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RESEARCH ARTICLE

ENGAGING CLINICIANS IN MANAGEMENT OF ESSENTIAL HYPERTENSION WITH LIFE STYLE MODIFICATIONS- THE ROLE OF BODY MASS INDEX

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ABSTRACT

Introduction: Hypertension is usually called "the silent killer" since no symptoms are there till serious complications develop. Hypertension is directly related to the risk of cardiovascular morbidity and mortality. ***Method:*** A intervention, randomised ,pre and post study. 40 essential hypertension (EH) patients in the age group of 20-40years, including both sexes and taking treatment since 5 to 10 years . By random selection 40 patients with essential hypertension were allocated to the study. The study had 2 groups namely control and study. The study group of 20 EH patients were subjected to intervention for 3 days with 1 hour duration of work out. ***Result***: In our study the main finding was fall in post test values of systolic blood pressure, diastolic blood pressure , pulse and BMI in study group. The finding of diastolic pressure is more pronounced as one way anova test is significant. BMI, post test finding in study group is significant. ***Conclusion***: It can be concluded that all patients of essential hypertension should be mandatorily prescribed dietary modifications and simple exercise in the form of walking along with routine antihypertensives.

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INTRODUCTION

Hypertension is difficult to diagnose until medical complications occur, since patients rarely present with specific symptoms in the early stages of the disease. Hypertension is also difficult to manage effectively, as is consistent treatment after it is diagnosed, due to lack of awareness and patient compliance (1). Conclusions from the eighth Joint National Committee guidelines, which is based on evidence from randomized controlled trials, suggest that a healthy eating, weight management, and appropriate physical activity are essential for the management of high blood pressure in adults, since these lifestyle managements have the potential to improve blood pressure control and even reduce the need for medication (2). Studies have revealed that the most important health risk factors include poor diet, inactivity and low physical inactivity, as well as smoking which are the main factors for an individual's lifestyle, and 80% of heart diseases could be avoided by making changes in these factors (3). Nonpharmacologic strategies have been shown to help lower blood pressure. Lifestyle modifications are recommended for all patients with hypertension.

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The American Heart Association/American College of Cardiology lifestyle management guideline recommends a diet emphasizing vegetables, fruits, and whole grains; limiting sodium intake to less than 2,400 mg per day; and exercising three or four times per week for an average of 40 minutes per session. (4) The dietary approaches to stop hypertension (DASH) diet recommends lots of fruits and vegetables, low-fat dairy products, low in total fat, saturated fat and cholesterol (5). DASH diet has produced effective results in lowering hypertension (6). But it has been found in many studies that ,other than their staple diets ,patients do not respond to above mentioned diets, on a regular basis. Must of studies (7-11) reported a significant reduction of blood pressure after an exercise session but results are difficult to compare. Although this variability, several meta-analyses and epidemiological evidences have consistently shown a total beneficial effect of a regular physical activity (12-14).

Objectives of the study were

- To find out the difference in systolic blood pressure ,diastolic blood pressure, pulse & BMI at post intervention ,in study group
- To compare study finding with control group.
- To relate intergroup difference.

METHODOLOGY

Study Design And subjects: This was a intervention, randomised , pre and post study. 40 essential hypertension (EH) patients in the age group of 20-40years, including both sexes and taking treatment since 5 to 10 years. Patients with essential hypertension (EH) who were prescribed routine antihypertensives. This study was taken up, after obtaining permission from institutional ethical committee.

An ***inclusion criterion*** was

- Available blood pressure data of patients for each clinic visit to assess hypertension control.
- Age between 20 to 60 years of both sexes.
- Duration of hypertension between 5-10 years.
- No prior record of following life style modifications.
- Patients with essential hypertension(EH)consenting to the study.

Exclusion criteria

- Age less than 20 years and more than 60 years.
- Hypertensive patients with major co- morbidities like cardiovascular disease.diabetes mellitus or Nephropathy.
- Hypertensive patients having cancer
- Patients with EH not consenting to the study.

Study setting-Department of Physiology, Jawaharlal Nehru Medical College, Wardha.

