AN OBSERVATION OF MENTAL HEALTH AND AGE ASSOCIATED MEMORY IMPAIRMENT IN ELDERLY POPULATION AND USE OF DIFFERENT CLINICAL SCORING SYSTEMS IN SCREENING FOR DEMENTIA

Medicine

Dr. Prasanna Kumar Rathor	Assistant Professor, MBBS,MD, General Medicine. PG Department Of Medicine. S.C.B. Medical College, Cuttack, Odisha, India
Dr. Saroj Kanta Sahu	Junior Resident, General Medicine. PG Department Of Medicine. S.C.B. Medical College, Cuttack, Odisha, India
Dr. Dhirendra Nath Moharana	Professor, MBBS,MD, General Medicine. PG Department Of Medicine. S.C.B. Medical College, Cuttack, Odisha, India
Dr. Madhusmita Patnaik*	Assistant Professor, MBBS,MD, General Medicine. PG Department Of Medicine. S.C.B. Medical College, Cuttack, Odisha, India*Corresponding Author

ABSTRACT

INTRODUCTION-Dementia is a public health problem and although it mostly affects elderly population, it is not a normal part of ageing. It is a syndrome with many causes, is defined as an acquired deterioration in cognitive abilities that impairs the successful performance of activities of daily living.

AIM-To assess the mental health and age associated memory impairment, screening and grading according to the rating system of patients with age $\geq$ 60years.

METHODS-In this study, 80 cases were evaluated. All patients with age $\geq$60 years were included in the study. The exclusion criteria were psychiatric illness, head injury, alcoholic or having altered sensorium due to other co-morbid condition e.g. cerebral malaria, hepatic encephalopathy, and terminal stage cancer patients. It is a observational study. These cases were evaluated for dementia clinically using mini mental status examination(MMSE), mental status questionnaire(MSQ), clock drawing test(CDT), mini cog, informant interview, and clinical dementia rating(CDR). They were also graded according to the severity of dementia using CDR.

RESULTS- The study revealed, the mean$\pm$ SD age of dementia was 71.46$\pm$6.57 years. Prevalence according to the scoring system, MMSE was 16%(male-17.8% and female-14.2%), MSQ was 31.3% (male-28.9% and female-34.3%), CTD was 48.7%(male-44.4% and female-54.3%), mini-cog was 7.5%(male-4.4% and female-11.4%), informant interview was 30%(male-28.5% and female-31.4%), and CDR was 17.5%(male-20% and female-14.3%). The dementia severity according to CDR were observed that 28.5% had questionable, 35.7% had mild, 38.8% had moderate, but none of these had severe dementia.

CONCLUSION- The Prevalence and severity of dementia increases with age both in males and females. In the course of dementia attention, calculation, and language are impaired early but the registration and recall are preserved up to late.

KEYWORDS

Dementia, Mini mental status examination, CDR, Mental disease.

INTRODUCTION-Dementia is a public health problem and although it mostly affects elderly population, it is not a normal part of ageing. Dementia is a syndrome, usually of a chronic or progressive in nature and is defined as "an acquired deterioration in cognitive abilities that impairs the successful performance of activities of daily living". Memory is the most common cognitive ability lost with dementia.[1] However, disturbances in executive functioning often precede the memory decline.[2] As the number of elderly in our population upsurges, prevalence of dementia rises.[3] The prevalence of dementia increases exponentially which doubles with every five year increment in age after 65. The total number of people with dementia worldwide in 2010 is estimated at 35.6 million and is projected to nearly double every 20 years, to 65.7 million in 2030 and 115.4 million in 2050. The total number of new cases of dementia each year worldwide is nearly 7.7 million, implying one new case every four seconds.[4] In India the size of the elderly population, i.e. persons above the age of 60 years is fast growing although it constituted only 7.4% of total population at the turn of the new millennium. In 2007-2008 they constituted 7.5% (males 7.5% and female 7.7%) of the total population. In Odisha they constitute 8.3% of the total population.[5] In 2010, there was 3.7 million Indians with dementia (2.1 million women and 1.5 million men) and the numbers are expected to double by 2030.[5,6] Prevalence and incidence projections indicate that the number of people with dementia will continue to grow, particularly among the oldest old, and countries in demographic transition will experience the greatest growth. By 2050 people aged 60 and over will account for 22% of the world's population, four-fifths living in Africa, Asia or Latin America.[4] Studies on dementia prevalence have not been uniform across our country.[6] It is therefore important to track the global prevalence and impact of this burdensome condition and its regional distribution in the context of rapidly unfolding demographic and health transitions.[4] In this study, to assess the mental health and age associated memory impairment, screening and grading according to the rating system of patients with age $\geq$ 60years.

