Acta Biomedica Scientia
e - ISSN - 2348 - 2168
Print ISSN - 2348 - 215X
www.mcmed.us/journal/abs
Research Article

# ASSESSMENT OF COGNITIVE STATUS IN HYPERTENSIVE GERIATRIC PATIENTS RECEIVING VARIOUS ANTIHYPERTENSIVE DRUGS IN A MEDICAL COLLEGE HOSPITAL

**Elizabath Shaji[1], Mirju Ali[1], Sheena Marin Thomas[2], Parthasarathy G[3*]**

[1] Pharm D Intern, The oxford college of Pharmacy, Bangalore-560068, Karnataka, India.
[2] Assistant Professor, Department of Pharmacy Practice, The oxford college of Pharmacy, Bangalore-560068, Karnataka, India.
[3] Professor and Head, Department of Pharmacy Practice, The oxford college of Pharmacy, Bangalore-560068, Karnataka, India.

## ABSTRACT

Objectives: The objective of our study is to assess the cognitive status in hypertensive geriatric patients using MoCA questionnaire, to assess the significance of various variables in the cognitive status in older adults. Methods: The patients demographic data and therapeutic details were collected. Assessment of cognitive function was done by providing MoCA questionnaire to the patients. From the MoCA questionnaire, we assessed the mild cognitive impairment of the patient and co related both mild cognitive impairment and non-mild cognitive impairment (normal) of the patient with various variables. We used Mean and Chi-square test to analyse the obtained data. Results: In a study period of 6 months a total of 135 patients were gathered. There were 78 (57.7%) patients who were male and 57 (42.2%) patients who were female. Total of 63 (46.66%) patients were unemployed. It was also found that the burden of the cognitive impairment in this population would have great consequences at individual, social and economic levels. We also observed that those who are unemployed and living in rural areas had a higher prevalence of cognitive impairment. Conclusion: It has been observed that, there is no association between cognitive impairment and hypertension in older adults with a low socio economic status.

**Keywords :-** Cognitive Status, Geriatrics, Hypertension, MoCA Questionnaire.

| Access this article online | |
|---|---|
| Home page: http://www.mcmed.us/journal/abs<br>DOI: http://dx.doi.org/10.21276/abs.2019.6.2.9 | **Quick Response code** |

| **Received:**25.07.19 | **Revised**:02.08.19 | **Accepted**:08.08.19 |
|---|---|---|

## INTRODUCTION

Hypertension, or a persistently high blood pressure is a sustained systolic blood pressure of 140 millimetres of mercury (mm Hg) or more, sustained diastolic blood pressure of 90 mm Hg or more, or both. Hypertension may alter the brain structure and function, including cognitive function which is the ability to efficiently process information [1].

Symptoms of severe hypertension include tiredness, nausea, vomiting, confusion, anxiety, and chest pain and muscle tremors [2]. Significant risk factors for HTN include being old, less physical activity, obesity, smoking and alcohol consumption [3]. The geriatric population i.e. the elderly population, usually includes people aged 65 and over [4]. Recent estimates have

Corresponding Author **Parthasarathy G** Email: - mypartha@gmail.com

predicted that people aged 65 and above will constitute 16 percent of total population by 2050[5]. In recent years, accumulating epidemiologic and mechanistic evidence has shown that hypertension is an important risk factor for dementia, Alzheimers disease and mild cognitive impairment (MCI).

Mild Cognitive impairment (MCI) is the term for individuals who fall between the cognitive changes of aging and early dementia. Domains affected include memory, visuospatial skills, language, attention, and executive function. The prevalence of MCI among different age groups is as follows: 6.7% for ages 60–64; 8.4% for ages 65–69, 10.1% for ages 70–74, 14.8% for ages 75–79, and 25.2% for ages 80–84 [6]. According to the recent ARIC (Atherosclerosis Risk in Communities) neurocognitive trail only midlife hypertension is associated with greater cognitive decline over 20 years follow up not the late life hypertension[21]. However, few studies showed that there is no relationship with and dementia high blood pressure and also suggested that dementia is related to low blood pressure due to J curve phenomenon [7].

