AN EXPLORATORY META-ANALYSIS OF DEMENTIA-RELATED BEHAVIORAL AND PSYCHOLOGICAL SYMPTOMS

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ABSTRACT

Background: *It is typical to anticipate behavioral and psychological symptoms (BPS) as a result of dementia. BPS impairs the quality of life, increases morbidity and burden, and raises healthcare expenses. Nevertheless, little research has been done on the symptom features, clinical correlations, and symptom-specific clusters that help in diagnosis, particularly in the Indian population.*

Materials and Methods: *The current research looked at the BPS clusters in dementia patients as part of a multicentric investigation in India based on different cognitive and neuropsychiatric characteristics. We conducted a cross-sectional analysis utilizing the Neuropsychiatric Inventory Questionnaire (NPI-Q), the Montreal Cognitive Assessment (MCA), and the Clinical Dementia Rating (CDR) scale to determine the degree of dementia. Also, a structured Clinical Interview for DSM-5 Research Version was used to assess each participant for the presence of a prior or present mental condition (s).*

Results*: We include the several BPS clusters that are specifically linked to dementia severity. Additionally, using linear regression analysis, we predicted three symptom clusters in mild dementia (anxiety, irritability, and abnormal motor), two in intermediate dementia (disinhibition, agitation/aggression), and three in severe dementia (delusion, euphoria/elation, and disinhibition).*

Conclusion: *The research offers understandings into the numerous symptom traits and interactions of BPS, which may be helpful to the doctor when evaluating dementia patients.*

Key words: *Behavioral and psychological symptoms, clusters, dementia*

INTRODUCTION

Alzheimer's affects memory and cognition. 24.3 million had dementia. The Creative Commons Attribution Non Commercial Share A like 4.0 License enables non-commercial remixing, adaptation, and building upon this open-access journal's articles.

4.6 million dementia cases yearly. The 2018 GBD reported 43.8 million dementia cases globally. India does. Due to fast epidemiological change, India has an aging population, rising risk factors, and rising dementia rates. India's dementia epidemic is not neuropsychiatric. Inadequate diagnosis, treatment, and prevention may cause dementia.

Dementia influences behavior and psychology. Dementia impairs intellect, behavior, and quality of life. Symptoms impact patients and main carers. Petrovic et al. observed BPS in 96% of dementia patients. Grief, worry, and agitation rule. Psychosis, emotional instability, bodily malfunction, and physiology produce most disability.

71% of Indian dementia patients showed four or more behavioral and psychological symptoms. Irritation, hormonal changes, apathy, and agitation are symptoms. Psychoses are rare. Alzheimer's patients exhibited more delusions, hallucinations, and anxiety than vascular dementia patients. Frontotemporal dementia causes greater motor, feeding, and disinhibited behavior.

India and other emerging nations must enhance BPS cluster symptom detection. Pre-diagnosis improves therapy. India's multi-ethnic, sociological, and environmental areas vary

in dementia and BPS. Find dementia BPS clusters. We assessed dementia severity, behavioral, and psychological symptoms.

MATERIALS AND METHODS

After receiving clearance from the IPS Research Ethics Committee, the Research, Education, and Training Foundation subcommittee undertook this multicentric investigation. Cross-sectional multicentric investigation at six sites in northern, southern, and eastern India. All participating centers followed a standard research protocol and had institutional ethics committees approve the study. Each institution was monitored by dementia-trained psychiatrists. We selected ICD-10 DCR-diagnosed dementia patients over 60 using purposive sampling. Psychosis, mood, anxiety, obsessive-compulsive, substance use (except tobacco and caffeine), or personality disorder before dementia were excluded from the study. Participants gave written permission. With 5%–8% dementia prevalence, infinite sample computation was used to determine sample size.

Tools

A thorough semi-structured proforma was used to gather the data and record sociodemographic and clinical details.

