

ORIGINAL RESEARCH

Cross sectional study of behavioural and psychological symptoms of dementia and assessment of various factors affecting the cognitive decline.

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ABSTRACT

Background: dementia is a progressive disease involving cognitive impairment in clear consciousness. The most common type being Alzheimer's disease. Cross sectional study was done in tertiary care hospital in Goa, India to evaluate the Behaviour and Psychological symptoms of dementia (BPSD). Association between sociodemographic profile of the patients with cognitive decline was assessed by Chi square tests. Significant associations were found between different variables and cognitive decline.

Keywords: dementia, Behaviour and Psychological symptoms of dementia (BPSD), cognitive decline

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INTRODUCTION

Dementia refers to a disease process marked by progressive cognitive impairment in clear consciousness." It involves multiple cognitive domains and cognitive deficits that cause impairment in social and occupational functioning. What affects more the ability of the individual to live independently is the cognitive decline which causes diminished performance in some domains, even if not all. Dementia is a disorder of ageing having a positive correlation between age and onset of dementia. Out of all the chronic debilitating illnesses, dementia is the most major and largest contribution to disability when compared to other chronic diseases from the developing world. Nearly 15 million people are affected by Dementia worldwide. The frequent cause accounting for 90% of all instances are Alzheimer's disease, vascular dementia, dementia with Lewy bodies and Frontotemporal dementia. Some much less widespread causes of dementia include chronic infections, brain tumors, hypothyroidism, subdural haemorrhage, normal pressure hydrocephalus, metabolic conditions and toxins or deficiencies of vitamin B13 and folic acid^[1] The trademark of

dementia is cognitive decline. Dementia gets complicated by behavioural symptoms like paranoid delusions and hallucinations^[2]This disease is accompanied by aggression (which could be verbal and physical), agitation, psychotic symptoms (hallucinations and delusions), depression, sleep disturbances.^[3] Studies of patients with dementia has shown 97% of the patients suffering from dementia developed one or more symptoms over the span of five-year period.^[4]Alongside the significant impact on the quality of life of people with dementia, it has been also associated with rapid cognitive and functional decline.^[5] In a study done by Shaji KS *et al.*,^[6] Behavioral symptoms and caregiver burden in dementia was studied. Results of the study showed that occurrence of BPSD was too high and it was find to be more commonly among patients with Alzheimer's Disease as compare to patients with Vascular Dementia. In 2014, Fauth and Gibbins found that apathy, depression and agitation were the most common symptoms. In 2017, Torrisi found that apathy and depression were commonest. In 2017,^[7]Lorenzo-Lopez found aberrant motor behaviours were the most prevalent. In 2018, study by

Hiyoshi-Taniguchi *et al.*,^[8] in Japan was done to assess which of the behavioural and psychological symptoms of dementia affect the caregivers, in which it was found that apathy, hallucinations and irritability were the most severe symptoms.

AIM: to study the behavioural and psychological symptoms of dementia.

OBJECTIVES

1. Assess the sociodemographic profile of patients.
2. Study the cognitive decline profile.
3. Association between sociodemographic profile and cognitive decline

MATERIALS AND METHODS

SETTING: The study was conducted at Institute of Psychiatry and Human Behaviour, Goa. It is a tertiary care psychiatry hospital in the state of Goa, having inpatient and outpatient facilities. The study sample was drawn from the patients attending OPD. Consecutive patients were approached for consent. Those who consented, were interviewed along with their caregivers, and scales were administered on the patient. Data was collected for 85 patients.

TYPE OF STUDY AND SAMPLE: A cross sectional descriptive study, a total sample of 100 were considered for the study, however due to Covid-19 pandemic the OPD attendance of patients were significantly reduced during the time period of March 2020 - June 2020 and a sample of 85 patients was collected.

CRITERIA

INCLUSION CRITERIA

1. Diagnosed cases of dementia using ICD-10 criteria presenting with caregiver.
2. Patient or caregiver consenting to participate.