Period of Study – 1 ½ years.

Intervention: By random selection 40 patients with essential hypertension were allocated to the study. The study had 2 groups namely control and study. Patients of both the groups were on their routine antihypertensive medication. Pretest was taken 1 week before initiation of intervention. The study group of 20 EH patients were subjected to intervention for 3 days with 1 hour duration of work out. The schedule was as follows
1st day- orientation to the disease through video programme and lectures.
2nd day- performance of exercise namely walking for 30 minutes at dawn or dusk for 5 days a week.
3rd day -explanation of diet chart .

Control group had 20 patients age & sex matched. They were on their routine antihypertensive treatment only. Duration of intervention was 3 months. Post test was taken 3 months after intervention was initiated. At the outset, basic characteristics including sex, age, monthly income, education, marital status, physical activity, body mass index (BMI), systolic blood pressure, diastolic blood pressure , pulse, family medical history, and other prescribed medication was documented. Advocated diet for the subjects in study group was Indian staple diet with reduced salt intake, lot of fresh fruits and green vegetables, garlic & turmeric. The study group also underwent brisk walking for 30 minutes daily at dawn or dusk for 5 days a week for 3 months.

Measurements: In our study normal blood pressure(BP) was defined as less than 140 mm Hg systolic and 90 mm Hg diastolic.

BP was recorded in the sitting posture with the sphygmomanometer kept at heart level. Mercury sphygmomanometer used was of the diamond make. An average of 3 consecutive reading with an interval of 30 minutes was taken as the accepted BP level. Change in body mass index(BMI) was calculated by comparing measurement data, namely height and weight, at the initiation of the study and the conclusion of the study.. An increase in BMI by >0.5 kg/m^2 or ≤0.5 kg/m^2 was also evaluated. Primary outcome of this study was difference in systolic blood pressure, diastolic blood pressure and pulse between pre & post test in all the groups. Secondary outcome was BMI in all the groups.

Statistical Analysis: Statistical analysis was done by using descriptive and inferential statistics using student's paired t test, one way ANOVA and Multiple Comparison Tukey Test and software used in the analysis was SPSS 24.0 version and $p<0.05$ was considered as level of significance.

Observation

Table 1: Distribution of patients in three groups according to their demographic characteristics

Demographic Characteristics	Study 1	Study 2	Control
Age Group(yrs)			
31-40 yrs	6(30%)	6(30%)	6(30%)
41-50 yrs	8(40%)	8(40%)	8(40%)
51-60 yrs	6(30%)	6(30%)	6(30%)
Total	20(100%)	20(100%)	20(100%)
Mean±SD	45.75±8.63	45.75±8.63	45.75±8.63
Range	32-60 yrs	32-60 yrs	32-60 yrs
Gender			
Male	15(75%)	13(65%)	14(70%)
Female	5(25%)	7(35%)	6(30%)
Education			
Primary	3(15%)	3(15%)	3(15%)
Secondary	8(40%)	8(40%)	8(40%)
Higher Secondary	0(0%)	0(0%)	0(0%)
Graduate	5(25%)	5(25%)	5(25%)
Post Graduate	4(20%)	4(20%)	4(20%)
Marital Status			
Single	3(15%)	3(15%)	3(15%)
Married	17(85%)	17(85%)	17(85%)
Family History			
Present	15(75%)	15(75%)	12(60%)
Absent	5(25%)	5(25%)	8(40%)

Table 2. Comparison of SBP in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	155.70±13.86	153.70±13.66	2±1.58	5.62 p=0.0001,S
Control	156.30±11.09	156.30±11.09	0±0	-

Table 3. Comparison of mean difference in SBP in two groups Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	153.70	13.66	3.05	147.30	160.09	120.00	174.00
Control	20	156.30	11.09	2.48	151.10	161.49	142.00	172.00

One Way ANOVA

Source of variation	Sum of Squares	df	Mean Square	F	p-value
Between Groups	343.63	2	171.81	1.149	0.324,NS
Within Groups	8521.35	57	149.49		
Total	8864.98	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-2.60	3.86	0.780,NS	-11.90	6.70