Structured Clinical Interview for DSM- 5 Research Version (SCID- 5- RV) is a semi-structured interview that aids in the DSM-5-compliant diagnosis of mental diseases. Clinicians and other qualified mental health professionals utilize it. A thorough instrument that creates present and lifetime disorders is the Research Version (SCID-5-RV).

Montreal Cognitive Assessment (MoCA) is a 10-minute, one-page cognitive assessment test that gives 30 points. The MoCA has 12 subsets that assess seven cognitive functions: visual-spatial/executive function (trail-making test, cube copy, clock drawing), attention and concentration (digit span test, serial subtraction, tapping), language (naming, repetition, and fluency), memory (delayed recall), memory (abstraction), and orientation (delayed recall). MOCA, whose official schooling lasted less than 12 years, gets one point.

Neuropsychiatric Inventory Questionnaire (NPI- Q) measures dementia neuropsychiatric disturbances. It was created for Alzheimer's sufferers. It evaluates 12 symptoms and applies to all dementia kinds. The caregiver performs it, reflecting their patient care experience. Delusions, hallucinations (visual, auditory, gustatory, or somatic), agitation, sadness, anxiety, elation, apathy, disinhibition, irritability, abnormal motor activity (pacing, rummaging, repetitive motions), sleep problems, and hunger or eating disorders are assessed.

The Clinical Dementia Rating (CDR) assesses neuropsychiatric dementia. It's for Alzheimer's patients. It assesses 12 dementia symptoms. Caregiver experience executes it. Delusions, hallucinations (visual, auditory, gustatory, or somatic), agitation, sorrow, anxiety, elation, apathy, disinhibition, irritability, aberrant motor activity (pacing, rummaging, repetitive movements), sleep difficulties, hunger, and eating disorders are examined.

Procedure

Patients were recruited after meeting inclusion and exclusion criteria. The research was detailed. Patients or their representatives provided written permission. A psychiatrist examined behavioral and psychiatric symptoms in a lengthy interview. Cognitive and neuropsychiatric symptoms were assessed using several measures. October 2019–June 2020 data collection. Because to the COVID-19 epidemic and decreased hospital visits, several

facilities suspended data collection until March 2020.

Statistical analyses

Frequency and percentage describe categorical variables. Continuous variables are mean ± standard deviation. Pearson correlation coefficient and linear regression analysis assessed relationship strength. SPSS 24.0 for Windows performed statistical analysis.

RESULTS

Sample characteristics (sociodemographic and clinical)

292 persons were studied. Participants attended public schools. Ranchi, Chandigarh, Murshidabad, Pondicherry, and Bhubaneswar submitted samples. Male (55.1%), married (69.9%), Hindu (75%), urban (43.8%), extended/joint family (55.5%), unemployed (32.5%). The mean age and education were 69.97 ± 6.84 and 7.99 ± 5.43 years, respectively [Table 1]. Dementia started 65.90 ± 6.67 years and lasted 20.19 ± 11.74 months. Alzheimer's was 47.3%, vascular 24.7%, and mixed 23.3%. 22.94% were drug-naïve or drug-free, whereas 20.9% utilized cognitive enhancers and antipsychotics. Patients' spouses (37.7%) and children (45.9%) provided primary care. 34.2% knew of dementia/BPS, whereas 21.9% were unaware [Table 2].

Table 1: Sociodemographic characteristics of patients with the diagnosis of dementia

VARIABLES (N=292)	**SUMMARY STATISTICS**
Age in years (Mean±SD)	69.97±6.84
Gender n (n%)	
Males Females	161 (55.1%) 131 (44.9%)
Religion n (n%)	
Hindu	219 (75%)
Muslim	35 (12%)
Sikh	25 (8.6%)
Christian	11 (3.8%)
Others	02 (0.7%)
Residence n (n%)	
Rural	128 (43.8%)
Urban	117 (40.1%)
Sub urban	47 (16.1%)
Marital status n (n%)	
Single	06 (2.1%)
Married	204 (69.9%)
Widow (er)	66 (22.6%)