The MoCA is a simple, stand-alone cognitive screening tool with superior sensitivity [8] which has excellent test-retest reliability and positive and negative predictive values for MCI. It was found that MOCA is more sensitive than MMSE in detecting cognitive dysfunction 3 to 6 months after experiencing neurological deficits [9]. The socioeconomic status, education, occupation, duration of hypertension, comorbidities, blood pressure are the important variables considering with respect to the cognitive status of geriatric patient in our study. So, efforts are needed improve the health condition of these patients by the means of effective patient care programs. Hence considering all these factors we have included the MoCA questionnaire to study the cognitive status in hypertensive geriatric patients.

## MATERIALS AND METHODS:

This prospective observational study was conducted in The Oxford Medical College Bangalore. The study samples were collected from the general medical ward. A total of 135 patients who were admitted in the department were interviewed using structured interview questionnaire. Ethics Committee approval was obtained from the Institutional Ethics Committee of The Oxford Medical College, Attibele, Bangalore (Reference no: IEC/TOMCHRC/070/17-18). The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction.

### Hospitalisation Criteria

In-patients admitted in the general medicine ward both male and female ward during the study period (6 months) who were geriatrics.

- Subjects who are willing to participate.
- Patient with age more than 65 years of both genders.
- Hypertensive patients with/without co-morbid conditions.
- Patients not diagnosed with neurodegenerative disorders.

It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuo constructional skills, conceptual thinking, calculations, and orientation time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal. Participants were chosen voluntarily and a written consent was obtained before the administration of the questionnaire to individual patients. Confidentiality of the participants was maintained. If the participants couldn't understand the questionnaires, due to language problem he/she were excluded from the study. Microsoft word and Excel have been used to generate graphs, tables for the analysis of the data**.** Chi square test and frequency were used in our study for statistical analysis.

In our study from a total of 135 patients, 58 % of female patients having mild cognitive impairment and only 42 % of them having normal cognition and in case of male patients, about 50 % of patients are normal and about 50 % of them having mild cognitive impairment. Here P=0.007 which was found to be significant. In our study comparison of occupation and cognitive status of the study population was carried out and p value was found to be P=0.001 which was highly significant.
The study procedure included the following steps:-

**STEP 1**: To obtain consent from the patient through informed consent form in English and Kannada language.
**STEP 2**: Collection of demographics of the patient (Name, Age, Sex, BMI etc.) and the data regarding diagnosis, prescribed drugs, indication and their route of administration, number of days of stay in case of inpatients.
**STEP 3**: Assessment of cognitive function in hypertensive geriatric patient by providing structured interview MoCA QUESTIONNAIRE to patients.
**STEP 4**: Calculating the scores in MoCA, filled by the patient and assessing the cognitive status (impaired or normal).
**STEP 5:**
Evaluating various variables of the patient and the co relating with mild cognitive impairment (MCI) obtained from MoCA questionnaire.

**STEP 6**:
The obtained data will be subjected for suitable statistical method. (Chi Square Test)

**RESULTS**

Patients were divided into 2 groups, normal and MCI (Mild cognitive impairment). Normal subjects those who were cognitively not impaired or who passed MoCA test and MCI those who failed to score MoCA test or cognitively impaired patients. A total of 120 patients were enrolled in this study in accordance to the inclusion criteria from the General Medicine department of The Oxford Medical College, Hospital and Research Centre, Bangalore.

Age wise distribution of the patients showed that majority of the patients were belonging to the age group 65-70 and then 71-80 (30% in both the groups is given in Table1 and Fig. 1.