METHODS-In this study, 80 cases were evaluated. All patients with age $\geq$60 years were included in the study. The exclusion criteria were psychiatric illness, head injury, alcoholic or having altered sensorium due to other co-morbid condition e.g. cerebral malaria, hepatic encephalopathy, and terminal stage cancer patient. It is a observational study. These cases were evaluated for dementia clinically using mini mental status examination (MMSE), mental status questionnaire(MSQ), clock drawing test(CDT), mini cog, informant interview, and clinical dementia rating(CDR). They were also graded according to the severity of dementia using CDR. The history along with general examination, and all systemic examination were done for these cases. All blood test, chest x-ray, CT/MRI scan of the brain, and EEG were done. All results for continuous variables were expressed as means ± SD (standard deviation). Analysis of the data was done using a software SPSS system 16.0. Microsoft word and excel had been used to generate graphs and tables.

OBSERVATION-

In the present study, 80 cases were included. Out of them, males were constituted 56.25%(45) and females 43.75%(35). The mean$\pm$SD age were calculated i.e. 71.46$\pm$ 6.57 years. It is shown in Table-1.

TABLE-1 AGE DISTRIBUTION OF SUBJECTS

TOTAL CASES	80
MEAN AGE	71.46%
STANDARD DEVIATION	6.57%
MINIMUM	60
MAXIMUM	88

Among these study group, the prevalence of dementia according to MMSE was 16% i.e. 13 out of 80 patients. This is showing in Table-2.The gender wise the prevalence of dementia according to MMSE was 17.8% i.e. 8 out of 45 males and 14.2% i.e.5 out of 35 females. Table-3 is showing the result.

TABLE-2 PREVALENCE OF DEMENTIA ACCORDING TO DIFFERENT SCORING SYSTEM

Scoring systems	Normal	Dementia
MMSE	67(84%)	13(16%)
MSQ	55(68.7%)	25(31.3%)
CDT	41(51.3%)	39(48.7%)
MINI-COG	74(92.5%)	6(7.5%)
INF-INT	56(70%)	24(30%)
CDR	66(82.5%)	14(17.5%)

TABLE-3 GENDER WISE PREVALENCE OF DEMENTIA ACCORDING TO DIFFERENT SCORING SYSTEM

Scoring systems	Normal		Dementia	
	Male	Female	Male	Female
MMSE	37(82.2%)	30(85.8%)	8(17.8%)	5(14.2%)
MSQ	32(71.1%)	23(65.7%)	13(28.9%)	12(34.3%)
CDT	25(55.5%)	16(45.7%)	20(44.4%)	19(54.3%)
MINI-COG	43(95.6%)	31(88.6%)	2(4.4%)	4(11.4%)
INF-INT	32(71.1%)	24(68.6%)	13(28.9%)	11(31.4%)
CDR	36(80%)	30(85.7%)	9(20%)	5(14.3%)

Among all the patients screened to have dementia according to MMSE, those cases had orientation impairment in 92% (12 cases out of 13), registration and recall in 46% (6 out of 13), but attention, calculation and language was impaired in 100% of cases (13 out of 13).It is showing in Table-4.

TABLE-4 FEATURES AMONG THE PERSONS WITH DEMENTIA ACCORDING TO MMSE

FEATURES OF MMSE	RETAINED		IMPAIRED	
	N	%	N	%
ORIENTATION	1	8	12	92
REGISTRATION	7	54	6	46
ATTENTION AND CALCULATION	0	0	13	100
RECALL	7	54	6	46
LANGUAGE	0	0	13	100

The dementia prevalence according to age and gender were calculated. In the 60-69years age groups, 1(5.88%) out of 17cases were male and 1(6.25%) out of 16 cases were female. In the age groups of 70-79years, 4(22.22%) out of 18cases were male and 2(15.38%) out of 13cases were female. In the 80-89years of age groups, 3(30%) out of 10cases were males and 2(33.33%) out of 6cases were females. It is showing in Table-5.

