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Original Research

Comparison of pharmacological and non-pharmacological methods in management of pre-hypertensive patients

Dr. Avesh[1], Dr. Jayanti Singh[2], Dr. R N Singh[3]

[1]Associate Professor, Dept of General Medicine, Mulayam Singh Yadav Medical College, Meerut, U.P., India;
[2]Associate Professor Dept of Physiology, FH Medical College, Agra, U.P., India;
[3]Associate Professor, Dept of Microbiology, Mulayam Singh Yadav Medical College, Meerut, U.P., India

***ABSTRACT*:**
Background: Hypertension is a disease of epidemic proportions especially in industrialized nations, affecting 29% of US adults alone. Despite this, the pathogenesis of primary hypertension is still not completely understood. Epidemiological studies implicated several dietary and other lifestyle-related factors contributing to hypertension development. Extensive published evidence supports the concept that non-pharmacological interventions, more recently referred to as lifestyle modifications, can substantially reduce blood pressure (BP) in both individuals with established hypertension and those with prehypertension. **Aim of the study:** To compare pharmacological and non-pharmacological methods in managements of prehypertensive patients. **Materials and methods:** The present study was conducted in the Department of General Medicine of Medical institute. The ethical clearance for the study was obtained from the ethical committee of the institute prior to starting the study procedure. For the study, we selected 200 patients with mild hypertension, that is, diastolic blood pressure >90 mmHg and <100 mmHg and systolic blood pressure >140 mm Hg and <160 mmHg from the outpatient department. Participants were randomly grouped into 2 groups, Group 1 and Group 2 with 100 patients in each group. Patients in Group 1 were prescribed Atenelol 50 mg oral tablet to be taken once a day. On the contrary, no drug was prescribed to Group 2 subjects rather they were advised physical exercise such as brisk walking for 50-60 minutes, 3-4 days per week. **Results:** The mean age of the patients that participated in the study was 39.65 years with age range being 21-60 years. The number of male patients was 113 whereas female patients were 87 in number. The mean age of patients in group 1 was 36.86 years and in group 2 was 33.25 years. In group 1, the number of male patients was 59 and female patients were 41. Similarly, in group 2, the number of male patients was 54 and female patients were 46. At 8 weeks there was significant reduction in the blood pressure as compared to baseline values. The reduced blood pressure at 8 weeks was 122.58/82.58 mmHg and 124.61/82.58 mmHg for group 1 and group 2 respectively. **Conclusion**: Within the limitations of the study we conclude that both pharmacological and non-pharmacological methods are effective for lowering the blood pressure in hypertensive patients. For better results both the methods should be used for patients with hypertension.
Keywords: Hypertension, antihypertensive, non-pharmacological management.

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Corresponding author: Dr. Jayanti Singh, Associate Professor Dept of Physiology, FH Medical College, Agra, U.P., India

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INTRODUCTION:

Hypertension is a disease of epidemic proportions especially in industrialized nations, affecting 29% of US adults alone.[1] It was identified as one of the most significant but modifiable risk factors for not only cardiovascular (CV) disease, stroke, and end-stage kidney disease but also for overall CV death.[2] Despite this, the pathogenesis of primary hypertension is still not completely understood. Epidemiological studies implicated several dietary and other lifestyle-related factors contributing to hypertension development. Extensive published evidence supports the concept that

non-pharmacological interventions, more recently referred to as lifestyle modifications, can substantially reduce blood pressure (BP) in both individuals with established hypertension and those with prehypertension.[3] Evidence also indicates that BP reduction decreases risk of poor CV outcomes, even in those with prehypertension. Studies have demonstrated that multiple lifestyle changes lower blood pressure by modifying the risk factors, thereby controlling hypertension,[4, 5] but the established evidences in India are inadequate. The effect of physical exercise, salt restriction, and yoga exercises in reducing blood pressure in adults have been studied earlier.[6] Hence, the present study was conducted to compare pharmacological and non-pharmacological methods in managements of prehypertensive patients.

MATERIALS AND METHODS:

The present study was conducted in the Department of General Medicine of Medical institute. The ethical clearance for the study was obtained from the ethical committee of the institute prior to starting the study procedure. For the study, we selected 200 patients with mild hypertension, that is, diastolic blood pressure >90 mmHg and <100 mmHg and systolic blood pressure >140 mm Hg and <160 mmHg from the outpatient department. Clinic criteria were used for the selection of all patients. It was made sure that no patient had taken anti-hypertensive drugs before the study. A detailed explanation regarding procedure of the study and advantages were given to the patient and an informed written consent was obtained. Participants were randomly grouped into 2 groups, Group 1 and Group 2 with 100 patients in each group. Patients in Group 1 were prescribed Atenelol 50 mg oral tablet to be taken once a day. On the contrary, no drug was prescribed to Group 2 subjects rather they were advised physical exercise such as brisk walking for 50-60 minutes, 3-4 days per week. It was ensured that each participant completed eight weeks of intervention, irrespective of the time they started. The blood pressure values were measured before starting the study, at 2 weeks, 4 weeks, 6 weeks and at 8 weeks using sphygmomanometer. The blood pressure was measured 3 times and the highest value was used for the assessment. The demographic characteristics of the patients were also recorded.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

