

Comparison of the Effect of Structured Lifestyle Changes Versus Verbal Advice Only on Blood Pressure Control Among Hypertensive Adults in a Tertiary Hospital in North Central Nigeria

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ABSTRACT

Background: Results from several clinical trials show that comprehensive behavioral intervention programs improve lifestyle behaviors and lower blood pressure. The study compared the effect of structured lifestyle modification versus verbal advice only on blood pressure control among hypertensive adults presenting in the GOPD of JUTH.

Study Design/Setting: The study was a randomized study involving hypertensive adults aged 20 years and above presenting in GOPD of JUTH.

Methods: Participants were consecutively selected and randomized into two groups, a structured lifestyle modification group (Group A) and a verbal advice only group (Group B). Group A was offered a structured lifestyle modification counseling while routine advice only was offered to group B. Data was collected about patients' socio-demographic, medical and lifestyle habits that included dietary and exercise history. Physical examination included blood pressure measurement. Participants were followed up monthly for twelve weeks during which blood pressure measurement was routinely carried out and changes in their lifestyle habits reported. The primary outcome was reduction in BP. The means at

95% confidence intervals of the blood pressure values of the two groups were determined using paired t-test analysis. Data was analyzed on an intention to treat basis. A *p*-value of <0.05 was considered significant in all analyses.

Results: The mean systolic blood pressure reduction in group A was 17 mmHg (8.7, 25.3; 95% CI) after 12 weeks versus 6.67 mmHg (0.47, 12.87, 95% CI) in group B. The mean diastolic pressure reduction after the same period was 8 mmHg (3.5, 12.5; 95% CI) in group A and 5.33 mmHg (1.5, 9.1; 95% CI) in group B. Paired t-test analyses revealed that these reductions were statistically significant in both groups.

Conclusion: Findings from the study show that individuals with hypertension can make and sustain, during a period of 12 weeks, multiple lifestyle modifications which can control or reduce blood pressure. There is therefore a need for improved lifestyle intervention programs, including those appropriate for delivery in the clinical setting, that enable individuals with or at risk for hypertension to adopt long-term healthier lifestyles

Keywords: Lifestyle modification, Hypertension, Blood pressure

INTRODUCTION

Hypertension is defined as systolic blood pressure of (SBP) ≥ 140 mmHg or diastolic blood pressure (DBP) of ≥ 90 mmHg, based on “two or more properly measured seated blood pressure (BP) readings on each of two or more office visits”.¹ If SBP and DBP fall into different categories, the category associated with the higher of the two pressures is applied. Management of hypertension by lowering BP into a more optimal range can be expected to lower CVD risks and increased BP related morbidities. Hypertensives are more likely to have hypercholesterolaemia, obesity and diabetes mellitus than those without it. It is associated with a decreased life expectancy, increased hospitalizations, increased health care costs and serves as a precursor to CVD.^{2,3} Although treatment of hypertension is mostly pharmacological, lifestyle changes is redefining this range of BP and emphasizing the role of health care providers in its management. The local population are on the increase.⁴ The presence of elevated blood pressure presents a unique opportunity for vigorous, yet straight forward lifestyle interventions. The management of hypertension with non-pharmacological approaches inclusive is an appropriate goal for clinicians in a wide range of practice settings.

Current recommendations for the prevention and treatment of high BP emphasize non-pharmacological therapy, also termed “lifestyle modification”. JNC-7 recommends lifestyle modification for all patients with hypertension and prehypertension.^{5,6} These modifications include:

1. Reducing dietary sodium to less than 2.4g per day
2. Increasing exercise to at least 30 minutes per day, four days per week
3. Limiting alcohol consumption to two drinks or less per day for men and one drink or less per day for women. One standard drink contains 10g of alcohol e.g one bottle of beer = 2.6 standard drinks

4. Following the dietary approaches to stop hypertension (DASH) eating plan (high in fruits, vegetables, potassium, calcium and magnesium, low fat and salt)
5. Achieving a weight loss goal of 4.5kg or more
6. Cessation of smoking (not recommended in JNC 7).

