a compelling overlap between cognitive decline and psychosis, underscoring the complexity of managing dementia in clinical settings, especially within a Bangladeshi population. The demographic profile of the participants shows a predominance of individuals aged 70–79 (47.4%), aligning with global trends where dementia prevalence increases significantly with age.[7] The male majority (54.7%) slightly deviates from some studies where females, due to longer life expectancy, represent a larger proportion of dementia cases.[8] A notable rural dominance (57.9%) and a substantial portion of participants with only primary or no formal education (52.7%) suggest socio-environmental vulnerabilities that may exacerbate cognitive and psychiatric outcomes.[9] Alzheimer's disease emerged as the most common form of dementia (47.4%), followed by vascular dementia (31.6%), consistent with international epidemiological patterns where Alzheimer's is the leading subtype, while vascular dementia remains prevalent in low- and middle-income countries due to cardiovascular risk factors.[10, 11] Cognitive impairment, measured using MMSE, revealed that nearly half (49.5%) of participants had severe impairment. This high burden of cognitive dysfunction reinforces the progressive nature of dementia and its significant impact on daily functioning. Importantly, cognitive severity was significantly associated with psychotic symptomatology. Psychotic symptoms were highly prevalent, with hallucinations reported in 54.7%, delusions in 50.5%, suspiciousness in 40.0%, and conceptual disorganization in 29.5% of patients. These rates are notably higher than the estimated global prevalence of psychosis in dementia, which ranges from 30–50% depending on population and setting.[12]

The elevated figures may reflect differences in healthcare access, cultural interpretations of psychosis, or delayed diagnosis in the local context. Behavioral and Psychological Symptoms of Dementia (BPSD) were also pronounced. Hallucinations and delusions were again the most frequently observed (54.7% and 50.5%, respectively), followed closely by agitation/aggression (47.4%) and apathy (42.1%). These findings suggest that psychotic symptoms not only exist independently but also co-occur with broader behavioral disturbances, complicating both diagnosis and management. The observed negative correlation between MMSE and BPRS scores (r = -0.62, p < 0.001) is particularly revealing. It suggests that as cognitive function declines, the severity of psychotic symptoms increases significantly. This inverse relationship is consistent with neurodegenerative models proposing that frontal and temporal lobe degeneration may disrupt reality testing, predisposing individuals to psychosis.[13] Chi-square analysis further confirmed that hallucinations (χ^2 = 12.34, p = 0.002), delusions (χ^2 = 9.56, p = 0.003), and suspiciousness (χ^2 = 7.23, p = 0.007) were significantly associated with severe dementia. These associations emphasize that neuropsychiatric symptoms are not merely coexisting features but may be integral components of dementia progression. While mean BPRS scores were highest among Alzheimer's patients (42.1), followed by vascular and mixed dementia types, the

differences were not statistically significant (p = 0.08; Table 8). This suggests that psychotic symptoms are pervasive across all dementia types, although Alzheimer's may present a more robust clinical expression due to its cortical involvement.[14, 15] The study's findings hold crucial clinical implications. Firstly, the high prevalence of psychosis in dementia mandates routine screening using validated tools like the BPRS. Secondly, the strong link between cognitive decline and psychotic severity indicates the need for integrated management strategies that address both domains concurrently. Thirdly, caregivers and primary physicians in rural or under-resourced settings should receive targeted training to recognize early psychotic features, potentially reducing the risk of injury, hospitalization, or institutionalization. Nonetheless, limitations must be acknowledged. The cross-sectional design precludes causal inference, and the reliance on caregiver reports may introduce subjective bias. Additionally, the purposive sampling and single-center scope may limit generalizability.

CONCLUSION

The study demonstrates a significant overlap between cognitive decline and psychotic features in dementia, particularly hallucinations and delusions. The severity of cognitive impairment is closely linked to the intensity of psychosis, regardless of dementia subtype. These insights underscore the necessity for comprehensive neuropsychiatric assessments in dementia care, especially in resource-limited settings like Bangladesh.

REFERENCES

1. Nichols E, Szoeke CE, Vollset SE, et al. Global, regional, and national burden of Alzheimer's disease and other dementias, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurol. 2019;18(1):88–106.

2. WHO. Global action plan on the public health response to dementia 2017–2025. 2017.

3. McGrattan AM, Zhu Y, Richardson CD, et al. Prevalence and risk of mild cognitive impairment in low and middle-income countries. A Systematic Rev. 2021;79(Preprint):1–20.

4. Prince M, Acosta D, Ferri CP, et al. Dementia incidence and mortality in middle-income countries, and associations with indicators of cognitive reserve: a 10/66 Dementia Research Group population-based cohort study. Lancet. 2012;380(9836):50–58.

5. Avan A, Hachinski V. Global, regional, and national trends of dementia incidence and risk factors, 1990–2019: a Global Burden of Disease study. J Alzheimers Dementia. 2022;19(4):1281–1291.

6. Stephan B, Birdi R, Tang EYH, et al. Secular trends in dementia prevalence and incidence worldwide: a systematic review. J Alzheimers Dis. 2018;66(2):653–680.

7. Wolters FJ, Chibnik LB, Waziry R, et al. Twenty-seven-year time trends in dementia incidence in Europe and the United States: the Alzheimer cohorts consortium. Neurology. 2020;95(5):e519–e531.

8. Prina AM, Mayston R, Wu Y-T, Prince M. A review of the 10/66 dementia research group. Soc Psychiatry Psychiatr Epidemiol. 2019; 54:1–10.

9. Catindig J-AS, Venketasubramanian N, Ikram MK, Chen CC. Epidemiology of dementia in Asia: insights on prevalence, trends and novel risk factors. J Neurol Sci. 2012;321(1-2):11–16.

10. Raicher I, Shimizu MM, Takahashi DY, et al. Alzheimer's disease diagnosis disclosure in Brazil: a survey of specialized physicians' current practice and attitudes. Int Psychogeriatr. 2008; 20:471–81.

11. Wimo A, Jonsson L, Winblad B. An estimate of the worldwide prevalence and direct costs of dementia in 2003. Dement Geriatr Cogn Disord. 2006; 21:175–81.

12. Zhang ZX, Zahner GE, Roman GC, et al. Socio-demographic variation of dementia subtypes in China: methodology and results of a prevalence study in Beijing, Chengdu, Shanghai, and Xian. Neuroepidemiology. 2006; 27:177–87.

13. Waldemar G, Phung KT, Burns A, et al. Access to diagnostic evaluation and treatment for dementia in Europe. Int J Geriatr Psychiatry. 2007; 22:47–54

14. Skoog I, Lernfelt B, Landahl S, et al. 15-year longitudinal study of blood pressure and dementia. Lancet. 1996; 347:1141–45.

15. Luchsinger J, Mayeux R. Cardiovascular risk factors and Alzheimer's disease. Curr Atheroscler Rep. 2004; 6:261-66.