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EFFECT OF LIFESTYLE MODIFICATIONS ON BLOOD PRESSURE IN HYPERTENSIVE PATIENTS

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ABSTRACT: Aim: The aim of the study is to assess effect of lifestyle modifications and implementation of DASH diet in daily life on blood pressure in hypertensive patients. **Method:** A prospective observational study was conducted for a period of six months from Dec- 2013 to May-2014. The data was collected by self prepared form and analyzed using descriptive statistics. Counselling on lifestyle changes and implementation of The DASH diet were given to the study population and post counseling changes were collected at visit 2. The significant difference in systolic and diastolic blood pressure was calculated by unpaired t-test. **Results:** A total of 186 patients were enrolled in the study, the mean (SD) age was 55.89(9.44), the percentage distribution of the study population showed that 103(55.37%) females and males 83(44.62%). The current study showed that overall effect of life style changes and implementation of the DASH diet in their daily life had a significant decrease in systolic ($p<0.0001$) and diastolic blood ($P<0.0001$) pressure of the study population. There was significant difference in the systolic (P value- 0.001) and diastolic blood pressure (P value-0.001) changes between the two groups of varied physical activity weekly once group and daily 1 hour group. **Conclusion:** In hypertensive individuals, lifestyle modifications and DASH diet can serve as an important and effective first-line treatment strategy adjunct to medication in person's already on drug therapy and enhance anti hypertensive drug efficacy, and decrease cardiovascular risk.

INTRODUCTION: In developing countries, high blood pressure is one of the risk factors for cardiovascular diseases, and the estimated 7.1 million Deaths, especially among middle, and old-age adults is due to high BP [1]. Hypertension is a major risk factor for stroke and coronary heart disease, and is a major contributor to the onset and progression of chronic heart failure and chronic kidney failure [2].

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Lifestyle interventions of reduced sodium intake and other dietary modifications (increased consumption of fiber, fruits, vegetables, and low fat dairy; reduced consumption of saturated and total fat) and increased physical activity and weight loss have resulted in significant BP reduction [3].

The DASH (Dietary Approaches to Stop Hypertension) diet, which was developed specifically to address hypertension and traditionally referenced as the recommended dietary guideline along with other DASH-like diets, is very similar (although not identical) to the current recommendations found in "Eating Well with Canada's Food Guide" and CHEP [4]. The combined effect of the DASH diet and lowering sodium intake to 1,500 mg was a reduction of

8.9/4.5 mm Hg (7.1/3.7 mm Hg in non hypertensive subjects and 11.5/5.7 mm Hg in hypertensive subjects). [5] Adopting low-risk dietary and lifestyle factors has the potential to prevent a large proportion of new-onset hypertension occurring among young women [6].

Aim:

The aim of the study is to assess effect of lifestyle modifications in blood pressure in hypertensive patients.

Objective of the study:

- **Primary Objective**: To unfold the diverse groups of people can adopt multiple lifestyle changes that can lead to improved BP control and reduced CVD risk.

- **Secondary Objective:** To provide suggestions on lifestyle modifications to prevent and control blood pressure in hypertensive patients.

Methods:

Study design: It is a prospective observational study.

Study period: The present study was carried out for a period of six months from Dec-2013 to May-2014.

Study site: The present study was conducted at Rajiv Gandhi Institute of Medical Sciences (RIMS) at the out -patient department, Kadapa.

Source of data:

All the patients satisfying the inclusion criteria were selected from medical outpatient departments in Rajiv Gandhi institute of medical sciences (RIMS) Government Hospital, Kadapa. All the required Data were collected from patients through personal interview and prescriptions.

Sample size:

During the study period of six months of this study, the total sample size was 186.

Inclusion criteria:

- ❖ Patients diagnosed with hypertension were included.
- ❖ Patients≥ 20 years of age were included in this study.
- ❖ Patients of both genders.

Exclusion criteria:

- ❖ Target organ damage and/or diabetes.
- ❖ Prior cardiovascular events like Heart failure, angina.
- ❖ Pregnancy and lactation women.
- ❖ Other co-morbidities.

Method of collection of data:

All the patients satisfying the inclusion criteria were selected from medical outpatient departments in Rajiv Gandhi institute of medical sciences (RIMS) Government Hospital, Kadapa. All the patients were given counselling on lifestyle changes and implementation of The DASH diet in their daily life.

Statistical analysis:

The data collected from the participants were entered into Microsoft excel spreadsheet and descriptive statistics were used. The mean and standard deviation (SD) and P values were calculated using a graph pad prism. P-value less than or equal 0.05 were considered significant.