EXCLUSION CRITERIA

1. Informed consent not available.
2. Intellectually disabled.

METHODOLOGY

Patients with their caregiver who attended Institute of Psychiatry and Human Behaviour OPD constituted the sample of this study. Consent to participate in the study was taken both from the patient or their caregiver. Interview time for each patient was approximately 1 hour. Sociodemographic data of the patient was recorded by using semi structured proforma. Patients were further evaluated for the symptoms by using the MMSE and NPI-Q scale The scales were converted to Konkani for patients and caregivers who did not understand English. In order to do the same the instruments used were translated by a professional translator from English to Konkani. The scales were then back translated to English.

TOOLS

• **MMSE-Mini mental status examination** : It is a brief, quantitative measure of cognitive status in adults. It's uses include screening for cognitive impairment,^[19] estimating the severity of cognitive impairment at a given point of time. It also plays a role in following the course of cognitive changes in an individual over time, and in documenting an individual's response to treatment. A 30-point questionnaire that is used extensively in clinical and research settings. It was originally introduced by Folstein *et al.* in 1975, in order to differentiate organic from functional Psychiatric patients. It covers the persons' orientation to time and place, recall ability, short term memory, and arithmetic ability.^[10] The MMSE scoring delineates the degree of cognitive impairment. More than 24 is normal. A score between 19-23 indicates mild cognitive impairment, between 10 and 18 indicates moderate cognitive impairment and a score less than 9 indicates severe cognitive impairment. Disadvantages to the utilisation of the MMSE is that it is affected by the demographic factors, age and education. A cochrane study done by Sam T Creavinet *et al.*, in January 2016 for the detection of dementia in clinically unevaluated people aged 65 and over in the community. Main objective was to determine the diagnostic accuracy of the MMSE at various cut points for dementia. Amongst the 100 people, sensitivity was 0.85; that is 85 with dementia correctly identified as having dementia, and 15 not having dementia. Specificity was 0.90, that is 90 without dementia correctly identified as not having dementia, and 10 were false positive.

•NEUROPSYCHIATRIC INVENTORY QUESTIONNAIRE^[11,12,13,14]:

The Neuropsychiatric Inventory Questionnaire was developed and cross validated with the standard NPI to provide a brief assessment of neuropsychiatric symptomatology in routine clinical practice settings (Kaufner *et al.*, J Neuropsychiatry Clin Neuroscie 2000). The original NPI included 10 neuropsychiatric domains, two others, nighttime behavioural disturbances and appetite changes have been subsequently added. Another recent modification of the original NPI is the addition of a caregiver distress scale for evaluating the psychological impact of neuropsychiatric symptoms reported to be present. The NPI-Q includes both of these additions. The NPI-Q is designed to be self administered questionnaire by informants about patients for whom they care. Each of the 12 NPI-Q domains contains a survey question that reflects the cardinal symptoms of the domain. Initial responses to each domain question are "Yes" or "No". If the response to the domain is "No", the informant goes to the next question, if "Yes" then the informant rates the severity of the symptoms present within the last month on a 3 point scale and the associated impact of the symptom manifestation on them using 5-point scale. This questionnaire can be completed within 5

minutes or less. Rating of the severity of the symptoms was done as below

1- Mild 2- Moderate 3 - Severe

STATISTICAL ANALYSIS: Data was entered into Microsoft Excel (Windows 7, version 2007) and analyses were done using the Statistical Package for Social Sciences (SPSS) for windows software (version 22.0; SPSS Inc, Chicago). Descriptive statistics such as mean and standard deviation for continuous variables were determined. Association between variables was analysed by using Chi-Square test for categorical variables.

Comparison of mean between quantitative variables were analysed using ANOVA (analysis of variance). Level of significance was set at <0.05

ETHICS

The approval of the ethical committee of Goa Medical College was sought prior to the commencement of this study. Patients and their caregivers were explained about the study in their local language. The aims and objectives were informed and their queries were addressed. They were informed that the information given by them would be used for study purpose only and they could withdraw from the study at any time if they wished so. Informed written consent for the interview and assessment was taken from the patient and their caregiver.

The data collected was sorted in a secure manner. The names of the patients and caregivers were kept confidential. Patients were offered treatment at the Institute of Psychiatry and Human Behaviour (IPHB).