RESULTS:

Table 1 shows the demographic characteristics of the patients. The mean age of the patients that participated in the study was 39.65 years with age range being 21-60 years. The number of male patients was 113 whereas female patients were 87 in number. The mean age of patients in group 1 was 36.86 years and in group 2 was 33.25 years. In group 1, the number of male patients was 59 and female patients were 41. Similarly, in group 2, the number of male patients was 54 and female patients were 46. Table 2 shows comparison of mean blood pressure of both groups at different intervals. Baseline values of blood pressure for group 1 and group 2 was 149.36/97.69 mmHg and 152.25/97.81 mmHg respectively. At 2 weeks there was reduction in mean blood pressure. The blood pressure was 141.25/93.51 mmHg and 148.65/93.82 mmHg for group 1 and group 2 respectively. At 8 weeks there was significant reduction in the blood pressure as compared to baseline values. The reduced blood pressure at 8 weeks was 122.58/82.58 mmHg and 124.61/82.58 mmHg for group 1 and group 2 respectively (Fig 1 and 2). The results were statistically significant. ($p<0.05$)

Table 1: Demographics of patients

Parameters	Group 1	Group 2	p-value
No. of patients (n)	100	100	
Mean age (years)	36.86	33.25	0.17
Sex			0.36
• **Male**	59	54	
• **Female**	41	46	

Table 2: Comparison of Mean blood pressure of Group A and Group B at follow up period

Mean value of Blood pressure (mmHg)	Group 1		Group 2		p-value
	Systolic	Diastolic	Systolic	Diastolic	
Baseline value	149.36	97.69	152.25	97.81	0.05
At 2 weeks	141.25	93.51	148.65	93.82	
At 4 weeks	135.26	88.54	137.29	90.25	
At 6 weeks	131.68	85.39	133.58	86.54	
At 8 weeks	122.58	82.58	124.61	82.58	

Fig 1: Systolic blood pressure

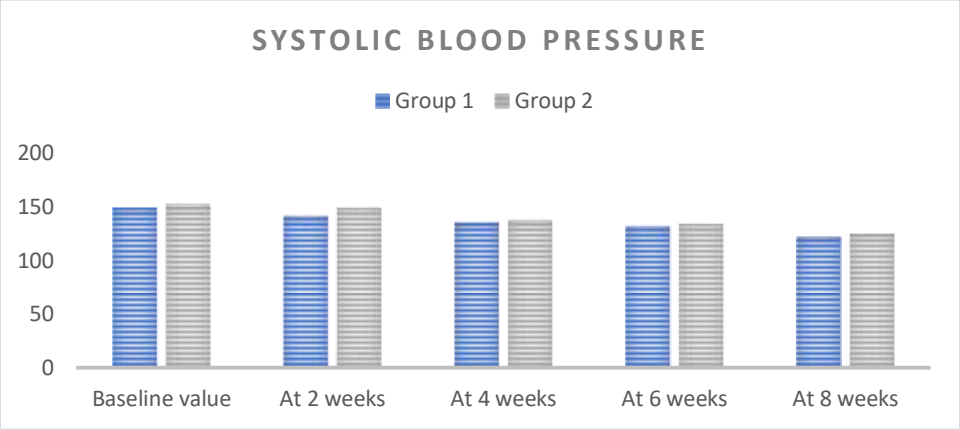
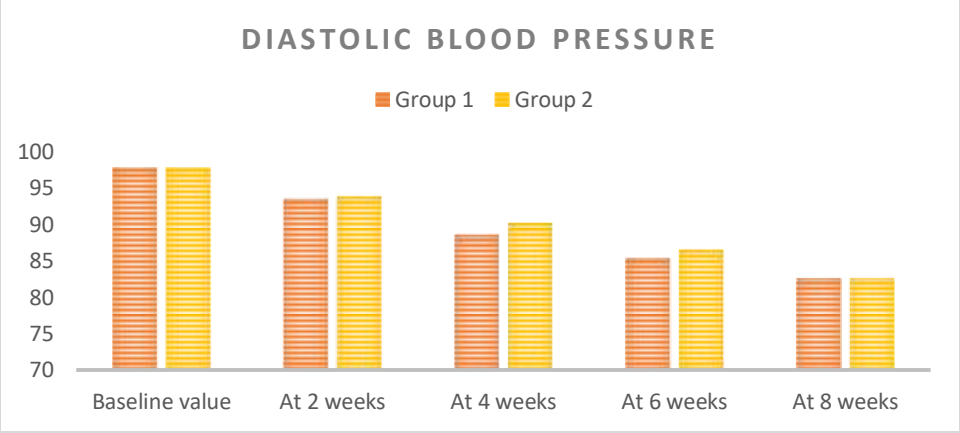