It is however unclear if these recommendations are more effective when a structured lifestyle modification is instituted rather than just verbal advice. The aim of this study therefore, is to compare the effect of structured lifestyle modification versus verbal advice on the management of hypertension among adults.

METHODOLOGY

The study was conducted in the General Out Patient Clinic (GOPC) of Jos University Teaching Hospital (JUTH) between February to May 2012. The study population comprised individuals aged 20 years and above presenting in the GOPC of JUTH. This was a comparative randomized study comprising two groups; Group A that received counseling on a structured lifestyle modification and Group B that were only advised verbally on lifestyle modification. Using the Power of 80% and a 95% confidence level, the sample size for means was used for the study and 60 participants were recruited. Thirty in each group. Patients with a systolic blood pressure of ≥ 140 mmHg and/or diastolic blood pressure of ≥ 90 mmHg were included. All consecutive eligible patients were recruited voluntarily into the study after obtaining a written informed consent. The participants were randomly assigned to either group A or group B. Each subject was interviewed by the author using a structured questionnaire. Items recorded on the questionnaire included the subject's socio-demographic data, history of alcohol ingestion, hypertension and smoking, current exercise activity as well as a family history of hypertension, stroke, heart disease, medications the patient was taking and a 24-hour dietary recall.

The subject's blood pressure was measured three times in the sitting position on the left arm using a mercury sphygmomanometer after at least 5 minutes of rest, with at least 5 minutes between measurements. Blood pressure readings were recorded to the nearest even number and the mean of the three recordings computed. All patients in group A were counseled and advised concerning diet and exercise using a structured format. They were given written diet and exercise instructions in either English or Hausa and asked to keep an exercise diary. Examples of a diet plan and local food groups were provided as well. They were asked to return for follow up at four weeks, eight weeks and twelve weeks. At each follow up visit, the instructions were reviewed and repeated according to the structured format in order to reinforce them. The blood pressure was taken at each follow up visit. The duration of exercise each day was also recorded. The obstacles that may have prevented the patient from adhering to the instruction sheet were noted. These were then repeated according to the structured format in order to reinforce them. Group B did not receive any structured counseling

concerning diet and exercise. They were only advised on exercise and a healthy diet. They were also followed up at four weeks, eight weeks and twelve weeks at which time their blood pressures were recorded.

Data was analyzed using Epi Info version 3.5.3 (Centres for Disease Control and Prevention, Atlanta, Georgia, USA).⁷ Background descriptive analysis was done to compare both groups. The primary outcome variable of interest was blood pressure. The means at 95% confidence intervals of the blood pressure changes was determined using the paired t-test and the proportions of categorical variables were compared using the χ^2 test or the Fisher's exact test.

RESULTS

Sixty subjects fulfilled the inclusion criteria and participated in the study – 30 each in both groups. Fifty three completed follow-up (88.33%) while seven (11.67%) did not complete the study. Out of seven that did not complete the study, four were in group A while three were in group B.

Sociodemographic characteristics:

	Control group N=30	Intervention group N=30	p value
Mean Age (years)	48.64±9.78	48.22±10.46	0.87
Age category(years)			
20-29	2	1	
30-39	3	4	
40-49	10	9	
50-59	10	12	
60-69	5	4	
Gender:			0.77
• Male	8	9	
• Female	22	21	
Educational Level:			0.92
• None	12	12	
• Primary	4	5	
• Secondary	6	7	
• Tertiary	8	6	
Marital Status:			0.38
• Married	26	28	
• Single	4	2	
Religion:			0.60
• Christian	19	17	
• Muslim	11	13	
Ethnicity			0.39
• Plateau People	20	23	
• Non- Plateau People	10	7	

Baseline Blood pressure: The mean systolic blood pressure of Group A was 148.44 ± 16.43 mmHg and 146.61 ± 13.81 mmHg for Group B ($p=0.65$). The mean diastolic blood pressure of group A and group B were 95.88 ± 10.21 mmHg and 91.96 ± 6.7 mmHg respectively ($p=0.08$). Values between the two groups were not statistically significant.