RESULTS

TABLE 1: sociodemographic profile

		N	%
GENDER	FEMALE	51	60.0
	MALE	34	40.0
AGE	40-50	4	4.7
	51-60	11	12.9
	61-70	28	32.9
	>70	42	49.4
RELIGION	HINDU	52	61.2
	CHRISTIAN	26	30.6
	MUSLIM	7	8.2
RESIDENCE	URBAN	56	65.9
	RURAL	29	34.1
EDUCATION	NIL	32	38.0
	PRIMARY	14	16.7
	HIGH SCHOOL	31	36.9
	GRADUATE	8	9.6
SOCIOECONOMIC STATUS	UPPER	2	2.4
	MIDDLE	52	61.9
	LOWER	31	36.7
OCCUPATION	EMPLOYED	12	14.3
	UNEMPLOYED	73	85.7
MARITAL STATUS	MARRIED	53	62.3
	WIDOW	52	61.2
TYPE OF FAMILY	NUCLEAR	40	47.6
	EXTENDED	41	48.8
	JOINT	4	4.7
DURATION OF ILLNESS	<1 YEAR	13	15.5
	1-3 YEARS	51	60.5
	4-6 YEARS	19	22.6
	>6 YEARS	2	2.4
UNTREATED ILLNESS	< 1 YEAR	18	21.4
	1-3 YEARS	49	58.3
	4-6 YEARS	16	19.0
	>6 YEARS	2	2.4
COMORBIDITIES	YES	38	45.2
	NO	47	55.8
TREATMENT FOR DEMENTIA	YES	30	35.3
	NO	55	64.7

DURATION OF TREATMENT	<1 YEAR	5	17.85
	1-3 YEARS	13	36.89
	4-6 YEARS	4	14.28
	>6 YEARS	6	21.42

TABLE 2: Distribution of patients according to the Symptoms (N=85)

SYMPTOMS	TOTAL	MILD	MODERATE	SEVERE
Delusions	19 (22.4%)	11 (57.9%)	8 (42.1%)	-
Hallucinations	43 (50.6%)	17 (39.5%)	20 (46.5%)	6 (14.0%)
Agitation	22 (25.9%)	7 (31.8%)	7 (31.8%)	8 (36.4%)
Depression	10 (11.8%)	7 (70.0%)	2 (20.0%)	1 (10.0%)
Anxiety	3 (3.5%)	-	2 (66.7%)	1 (33.3%)
Elation	5 (5.9%)	3 (60.0%)	2 (40.0%)	-
Apathy	9 (10.6%)	7 (77.8%)	2 (22.2%)	-
Disinhibition	35 (42.4%)	16 (45.7%)	9 (25.7%)	10 (28.6%)
Irritability	36 (42.4%)	10 (27.8%)	17 (47.2%)	9 (25.0%)
Motor disturbances	17 (20.0%)	3 (17.6%)	5 (29.4%)	9 (52.9%)
Night time behaviour	45 (52.9%)	5 (11.1%)	20 (44.4%)	20 (44.4%)
Appetite	7 (8.2%)	2 (28.6%)	5 (71.4%)	-

TABLE 3: Distribution of patients according to MMSE (N=85)

MMSE	NO	PERCENT
Mild	9	10.6
Moderate	47	55.3
Severe	13	15.3
Could Not Be Tested	16	18.8

TABLE 4: Association between patients' occupation and MMSE

Occupation	Mild	Moderate – severe	Could not be tested
Employed	4 (33)	6 (50)	2 (16.7)
Unemployed	5 (6.8)	54 (74)	14 (19.2)
P value	0.006*	0.551	

Chi square test, P value = 0.028, significant

Association between patients' Occupation and MMSE shows that there was statistically significant association between Occupation and MMSE score ($p=0.028$). Among the employed patients, majority of them were found to have mild to moderate level of cognitive decline, where as amongst the unemployed patients, majority were found to have moderate to severe level of cognitive decline, suggesting that patients whose cognitive decline was of severe intensity were unemployed. The difference in proportion of severity of dementia between the employed and unemployed was found to be statistically significant.

