ORIGINAL ARTICLE

Magnitude of Neurocognitive Impairment and Severity of Depression in Geriatric Population

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ABSTRACT

Background and Objective: With the increasing life expectancy of the populations and rising prevalence of depressive and neurocognitive disorders, there is a need to address the association between the two in terms of magnitude of the neurocognitive disorders and the severity of depression. The current study addresses this issue and aims to observe the association between the two.

Methods: This cross-sectional descriptive study was conducted from September 2014 to March 2015 at the Institute of Psychiatry at Benazir Bhutto Hospital, Rawalpindi, Pakistan where consecutive patients aged ≥ 65 years were screened for depression using Geriatric Depression Scale (GDS). Neurocognitive impairment was assessed using Mini Mental State Examination (MMSE). Chi-square test was used to compute the association between depression severity and neurocognitive deficit.

Results: There was approximately equal gender distribution with a mean age of 63.6 ± 9.68 years. Eighty six percent of the study population was found to be suffering from clinical depression while seventy percent had neurocognitive deficit. The severity of depression came out to be directly proportional to the magnitude of the neurocognitive disorder (P = 0.000) with 68.8% of the patients with severe depression having moderate to severe neurocognitive deficit.

Conclusions: Depression is associated with significant neurocognitive impairment in elderly in the local population; higher the severity of depression more the magnitude of cognitive impairment.

KEYWORDS: Depression, Neurocognitive Disorders, Geriatric Population.

How to Cite This: *Yasir S, Yasir SB, Haider N, Fatima S, Mazhar M, Chaudhry S, et al. Magnitude of neurocognitive impairment and severity of depression in geriatric population. Biomedica. 2020; 36 (4): 400-4. doi: https://doi.org/10.51441/BioMedica/5-87.*

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- Received for publication: 25-10-2020
- Revision Received: 01-12-2020
- Accepted for publication: 11-12-2020

INTRODUCTION

With the increase in life expectancy, the geriatric population is expected to double in 2050 from that of 2015. This will result in the number of older adults (above 60 years of age) to 2 billion from a figure of 900 million.[1] Internationally, the prevalence of cognitive impairment and depression in the geriatric population is between 17%–36% and 11%–30% respectively.[2]

Approximately two thirds of the individuals who are suffering from acute depression experience some level of cognitive impairment and

generally precedes first episode of depression. Pragmatic evidence of impaired cognitive function in the domains of memory, learning, attention, psychomotor and executive function exists, however, there is inconsistency in the pattern of neuropsychological deficits among individuals.[3] People suffering from unipolar disorder in state of remissions also experience neurocognitive dysfunction.[4]

Neurocognitive deficit is a reduction or impairment of cognitive function such as memory, attention, executive functioning, and psychomotor speed.[4] Meta-analysis based on findings of number of research papers, major depressive disorder (MDD) is reported to be associated with decrease in the volume of hippocampus and basal ganglia.[5] Alterations of these morphometric measures have been correlated with psychopathological symptoms and cognitive dysfunctions in depression.[6] It means that cognitive functions in depression have a clear pathophysiological basis and there is a possibility that after depression remits the deficits cognitive functions may persist. Based on the data, it is evident that burden of depression and cognitive impairment is bound to increase with the increase in the elderly population, therefore it will become essential for health care providers dealing with mental health and wellbeing to be able to diagnose and treat these patients with an understanding of the relation between these two conditions as elderly with clinical depression and associated neurocognitive impairment are reported to experience higher rate of adverse outcomes in their lives both in terms of morbidity and mortality.[7] There is paucity of research in Pakistan in terms of assessing the magnitude of neurocognitive deficits and their relationship with degree of depression in elderly patients. The present study was undertaken to assess the depression and neurocognitive deficits in the elderly patients and to observe the association between the two in patients presenting to a tertiary care hospital at Rawalpindi, Pakistan.

METHODS

This descriptive study was conducted at the Institute of Psychiatry at Benazir Bhutto Hospital, Rawalpindi, Pakistan from September 2014 to March 2015 availing the inpatient and outpatient facilities. Sample size was calculated to be 292 by using World Health Organization (WHO) sample size calculator, taking confidence level 95%, anticipated population proportion 5% and absolute precision required to be 2.5%. Ethical approval of the study was obtained from the institutional Ethical Review Committee vide Letter No. PSY/22/2014, dated 14/09/2014. After written informed consent, sample was collected through non-probability consecutive sampling. Patients of both genders and an age range of 60-85 years were included in the study. Patients diagnosed with dementia, depression with psychotic features, drug abuse and who had history of degenerative neurological disorder, cortical strokes, severe or unstable physical illness (i.e. those who had been hospitalized in the last 3 months) were excluded.