Lifestyle Habits:

Alcohol consumption: At baseline, participants who had a current history of alcohol consumption in the form of beer, wine, whisky and local brew, of more than two standard drinks per day and a duration of at least one year, were as follows: Nineteen (31.67%) in group A and 16 (26.67%) in group B. Post intervention, 12 (20%) participants in group A and Nine (15%) participants in group B had reduced alcohol consumption.

Cigarette smoking: No participant in either group A or group B had a current history of cigarette smoking. On completing the study, no participant in both study groups had resumed or started smoking during the study.

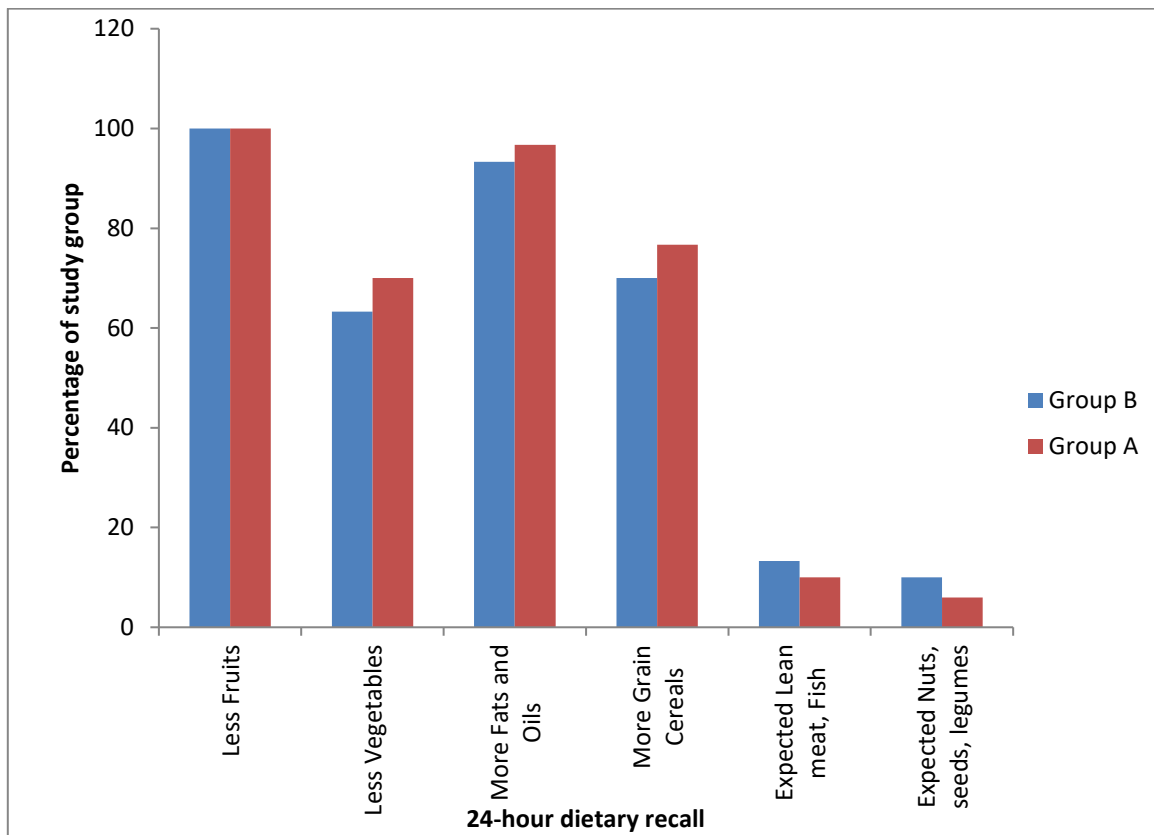
Exercise: At enrollment, 19 (31.7%) of the total participants were involved in some form of regular aerobic exercise, ten (16%) from group A and nine (15%) from group B. Group A exercised for an average of two days per week for an average of 37 minutes per day while group B also exercised for an average of two days per week for but for an average of 34.5 minutes per day. Among those that exercised, the most common exercise undertaken was brisk walking in both groups, five (50%) participants in group A and seven (77.7%) participants in group B. At the end of the study, 46 (76.7%) of the total study participants were involved in some form of regular aerobic exercise, 22 (47.8%) participants in group A and 25 (54.3%) participants from group B. Group A exercised for an average of four days per week for an average of 35 minutes per day while Group B exercised for an average of three days per week for an average of 32 minutes per day. The most common exercise

undertaken was brisk walking in both groups, 15 (50%) participants in group A 13 (43.3%) in group B. Jogging, skipping, climbing staircases, cycling, tennis, football and other forms of aerobic exercises made up the remaining.