TABLE 5: Association between patients' Co-morbidities and MMSE (N = 85)

Comorbidities	Mild	Moderate	Severe	CNBT
Yes	5 (13.2)	14 (36.8)	11 (28.9)	8 (21.1)
No	4 (8.5)	33 (70.2)	2 (4.3)	8 (17.0)
P value	0.433	<0.001*	<0.001*	

Chi- square test, P value = 0.004, significant

Association between patients' co-morbidities and MMSE shows that there was statistically significant association between co morbidities and MMSE score ($p=0.004$). Patients who had associated co morbidities, had more severe level of cognitive decline (28.9%) compared to the ones who had no co-morbidities who had moderate level of cognitive decline (70.2%). The difference in proportion of severity of dementia between the patients who had co morbidities and those who did not have any associated co morbidities was found to be statistically significant.

TABLE 6: Association between Duration and MMSE (N = 85)

Duration years mean (SD)	Mild	Moderate	Severe	CNBT	P value
Duration of illness	3.67 (2.34)	3.96 (3.00)	1.77 (1.01)	3.25 (1.88)	0.060
Duration of untreated illness	3.67 (2.34)	4.06 (2.69)	1.62 (0.76)	2.88 (1.99)	0.010*

Treatment	3.00 (1.73)	3.86 (2.38)	14.40 (12.40)	4.83 (4.07)	0.011*
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ANOVA, P value* significant Association between Duration and MMSE shows that there was no statistically significant association between duration of illness (p=0.060) and MMSE. However Statistically significant association was seen between duration of untreated illness (p=0.010) with MMSE, and duration of pharmacological treatment taken for dementia (p= 0.011) with MMSE. The mean duration of untreated illness is maximum in patients with moderate cognitive decline, compared to the ones with mild, suggesting that longer duration of untreated illness presents with more severe cognitive decline. The mean duration of treatment taken by the patients for dementia is maximum in severe dementia compared to the ones with mild and moderate, suggesting that the more severe dementic patients require medications.

DISCUSSION

Sociodemographic variables: In the present study, 60% of the patients were females, which is consistent with studies by Azad *et al.* (2007)^[15] and by P.S. Mathuranath *et al.* (2010)^[16] in which females constituted 65% and 59% respectively. 49.4% of the patients were from >70 year of age similar to Azad *et al.* (2007) and P.S. Mathuranath *et al.* (2010) in which 62.3% and 76.9% were above 75 years of age respectively, followed by 32.9% by 61-70 years. Majority of the patients were Hindu (61.2%), followed by Christian (30.6%) and Muslim (8.2%). It was found that majority (65.5%) of them were from rural area which is in accordance with B. Nunes *et al.* (2010)^[17] in which rural constituted to 66.8% and Eleni Jelastopulu *et al.*^[18] in which rural constituted to 71% (2014). Distribution of patients according to the education shows that majority of them did not have any formal education (37.6%) which is again consistent with Eleni Jelastopulu *et al.* (2014)^[18] (70%) and 36.5% had education up to high school. Majority of the patients (61.2%) belonged to middle socio economic status according to the modified B.G Prasad classification. 85.9% of the patients were unemployed and 62.4% were married. Majority of the patients belonged to extended (48.2%) and nuclear family (47.1%). Distribution of patients according to the Duration of illness shows majority of the patients had duration of illness of 1-3 years, followed by 4-6 years. Majority of the patients had duration of untreated illness of 1-3 years (57.6%), followed by <1 years (22.2%) and 4-6 years (18.8%). Majority of the patients didn't have any associated co-morbidities (55.3%). Among the ones who had co morbidities, hypertension was found to be the most common co morbidity, followed by diabetes mellitus consistent with Eleni *et al.* (2014)^[18] in which hypertension was the first most common (80.2%) and diabetes mellitus was second most common (60.8%) Distribution of patients according to the treatment shows 64.7% did not receive any for dementia treatment., in contrast to

Eleni *et al.*^[18] in which nearly 50% of the patients received medications for dementia including Nootropics and acetylcholinesterase inhibitors. Among the ones who were on medications, majority of the patients had taken treatment for the duration of 1-3 years (36.9%), followed by >6 years (21.4%) and 4-6 years (14.3%).

Cognitive decline : Distribution of patients according to MMSE shows, majority of the patients had moderate cognitive decline (55.3%), followed by the ones on whom could not be tested (18.8%), because few of them had hearing impairment and few of them had frank psychotic symptoms making it difficult for interview. Severe cognitive decline was seen in 15.3%.