Table 2 and figure 2 shows distribution of study population based on their occupation. It was found that majority patients were unemployed. Only least population found to be with high employment status

Table 3 and figure 3 shows data evaluated of the distribution based on the social habits of patients. More people are found to be without any social habits. 22% people were with both alcoholic and smoking habits.

Table 4 and Figure 4 showed the distribution based on the education of patients. Among the enrolled patients, majority of them completed their lower primary education followed by upper primary, high school and higher secondary education. The least number of patients showing have degree level of education.

Table 5 and figure 5 shows the distribution of patients based on their current drug therapy.

Table 6 and Figure 6 shows the data evaluated of the distribution based on the duration of hypertension of patients. It is found that patients were taking antihypertensive therapy for 1-5 (22.2%) years, followed by 6-10 (37.7%) years therapy,11-15 (8.04%), 16-20 (4.44%) and the least number of patients were taking antihypertensive therapy for >20 (2.2%) years

Table 7 and Figure 7 show the distribution of cognitive status (MoCA points) of the study population. About 53.3 % of patients having mild cognitive impairment and about 46.6% of patients are normal in cognition based on MoCA test results.

Table 8 and Figure 8 shows the data regarding Comparison of age and Cognitive status in the study population. Highest level of cognitive impairment of 92.85% was associated with the people of age >80 then 71-80 (88.8%) and 65-70 (40%). which shown that cognitive impairment was associated with older age.

Table 9 and Figure 9 showed that Comparison of hypertension and co-morbid diseases of HTN with Cognitive status in the study population.

**Table 1. Age wise distribution of the patients**

| Age(yrs.) | Total No. Of Patients |
|---|---|
| 65-70 | 93(68.69%) |
| 71-80 | 27(20.320%) |
| >80 | 15(11.11%) |
| Total | 135 |

**Table 2. Distribution of study population based on their occupation.**

| Occupation | Total No. Of Patients N=135 |
|---|---|
| Unemployed | 63(46.66%) |
| Daily wage worker | 45(33.33%) |
| Farmer | 19(14.07) |
| Business | 7(5.18%) |
| Govt. Servant | 1(0.740%) |

**Table 3. Distribution based on the social habits of patients.**

| Social Habits | Total No. Of Patients N=135 |
|---|---|
| Alcoholic | 17(12.59%) |
| Smoking | 24(17.77%) |
| Alcoholic + Smoking | 30(22.22%) |
| Nil | 64(47.44%) |

**Table 4. The distribution based on the education of patients.**

| Education | No. Of PatientsN=135 |
|---|---|
| Lower Primary | 90(66.6%) |
| Upper Primary | 21(15.5%) |
| High School | 15(11.11%) |
| Higher Secondary | 6(4.44%) |
| Graduate | 3(2.22%) |

**Table 5. Distribution of patients based on their current drug therapy**

| DRUGS | No. Patients N=135 |
|---|---|
| ARB | 42(31.1%) |
| β BLOCKERS | 241(7.7%) |
| Diuretics | 19(14.7%) |
| CCB | 16(11.8%) |
| ACE | 10(7.4%) |
| ARB+β BLOCKER | 11(8.14%) |
| ARB+DIURETICS | 6(4.53%) |
| ARB+CCB | 5(3.70%) |
| CCB+ β BLOCKER | 2 (1.48%) |

**Table 6. Distribution based on the duration of hypertension of patients.**

| Duration(years) | No. Of Patients N=135 |
|---|---|
| 1—5 | 30(22.2%) |
| 6—10 | 51(37.7%) |
| 11—15 | 35(8.04%) |
| 16—20 | 16(4.44%) |
| >20 | 3(2.22%) |

**Table 7. Ddistribution of cognitive status (MoCA points) of the study population.**

| MoCA | No. Of Patients | Percentage (%) |
|---|---|---|
| Pass | 63 | 46.60 |
| Fail | 72 | 53.30 |
| Total | 135 | 100 |