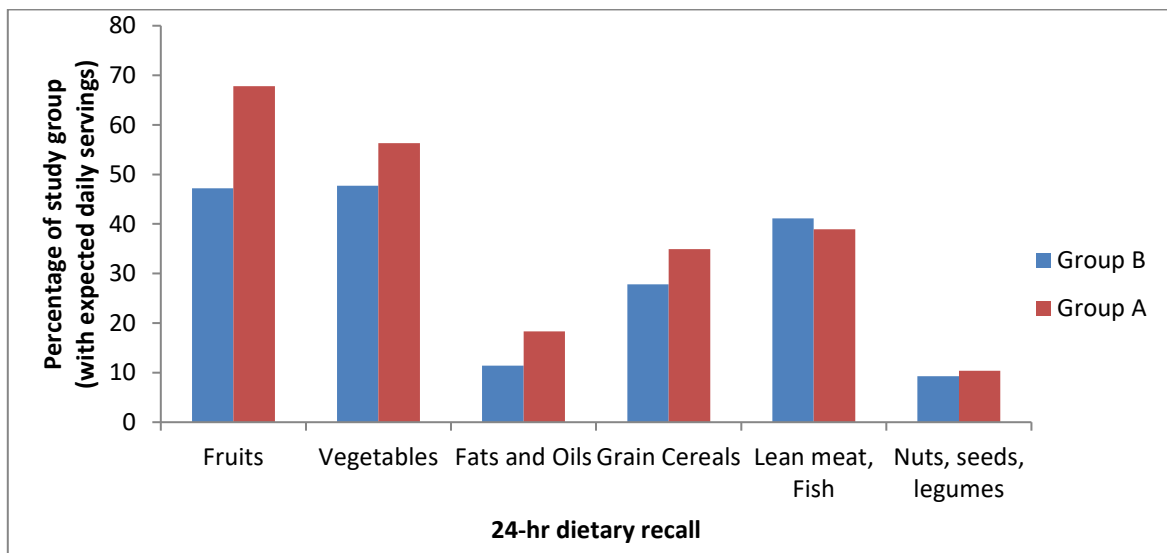
Dietary pattern: Based on a 24 hour dietary recall and estimated from the average equivalent of the DASH diet, the dietary pattern of participants in the study groups were compared (Figure 3). All patients in both groups had less than the expected daily servings of fruits with 70% and 63.3% of participants having less than the expected daily servings of vegetables in group A and group B respectively. Of the total study participants, 96.7% of the participants in group A had more than the expected daily servings of fats and oils versus 93.3% in group B while 76.7% of group A had more than the expected daily servings of grain and grain cereals versus 70% in group B. Only 10% of group A population had the expected value for lean meat, poultry or fish against 13.3% of group B population. Only 6% of group A population had some form of nuts, seeds or legumes and in required daily amounts at enrollment versus 10% in group B. All participants in the study group were taking more than the expected daily servings of more than one teaspoon full of salt either in prepared meals or on the table or both.

On completing the study, 67.8% of group A had the expected daily servings of fruits against 47.2% of group B. The structured lifestyle modification and the verbal advice only groups comprised 56.3% and 47.7% of participants who had the expected daily servings of vegetables respectively. In group A, 18.3% had the expected daily servings of fats and oils versus 18.31% in group B. Group A was made up of 34.9% who had the expected daily servings of grain and grain cereals which was comparable with 27.8% in group B. Only 38.9% of group A had the expected servings for lean meat, poultry or fish against 41.1% of group B. On completion of the study, 11.4% of group A had some form of nuts, seeds or legumes versus 9.3% of the group B. All participants

in both study arms had reduced their salt intake at the end of the study.