Behavioural and Psychological symptoms :

Distribution of patients according to Psychological and Behavioural symptoms profile from the NPI scale it was found that nighttime behaviour was the most common symptom followed by hallucinations, irritability, disinhibition, partially consistent with study done by M. Petrovic *et al.*^[19] (2014 published), in which irritability was seen in 44.6% of the patients, hallucinations in 42.3% and disinhibition was seen in 41.5% of patients. In our study, delusions were present in a total of 22.4% of patients, out of which, present mildly in 57.9% and moderately in 42.1% of the patients. Hallucinations were present in a total of 50.6% patients, out of which a mild level was seen in 39.5%, moderate level in 46.5% and severe level in 14.0% of the patients. Agitation was present in a total of 25.9% of patients, out of which in a mild level in 31.8%, moderate level in 31.8% and of severe level in 36.4% of the patients. Depression was present in a total of 11.8% of patients, out of which 70.0% had mild depression, 20.0% had moderate depression and 10.0% had severe depression. Anxiety was seen in a total of 3% of patients, out of which 66.7% had moderate anxiety and 33.3% had severe anxiety. Elation of mood was seen in total of 5.9% patients, in whom it was present in mild level in 60.0% and of moderate level in 40.0%. Apathy was seen in total of 10.6%, out of which 77.8% had mild apathy and 22.2% had moderate apathy. Disinhibition was present in total of 41.2% of patients, out of which 45.7% had mild disinhibition, 25.7% had moderate, and 28.6% had severe disinhibition.

Irritability was seen in total of 42.4% of patients, of which 27.8% had mild irritability, 47.2 had moderate irritability and 25.0 had severe irritability. Motor disturbances were seen in 20.05 of patients, in 17.6% was of mild level, 29.4% was of moderate level and in 52.95 was of severe level. Night-time behaviour was seen in total of 52.9% of patients, out of which 11.15 had mild level, 44.4% had moderate level and severe level.

Appetite disturbances was present in total of 8.25% of patients, of which 28.6% had mild disturbances and 71.4% had moderate disturbances.

Association Between MMSE And Variables : Statistically significant association was seen between occupation of the patient and MMSE scores, similar to study by Moraes *et al.*^[20](2010). Significant association was found between MMSE and co morbidities similar to Eleni *et al.* (2014), duration of illness and duration of untreated illness with MMSE score. Results of the present study shows that no statistically significant association between was seen across age in contrast to Anderson *et al.*^[21](2007) in which the older age group of patients were noted to have lower scores of MMSE. No statistically significant association was found between MMSE and gender, MMSE and education in contrast to Han *et al.*^[21](2008) in which female gender and low education level was seen to scores low on MMSE. No significant association was found between MMSE and socioeconomic status, MMSE and marital status in contrast to Riberro *et al.*^[22](2010) in which the married group of patients had scored better on MMSE. Association between type of Family, religion, relationship with caregiver and MMSE score was found ($p>0.05$), not statistically significant. In the current study there was statistically significant association between duration of illness ($p=0.060$), untreated illness ($p=0.010$) and treatment ($p=0.011$) with MMSE.

STRENGTHS AND LIMITATIONS

STRENGTHS

- first type of study in Goa which is done to evaluate the BPSD.

LIMITATIONS

- Small sample size.
- Cross sectional design, which could have inherent bias.

CONCLUSION

Psychological and behavioural symptoms in dementia were studied. Various sociodemographic variables and level of cognitive decline were evaluated. Patients' occupation, co morbidities in the patients, duration of untreated dementia, and duration of treatment taken for dementia were associated with the MMSE score. The study revealed that the night time disturbances in the patients were the most common BPSD, followed by hallucinations, irritability. Generally, behavioural and psychological symptoms of dementia have been thought to be of secondary importance, but are actually important determinants of distress in patients, burden in their caregivers and have a direct influence on patient outcome. It is hence important to understand the symptoms of dementia and to assess the burden of their caregivers so as to provide immediate treatment both, to the patients and their caregivers.

Conflict Of Interest : Nil

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