TABLE-5 DEMENTIA PREVALENCE ACCORDING TO AGE AND GENDER(N-(13)

AGE GROUP(YRS)	MALE			FEMALE		
	N	TOTAL	%	N	TOTAL	%
60-69	1	17	5.88	1	16	6.25
70-79	4	18	22.22	2	13	15.38
80-89	3	10	30	3	6	33.33

Among the study population the prevalence of dementia according to MSQ was 31.3% i.e. 25 cases of dementia out of 80 patientTable-2.Gender wise prevalence of dementia according to MSQ was 28.9% among males and 34.3% among females i.e.13 cases out of 45 males and 12 cases out of 35 females had dementia. Among those who had dementia according to MSQ, 31.2% had minimal and 68.8% had moderate dementia, but no one had severe dementia Table-3.

Among the study population the prevalence of dementia according to

CDT was 48.7% i.e. 39 cases out of 80 patients had dementia Table-2. Gender wise prevalence of dementia according to CDT was 44.4% cases among males and 54.3% cases among females i.e. 20 cases out of 45 males and 19 cases out of 35 females had dementia Table-3.

Among the study population the prevalence of dementia according to MINI-COG was 7.5% i.e. 6 cases out of 80 patients had dementia Table-2. Gender wise prevalence of dementia according to MINI-COG was 4.4% among males and 11.4% among females i.e. 2 cases out of 45 males and 4 cases out of 35 females had dementia Table-3.

Among the study population the prevalence of dementia according to informant-interview was 30% i.e. 24 cases out of 80 patients had dementia. Table-2 Gender wise prevalence of dementia according to informant-interview was 28.9% cases among males and 31.4% cases among females i.e. 13 cases out of 45 males and 11 cases out of 35 females had dementiaTable-3.

Among the study population the prevalence of dementia according to CDR was 17.5% i.e. 14 cases out of 80 patients had dementia Table-2 Gender wise prevalence of dementia according to CDR was 20% cases among males and 14.3% cases among females i.e. 9 cases out of 45 males and 5 cases out of 35 females had dementia Table-3.

Out of 80 patients, the relation between results of different scoring systems were according to MMSE 13 patients, CDR 14 patients, MSQ 25, Informant Interview 24, CDT 39 and Mini-Cog showed 6 patients of dementia.

Association of age with degree of dementia according to CDR, in the 60-69years age group 7.1% (1 patient) had questionable dementia, 14.3% (2 patients) had mild dementia and no one had severe dementia. In the 70-79 years age group 14.3% (2 patients) had questionable dementia, 7.1% (1 patient) had mild dementia and 14.3% (2 patients) had severe dementia. In the 80-89 years age group 7.1% (1 patient) had questionable dementia, 14.3% (2 patients) had mild dementia and 21.5% (3 patients) had severe dementia Table-6.

Table-6 ASSOCIATION OF AGE WITH DEGREE OF DEMENTIA ACCORDING TO CDR

Age group (years)	Degree of dementia(Number of cases-12)					
	Questionable Mild				Moderate	
	Number	%	Number	%	Number	%
60-69	1	7.1	2	14.3	0	0
70-79	2	14.3	1	7.1	2	14.3
80-89	1	7.1	2	14.3	3	21.5

DISCUSSION-
The consecutive 80 cases of elderly persons age $\geq$ 60years attending the Geriatric OPD were taken. All of them were evaluated for dementia clinically using Mini Mental Status Examination (MMSE).9 Similar evaluation had done by Folstein et al 1975.

Out of them, males were constituted 56.25% (45) and females 43.75% (35).The mean$\pm$SD age of these cases were calculated as 71.46$\pm$ 6.57 years. Table-1 is showing this. Previously, different studies were conducted on all the patients with age 60 years and above. The result is at par. [10,11,12.]

When the MMSE was taken into account, which is the most widely accepted and most widely used screening tool for dementia worldwide, the prevalence of dementia according to MMSE was 13(16%)cases out of the 80 patients of this study group. This is showing in Table-2. It was higher than the other studies done before. [11,12,13.]

The gender wise the prevalence of dementia according to MMSE was 17.8% i.e. 8 out of 45 males and 14.2% i.e.5 out of 35 females. Table-3 is showing this. There is difference in the gender distribution in previous studies. [10,14.]