Baseline dietary pattern of the control and intervention groups based on a 24 hour dietary recall



Post-intervention dietary pattern of the control and intervention groups based on a 24 hour dietary recall.

Blood Pressure Changes in Groups A and B:

Blood pressure changes within Group A:
 For group A, 25.7% of participants had at least a 5% reduction of systolic blood pressure, while 13.25 % had at least a 5%

reduction in diastolic blood pressure. The mean systolic blood pressure reduction in this group after 12 weeks was 17 mmHg (8.7, 25.3; 95% CI) while the mean diastolic blood pressure reduction after the same duration was 8 mmHg (3.5, 12.5; 95% CI). The paired

t-test analysis showed a significant statistical difference in mean reduction of the systolic blood pressure at the end of the study {t (29)4.02, p=0.002}. The difference in diastolic blood pressure was also statistically significant {t (29)3.6, p=0.0006}.

Blood pressure changes within Group B:

In group B, 11.25% of the participants had at least a 5% reduction in systolic blood pressure while 9.3% had at least a 5% reduction of diastolic blood pressure. The mean systolic blood pressure reduction in the control group after 12 weeks was 6.67 mmHg (0.47, 12.87, 95% CI) while the mean diastolic pressure reduction after the same period was 5.33 mmHg (1.5, 9.1; 95% CI). Paired t-test analysis revealed a statistically significant difference in the mean reduction in SBP at the end of the stud, {t (29)1.92, p=0.03}. The mean reduction in diastolic blood pressure on completing the study was also statistically significant, {t (29)2.7, p=0.006}.

DISCUSSION

Data from seminal studies have demonstrated the effectiveness of diet and other lifestyle changes in lowering BP.^{8,9} The Hypertension Prevention Trial, phases I and II of the Trials of Hypertension Prevention (TOHP), PREMIER trial, and TOHP long-term follow-up data show that in participants with hypertension, lifestyle intervention can help control BP and reduce the worsening of hypertension.^{10,11} Hypertension status was the principal blood pressure-related outcome of this study at 12 weeks and the present findings, like these other studies confirm that structured therapeutic lifestyle changes can be an effective tool to help control hypertension. There was a statistically significant difference in the blood pressure changes at the beginning and the end of the study within structured lifestyle modification group (group A) and the verbal advice only group (group B). Although changes in blood pressure were statistically significant in both groups, greater reductions were noted in group A than in group B suggesting that a

structured approached in changes in lifestyle habits may be more beneficial and of higher clinical relevance. The prevalence of systolic hypertension at 12 weeks in group A and group B were 63.33% and 76.67% respectively, corresponding to control rates of 36.67% and 23.33% respectively. For diastolic hypertension, control rates were 30% and 26.7% respectively in group A and group B. These control rates compare favorably with the PREMIER studies where the best rates of blood pressure control (lowest prevalences of elevated blood pressure) and the greatest reductions in blood pressure were observed at six months.^{12,13} A longer duration of study of at least six months may have been comparable with the PREMIER studies.

A few studies have observed that the cumulative effect on blood pressure when several intervention components are implemented simultaneously is less than what would be predicted based on their separate effects implemented alone. For example, weight loss, that involves exercise, is known to be highly effective in reducing blood pressure, and the added effect of the DASH diet may be lessened under conditions of weight loss; similar results were seen when the DASH diet was consumed in the context of a reduced salt (low-sodium) diet.^{14,15} Nevertheless, recommendations for blood pressure control should include all lifestyle changes that are known to improve blood pressure status when implemented alone, because some degree of additivity is probable as was observed in this study.

CONCLUSION

The changes in lifestyle measures observed among participants suggests that, compared to group B, participants in group A demonstrated better results with more positive outcomes in terms of improved systolic and diastolic blood pressures. However, overall findings from this study show that individuals with hypertension in either group can make and sustain, during a period of 12 weeks, multiple lifestyle modifications which can control blood

pressure and reduce the risk for cardiovascular and other chronic diseases.

Declaration by Authors

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