Divorced	04 (1.4%)
Others	12 (4.1%)
Years of education (Mean±SD) in years	7.99±5.43
Monthly income (INR)	
<2390	51 (17.5%)
2391-7101	48 (16.4%)
7102-11836	53 (18.2%)
11837-17755	34 (11.6%)
17756-23673	24 (8.2%)
23674-47347	44 (15.1%)
47348 and above	38 (13.0%)
Family type Nuclear	115 (39.4%)
Extended/Joint	162 (55.5%)
Living alone	11 (3.8%)
Old age home	4 (1.4%)
Previous Profession	
Professional	20 (6.8)
Semi-professional	26 (8.9%)
Clerical/Shop Owner/Farmer	44 (15.1%)
Skilled worker	26 (8.9%)
Semi-skilled worker	30 (10.3%)
Unskilled worker	51 (17.5%)
Unemployed	95 (32.5%)

Table 2: Clinical characteristics of patients with the diagnosis of dementia

VARIABLES (N=292)	SUMMARY STATISTICS
Age of onset of illness (Mean±SD) in years	65.90±6.67
Duration of treatment (Mean±SD) in months	20.19±11.74 Diagnosis
Dementia in Alzheimer's disease	138 (47.3%)
Vascular dementia	72 (24.7%)
Mixed dementia	68 (23.3%)
Other dementias	08 (2.73%)
Unspecified dementia	06 (2.1%)
Treatment	
No treatment	67 (22.94%)
Cognitive enhancers (CE)	53 (18.2%)
Antipsychotics (AP)	30 (10.3%)
CE+AP	61 (20.9%)
Others	04 (1.4%)
Treatment Unknown	77 (26.4%)
Primary caregiver	
Spouse	110 (37.7%)
Children	134 (45.9%)
Other informal caregivers	47 (16.1%)
None	01 (0.3%)
Awareness of dementia in the family	
Good	100 (34.2%)
Satisfactory	114 (39.0%)
Poor	14 (4.8)
No response	64 (21.9%)

Table 3: Behavioral and psychological symptom severity profile in dementia patients (N=292)

Variables (*n*=292) Absent *n* (*n*%)	**Mild *n* (*n*%)**	**Moderate *n* (*n*%)**		**Severe *n* (*n*%)**
Delusions	114 (49.3%)	45 (15.4%)	63 (21.6%)	40 (13.2%)
Hallucinations	162 (55.5%)	42 (14.4%)	47 (16.1%)	41 (14%)
Agitation/Aggression	86 (29.5%)	41 (14%)	102 (34.9%)	63 (21.6%)
Dysphoria/Depression	116 (39.7%)	54 (18.5%)	87 (29.8%)	35 (12%)

Anxiety	120 (41.4%)	82 (28.1%)	76 (26%)	14 (4.8%)
Euphoria/Elation	189 (64.7%)	26 (8.9%)	50 (17.1%)	27 (9.7%)
Apathy/Indifference	118 (40.4%)	29 (9.9%)	84 (28.8%)	61 (20.9%)
Disinhibition	156 (53.4%)	44 (15.1%)	62 (21.2%)	30 (10.3%)
Irritability/Lability	77 (26.4%)	42 (14.4%)	104 (35.6%)	69 (23.6%)
Aberrant Motor Behavior	123 (42.1%)	33 (11.3%)	76 (26%)	60 (20.5%)
Night-time Behaviour	87 (29.8%)	40 (29.8%)	96 (32.9%)	69 (23.6%)
Appetite/Eating	127 (43.5%)	127 (43.5%)	49 (16.8%)	61 (20.9%)

Behavioral and psychological symptoms and cognitive profile of dementia

BPS severity determined the neuropsychiatric profile. 43.5% experienced modest appetite/eating, 29.8% evening behavior, and 28.1% anxiety. 35.6% had moderate irritability/liability, 34.9% agitation/aggression, 29.8% dysphonia/depression, and 28.8% apathy/indifference. Irritability (23.6%), nocturnal behavior (23.6%), appetite/eating (20.9%), and abnormal motor behavior (20.5%) characterized severe BPS. MoCA scores averaged 11.39 ± 6.08.

