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A study on cognitive impairment in essential hypertensives

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Abstract
Introduction: Evidence presented suggests that raised blood pressure levels contribute to cognitive impairment in susceptible people (especially in concomitant conditions which predispose to cerebral ischemia).
Methodology: 50 hypertensives were taken for the study, assessed and analyzed. The samples were matched for age, sex, education and socio-economic status. The tools used were socio-demographic data and clinical proforma, SMMSE (Standardized Mini Mental Status Examination) scale and BCRS (Brief Cognitive Rating Scale). They're very significant cognitive deficits measured by SMMSE on orientation and constructional ability and in BCRS it was in orientation only.
Results: Mean age being 51.4 years, predominant being male sex, educated upto primary school (i.e., 5th std), residing in urban areas, married and earning less than Rs. 2,500/- per month. A significant number of cases were Hindus i.e, 46% in the hypertensive group. Occupational background showed there were more non-agricultural laborers i.e., 42% in cases. The mean duration of hypertension was 5.2 years which was statistically very highly significant in cases. The mean systolic blood pressure was 164 mmHg which was statistically very highly significant in cases. The mean diastolic blood pressure was 103 mm Hg which was statistically very highly significant in cases.
Conclusion: The overall cognitive decline on both SMMSE and BCRS scores were very highly significant, thus signifying a global cognitive decline.

Keywords: Hypertension; Central Nervous system; Impairment

Introduction

The Central Nervous System (CNS) is frequently affected by arterial hypertension. Many aspects of the CNS changes caused by arterial hypertension however are unclear. There is substantial literature on the cognitive and behavioral effects of high blood pressure in the absence of stroke, hence many questions remain unanswered. Most studies are only on few elderly subjects. They did not control for education, alcohol use, smoking or antihypertensive treatment (Wilkie 1971, Hertzog 1978). [1, 2]

The identification of variables that are related to the level of cognitive performance may serve to suggest risk factors for further investigation. One method for determining the level of cognitive function is the structured measurement of the performance of specific tasks. Cognitive decline is an important problem in elderly. With increasing numbers of people living into old age, hence it is necessary to understand possible causes of cognitive decline. A number of clinical based studies of middle aged adults have examined the relation of blood pressure to the level of performance on cognitive function tests and found that hypertension was associated with at least some of the aspects of cognitive function. Both hypertension and cognitive impairment are common disorders in old people. Many people have reviewed epidemiological, clinical and experimental studies that have examined the association between these conditions. Evidence presented suggests that raised blood pressure levels contribute to cognitive impairment in susceptible people (especially in concomitant conditions which predispose to cerebral ischemia). Some studies demonstrate certain classes of antihypertensive drugs are beneficial for ischemia and cell growth processes, while others tend to impair cognitive functions-either by central action or alterations to cerebral blood flow. Objectives of the Study: To determine the cognitive impairment in essential hypertensives.

Materials and Methods

Subjects for the study were selected from the in-patient and out-patient facility of Department of General Medicine, Katuri Medical College, Guntur. Katuri Medical College has multispecialty service oriented facilities for Medical Education, research and advanced medical care with a total bed strength of 1000, catering to the needs for patients mainly from Eastern, Central & coastal Andhra Pradesh. It has inpatient facilities for more than 50 patients under psychiatry, as well as outpatient and community services in psychiatry department. 50 subjects who were diagnosed as essential hypertensives. Initial contact was made in the General Medicine Department of the Hospital. The essential hypertensives were identified. An informed consent was obtained from those who were willing to participate in the study. Patients satisfying the inclusion and exclusion criteria were assessed for cognitive impairment using the Standardized Mini Mental Status Examination (SMMSE) and Brief Cognitive Rating Scale (BCRS) scales.

Instruments of assessment: 1. Standardized Mini Mental Status Examination (SMMSE) 3
2. Brief Cognitive Rating Scale (BCRS) 4

Results

50 hypertensives were taken for the study, assessed and analyzed. Following are the results. The mean age in the controls group was 51.40 years (SD=8.108) and 51.40 years (SD =8.108) in the cases group. The p value of 1 in overall group statistics was not significant.

