International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Effectiveness of Lifestyle Modification to Control the Blood Pressure Among Hypertensive Patient of Morang District

Shashi Sharma Rijal

Department of Internal Medicine, Purbanchal University Teaching Hospital

Abstract

Background: Hypertension is a strong, independent and etiologically relevant risk factor for cardiovascular diseases and therefore, the leading cause of preventable death worldwide. The purpose of this study was to determine the effect of multifaceted lifestyle modification intervention on blood pressure among hypertensive patients.

Methods: A quasi-experimental study was conducted among 67 participants in the medical OPD through convenience sampling method. The studied multifaceted intervention includes motivational interviews and 60 minutes 3 training session on dietary patterns and exercise and 4 phone call follow-ups. BP was measured before and after intervention and compared between them.

Results: The differences between the mean changes in before and after intervention are systolic (-7.65 ± 4.45), and diastolic (5.74± 4.45)

Conclusion: The studied multifaceted lifestyle intervention promoted and reduced systolic and diastolic BP. Thus, the use of this method as a supplementary treatment is recommended during visit to medical OPD.

Keywords: lifestyle modification, effectiveness, hypertension

Introduction:

Cardiovascular diseases (CVDs) remain the most common cause of death worldwide, causing 17.3 million (31.5%) deaths globally [1]. One of the most important risk factors to develop CVDs is hypertension[1]. Globally WHO reports suggest that estimated 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries[2]. Studies evaluating lifestyle modifications such as weight-reducing diets, regular exercise as well as restricted alcohol and salt intake showed positive effects on blood pressure[3]

An unhealthy diet, physical inactivity and obesity increase the risk of developing hypertension. Lifestyle change is a key component in the cardiovascular risk management and essential in decreasing blood pressure [4,5,6] . Several studies have demonstrated a benefit of lifestyle recommendation in the management of hypertension. Without interventions for elevated blood pressure, we are unlikely to meet the target of reducing by a third premature mortality from non-communicable diseases, as set in the 2015 UN Sustainable Development Goals [7,8] A 5 mm Hg reduction in systolic blood pressure in the population has been estimated to result in a 14% overall reduction in mortality due to stroke, a 9% reduction in mortality due to coronary heart disease, and a 7% reduction in all-cause mortality [9,10] Even

modest population-wide reductions in systolic blood pressure 1 mm Hg are predicted to have substantial effects on cardiovascular death prevention [11.]

The aim of our study was to assess the effectiveness of lifestyle modification to control blood pressure in hypertensive patients in Morang district.

Materials and Methods

Study design and settings: This quasi-experimental study was conducted in the medical outpatient department of Purbanchal Teaching Hospital of Morang district. This study was conducted with one group of pre and post intervention. The inclusion and exclusion criteria of participants are shown in table 1.

Table 1. Intervention participant's inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Adults ≥18 years with an established hypertension diagnosis (systolic BP ≥140 mm Hg and/or diastolic BP≥90 mm Hg on time of medical OPD and accompaniment with 1 family member or using antihypertensive medication) Able to give consent and respond to questions	Self-reported critically ill patients (dementia, prior heart condition) Pregnant Planning of relocation during the follow-up period (within 6mnths)

Study population: Adults hypertensive patient with blood pressure more than 140/90mmHg and able to attend the training session without any other critical illness.

Sample size: Our sample size was 70, 14 individuals in each group of intervention enroll for 6months. For sample size calculation power was set at 80% and level of significance at 5% to observe a minimum detectable mean difference of 5mmhg which was equal to 70 individuals 14 in each group

Outcomes: The trial outcomes are shown in Table 2, The trial outcome measures are shown in table 2. The primary outcome is net change in mean systolic BP measured after 6 months from enrolment. The secondary outcomes are net change in mean diastolic BP, proportion of hypertensive patients controlling BP and physical activity, BMI, diet quality.

Table 2: Study variables

Outcome	Description	Variable type	Effect measure, summary
Primary outcome			
Systolic BP (mmHg)	Net change in mean systolic BP from baseline	Continuous	Difference in mean
Secondary Outcome			
Diastolic BP	Net change in mean diastolic BP	Continuous	Difference mean
Control BP	Participants with BP<140/90 mmHg	Binary	Difference in proportion
Body mass index	Weight measured in kilogram divided by height squared measured meters (kg/ m2)(cut-off <25kg/m2)	Binary	Difference in proportion

Diet	Count in the number of fruits and vegetables in a week	Count (0-7)	Difference in mean
Salt intake	Daily intake of salt as reported by participants (cut off 5g/day)	Binary	Difference in proportion
Physical activity	Metabolic equivalent of task (MET) minutes per week using global physical activity questionnaire (cut off >600MET)	Binary	Difference in proportion
Confounder to adjust			
Marital status	Marital status at baseline	Binary	
Age	Measured in completed years	Continuous	
Exposure to intervention	Number of medical OPD visit	Continuous	
BP, blood pressure			

Sampling: Convenient sampling was done to select the hospital and then simple random sampling was done to allocate the participants until the sample size reached the predetermined number. 14 participants were divided in five groups for intervention.