Multiple regression of behavioral and psychological symptoms (dependent factors) with cognitive scores as a predictor

Behavioral and psychological symptoms and dementia severity were assessed using a linear regression analysis. Hence, mild dementia was associated with anxiety, irritability/lability, abnormal motor behavior, agitation/aggression, severe dementia, delusions, and euphoria/elation (trend level) [Table 5].

DISCUSSION

The Indian Psychiatric Society Research, Education, and Training Fund funded this multicentric dementia BPS study (IPS). Jharkhand, Chandigarh, West Bengal, Puducherry, and Odisha offered 292 research participants. Hospital-based samples with various clinical diseases have sociodemographic, clinical, cognitive, and BPS clusters. Indian studies employed hospital or community samples. In Shaji et alcommunity-based .'s study, Alzheimer's dementia patients were 76.5 ± 9.1 and vascular dementia patients 81.7 ± 8.6. In another Pinto-Seethalakshmi study, the mean sample age was 65.1 ± 12.25 years. The mean age was 69.97 ± 6.84 years, like previous investigations. Male (55.1%), rural (43.8%), joint/extended family (55.5%). In India, 45.9% of informal caretakers were first-degree relatives. This statistics may reflect Indian tertiary geriatric patients' sociodemographics.

Table 4: Bivariate correlation of severity of behavioral and psychological symptoms with the severity of dementia measured by CDR

	Del	Hal	Ag	Dys	Anx	Eup	Apa	Dis	Irr	MB	NB	App
Memory	0.251**	0.253**	0.079	0.153**	0.132*	0.128	-0.005	0.003	-0.126*	-0.044	0.006	0.116*
Orientation	0.146*	0.105	0.000	0.127*	-0.034	0.191**	0.038	-0.031	-0.089	-0.055	0.099	-0.079
Judgement and Problem solving	0.284**	0.164**	0.097	0.150*	0.137*	0.374**	-0.026	0.016	-0.069	-0.081	0.040	-0.083
Outer activities	0.216**	0.130*	0.128*	0.148*	0.101	0.026	0.068	0.060	-0.111	0.066	0.037	-0.046
Housework Hobbies	0.247**	0.212**	0.026	0.165**	0.053	-0.032	0.032	-0.0546	0.196**	-0.048	-0.018	-0.086
Personal care	0.134*	0.099	0.147*	0.005	0.005	0.036	0.205**	0.175**	0.032	0.198**	0.136*	0.093
Significance level *P<0.05, **P<0.01; Del - Delusions, Hal - Hallucinations, Ag - Agitation/Aggression, Dys - Dysphoria/Depression, Anx - Anxiety, Eup - Euphoria/ Elation, Apa - Apathy/Indifference, Dis - Disinhibition, Irr-Irritability/Lability, MB-Aberrant Motor Behaviour, NB-Night-time Behaviour, App-Appetite/Eating												

Table 5: Predictor role of global cognitive scores on behavioral and psychological symptoms in dementia

Dependent Factors	Unstandardized Beta	Std. Error	t	P
Mild Dementia				
Anxiety	0.029	0.014	2.110	0.037*
Irritability/Lability	0.036	0.017	2.090	0.038*
Aberrant Motor	0.038	0.019	1.979	0.050
Moderate Dementia				
Disinhibition	0.026	0.013	1.966	0.052
Agitation/Aggression	0.036	0.020	1.863	0.065
Severe Dementia				
Delusions	0.109	0.046	2.353	0.025*
Euphoria/Elation	0.056	0.030	1.882	0.069
Disinhibition	0.097	0.047	2.065	0.047*
Predictor factor: Total MoCA score; Significance level *P<0.05				