Table 1: Sex Distribution

Sex		
Male	Frequency	35
	%	70.0%
Female	Frequency	15
	%	30.0%
Total	Frequency	50
	%	100.0%

There were 35 (70.0%) males and 15 (30.0%) females in the control group. The cases group consisted of 35 (70.0%) males and 15 (30.0%) females (Table-1).

Table 2: Marital status wise Data

Marital Status		
		cases
Un Married	Frequency	3
	%	6.0%
Married	Frequency	47
	%	94.0%
Total	Frequency	50
	%	100.0%

In the cases group, 3 (6%) were unmarried while 47 (94.0%) were married (Table-2).

Table 3: Religion wise Data

Religion		Groups
		Cases
Hindu	Frequency	23
	%	46.0%
Muslim	Frequency	15
	%	30.0%
Christian	Frequency	12
	%	24.0%
Total	Frequency	50
	%	100.0%

Table 4: Domicile wise data

Domicile		Groups
		Cases
Urban	Frequency	40
	%	80.0%
Semi-urban	Frequency	1
	%	2.0%
Rural	Frequency	9
	%	18.0%
Total	Frequency	50
	%	100.0%

The cases group consisted of 23 (46%) Hindus, 15 (30.0%) Muslims and 12 (24%) Christians. The p value of 0.042 in overall group statistics was significant (table-3).

The cases group consisted of 40 (80.0%) urban domicile, 1(2%) semi-urban and 9 (20.0%) rural domicile. The p value of 0.398 in overall group statistics was not significant (table-4).

Table 5: Education wise data

Education		Groups
		Cases
Illiterate	Frequency	18
	%	36.0%
Literate / Primary	Frequency	19
	%	38.0%
Middle	Frequency	8
	%	16.0%
Secondary	Frequency	5
	%	10.0%
Higher Secondary	Frequency	0
	%	.0%
TOTAL	Frequency	50
	%	100.0%

Table 6: Occupation wise data

Occupation		Groups
		Cases
Clerical	Frequency	1
	%	2.0%
Business	Frequency	4
	%	8.0%
Farmers/ Coolies/ Fisheries	Frequency	10
	%	20.0%
Transport/ Telecommunications	Frequency	4
	%	8.0%
Service/ recreational/sports etc.	Frequency	1
	%	2.0%
Aged / Retired	Frequency	0
	%	.0%
Housewives	Frequency	9
	%	18.0%
Non-agricultural labourers	Frequency	21
	%	42.0%
TOTAL	Frequency	50
	%	100.0%

The cases group education consisted of 18 (36%) primary, 8 (16%) middle, 5 (10%) secondary, 0 (0%) higher secondary & 18 (36%) illiterate (Table 5).

In the cases group 1 (2%) were clerical job, 4 (8%) business work, 21 (42%) non-agricultural workers, 4 (8%) transportation workers, 9 (18%) housewives and 10 (20%) farmers. The p value of 0.381 in the overall group statistics was not significant (Table 6).

Table 7: Income wise data

Income		Groups
		Cases
< Rs. 2500/-	Frequency	34
	%	68.0%
Rs.2500/- to Rs.4999/-	Frequency	10
	%	20.0%
Rs.5000/- to Rs.7499/-	Frequency	5
	%	10.0%
Rs.7500/- to Rs.9999/-	Frequency	0
	%	.0%
> Rs. 10,000/-	Frequency	1
	%	2.0%
Total	Frequency	50
	%	100.0%

In the cases group, 34 were earning less than Rs.2500/- 10; Rs. 2500/ to Rs. 4999/, 5 Rs. 5000/- to Rs. 7499/- and 2 more than Rs.7500/-. The p value of 0.908 in the overall group statistics was not significant. While 50 cases also scored 3, in the cases group. While 50 cases also scored 5, in the cases group. In the SMMSE - recall scores, there were 50 subjects who scored 3, while 1 case scored 1, 5 cases scored 2 and 44, scored 3, in the cases group; While 23 cases scored 0 and 7 case scored 1, in the study group. While 40 cases scored 1, 7 cases scored 2 and 3 cases scored 3, in the cases group. The p value of 0.004 in the overall group statistics was highly significant. While 43 cases scored 1, 2 case scored 2, 2 case scored 3 and 3 cases scored 4 in the cases group. While 30 cases also scored 8, in the cases group. While 47 cases scored 1 and 3 cases scored 2, in the cases group (Table-7).