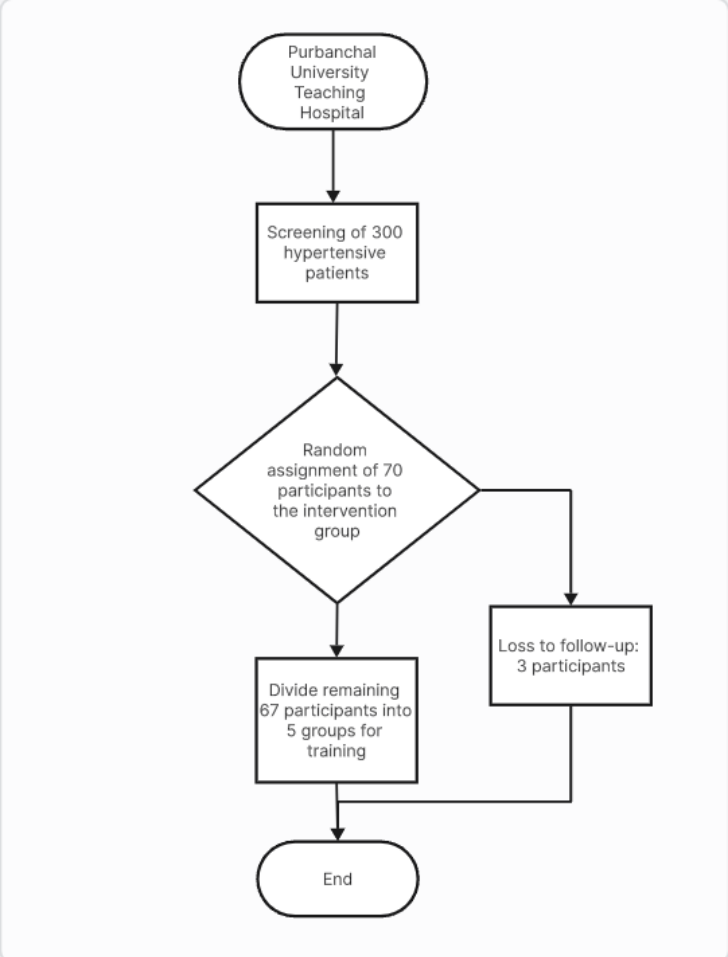

Fig. Flow chart of sampling technique

Enrolment process: First, the study was explained to 70 patients referring to the medical OPD who had the inclusion criteria; those who were willing to take part in the study were asked to provide a written consent form. Next, each participant received a numbered card and based on the number. The data were collected through reviewing of medical records and completion of the questionnaire by the researcher. Four BP measurements were taken and average of the last two measurements were used.

Data collection and assessment: Socio demographic data such as age (years), gender (male/female/other), marital status (married/ unmarried/widow), education (years of education), occupation (government/ self-employed/private/ unemployed), income (annual household and per capita income) was collected at enrolment. Health behaviors such as diet, physical activity (metabolic equivalents of task minutes per week) using a global physical activity questionnaire, alcohol (drinks per week) and smoking (cigarettes per day) and salt intake were collected and BP and anthropometric measurements taken during enrolment and follow-up. Blood pressure of the participants were measured in the right hand of participants and recorded at 2 times with a 5-minute interval. In addition, multifaceted lifestyle modification programmer participants were measured and recorded at the beginning of the study follow -up in 2 months until the 6months.

Intervention: Subsequently, in a class located at the entry of Purbanchal Teaching Hospital, 3 training sessions (60 minutes) were held in 5 weeks and emphasis was placed on dietary pattern, promoting regular aerobic and walking exercises, family support for taking medications. Moreover, a 10-minute phone call was made with the participants and their family member at the end of each month for 6 months. The content of the training sessions consisted of the nature and side effects of the disease, the consequences of not taking HTN medication, methods of controlling the disease via appropriate lifestyle changes (Table 2). The information was presented through lectures, PowerPoint, discussions between participants, and a training booklet. The content of the phone calls included question and answer sessions regarding the reinforcement of the content of the training sessions, techniques of strengthening family support, maintenance of dietary pattern and promoting regular exercises, and answers to possible problems of the participants.