Clinical characteristics of people with dementia

Dementia onset was 65.90 ± 6.67 years. Vascular, mixed, and Alzheimer's were the most common diagnoses. Vascular (39%), then Alzheimer's (54%), are India's most common dementias. [19] Prevalence matches globally. Age-adjusted dementia prevalence is 1%–3% in India and sub-Saharan Africa, with 60% Alzheimer's disease and 30% vascular dementia. Dementia averaged 20.19 months. Caregivers should seek medical treatment despite delayed hospitalization due to vague symptoms, illness progression, or BPS.

Behavioral and psychological symptoms of dementia

BPS symptoms vary in frequency and intensity. Conceptualized symptom clusters. Psychotic and emotional disorders, abnormal motor activity, social relations, speech, personality changes, and somatic abnormalities grouped. This sample had BPS across diagnosis. In our study, aggression/aggression, nocturnal behavior, and dysphoria/depression were the most common symptoms. 50% of inpatients were psychotic. BPS was more common in Alzheimer's patients, Shaji found. Delusions, activity disruption, aggressive behaviors, and hallucinations were the most prevalent BPS in that study, with 96.6% experiencing at least one.

Dementia sufferers might be impaired by delusions and hallucinations. Similar to previous studies, 51.7% had delusions and 44.5% had hallucinations. Sleep disturbances cause depression, disinhibition, and aberrant motor activity. 69.2% exhibited nighttime behavior, 57.9% aberrant motor activity. Dementia disrupted sleep more.

BPS is linked to dementia severity in cognition, orientation, judgment, problem-solving, outdoor/social, personal care, and functional status domains. Neuropsychiatric diseases independently influence functional status regardless of age, memory, or executive function. BPS associated strongly with dementia severity in everyday life and functional areas. Most importantly, memory impairment promotes depression/dysphoria, anxiety, delusions, and hallucinations. This bidirectional relationship increases dementia.

Predictor model of global cognitive scores on BPS in dementia

Regression analysis reveals that NPI-Q behaviors highly correlated with MoCA cognitive ability. Mild dementia individuals with the highest cognition exhibited the most anxiety, aberrant motor activity, and irritability/lability. Restlessness and wandering cause cognitive deterioration. This study shows that mild dementia disrupts motor function. Severity depends on several factors. Disinhibition and agitation/aggression were linked to mild dementia cognitive decline. Violence and disinhibition are connected to dementia and a damaged brain. With severe dementia, delusions, exhilaration, and disinhibition decreased cognitive performance. psychotic clusters. Psychotic symptoms increase in moderate-to-severe dementia (CDR 2 and 3).

CONCLUSION, LIMITATIONS AND FUTURE DIRECTIONS

Considering dementia severity and cognitive failure, this research examines behavioral and psychological symptom clusters in dementia. Some BPS clustered, while others were individual. Due to inter-individual heterogeneity, the variables could not be linked to severity. So, whether to study symptoms individually or in groups may be crucial. While examining patients, professionals must carefully analyze each symptom and its interrelationships. Study constraints existed. Dementia diagnosis criteria were not updated.

The cross-sectional research could not track BPS duration or cognitive effects. Future longitudinal research may focus on BPS and their effects on everyday living, social functions, cognitive functions, and total activities. Future research may focus how the illness and BPS affect caregivers. help with current research. We appreciate the Indian Psychiatric Society's assistance.

