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COGNITIVE IMPAIRMENT AND DEPRESSION IN GERIATRIC INDIVIDUALS –A PILOT STUDY

Physiology

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ABSTRACT

Cognitive impairment is common in geriatric depression, and depressed individuals with co-morbid cognitive impairment are at increased risk for a number of adverse medical, psychiatric and cognitive outcomes. The aim of this study is to evaluate the cognitive impairment and depression in elderly subjects. The present cross-sectional descriptive study was conducted on 100 subjects aged 60 years and above. Cognitive function was assessed by applying standardized Mini-Mental State Examination (MMSE) of Folstein. Depression was assessed with the Geriatric Depression Scale (GDS), a questionnaire specifically developed for screening depressive symptoms in elderly populations. In our study 99% of elderly study subjects had cognitive impairment. We observed that the prevalence and severity of cognitive impairment was increasing with age and females had higher prevalence of cognitive impairment than males.

KEYWORDS

Cognitive impairment, depression, geriatric population

INTRODUCTION:

The geriatric population is defined as population aged 60 years and above [1]and they were expected to constitute 10.2% of the total world population by 2025.[2] The life expectancy of an average Indian has increased from 54 years in 1981 to 64.6 years in 2002.[3] According to Sharma [4] the population of people aged 60 years or above is likely to increase to 18.4% of the total population in India by the year 2025.The feeling of loneliness and age-related decline in the physical and physiological functioning make the elderly more prone to psychological disturbances.[5]

Late-life depression affects about 3.0 - 4.5% of adults 65 years and older in the United States. [6] Many depressed older adults often complain of cognitive symptoms, which range from normal cognitive aging to mild neuro-cognitive disorder to major neuro-cognitive disorder (dementia). Cognitive impairment is common in geriatric depression, and depressed individuals with co-morbid cognitive impairment are at increased risk for a number of adverse medical, psychiatric and cognitive outcomes. Although depression is generally characterized as a mood disorder, there is increasing recognition that it is also a cognitive disorder for many older adults. Viewed separately, clinically significant depressive symptoms are present in 11–30% of older adults internationally (Kivela et al. 1988 [7]; Gallo & Lebowitz, 1999[8] ; Steffens et al 2000[9]; Copeland et al 2004[10]; Lee & Shinkai, 2005)[11], and cognitive impairment is estimated to exist in 17–36% of adults over the age of 65 (Koenig & Blazer, 1992[12]; Lee & Shinkai, 2005[11]; Rait et al. 2005[13]; Graciani et al. 2006[14]).

Wide range of estimates for mental health morbidities in the elderly, ranging from 2.2 to 33.3% for age specific populations were reported in a recent review.[15] The main risk factors are loss of fortune, fall in self-esteem, sense of helplessness, illiteracy, poor health, social and gender discrimination, financial debt and status as a widowed person. The physical illnesses have role of causal or association with psychiatric illness especially with depression and significant or non significant association with cognitive impairment and depression.

Depressive symptoms and cognitive impairment were highly significantly correlated showing that they do co-occur in old age. [16] The relation between depression and cognition is very complex. It is very difficult to conclude where cognitive impairment begins and where depression ends or vice versa. Prevalence studies in Europe, the United States, and Canada reveal relatively consistent findings. 22.2% of individuals in the United States of age 71 years or older have cognitive impairment without dementia[17], and Canadian samples aged 65 and over report prevalence rates for cognitive impairment without dementia of 16.8%.[18] In contrast, the prevalence of depression in elderly New Mexico Hispanic population was 13.2% (6.4% in men and 16.9% in women).[19] In a meta-analysis of various study reports of community based mental health surveys on geriatric depressive disorders in those aged 60 years and above, conducted in the continents of Asia, Europe, Australia, North America, and South America between 1955 and 2005, the median prevalence rate of depressive disorders in the world for the elderly population was determined to be 10.3%, while among the elderly Indian population, it was determined to be 21.9% Barua et al.[20]

AIMS AND OBJECTIVES:

The aim of this study is to evaluate the cognitive impairment and depression in elderly subjects.

MATERIAL AND METHODS:

The present cross-sectional descriptive study was conducted on 100 subjects aged 60 years and above. The study was conducted in people who were attending general medicine outpatient department in this teaching hospital.

EXCLUSION CRITERIA:

Subjects who are not cooperative; who are not able to give informed consent; acute emergency and severe morbid cases were excluded.