Demographic data regarding age & gender of patients, marital status, education, employment status and monthly incomewas collected from 292 consecutive patientswho met the inclusion criteria from the outpatient and inpatient departments.In patients above 60 years of age, screening for depression was done using Geriatric Depression Scale (GDS)[8] which is a 15-item questionnaire with cut off score of 5, available in both English and Urdu versions. Patients scoring 5 or more on Urdu version of the questionnaire were included in the study. Patients were assessed for severity of depression by administering Beck Depressive Inventory (BDI).[9] Neurocognitive impairment was measured by administering Mini Mental State examination (MMSE).[10] Score less than 23 in MMSI indicate cognitive impairment.

STATISTICAL ANALYSIS

All the collected data was analyzed using the Statistical Package for Social Sciences (SPSS version 25.0). Age was presented as mean and standard deviation while gender of patients, marital status, education, employment status and monthly income, neurocognitive deficit and severity of depression was presented as frequencies and percentages. Chi-Square test is used to observe the association between the magnitude of neurocognitive disorders and severity of depression. P-value < 0.05 was considered significant for all analysis at a confidence level of 95%.

RESULTS

The mean age of the participants was 63.6 ± 9.68. There was approximately equal gender distribution with 145 (49.7%) males and 147 (50.3%) females. Out of the total, 187 (64%) were married, 92 (31.5%) were widowed and 13 (4.5%) were divorced. The 88 (30.1%) patients had no formal education, 101 (34.6%) had primary education, 87 (29.8%) had done their matriculation while 16 (5.5%) of the elderly had studied beyond matric.

The percentage of depression in the study population is shown in Fig.1. Number of elderly ranging from no depression to mild, moderate and severe was 42, 94, 108 and 48 respectively. According to MMSE, no impairment was seen in 85 individuals followed by moderate, and severe impairment (Fig.2). The association between the severity of depression and cognitive impairment through Chi-square test was found to be highly statistically significant (P = 0.000) in the elderly presenting to the tertiary care hospital (Table-1), implying that severe the depression, higher will be the magnitude of the cognitive damage. In all the moderate and severe cases of neurocognitive impairment, approximately 75% and 90% of patients had moderate to severe depression.

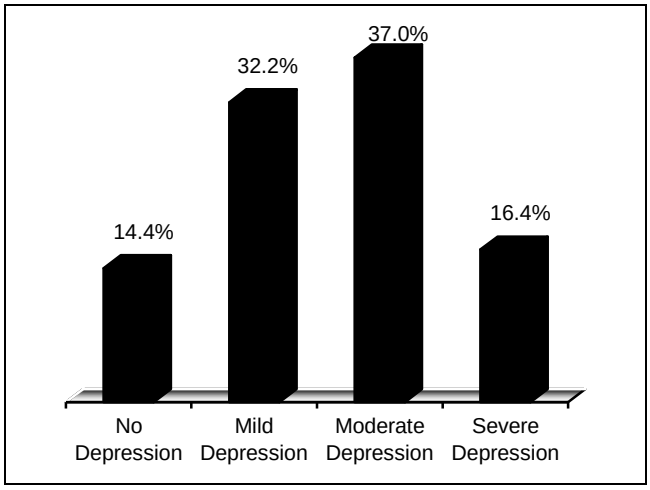

Fig.1: Percentage of severity of depression in study participants.

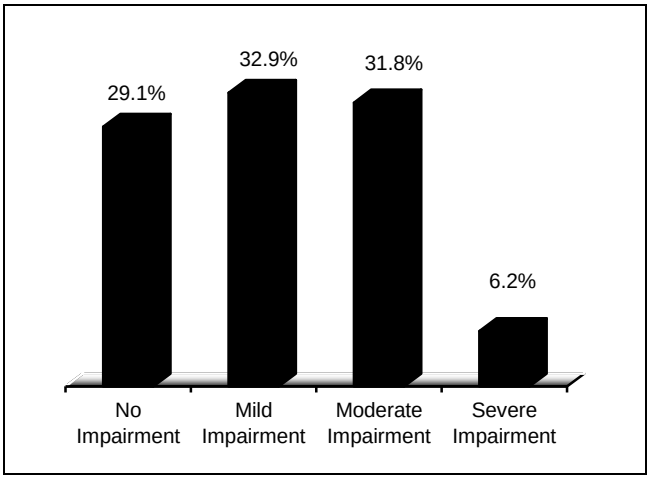

Fig.2: Percentage of different degrees of cognitive impairment in study participants.

Table-1: Association between severity of depression and magnitude of cognitive impairment.