Table 4: Comparison of DBP in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	93.90±6.40	93.20±5.74	0.70±1.17	2.66 p=0.015,S
Control	95.50±5.42	95.50±5.42	0±0	-

Table 5: Comparison of mean difference in DBP in two groups

Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	93.20	5.74	1.28	90.51	95.88	80.00	104.00
Control	20	95.50	5.42	1.21	92.96	98.03	80.00	106.00

One Way ANOVA

Source of variation	Sum of Squares	Df	Mean Square	F	p-value
Between Groups	277.033	2	138.517	4.77	0.012,S
Within Groups	1653.950	57	29.017		
Total	1930.983	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-2.30	1.70	0.374,NS	-6.39	1.79

Table 6: Comparison of pulse in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	77±4.07	76.10±3.40	0.90±1.51	2.65 p=0.015,S
Control	77±4.07	77±4.07	0±0	-

Table 7: Comparison of mean difference in Pulse in two groups

Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	76.10	3.40	0.76	74.50	77.69	70.00	82.00
Control	20	77.00	4.07	0.91	75.09	78.90	70.00	86.00

One Way ANOVA

Source of variation	Sum of Squares	Df	Mean Square	F	p-value
Between Groups	44.40	2	22.20	1.74	0.18,NS
Within Groups	723.60	57	12.69		
Total	768	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-0.90000	1.12	0.705,NS	-3.61	1.81

Table 8: Comparison of weight in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	61.70±10.06	59.30±9.27	2.40±1.96	5.56 p=0.0001,S
Control	61.70±10.06	61.70±10.06	0±0	-

Table 9: Comparison of mean difference in weight in three groups

Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	59.30	9.27	2.07	54.95	63.64	36.00	76.00
Control	20	61.70	10.06	2.25	56.99	66.40	36.00	82.00

One Way ANOVA

Source of variation	Sum of Squares	Df	Mean Square	F	p-value
Between Groups	58.133	2	29.067	0.323	0.72,NS
Within Groups	5128.600	57	89.975		
Total	5186.733	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-2.40	2.99	0.704,NS	-9.61	4.81

Table 10: Comparison of height in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	5.31±0.31	5.31±0.31	0±0	-
Control	5.31±0.31	5.31±0.31	0±0	-

Table 11: Comparison of mean difference in height in two groups

Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	5.31	0.31	0.07	5.16	5.46	4.40	5.60
Control	20	5.31	0.31	0.07	5.16	5.46	4.40	5.60

One Way ANOVA

Source of variation	Sum of Squares	df	Mean Square	F	p-value
Between Groups	0.000	2	0.000	0.000	1.00,NS
Within Groups	5.716	57	0.100		
Total	5.716	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	0.00	0.10	1.000,NS	-0.24	0.24

Table 12: Comparison of BMI in two groups at pre and post test

Groups	Pre t/t	Post t/t	Mean Difference	t-value
Study	24.15±4.68	22.40±3.74	1.75±1.83	4.27 p=0.0001,S
Control	23.50±4.32	23.50±4.32	±	-

Table 13: Comparison of mean difference in BMI in two groups

Descriptive Statistics

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Study	20	22.40	3.74	0.83	20.64	24.15	18.00	30.00
Control	20	23.50	4.32	0.96	21.47	25.52	17.00	32.00

One Way ANOVA

Source of variation	Sum of Square	df	Mean Square	F	p-value
Between Groups	18.63	2	9.31	0.547	1.00,NS
Within Groups	970.35	57	17.02		
Total	988.98	59			

Multiple Comparison: Tukey Test

Group		Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Study	Control	-1.10	1.30	0.678,NS	-4.23	2.03

RESULTS

Table 1 shows demographic distribution in both the groups. Table 2 shows post test finding in study group is significant, One way Anova & tukey test finding is not significant.(Table 3). Similar finding is for pulse, weight and height as seen from Table 6 , 7,8,9 , 10and 11. Diastolic pressure findings in study group at post test is significant (Table4). One way Anova test shows significance between and withen groups. Tukey test was not significant.(Table5). Table 12 shows significant finding in BMI at post test study group. . Findings of descriptive statistics on BMI is not significant(Table 13).