Each study subject was put to a series of tests using a pre-tested, pre-structured study questionnaire after completion of physical assessment by physician and all the information regarding socio-demographic profile, present physical health status, problems and mental abilities (cognitive status) and most common psychiatric illness (depression) was collected. Few measurements (e.g. Blood pressure measurement) were taken to know the current health status of the study subjects. The study protocol was approved by the Institutional Ethical Committee and informed written consent was obtained from all subjects.

Cognitive function was assessed by applying standardized *Mini-Mental State Examination (MMSE)* of Folstein .[21] MMSE scores range from 0 to 30, with lower scores indicating increasing severity of cognitive impairments in the domains of orientation, memory, attention, and executive functions. Subjects with cognitive impairment had scores between 0 and 18. Subjects with scores between 0-10 were considered as having severe cognitive impairment; with scores between 11-20 as moderate; scores between 21-25 as mild and scores between 26-30 as normal cognition. The sensitivity was 87%, and specificity was 82%.

Depression was assessed with the *Geriatric Depression Scale (GDS)* [22], a questionnaire specifically developed for screening depressive symptoms in elderly populations. *Yesavage's Geriatric Depression Scale (GDS)* - Shorter version was used to detect whether the study subject is having depression or not. It is a screening tool and not a diagnostic one, having a sensitivity of 91.0% and a specificity of 72.0% in a community sample. The shorter version of the scale consists of 15 questions and each negative answer will carry a mark and thus the

more the scoring is, the more the chances of having depression. The maximum score that one can get is 15, which indicates a severe depression. The cut off for normal range was 5. The sensitivity and specificity was 84% and 95%, respectively.

The data obtained was analyzed with the *Graph pad prism software* and the prevalence of cognitive impairment, depression was calculated in percent. A chi-square analysis was conducted to look for differences between groups defined by age, gender and other factors.

TABLES:

Table 1: Socio-demographic features of the subjects

Distribution	No.of persons (n)	Percentage (%)
Age distribution (years)		
60-65	45	45
66-70	31	31
71-75	15	15
76-80	2	2
81-85	4	4
Above 85	3	3
Sex distribution		
Male	27	27
Female	73	73
Religious distribution		
Hindu	90	90
Muslim	3	3
Christian	7	7
Educational status		
Illiterate	98	98
Primary education	1	1
Secondary education	0	0
Higher secondary education	0	0
Diploma	0	0
Degree and above	1	1
Marital status		
Unmarried	0	0
Married	90	90
Divorced	0	0
Separated	0	0
Widowed	10	10
Socio economic status		
Upper class	0	0
Higher middle	1	1
Middle	7	7
Lower middle	0	0
Lower class	92	92
Chronic diseases		
Hypertension (HTN)	55	55
Diabetes mellitus (DM)	15	15
HTN and DM	10	10
Other diseases	39	39

Table 2: Distribution of subjects with cognitive impairment based on age

	Age distribution (years)	MMSE				Total No. of persons
		Normal (%)	Mild (%)	Moderate (%)	Severe (%)	
1	60-65	1(2.22)	1(2.22)	33(73.33)	10(22.22)	45
2	66-70	0	0	24(77.41)	7(22.58)	31
3	71-75	0	0	13(86.66)	2(13.33)	15
4	76-80	0	0	2(100)	0	2
5	81-85	0	0	4(100)	0	4
6	86-90	0	0	2(66.66)	1(33.33)	3
	Total	1(1)	1(1)	78(78)	20(20)	100

Table 3: Distribution of subjects by cognitive status with relation to gender

Sl. No.	Gender	MMSE				Total No. of persons	Percentage (%)
		Normal (%)	Mild (%)	Moderate (%)	Severe (%)		
1	Male	1(3.70)	0	19(70.37)	7(25.92)	27	96.29
2	Female	0	1(1.36)	59(80.82)	13(17.80)	73	100
	Total	1(1)	1(1)	78(78)	20(20)	100	99

Table 4: Distribution of elderly subjects by cognitive status with relation to diabetes mellitus and hypertension illness

Sl. No.	Chronic diseases	Cognitive impairment		Total No. of persons	Percentage (%)
		Normal	Impaired		
1	HTN	0	74	74	100
2	DM	0	1	1	100
3	HTN&DM	0	14	14	100
4	Others	1	10	11	100
	Total	1	99	100	99

Table 5: Prevalence of depression in study population based on age

Sl. No.	Age distribution (years)	GDS		Total No. of persons
		Yes	No	
1	60-65	17	28	45
2	66-70	6	25	31
3	71-75	6	9	15
4	76-80	1	1	2
5	81-85	1	3	4
6	Above 85	0	3	3
	Total	31	69	100

Table 6: Distribution of depression in study subjects based on gender

Sl. No.	Gender	GDS		Total No. of persons
		Yes	No	
1	Male	7	20	27
2	Female	24	49	73
	Total	31	69	100