Discussion

This study shows that there are significant cognitive impairment in hypertensives. In this study more of hypertensive who had cognitive impairment were in their mean age 51.4 years. This was comparable with the results noted in the earlier studies where their mean age was more than 56 years and advanced age.5, 6, 7 in this study the hypertensive that had the cognitive impairment were of male sex. This was comparable with the results in the earlier studies.6 in this study more of the hypertensive who had cognitive impairment were earning less than Rs. 2,500/- per month. No other previous studies have mentioned regarding this. In this study there were significant numbers of cases of Hindus having cognitive impairment, where previous studies have studied particularly biracial community who had curvilinear association with cognitive performance.8, 9 In this study cognitive impairment were more in hypertensives who were urban domicile. The results noticed in present study were not comparable with a previous study which concluded as rural residents having more cognitive dysfunctions.6 In this study hypertensive group who have cognitive impairment were educated upto primary school i.e., 5th Std. This was comparable with results noticed in earlier studies where less or lower education was noticed.10, 11 The results noticed in the present study were not comparable with one study where it mentions 8 years or less of education. 12 In this study the occupational background showed that there were more of non-agricultural laborers who had cognitive deficits like orientation, concentration and constructional disability. Previous studies have shown that less prestigious occupation, increased levels of disability13 and poor manual dexterity 14 had decreased cognitive performance for immediate and delayed memory, attention, orientation and executive function. In this study the mean duration of hypertension was 5.2 years which has very highly significant for any cognitive dysfunctions. This was comparable with the results noticed in the earlier studies of 4 years duration.15 the results which were not comparable with other previous studies are 3 years duration, 16 5 years duration, 17 and 6 years duration.18

In this study the mean systolic blood pressure was 164 mmHg in cases who had cognitive dysfunctions which was statistically very highly significant. This was comparable with the results noticed in previous studies where the systolic blood pressure (more than 160 mmHg) is at the risk of cognitive impairment. 19 In this study the mean diastolic blood pressure was 103 mmHg in cases who had cognitive dysfunctions which was statistically highly significant. This was comparable with the results noticed in the previous studies where the diastolic blood pressure (more than 100 mmHg) in hypertensives had cognitive deficits13. This was not comparable with the results noticed in the previous studies where the diastolic blood pressure was less than 77 mmHg in hypertensives had cognitive deficits. 3, 9 in this study mean of both systolic and diastolic blood pressure was raised [around SBP 164 mmHg and DBP 103 mmHg] and the results showed the cognitive dysfunctions in the hypertensive cases. This was comparable with the results noticed in the previous studies where both systolic and diastolic blood pressure was raised in the hypertensive i.e., 160 mmHg and 100 mmHg respectively who had cognitive dysfunctions.20

Finally, in the SMMSE scale and BCRS scale the overall total scores on cognitive impairment in cases showed results which were statistically very highly significant. This was comparable with the results noticed in many of the previous studies of overall cognitive decline but was not comparable with some of the other studies. 70 The authors in all the previous studies have used different cognitive test scales and instruments (except SMMSE and BCRS) to test the cognitive impairment in hypertension.

Conclusion

The study was done to compare the cognitive impairment of hypertensives. Sample was homogeneous and matched for age, sex, education and socio-economic status. There are significant cognitive deficits in hypertensives. There is statistically significant correlation between the socio-demographic variables and cognitive changes in the study group. They are as follows: Mean age being 51.4 years, predominant being male sex, educated upto primary school (i.e., 5th std), residing in urban areas, married and earning less than Rs. 2,500/- per month. A significant number of cases were Hindus i.e, 46% in the hypertensive group. Occupational background showed there were more non-agricultural laborers i.e., 42% in cases. The mean duration of hypertension was 5.2 years which was statistically very highly significant in cases. The mean systolic blood pressure was 164 mmHg which was statistically very highly significant in cases. The mean diastolic blood pressure was 103 mm Hg which was statistically very highly significant in cases.

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