Depression	*Neurocognitive Impairment n (%)*				*Total*
	None	*Mild*	*Moderate*	*Severe*	
None	32 (76.2%)	6 (14.3%)	4 (9.5%)	0 (0.0%)	42 (100%)
Mild	27 (28.7%)	46 (48.9%)	19 (20.2%)	2 (2.1%)	94 (100.0%)
Moderate	18 (16.7%)	37 (34.3%)	45 (41.7%)	8 (7.4%)	108 (100.0%)
Severe	8 (16.7%)	7 (14.6%)	25 (52.1%)	8 (16.7%)	48 (100%)
Total	85 (29.1%)	96 (32.9%)	93 (31.8%)	18 (6.2%)	292 (100%)

P-value = 0.000 Chi-square = 60.118

DISCUSSION

Association between the severity of depression and neurocognitive impairment was found to be highly statistically significant in the elderly alluding to the fact that severe the depression higher will be the cognitive impairment. In all the moderate and severe cases of neurocognitive impairment approximately 75% and 90% of patients had moderate to severe depression. In the current study an association is observed between depression and the psychological domains of delayed recall, executive function, memory, attention, and concentration as measured through MMSE. This is consistent with findings of another study which found a highly statistically significant

difference in performance between cognitive functions of normal people and depressed patients especially in areas of verbal fluency, semantic fluency and memory.[11]

Current results are in line with another study conducted on 105 Chinese elderly with late onset depression analyzed the relationship between severity of depression and cognitive performance with the impact of the interaction on functional ability of these patients. Researchers compared cognitive impairment with severity of mood symptoms. Results highlighted that the rising severity of depression related to lower scoring on MMSE with delay in recall, and a poor performance in Trail Making test by the Chinese elderly. Authors concluded that the functional disability in their patients was due to depressive mood and lack of motivation in performing daily tasks intensified by abnormalities in behavior due to executive dysfuntion.[7] However, results may not be comparable as the timing of onset of depression was not a variable in the current study. A meta-analysis of 22 studies by Zakzanis et al.[12] showed that declarative or episodic memory and attention as the cognitive domains most influenced by depression. Other studies also support the results of current study indicating thatlate onset depression (LOD) has generalized neurocognitive impairment in upto fifty percent of cases.[13]

Keeping in view the findings of the current study it is evident that depression is primarily a mood disorder, however, for elderly individuals, it is also a cognitive disorder. The reason why cognitive impairment occurs in depression can be multifactorial. One of the factors for cognitive impairment in depression, with onset after 60 years of age, is related to deep white matter structures and subcortical pathology and that is frequently associated with cognitive impairment, specifically with significant abnormalities in executive function that reflect underlying dysfunction of frontostriatal circuits.[14,15]

An important aspect in this relation is the fact that depression could occur because of psychological reaction in response to clinical diagnosis of neurocognitive impairment.[16] Numerous tricyclic antidepressants having anticholinergic effects can also be a factor in causing cognitive impairment in elderly suffering from depression.[17] A study has shown potential negative effects of antidepressants on cognition highlighting thatdifferent parameters of cognition can be affected by different classes of antidepressant drugs.[18] This is further complicated by the realization that depression in the aged is a risk factor of neurodegenerative disease that reflects underlying degenerative or vascular processes.[17] There is a possibility that neurocognitive impairment can be unmasked by depression as it can compromise cognitive reserve and allow dementia like symptoms to manifest earlier than they would have been otherwise.[19] All of the above mentioned interactions may be involved in the link between depression and cognition. Therefore, it is crucial for the psychiatrists to distinguish between cognitive deficits secondary to depression from dementia presenting with depressive symptoms. A critical approach is needed and clinicians must consider all the factors that can either worsen depression in cognitively impaired or vice versa especially while prescribing medications that can have possible drug interactions.[20] In old age depressed individuals early identification of neurocognitive impairment and long-term follow-up of these patients can, not only be useful in effective management but, may provide useful information regarding course and etiology of future dementia outcomes in these patients.

CONCLUSION

A high frequency of neurocognitive impairment in geriatric patients with depressive illness was observed with a statistically significant association between the severity of depression and frequency of neurocognitive symptoms**.** Severity of depression is directly proportional to extent of neurocognitive impairment in the elderly population presenting in Pakistan.

LIMITATION OF THE STUDY

Some of the participants' native language was not Urdu which created difficulty for them to understand the exact meaning of even basic questions; the questions had to be further simplified according to their level of understanding.

ACKNOWLEDGEMENT

The authors are indebted to all the patients who voluntarily participated in the study.

CONFLICT OF INETEREST

None to declare.

GRANT SUPPORT & FINANCIAL DISCLOSURE

None to disclose.

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Author's Contribution

SY: Conception and design of study, data interpretation, Drafting of manuscript.
SBY, SC: Data analysis and interpretation.
SF, NH, MM, ATN: Acquisition of data and drafting of manuscript with critical revision for intellectual content.
ALL AUHTORS: Approval of the final version of the manuscript to be published.