**Table 8. Comparison of age and Cognitive status in the study population.**

| AGE (YEARS) | NORMAL | MIC | TOTAL(n) |
|---|---|---|---|
| **65-70** | **56(60.2%)** | **37(39.78%)** | **93** |
| 71-80 | 3(11.1%) | 24(88.8%) | 27 |
| >80 | 1(7.14%) | 14(92.85%) | 15 |
| Total | 61 | 47 | 135 |

P=0.001, significant, Chi- square test

**Table 9. Comparison of hypertension and co-morbid diseases of HTN with Cognitive status in the study population**

| Co-morbidity | Normal | MCI | TOTAL |
|---|---|---|---|
| HTN | 13(56.5%) | 10(43.47%) | 23 |
| HTN+DM | 12(21.4%) | 44(78.5%) | 56 |
| HTN+ Asthma | 16(33.52%) | 18(52.94%) | 34 |
| HTN+HL | 3(33.3%) | 6(66.6%) | 9 |
| Others | 4(30.76%) | 9(69.26%) | 13 |
| Total | 48(35.5%) | 87(64.4%) | 135 |

P=0341, Not significant, Chi- square test

**Fig. 1. Age wise distribution of the patients**

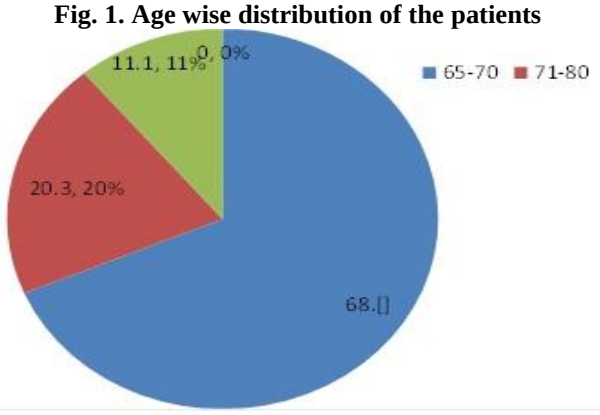



**Fig. 2. Distribution of study population based on their occupation.**

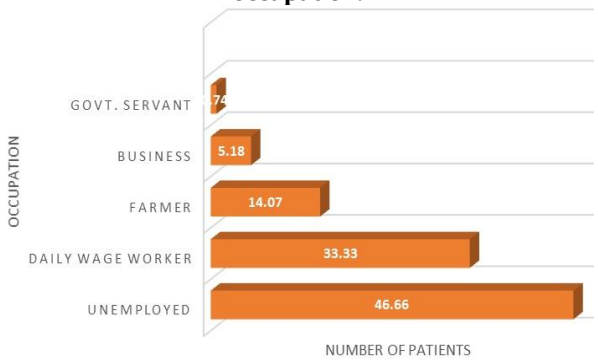



**Fig.3. Distribution based on the social habits of patients**

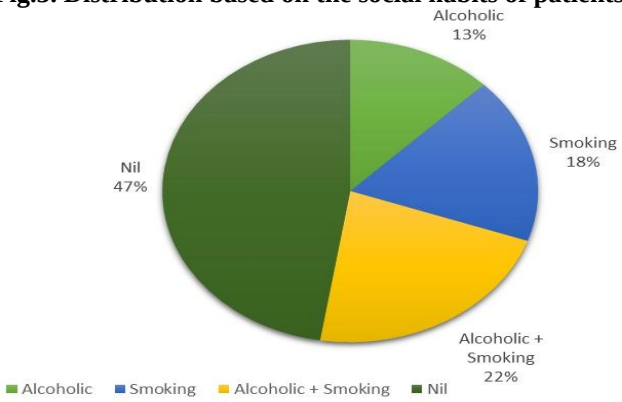



**Fig. 4. Distribution based on the education of patients.**

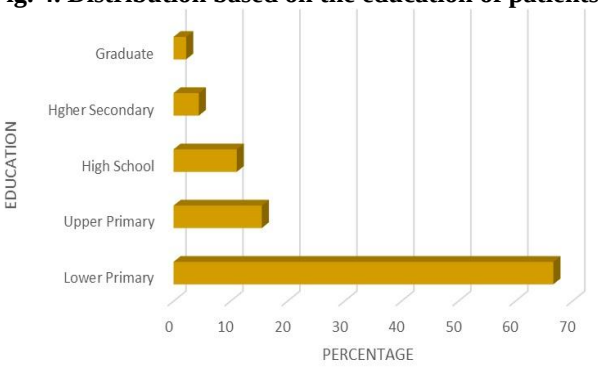



**Fig. 5. Distribution of patients based on their current drug therapy**

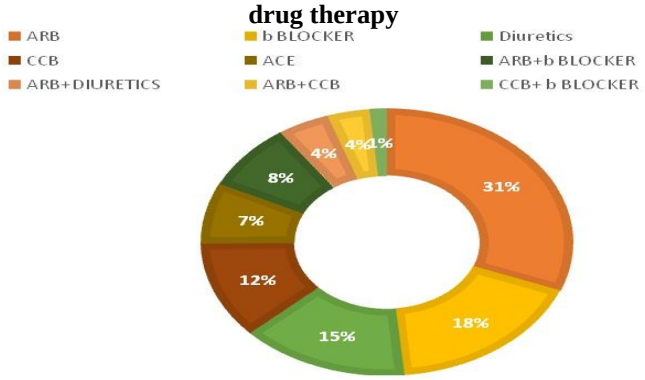



**Fig. 6. Distribution based on the duration of hypertension of patients**

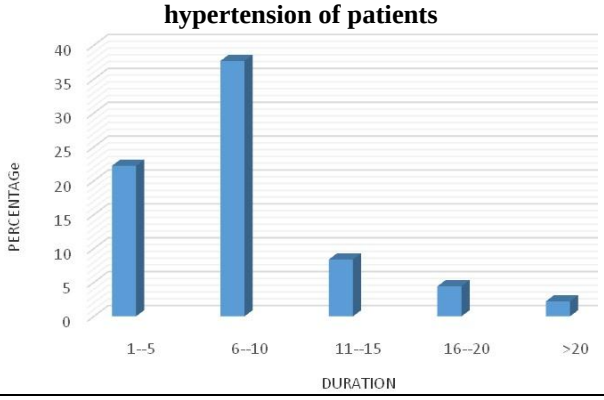



**Fig. 7. Distribution of cognitive status (MoCA points) of the study population**

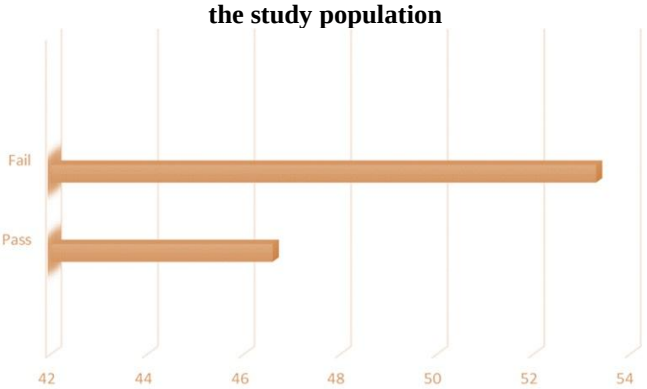