Table 3. The content of training session

Row	Content	Method	Time
First session .	Introduction of the researcher and explanation of the purpose of the research ad its implementation to the participants Motivation for the participants in research and attention to disease Training of families to remind the drugs Monitoring blood pressure, body weight and height	Lecture + Power point	60min
Second session	Explanation of definition of HTN and its risk factors and complication Explanation of how to control HTN and maintain healthy lifestyle Explanation of DASH diet and exercise to control the hypertension	Lecture + Power Point Demonstration of exercise	60 min

Third session	A review of previous content Question about the complication of not controlling HTN Question about the dietary pattern Monitoring Blood pressure and daily routine	Lecture + Power point	60 min

HTN: Hypertension; BP: Blood pressure

At the end of the study, in order to follow ethical codes, the subjects were given a training booklet with regard to discussions of the training sessions The numerical variables are reported as mean ± standard deviation (SD), and categorical variables are presented as frequencies and percentages. Using the Kolmogorov-Smirnov normality test, variables were normally distributed. For inter-group comparisons, the paired t-test was used, and for between-group comparisons, the independent t-test was used. The difference between two means of before and after intervention where compare in SPSS software version 16.

This study received approval from the Institutional Review Committee of Purbanchal University School of Health Sciences (reference number: 038-078/79) and Purbanchal University Teaching Hospital before confidentiality was maintained throughout the study. Data were anonymized and stored securely.

Results: The average age of the participants was 59.17 ± 12.63, respectively. Moreover, the duration of HTN in respondents was 10.49 ± 8.91 years. Among the participants 35 (52.2%), 12 (17.9%), and 20 (29.9%) individuals were, respectively, employed, retired or unemployed, and housewives. Among the participants respectively, 32(23.9%) and 16 (47.7%) individuals used tobacco and smoking respectively. The prevalence of diabetes and hyperlipidemia was 17.9% (n = 12) and 29.9% (n = 20) in the intervention group, (Table 2).

Table 4: Clinical Characteristics of respondents (n=67)

Variables	Number	Percentage (%)
Age (59.17 ± 12.63)		
Young	15	22.38
Middle	36	56.71
Old	16	23.88
Sex		
Male	41	61.2
Female	26	38.8
Occupation		
Employed	35	52.2
Retired	12	17.9
Homemaker	20	29.9
Marital status		
Married	53	79.1
Single	14	20.9
Currently smoking habits	16	23.89
Tobacco consumption	32	47.76

Diabetes	12	17.9
hyperlipidemia	20	29.9

Age is presented as Mean standard deviation

The average age of the participants was 59.17 ± 12.63, respectively. Moreover, the duration of HTN in respondents was 10.49 ± 8.91 years. Among the participants 35 (52.2%), 12 (17.9%), and 20 (29.9%) individuals were, respectively, employed, retired or unemployed, and housewives. Among the participants respectively, 32(23.9%) and 16 (47.7%) individuals used tobacco and smoking respectively. The prevalence of diabetes and hyperlipidemia was 17.9% (n = 12) and 29.9% (n = 20) in the intervention group

Table 5. The average of pre intervention and post intervention

Variables	**Pre intervention Mean ±SD**	**Post intervention Mean ± SD**
Systolic BP	133.88 ±4.75	126.22 ± 5.41
Diastolic BP	87.04 ± 5.25	81.30±3.18
Mean difference in systolic BP	-7.66 ± 4.2	
Mean difference of diastolic BP	-5.75 ± 4.54	

Values are presented as mean ±SD

SD: Standard deviation; BP: Blood pressure

The mean ± SD of systolic and diastolic BP was, respectively, 133.88 ± 4.75 and 87.04 ± 5.25 before the intervention, and 126.22 ± 5.41 and 81.30± 3.17 three months after the intervention, thus representing a significant decrease ($p< 0.001$). There was a significant difference in terms of average changes in systolic BP before and after intervention (-7.65 ± 4.45). The average of variation in diastolic BP before and after the intervention was (-5.74 ± 4.54), respectively.

Discussion:

Adherence to lifestyle modification is important in controlling HTN. The purpose of the study was to determine the effect of multifaceted intervention and BP scores among 67 participants. Based on the results of various researches factors such as gender, age, sex, occupation and disease of diabetes and hyperlipidemia are effective factors impact on BP management.[13] . Thus, quasi experimental study was done to compare the mean difference of BP. After the intervention there was difference between systolic and diastolic BP.