Table 7: Distribution of depression in study population with diabetes mellitus (DM) and hypertension (HTN)

Sl. No.	Chronic diseases	Depression		Total No. of persons	Percentage (%)
		Yes	No		
1	HTN	24	50	74	32.43
2	DM	0	1	1	0
3	HTN&DM	4	10	14	28.57
4	Others	4	7	11	36.36
	Total	32	68	100	

OBSERVATIONS AND RESULTS:

100 elderly subjects aged 60 years and above of both sexes were evaluated in this study. Socio demographic profiles and medical history of study subjects are shown in Table 1. 75% of the study subjects have hypertension, 1% has diabetes and 14% have both hypertension and diabetes.

The prevalence and severity of cognitive impairment was found to be more with increasing age(98.68% in the age group of 60-70 years, 100% in the age group of 71- 80 years and above 80 years) which was not statistically significant (p value = 0.99,Table 2). The prevalence of cognitive impairment in males and females were 96.42% and 100% respectively. The females had higher prevalence of cognitive impairment than in the males which was not statistically significant (p value = 0.384, Table 3).Cognitive impairment was more (100%) among those who were having combined chronic diseases (hypertension and diabetes), only diabetes (100%) and followed by hypertension (98.66%) which was not statistically significant (p value = 0.95, Table 4).

Overall prevalence of depression was 69%.It was observed that the

prevalence of depression increased with increasing age group except in the 71-80 age group (69.73%in age group of 60-70 years, 58.82% in age group of 71-80 years and 85.71%in age group 81 above), which was not statistically significant (p value = 0.385, Table 5). The prevalence of depression was found to be more in elderly males (75%) than in female subjects (66.66%) which was not significant statistically (p value = 0.42, Table 6). The prevalence of depression in people suffering with hypertension was 68%, and in people with only diabetes was 100% and in people with diabetes and hypertension was 71.42 % which was not statistically significant (p value= 0.91, Table 7).

DISCUSSION:

The present cross sectional study was conducted to evaluate the prevalence of cognitive impairment and depression among the population of age 60 years and older.

In our study 99% of elderly study subjects had cognitive impairment. The prevalence and severity of cognitive impairment was increasing with age. The females had higher prevalence of cognitive impairment than males which was not statistically significant, which might be due to difference in literacy status, the age difference between male and female subjects and usage of social cognitive skills. The present study also revealed that there was an inverse relationship between the cognitive impairment and the literacy status.

The prevalence of depression, based on GDS scores, was found to be 69% in the present study. Studies have revealed that the prevalence rates for depression in community samples of elderly in India vary from 6 to 50%. [15] The prevalence has been reported to be 45.9% in Mumbai, [23] 29.36% in Dharwad district, Karnataka, [24] 31.4% in Maharashtra, [25] and 12.7% in Vellore, Tamil Nadu. [26]

Overall prevalence of depression was 69% in our study which was almost consistent with another study conducted by Pracheth R et al [24]. Our results differed from the studies conducted by JK W [27], Steffens DC et al [28] where overall prevalence of depression in the elderly was estimated to be 53.7%, 39.04% respectively. This difference in the prevalence of depression amongst the elderly could be most likely due to the difference in study settings, family composition and support, as well the basic customs and traditions prevalent in that area. The elderly population in rural setting might have increased risk of psychiatric co-morbidities especially depression due to lack of awareness and lack of availability of health services. Community-based mental health studies conducted in India have revealed a variable prevalence of depressive disorders.

Several chronic health conditions increase in prevalence in late-life, including arthritis, cancer, diabetes, heart disease, hypertension, stroke, thyroid disease, and pulmonary disease. Each of these conditions can produce transient cognitive fluctuation or physical/sensory impairment. The interactions between medical illness, depression, and cognitive impairment can be bidirectional, which can make it difficult to distinguish cause and effect. Practical considerations that should be taken into account when evaluating older individuals, such as medication use, presence of co morbid chronic diseases, sensory and physical limitations, and availability of social supports.

CONCLUSION:

Our study provides useful information on the prevalence of cognitive impairment and depression among older adults in rural population. In the elderly population, both cognitive impairment and depression have become public health problems.

SUMMARY:

Depression and cognitive impairment are among the most important mental health problems in elderly people. Both conditions may have severe consequences which might include diminished quality of life, functional decline and high mortality.

Limitations of the study:

In our study independent association between depression and cognitive impairment could not be established as other confounding factors were not eliminated. Small sample size, selection bias and recall bias cannot be eliminated. Further research is needed to address these limitations.

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