**Fig. 8. Comparison of age and Cognitive status in the study population**

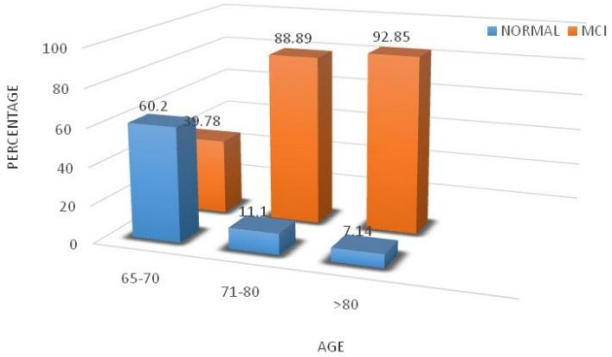
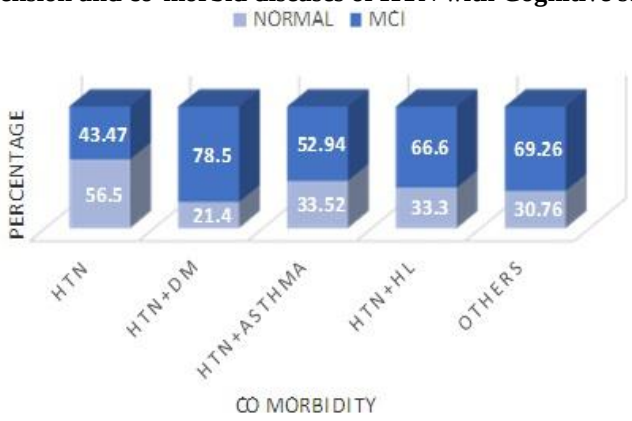


**Fig. 9. Comparison of hypertension and co-morbid diseases of HTN with Cognitive status in the study population**




## DISCUSSION

Cognitive status in geriatric patients was studied and the correlations with various factors were assessed during the study period. The findings were very significant and we observed a number of correlations between varied parameters such duration of hypertension, education, socio economic status, blood pressure level, other co-morbid conditions etc. The age of patient varies ≥ 65 years; maximum numbers of patients were in the age group of 65 to 70 years. And highest level of cognitive impairment of 92.85% was associated with the people of age >80 then 71-80 (88.8%) and 65-70 (40%). This can be comparable with the previous study shown that cognitive impairment was associated with older age, lower educational level and increased severity of motor impairment.

In the our study from a total of 135 patients, 58 % of female patients having mild cognitive impairment and only 42 % of them having normal cognition and in case of male patients, about 50 % of patients are normal and about 50 % of them having mild cognitive impairment.

This study observed that the higher number of patients who passed the MoCA test were taking antihypertensive therapy for 1-5 (80%) years, followed by 6- 10(62.7%) years therapy and the least number of patients who passed MoCA test were taking antihypertensive therapy for 16-20 (18.7%) years, which suggest that in hypertensives, the duration of hypertension is associated with as a risk for dementia and cognitive decline. The same fact was also abstracted by previous study and also as per American heart association.Years of education was strongly related to cognitive level in all domains, particularly verbal fluency as observed in the previous study**.** Education is an important confounding factor**.** We found an association between unemployment and cognitive impairment

## CONCLUSION

In our prospective observational study, we reached to a conclusion that there is no association between cognitive impairment and hypertension in older adults with a low socioeconomic status. High blood pressure in midlife is associated with an altered cognitive function in the elderly. The association of high BP in late life and oldest old age cognitive dysfunction is less clear. However in hypertensive, the duration of the antihypertensive treatment is associated with a reduced risk for dementia and cognitive decline. Quality of life, life styles habits (smoking, alcoholism), educational status, employment status these are confounders could produce a positive bias to the geriatrics, because these variables increase the prevalence of the exposure and the outcome. Those who are unemployed and living in rural areas had a higher prevalence of Cognitive impairment. The burden of the cognitive impairment in this population would have great consequences at individual, social and economic levels. For these reasons, early actions during life and social support can prevent some of the most important consequences of cognitive impairment.