RESULTS:

Sample distribution based on gender: A total of 186 patients were enrolled in the study, the mean (SD) age was 55.89 (9.44%), the percentage distribution of the study population showed that 103 (55.37%) females and males 83(44.62%) which were represented **Table 1, Fig. 1**.

TABLE 1: PERCENTAGE DISTRIBUTION BASED ON SEX

Total No. of Patients with HTN	No. of Male Patients (%)	No. of Female Patients (%)
186(100%)	83(44.62%)	103(55.37%)

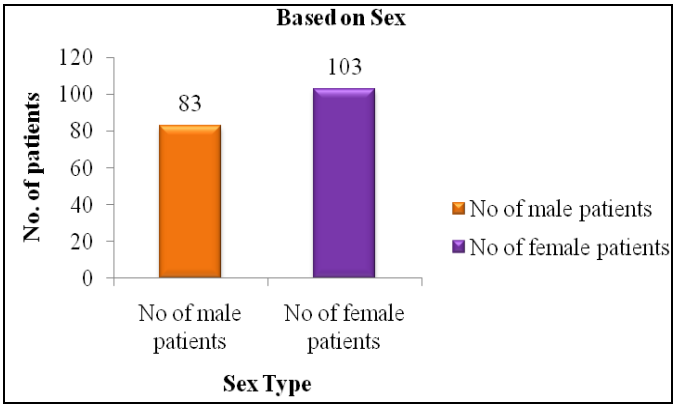

FIG 1: PERCENTAGE DISTRIBUTION BASED ON SEX

Graphical representation of different age groups in the study sample:

Total distribution of patients with respect to age group shows that majority of patients were found in between the age group 40-60 years 114(61.29%), followed by 59(31.72%) in between the age group 60-80 years, 13(6.98%) in between the age group 20-40 years were represented in **Table 2, Fig .2.**

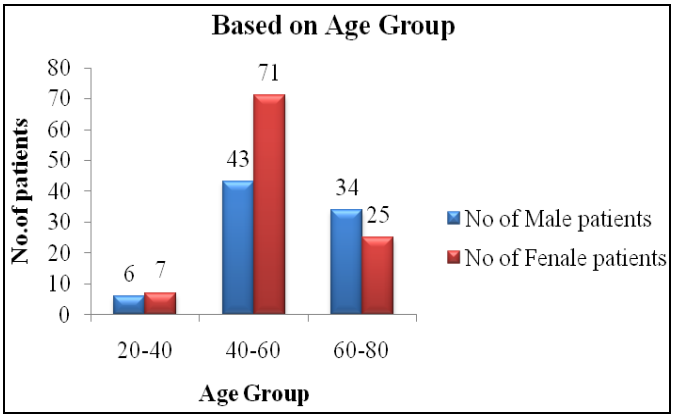

FIG. 2: BASED ON AGE GROUP

TABLE 2: PERCENTAGE DISTRIBUTION OF PATIENTS BASED ON AGE GROUP

Age Group (yrs)	No. of Male Patients with HTN (%)	No. of Female Patients with HTN (%)	Total No. of Patients (%)
20-40	6 (7.22%)	7 (6.79%)	13 (6.98%)
40-60	43 (51.80%)	71 (68.93%)	114 (61.29%)
60-80	34 (40.96%)	25 (24.27%)	59(31.72%)
Total	83(44.62%)	103(55.37%)	186(100%)

Effect of lifestyle modifications and DASH diet on blood pressure:

In the present study the overall effect of lifestyle changes and implementation of DASH diet in their daily life had significant decrease in systolic ($p<0.0001$) and diastolic blood ($p<0.0001$) pressure of the study population were represented in **Table 3**.

TABLE 3: EFFECT OF LIFESTYLE MODIFICATIONS AND DASH DIET ON BLOOD PRESSURE

Blood pressure change (mm Hg)	Visit 1 mean(SD)	Visit 2 mean(SD)	Change mean(SD)	P value
Systolic blood pressure	135.38(6.25)	128.89(5.96)	6.53(3.45)	0.0001
Diastolic blood pressure	86.89(4.99)	81.78(3.38)	5.10(4.6)	0.0001

Comparing the effect of physical exercise on blood pressure:

The habit of physical exercise was calculated in the study population where 128 patients do it once in a week and 58 patients does it on a daily basis for one hour. The mean (SD) decrease in the systolic blood pressure was found to be 4.5(2.57) mm of Hg in once in a week and 6.86(3.51) mm of Hg in daily basis for one hour; decrease in the diastolic blood pressure was found to be 4.01(4.02) mm of Hg in once in a week and 6.79(4.61) mm of Hg in daily basis for one hour patients respectively were represented in **Table 4**.