Fig 2: Diastolic blood pressure



DISCUSSION:

In the present study, we observed that there was significant decrease in blood pressure with both the pharmacological and non-pharmacological approach for management of newly diagnosed hypertension. The results were statistically significant. The results on comparing with previous studies were found to be consistent. Kaelber DC et al evaluated diagnosis and initial medication management of pediatric hypertension and prehypertension in primary care. Retrospective cohort study aggregating electronic health record data on >1.2 million pediatric patients from 196 ambulatory clinics across 27 states. Demographic, diagnosis, blood pressure (BP), height, weight, and medication prescription data extracted. Main outcome measures include proportion of pediatric patients with ≥3 visits with abnormal BPs, documented hypertension and prehypertension diagnoses, and prescribed antihypertensive medications. Marginal standardization via logistic regression produced adjusted diagnosis rates. Three hundred ninety-eight thousand seventy-nine patients, ages 3 to 18, had ≥3 visits with BP measurements. Of these, 3.3% met criteria for hypertension and 10.1% for prehypertension. Among practices with ≥50 eligible patients, 2813 of 12 138 patients with hypertension and 3990 of 38 874 prehypertensive patients were diagnosed. Age, weight, height, sex, and number and magnitude of abnormal BPs were associated with diagnosis rates. Of 2813 diagnosed, persistently hypertensive patients, 158 (5.6%) were prescribed antihypertensive medication within 12 months of diagnosis. They concluded that hypertension and prehypertension were infrequently diagnosed among pediatric patients. Guidelines for diagnosis and initial medication management of abnormal BP in pediatric patients are not routinely followed. Noone C et al compared the relative effectiveness, for blood pressure reduction, of different approaches to increasing physical activity and different first-line anti-hypertensive therapies in people with hypertension. A systematic review was conducted to identify studies involving randomised controlled trials which compare different types of physical activity interventions and first-line anti-hypertensive therapy interventions to each other or to other comparators (e.g. placebo, usual care) where blood pressure reduction is the primary outcome. They searched the Cochrane Library, MEDLINE and PsycInfo. This study will

provided evidence regarding the comparability of two common first-line treatment options for people with hypertension. [7, 8] Jankowska-Polańska B et al investigated the relationship between frailty syndrome (FS) and adherence to pharmacological and non-pharmacological treatment for hypertension. The study included 100 patients diagnosed with hypertension and treated with one or more hypotensive drugs. Frail patients obtained low scores for adherence to pharmaceutical treatment of hypertension, while non-frail patients obtained moderate scores. Non-frail patients had higher scores in two out of four domains of the Health Behavior Inventory (HBI): positive mental attitudes and health practices; as well as higher global scores (HBI raw score): 83.3 ± 10.6 vs. 77.3 ± 9.5. Multiple regression analysis showed that frailty syndrome (FS) was a statistically significant independent determinant of worse adherence to pharmacological treatment and health behaviors. Education was a statistically significant independent determinant of better adherence to pharmacological treatment, while net income positively affected health behaviors as measured by the HBI. They concluded that FS is a significant independent factor contributing to worse adherence to pharmacological and non-pharmacological treatment of hypertension. Better education significantly improves patients' adherence to the prescribed pharmacological treatment, while a good financial standing evidenced by high net income is a determinant of better adherence to health-related behaviors recommended in hypertension treatment. Subramanian H et al tested the efficacy of non-pharmacological interventions in preventing/controlling hypertension. The subjects, prehypertensive and hypertensive young adults (98 subjects: 25, 23, 25, 25 in four groups) were randomly allotted into a group that he/she had not belonged to in the earlier RCT: Control (New Group I), Physical Exercise (NG II)-brisk walking for 50 to 60 minutes, three to four days/week, Salt Intake Reduction (NG III) to at least half of their previous intake, Yoga (NG IV) for 30 to 45 minutes/day, five days/week. Blood pressure was measured before and after eight weeks of intervention. Analysis was by ANOVA with a Games-Howell post hoc test. Ninety-four participants (25, 23, 21, 25) completed the study. All three intervention groups showed significant reduction in BP, while the Control Group showed no significant difference. Persistence of significant reduction in BP in the three intervention groups after cross-over confirmed the biological plausibility of these non-pharmacological interventions. This study reconfirmed that physical exercise was more effective than Salt Reduction or Yoga. Salt Reduction, and Yoga were equally effective. They concluded that physical exercise, salt intake reduction, and yoga are effective non-pharmacological methods for reducing blood pressure in young pre-hypertensive and hypertensive adults. [9, 10]

CONCLUSION:

Within the limitations of the study we conclude that both pharmacological and non-pharmacological methods are effective for lowering the blood pressure in hypertensive patients. For better results both the methods should be used for patients with hypertension.

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