REFERENCES

1. *Das SK, Pal S, Ghosal MK. Dementia: Indian scenario. Neurol India 2012;60:618-24.*
2. *Ferri CP, Prince M, Brayne C, Brodaty H, Fratiglioni L, Ganguli M, et al. Global prevalence of dementia: A Delphi consensus study. Lancet 2005;366:2112-7.*
3. *Nichols E, Szoeke CEI, Vollset SE, Abbasi N, Abd-Allah F, Abdela J, 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;18:88-106.*
4. *Sathianathan R, Kantipudi SJ. The dementia epidemic: Impact, prevention, and challenges for India. Indian J Psychiatry 2018;60:165-7.*
5. *Kar N. Behavioral and psychological symptoms of dementia and their management. Indian J Psychiatry 2009;51(Suppl 1):S77-86.*
6. *Hersch EC, Falzgraf S. Management of the behavioral and psychological symptoms of dementia. Clin Interv Aging 2007;2:611-21.*
7. *de Vugt ME, Riedijk SR, Aalten P, Tibben A, van Swieten JC, Verhey FRJ. Impact of behavioural problems on spousal caregivers: A comparison between Alzheimer's disease and frontotemporal dementia. Dement Geriatr Cogn Disord 2006;22:35-41.*
8. *Petrovic M, Hurt C, Collins D, Burns A, Camus V, Liperoti R, et al. Clustering of behavioural and psychological symptoms in dementia (BPSD): A European Alzheimer's disease consortium (EADC) study. Acta Clin Belg 2007;62:426-32.*
9. *Srikanth S, Nagaraja AV, Ratnavalli E. Neuropsychiatric symptoms in dementia-frequency, relationship to dementia severity and comparison in Alzheimer's disease, vascular dementia and frontotemporal dementia. J Neurol Sci 2005;236:43-8.*
10. *Mukherjee A, Biswas A, Roy A, Biswas S, Gangopadhyay G, Das SK. Behavioural and psychological symptoms of Dementia: Correlates and impact on caregiver distress. Dement Geriatr Cogn Dis Extra 2017;7:354-65.*
11. *Pinto C, Seethalakshmi R. Behavioral and psychological symptoms of dementia in an Indian population: comparison between Alzheimer's disease and vascular dementia. Int Psychogeriatr 2006;18:87-93.*
12. *Structured Clinical Interview for DSM-5 (SCID-5). Available from: https://www.appi.org/products/structured-clinical-interview-for-dsm-5-scid-5. [Last accessed on 2019 Jun 06].*
13. *Nasreddine ZS, Phillips NA, Bédirian V, Charbonneau S, Whitehead V, Collin I, et al. The montreal cognitive assessment, MoCA: A brief screening tool for mild cognitive impairment. J Am Geriatr Soc 2005;53:695-9.*
14. *Validation of the NPI-Q, a brief clinical form of the Neuropsychiatric Inventory - PubMed. Available from: https://pubmed.ncbi.nlm.nih. gov/11001602/. [Last accessed on 2020 Aug 28].*
15. *Hughes CP, Berg L, Danziger WL, Coben LA, Martin RL. A new clinical scale for the staging of dementia. Br J Psychiatry 1982;140:566-72.*
16. *Pinto C, Seethalakshmi R. Longitudinal progression of behavioral and psychological symptoms of dementia: A pilot study from India. Psychogeriatrics 2006;6:154-8.*
17. *Shaji KS, George RK, Prince MJ, Jacob KS. Behavioral symptoms and caregiver burden in dementia. Indian J Psychiatry 2009;51:45-9.*
18. *Sinha P, Desai NG, Prakash O, Kushwaha S, Tripathi CB. Caregiver burden in Alzheimer-type dementia and psychosis: A comparative study from India. Asian J Psychiatr 2017;26:86-91.*
19. *Shaji S, Bose S, Verghese A. Prevalence of dementia in an urban population in Kerala, India. Br J Psychiatry 2005;186:136-40.*

20. Kalaria RN, Maestre GE, Arizaga R, Friedland RP, Galasko D, Hall K, et al. Alzheimer's disease and vascular dementia in developing countries: Prevalence, management, and risk factors. Lancet Neurol 2008;7:812- 26.