## ACKNOWLEDGEMENT:

First and foremost, our greatest regards to the Almighty, for bestowing upon us the courage to face the complexities of life and complete this project successfully. We thank The Principal of our institution, our Head of the Department, Department of Pharmacy Practice, The Oxford College of Pharmacy, Bangalore, Dr. G Parthasarathy, for providing us with his insights. With all sincerity from the bottom of our hearts, we thank our project guide Mrs. Sheena Marin Thomas, Assistant Professor, Department of Pharmacy Practice, for her guidance, support and encouragement throughout the duration of this project and without whom this project would be incomplete. Our sincere thanks to our co-guide, Dr. Suma D, Associate Professor and Head, Department of Orthopaedics, The Oxford Medical College and Research Centre, Attibele, Bangalore, for his help and guidance in our thesis.

**REFERENCES:**


1. Waldstein SR. (2003) The Relation of Hypertension to Cognitive Function. *Curr Dir Psychol*, 12(1), 9-12
2. Giles TD, Materson BJ, Cohn JN, et al. Definition and classification of Hypertension: an update. J Clin Hypertens (Greenwich). 2009; 11611-614.
3. Chataut J, Adhikary RK, Sinha NP. (2011) The prevalence of and risk factors for hypertention in adults living in central development region of Nepal. *Kathmandu Univ Med J*, 33 (1), 13-8.
4. Canbaz S, Sunter A.T, Dabak S, Peksen Y. (2003) The prevalence of chronic diseases and quality of life in elderly people in Samsun. *Turk J Med Sci*, 33(5), 335-36.
5. Kinsella, K. and He, W. (2009) U.S. Census Bureau, International Population Reports, P95/09-1, An Ageing World: 2008. Washington, DC: US Government Printing Office.
6. Grundman M, Petersen RC, Ferris SH, et al. (2004). Mild cognitive impairment can be distinguished from Alzheimer disease and normal aging for clinical trials. *Arch. Neurol.* 61 (1), 59–66. PMID 14732621.
7. Gottesman RF, Schneider AL, Albert M, Alonso A, Bandeen-Roche K, Coker L, Coresh J, Knopman D, Power MC, Rawlings A, Sharrett AR, Wruck LM, Mosley TH. (2014) Midlife hypertension and 20-year cognitive change: the atherosclerosis risk in communities neurocognitive study. *JAMA Neurol*, 71(10), 1218-27.
8. McGuinness B, Todd S, Passmore P, Bullock R. (2009) Blood pressure lowering in patients without prior cerebrovascular disease for prevention of cognitive impairment and dementia. *Cochrane Database Syst Rev*, 4, CD004034.
9. Roalf DR, Moberg PJ, Xie SX, Wolk DA, Moelter ST, Arnold SE. (2013) Comparative accuracies of two common screening instruments for classification of Alzheimer's disease, mild cognitive impairment, and healthy aging. *Alzheimers Dement*, 9(5), 529–37.
10. Porras ML, Soriano VO, Porras MM, Runzer-Comenares FM, Malaga G, Miranda JJ. (2017) Cognitive impairment and hypertension in older adults living in extreme poverty: a cross-sectional study in Peru. *BMC. Geriatrics*, 17, 250
11. Mittal S,Verma P, Jain N, Khatter S, Juyal A. ( 2 0 1 2 ) Gender based variation in cognitive functions in adolescent subjects . *Ann neurosci*, 19 (4), 165-168.
12. Zahodne LB, Glymour MM, Sparks C, Bontempo D,Dixon RA, MacDonald SWS et al. (2011) Education Does Not Slow Cognitive Decline with Aging: 12-Year Evidence from the Victoria Longitudinal Study. *J Int Neuropsychol Soc.* 17, 1-8.


**Cite this article:**
Elizabath Shaji, Mirju Ali, Sheena Marin Thomas, Parthasarathy G. Assessment Of Cognitive Status In Hypertensive Geriatric Patients Receiving Various Antihypertensive Drugs In A Medical College Hospital. **Acta Biomedica Scientia**, 2019;6(2):93-99. DOI: **http://dx.doi.org/10.21276/abs.2019.6.2.9**