DISCUSSION

In our study the main finding was fall in post test values of systolic blood pressure, diastolic blood pressure , pulse and BMI in study group. The finding of diastolic pressure is more pronounced as one way anova test is significant. As regards to BMI, post test finding in study group is significant . This finding implies that the intervention of diet and exercise has beneficial effect on BMI. This weight reduction can halt the future complications of essential hypertension. Eisenberg DM et al observed in their study that of the various lifestyle interventions, physical activity and dietary intervention showed dimunition in the blood pressure and reduce CVD events, which have emerged as the two most effective and physiologically desirable approaches (15). Pitsavos C et al reported that several epidemiological studies have confirmed the effectiveness of mediterranean dietary pattern. There is ample evidence that dietary change with reduced caloric intake, whether appropriate, increased consumption of fish, fruits and vegetables and reduced intake of saturated fatty acids offers an additional nutritional approach to the prevention and treatment of hypertension. (16-18). Kokkinos P et al in their study have found that mediterranean diet has all these beneficial properties because it is based on high consumption of olive oil, legumes, cereals, fruits, vegetables, fish and low consumption of meat and meat products (19).

Weight loss is another important lifestyle modification for reducing blood pressure. Weight loss of approximately 10 kg (22 lb) may reduce systolic blood pressure by 5 to 20 mm Hg. This finding was reported by Chobanian AV et al in their study (20). McDonald et al reported in their study that activities such as aerobic dancing, biking, walking and sports are recommended for at least half an hour per day (21). They have also found that excess body weight has a major impact on high blood pressure hence losing weight is an essential way of managing and preventing high blood pressure. Proper weight loss plan includes exercises and good nutrition. Therefore it is important to get a 30 minute workout at least 5 days a week. Guidelines for the management of arterial hypertension says that Every 1% reduction in body weight lowers systolic blood pressure by an average of 1 mmHg (22). Physical activity determines a systemic adaptation of the arterial wall which might lead to decrease in peripheral resistance (23). Exercise training leads to a higher number of capillaries for muscle fiber by increasing a number of pro-angiogenic factors (24,25)

Conclusion

The finding was fall in post test values of systolic blood pressure, diastolic blood pressure , pulse and BMI in study group who were patients of essential hypertension subjected to intervention of diet and exercise. It can be concluded that all patients of essential hypertension should be mandatorily prescribed dietary modifications and simple exercise in the form of walking along with routine antihypertensives. This will cut down the dosage, side effects, economic expense , future complications and comorbidities of essential hypertension..

REFERENCES

Brien Eoin O, Beevers DG, Lip Gregory YH. ABC of hypertension. London: BMJ Books; 2007. ISBN: 1-4051-3061-X)

Cardoso CG Jr, Gomides RS, Queiroz AC, Pinto LG, da Silveira Lobo F, et al. 2010. Acute and chronic effects of aerobic and resistance exercise on ambulatory blood pressure. Clinics (Sao Paulo) 65: 317-325.

Carpio-Rivera E, Moncada-Jiménez J, Salazar-Rojas W, Solera-Herrera A. 2016. Acute effects of exercise on blood pressure: A meta-analytic investigation. Arq Bras Cardiol 106: 422-433.

Chobanian AV, Bakris GL, Black HR, et al. National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; National High Blood Pressure Education Program Coordinating Committee. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report [published correction appears in *JAMA*. 2003;290(2):197]. *JAMA*. 2003;289(19):2560–2572.)

Cornelissen VA, Fagard RH 2005. Effect of resistance training on resting blood pressure: A meta-analysis of randomized controlled trials. J Hypertens 23: 251-259.

Eisenberg DM, Delbanco TL, Berkey CS, et al. 1993. Cognitive behavioral techniques for hypertension: Are they effective? Ann Intern Med.118:964–972.)