Among all the patients screened to have dementia according to MMSE, those cases had orientation impairment in 92% (12 cases out of 13), registration and recall in 46% (6 out of 13), but attention,

calculation and language was impaired in 100% of cases (13 out of 13).Table-4 is showing this.[6]

The dementia prevalence according to age and gender were calculated. In the 60-69years age groups, 1(5.88%) out of 17cases was male and 1(6.25%) out of 16 cases was female. In the age groups of 70-79years, 4(22.22%) out of 18cases were male and 2(15.38%) out of 13cases were female. In the 80-89years of age groups, 3(30%) out of 10cases were males and 2(33.33%) out of 6cases were females.Table-5 shows this. [14]

Among the study population the prevalence of dementia according to MSQ was 31.3% i.e. 25 cases of dementia out of 80 patient. Table-2 shows this. Gender wise prevalence of dementia according to MSQ was 28.9% among males and 34.3% among females i.e.13 cases out of 45 males and 12 cases out of 35 females had dementia. Among those who had dementia according to MSQ, 31.2% had minimal and 68.8% had moderate dementia, but no one had severe dementia. Table-3 shows this.Among the study population the prevalence of dementia according to CDT was 48.7% i.e. 39 cases out of 80 patients had dementia. Table-2 shows this. Gender wise prevalence of dementia according to CDT was 44.4% cases among males and 54.3% cases among females i.e. 20 cases out of 45 males and 19 cases out of 35 females had dementia. Table-3 shows this. This was more than three times higher than what was observed by Nishiwaki et al (2004)15.Among the study population the prevalence of dementia according to MINI-COG was 7.5% i.e. 6 cases out of 80 patients had dementia. Table-2 Gender wise prevalence of dementia according to MINI-COG was 4.4% among males and 11.4% among females i.e. 2 cases out of 45 males and 4 cases out of 35 females had dementia. Table-3 This was much less than stated by Borson et al (2007)[16].

Among the study population the prevalence of dementia according to informant-interview was 30% i.e. 24 cases out of 80 patients had dementia. Table-2 Gender wise prevalence of dementia according to informant-interview was 28.9% cases among males and 31.4% cases among females i.e. 13 cases out of 45 males and 11 cases out of 35 females had dementia. Table-3 Among the study population the prevalence of dementia according to CDR was 17.5% i.e. 14 cases out of 80 patients had dementia. Table-2 Gender wise prevalence of dementia according to CDR was 20% cases among males and 14.3% cases among females i.e. 9 cases out of 45 males and 5 cases out of 35 females had dementia. Table-3 Association of age with degree of dementia according to CDR, in the 60-69years age group 7.1% (1 patient) had questionable dementia, 14.3% (2 patients) had mild dementia and no one had severe dementia. In the 70-79 years age group 14.3% (2 patients) had questionable dementia, 7.1% (1 patient) had mild dementia and 14.3% (2 patients) had severe dementia. In the 80-89 years age group 7.1% (1 patient) had questionable dementia, 14.3% (2 patients) had mild dementia and 21.5% (3 patients) had severe dementia. Table-6 Graves et al (1996) in their study stated that in the institutional population, the prevalence rate was 66%, and in the community, 2.9% persons with lower education had higher overall rates of dementia than those with higher education. So this may explain relatively higher prevalence of dementia in our study group. At the same time it must be reminded that the life expectancy is less than 70 years in India, much less in comparison to the west. So the possibility of getting data among the patients aged 60 years and above is less in comparison to the western data. [17]

As depicted in Table, the variations among the results of different scoring systems applied to screen dementia among same individuals were frequent. According to MMSE 13 patients (16%) had dementia, whereas according to CDT it was 39 (48.7%) and according to MSQ 25(31.3%). According to Mini-Cog 6 patients (7.5%) had dementia whereas Informant Interview method found 24(30%) to be having dementia. According to CDR it was 14 patients (17.5%).The CTD showed a much higher prevalence (48.7%) than MMSE (16%). This may be due to the fact that the CTD involves drawing a circle but it was showed in MMSE that drawing (language) was impaired in all the demented patients and so it may be one of the earliest features of dementia. Similarly the Mini-Cog showed a very less prevalence of dementia(7.5%) as compared to MMSE(16%). It might be due to the fact that it involves recall, which as shown in MMSE, is impaired the least among the people with dementia and so it might be one of the features to be affected late in the course of dementia.

CONCLUSION-

The prevalence and severity of dementia increases with age both in males and females. Mini-mental status examination(MMSE) is the most widely used cognitive test for dementia in clinical practice. It tests a broad range of cognitive functions including orientation, recall, attention, calculation, language manipulation and constructional apraxias. In early stages of dementia attention, calculation and language are impaired but registration and recall are preserved up to late stage in the course of dementia according to different clinical scoring system.

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