Levia et al report that a reduction in systolic and diastolic BP in the in the intervention group through a multifaceted intervention including self-control of BP, physician visit drug reminder box and family support during fourth session of the study.[14]

Lifestyle intervention, including dietary changes increased exercise and smoking and drinking cessation have seen shown to decrease BP. And intensify the effects of antihypertensive medication. However, we observed significant BP lowering effects related primary exercise in combination with dietary management. The net effect of this lifestyle intervention improved the BP control by the mean difference of systolic and diastolic BP. In a study by Wlliams etal., systolic BP in the intervention group decreased by 6.9mmHG and their diastolic BP to 2.25mmHG after the intervention which is consistent with result of present study.[15]

Based on the findings, the mean changes in the systolic and diastolic BP are -7.66, -5.75 which is contrast with the findings of the study of Azram et al.[16]

Conclusion:

According to findings of the research, it can be concluded that a multifaceted intervention focusing on healthy lifestyle education strengthen patient support for the drug use by its important supporter, the family can significantly affect the reduction in blood pressure therefore reduce systolic and diastolic BP 7.6- and 5.7-mm Hg. Therefore, lifestyle intervention can decline the disease control.

References

1. Townsend N, Wilson L, Bhatnagar P, Wickramasinghe K, Rayner M, Nichols M. Cardiovascular disease in Europe 2016: an epidemiological update. Eur Heart J. 2016;37(42):3182–3. https://doi.org/10.1093/eurheartj/ehw468.
2. WHO. Noncommunicable diseases country profiles 2023: WHO; 2023
3. Forouzanfar MH, Afshin A, Alexander LT, Biryukov S, Brauer M, Cercy K, et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the global burden of disease study 2015. Lancet. 2016;388(10053):1659–724.
4. Timmis A, Townsend N, Gale CP, Torbica A, Lettino M, Petersen SE, et al. European society of cardiology: cardiovascular disease statistics 2019. Eur Heart J. 2020;41(1):12–85.
5. 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy | European Heart Journal | Oxford Academic [Internet]. [cited 2020 Jul 1]. Available from:
6. Valenzuela PL, Carrera-Bastos P, Gálvez BG, Ruiz-Hurtado G, Ordovas JM, Ruilope LM, et al. Lifestyle interventions for the prevention and treatment of hypertension. Nat Rev Cardiol. 2020:1–25 Nature Research.
7. Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, et al. 2016 European guidelines on cardiovascular disease prevention in clinical practice. Eur Heart 2016;37:2315–81 Oxford University Press.
8. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19·1 million participants. Lancet 2017; 389: 37–55.
9. 3 UN. Transforming our world: the 2030 Agenda for Sustainable Development. https://sustainabledevelopment.un.org/post2015/ transformingourworld (accessed Oct 25, 2017).
10. 4 Whelton PK, He J, Appel LJ, et al. Primary prevention of hypertension: clinical and public health advisory from The National High Blood Pressure Education Program. JAMA 2002; 288: 1882–88.
11. 5 Hardy ST, Loehr LR, Butler KR, et al. Reducing the blood pressurerelated burden of cardiovascular disease: impact of achievable improvements in blood pressure prevention and control. J Am Heart Assoc 2015; 4: e002276
12. . Lee SY. *Health care policy and its challenges.* Sejong: Korea Institute for Health and Social Affairs; 2015.
13. Hanus KM, Prejbisz A, Gasowski J, Klocek M, Topor-Madry R, Lesniak W, et al. Relationship between gender and clinical characteristics, associated factors, and hypertension treatment in patients with resistant hypertension. Kardiol Pol 2017; 75(5): 421-31

14. Leiva A, Aguilo A, Fajo-Pascual M, Moreno L, Martin MC, Garcia EM, et al. Efficacy of a brief multifactorial adherence-based intervention in reducing blood pressure: A randomized clinical trial. Patient Prefer Adherence 2014; 8: 1683-90
15. Williams A, Manias E, Walker R, Gorelik A. A multifactorial intervention to improve blood pressure control in co-existing diabetes and kidney disease: A feasibility randomized controlled trial. J Adv Nurs 2012; 68(11): 2515-25.
16. Williams A, Manias E, Walker R, Gorelik A. A multifactorial intervention to improve blood pressure control in co-existing diabetes and kidney disease: A feasibility randomized controlled trial. J Adv Nurs 2012; 68(11): 2515-25.
17. Neupane D, McLachlan CS, Sharma R, Gyawali B, Khanal V, Mishra SR, et al. Prevalence of hypertension in member countries of South Asian Association for Regional Cooperation (SAARC): systematic review and meta-analysis. Medicine (Baltimore). 2014;93(13):e74