European Society of Hypertension/ European Society of Cardiology (ESH/ESC). Guidelines for the management of arterial hypertension. European Heart Journal. 2013;2185-2186.

Fagard RH 2001. Exercise characteristics and the blood pressure response to dynamic physical training. Med Sci Sports Exerc 33: S484-S492.

Fagard RH. 2005. Physical activity, physical fitness and the incidence of hypertension. J Hypertens 23: 265-267.

Gliemann L, Buccs R, Nyberg M, Hoppeler H, Odriozola A, et al. 2015. Capillary growth, ultrastructure remodeling and exercise training in skeletal muscle of essential hypertensive patients. Acta Physiol (Oxf) 214: 210-220.

Hoier B, Hellsten Y. 2014. Exercise-induced capillary growth in human skeletal muscle and the dynamics of VEGF. Microcirculation 21: 301-314.

James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8) JAMA. 2014;311:507–520. [PubMed] [Google Scholar])

Jennings GL 1997.Exercise and blood pressure: Walk, run or swim? J Hypertens 15: 567-569.

Kelley GA, Kelley KA, Tran ZV. 2001. Aerobic exercise and resting blood pressure: A meta-analytic review of randomized, controlled trials. Prev Cardiol 4: 73-80.

Kim CY, Lee KS, Khang YH, Yim J, Choi YJ, Lee HK, et al. 2000. Health behaviors related to hypertension in rural population of Korea. *Korean J Prev Med.,* 33:56–68. [Google Scholar])

Kokkinos P, Panagiotakos DB, Polychronopoulos E. 2005. Dietary influences on blood pressure: The effect of the Mediterranean diet on the prevalence of hypertension. J Clin Hypertens (Greenwich) 7: 165-170.

McDonald A, Motta J, Roa R, Fontes F, Bastista I, et al. Prevalencia de factores de riesgo asociados a enfermedad cardiovascular (PREFEC) [Prevalence of risk factors associated to cardiovascular disease]. Panama: Instituto Conmemorativo Gorgas de Estudios de la Salud; 2010. Brasil.

Núñez-Córdoba JM, Valencia-Serrano F, Toledo E, et al. 2009. The Mediterranean diet and incidence of hypertension: the Seguimiento Universidad de Navarra (SUN) Study. Am J Epidemiol. 69(3):339–346. ref-57Williams B, Poulter NR, Brown MJ, et al. Guidelines for management of hypertension: Report of the fourth working party of the British Hypertension Society, 2004-BHS IV. J Hum Hypertens. 2004; 18(3):139–185.

Opie RS, Segal L, Jacka FN, Nicholls L, Dash S, et al. Assessing healthy diet affordability in a cohort with major depressive disorders. J. Public Health Epidemiol. 2015;7(5):159-169.

ornelissen VA, Fagard RH. 2005. Effects of endurance training on blood pressure, blood pressure-regulating mechanisms, and cardiovascular risk factors. Hypertension 46: 667-675.

Pitsavos C, Panagiotakos DB, Chrysohoou C, Papaioannou I, Papadimitriou L, et al. 2003. The adoption of Mediterranean diet attenuates the development of acute coronary syndromes in people with the metabolic syndrome. Nutr J 2: 1.

RUPAL OZA, MD, and MIRIAM GARCELLANO, DO,. Nonpharmacologic Management of Hypertension: What Works?.*Am Fam Physician.* 2015 Jun 1;91(11):772-776.)

Schroder H, Schmelz E, Marrugat J. 2002. Relationship between diet and blood pressure in a representative Mediterranean population. Eur J Nutr 41: 161-167.

Thijssen DH, Dawson EA, van den Munckhof IC, Birk GK, Timothy Cable N, et al. 2013. Local and systemic effects of leg cycling training on arterial wall thickness in healthy humans. Atherosclerosis 229: 282-286.

Trichopoulou A, Costacou T, Bamia C, Trichopoulos D. 2003. Adherence to a Mediterranean diet and survival in a Greek population. *N Engl J Med* 348: 2599-2608.

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