Both the systolic (p value- 0.001) and diastolic blood pressure (p value- 0.001) changes were found to be statistically significant.

TABLE 4: COMPARING THE EFFECT OF PHYSICAL EXERCISE ON BLOOD PRESSURE

Blood pressure change (mm Hg)	Weekly once mean(SD) n=128	Daily 1 hour mean(SD) n=58	P value
SBP			
Visit 1	133.5(4.81)	133.7(4.89)	
Visit 2	129.0(5.35)	126.9(5.87)	0.001
Change	4.5(2.57)	6.86(3.51)	
DBP			
Visit 1	87.10(4.55)	86.89(4.66)	
Visit 2	83.09(3.59)	80.10(0.44)	0.001
Change	4.01(4.02)	6.79(4.61)	

Comparing the blood pressure based on duration of hypertension:

In the study population based on duration of hypertension patients who were diagnosed as hypertension with a duration period of < 1 year are 118 and >1 year are 68 in number.

The mean (SD) decrease in the systolic blood pressure was found to be 7(5.55) mm of Hg in <1 year diagnosed and 5.55(3.75) mm of Hg in >1 year duration of diagnosed patients; decrease in the diastolic blood pressure was found to be 6.55 (4.74) mm of Hg in <1 year diagnosed and 5.02(4.64) mm of Hg in >1 year duration of diagnosed patients respectively were represented in **Table 5**.

Both the systolic (p value- 0.012) and diastolic blood pressure (p value-0.034) changes were found to be statistically significant.

TABLE 5: COMPARING THE BLOOD PRESSURE BASED ON DURATION OF HYPERTENSION

Blood pressure change (mm Hg)	<1 Year mean(SD) n=118	>1year mean(SD) n=68	P value
SBP			
Visit 1	134.83(5.01)	135(5.03)	
Visit 2	127.83(5.25)	129.44(4.54)	0.012
Change	7(3.82)	5.55(3.75)	
DBP			
Visit 1	86.77(4.69)	86.76(4.71)	
Visit 2	80.13(1.06)	81.73(3.27)	0.034
Change	6.55(4.74)	5.02(4.64)	

DISCUSSION: In the present study the overall effect of lifestyle changes and implementation of DASH diet in their daily life had a significant decrease in systolic (p<0.0001) and diastolic blood (P<0.0001) pressure of the study population. This study demonstrated that lifestyle changes and DASH dietary approaches can Favorably affect blood pressure in adults with The average systolic blood pressure of less than 140mm Hg and diastolic blood pressure of 80 to 95mm Hg. The most commonly affected age group with hypertension is 40-60 yrs in the total study population which accounts for 114 patients.

In the study population based on duration of hypertension patients who were diagnosed as hypertension with a duration period of <1 year are 118 and >1 year are 68 in number. Irrespective of duration of Hypertension, significant reduction in blood pressure was seen. Lifestyle modification is indicated for all patients with hypertension, regardless of drug therapy, because it may reduce or even abolish the need for antihypertensive drugs. In addition to the immediate goal of lowering blood pressure, the recommended lifestyle changes confer a range of health benefits, including better outcomes of common chronic diseases.

Limitation of the Study:
Only one follow up was performed to study the effect of life style changes and implementation of DASH diet within the limited time period of the study to observe the blood pressure changes in the participants.

CONCLUSION: Management of hypertension recommends lifestyle modification as an important and effective first-line treatment strategy. In addition to the significant lowering of blood pressure achieved through changes to eating patterns (DASH diet), and adopting changes in life style like moderating alcohol intake, weight loss, regular physical activity and smoking cessation can confer with other significant cardiovascular health benefits. Regardless of other treatments indicated, all patients who need to lower their blood pressure should be given advice and support to achieve and maintain healthy behaviors.

In hypertensive individuals, lifestyle modifications can serve as an adjunct to medication in a person's already on drug therapy and enhance anti hypertensive drug efficacy, and decrease Cardiovascular risk.

Special care and education is needed to control blood pressure in special cases as they have shown random variation in systolic and diastolic readings and they are prone to develop end organ damage. Regular check up by patients and periodic monitoring of the patient's prognosis by physicians is necessary to avoid CV morbidities and risk.

It is the responsibility of all health care professionals to educate the patients regarding lifestyle modifications, which improves the community health status.

COMPETING INTERESTS: The authors declare that they have no competing interest.

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