Original Article

Lifestyle Counselling and Blood Pressure Control among Hypertensive in a Primary Care Clinic; A Quasi-Experimental Study

Olukokun TA,[1] Ayodapo AO,[2] Omosanya OE,[1] Elegbede OT,[1] Ibrahim AO.[1]

[1]*Department of Family Medicine, Federal Teaching Hospital, Ido-Ekiti.Ekiti State. Nigeria*

[2]*Department of Family Medicine, Federal Medical Centre, Birnin-Kebbi, Kebbi State. Nigeria*

**** Correspondence:*** *Olukokun TA, Department of Family Medicine, Federal Teaching Hospital, Ido-Ekiti.Ekiti State. Nigeria.* ***E-mail****: valueaddedtaiwo2011@yahoo.com , **Tel**: +2348060222229*

For reprints contact: chsjournals@gmail.com

ABSTRACT

Hypertension is a global health issue among the adult population with associated high morbidity and mortality rates. As the prevalence of hypertension increases in adult Nigerians, achieving target blood pressure (BP) control has become an important management challenge, especially with the adoption of western diet and lifestyle. Therefore, the aim of this study was to determine the role of lifestyle counseling on BP control among hypertensives attending a general outpatient clinic at Federal Teaching Hospital, Ido- Ekiti. A Quasi-experimental study was performed on 322 adult patients (161 in the intervention group and 161 in the control group) with hypertension who had been on treatment for at least 3 months. Relevant data were collected using interviewer-administered semi-structured questionnaire. The 5As brief intervention for addressing health risk behaviour tool was used as a counseling guide only for the intervention group. The differences in the BP control between the intervention and control groups were statistically significant ($p < 0.001$) as more than two third of the intervention group 135(83.9%) had good BP control, compared to 68(42.2%) of the control group. Lifestyle counseling led to good BP control. Physicians will do well to counsel hypertensive patients on nutrition and lifestyle behaviour with a view to improving BP control in them.

Keywords: *blood pressure, counselling, lifestyle, primary care clinic*

INTRODUCTION

High blood pressure (BP) or hypertension is the most common non-communicable disease and a significant risk factor for renal disease and cardiovascular diseases such as heart attacks, stroke, and left ventricular hypertrophy globally.[1] In Nigeria, the prevalence of hypertension has been on the increase affecting a significant number of highly productive populations. Multiple factors have been demonstrated to be associated with the development of hypertension and its complications. These are grouped into modifiable and non-modifiable factors. However, the modifiable factors such as environmental and lifestyle factors rather than non-modifiable factors (genetics and sex) are mainly associated with hypertension. Hypertension has a stronger association and causal link with five particular behaviours: Tobacco use, excessive use of alcohol, physical inactivity, unhealthy diet (high salt intake and, insufficient fruit and vegetable consumption) and obesity which are consequences of urbanisation in developing countries.[2] Despite recent advances in drug therapy, majority of diagnosed hypertensive patients are poorly controlled. [3,4,5] Factors preventing optimal blood pressure control exist at the patient, physician, and health system levels. Reasons for inadequate control of hypertension at the patient level are heterogeneous including low adherence to antihypertensive medications and lifestyle changes, low compliance with scheduled follow-up visits and suboptimal pharmacotherapy.[6,7] Studies have shown that compliance with lifestyle modifications such as regular exercise for at least 30 min thrice per week, eating salt and fat free diets, cessation of smoking, and reduction in daily alcohol consumption are essential for adequate lowering of blood pressure.[8, 9]

While the WHO and other health services bodies argued for a focus on behaviour change and health promotion in health care services to prevent approximately 80% of heart disease, stroke, and type-2-diabetes globally with elimination of risk factors such as smoking, physical inactivity, and unhealthy diet,[10] researchers have argued that the complexities of lifestyle behaviour change require health professionals to move away from simple advice giving to a more counselling-based approach.[11]

The term counselling is used alongside terms such as patient education, information, advice, teaching, or guidance,[12] however, it could simply be defined as 'a systematic process which gives individuals an opportunity to explore, discover and clarify ways of living more resourcefully, with a greater sense of well-being.[13] Lifestyle counselling includes a broad range of behavioural change strategies (e.g. decisional balance, self-monitoring, goal setting and relapse prevention) used by health workers when working collaboratively with patients.[11]

Counselling based on individual needs gives patients a sense of participation in their own treatment and the confidential atmosphere provides an opportunity to discuss with the patient their feelings and attitudes towards the disease.[12] The 5As model of behaviour change counselling is an evidence-based approach appropriate for a broad range of different behaviours and health conditions, and is feasible to apply in primary care to provide brief interventions for lifestyle modification in the clinical setting.[14,15]

Hence, this interventional study is determined to assess the role of lifestyle counselling on blood pressure control among hypertensive attending a primary care clinic, using 5As model of behavioural change counselling.

MATERIALS & METHODS

Study Area

The study was conducted in the General Outpatient Department Federal Teaching Hospital, Ido-Ekiti, Ekiti State. The hospital, though a tertiary institution, renders primary and secondary health care. The hypertensive patients are seen daily in the department by the resident doctors under the supervision of Consultant Family Physicians.

Study Design

The study was hospital based interventional study.

Duration of Study

The study was conducted over a period of 20 weeks (January-May 2015).

Sample Size

This was determined using the formula[16]

$n` = 2z^2pq/d^2$

The minimum sample size was 141. However, in order to allow for unexpected data losses and drop-outs during recruitment, a sample size of 161 per group was used for the study.

Sampling Technique

Simple random and systematic random sampling techniques were used to recruit subjects among hypertensive patients attending the clinic. The first participant was selected by simple random sampling, 2 small papers were marked YES and NO. The first 2 patients in the waiting area who gave consent to participate in the study were asked to pick the paper, and the patient that picked the YES was the first for that day and then every second patient was selected by systematic random sampling. This was repeated every clinic day until the sample size was met.

Randomisation of the Study

Subjects were allocated into 2 groups (control and intervention) by randomization. The intervention and control groups were randomised by having opaque envelopes numbered serially with cards which indicated whether a patient should be in intervention or control. They were statistically matched for socio-demographic characteristics (age, sex, type of family, household size, educational level and average monthly income).

Inclusion and Exclusion Criteria

Inclusion criteria include hypertensive aged ≥ 30 years and ≤ 80 years, who have been on treatment for at least 3 consecutive months. Excluded from the study were critically ill, psychiatric and pregnant women.

Ethical Clearance and Consent

Ethical clearance was obtained from the Ethical Review and Research committee of Federal Teaching Hospital, Ido-Ekiti. Informed verbal and written consent were also obtained from willing participants.

Participants Flow

Over the recruitment period of 2 months, 726 participants were encountered. Of these, 676 participants met the inclusion criteria, while 7 were excluded (these were participants whose age were less than 30 years, or who were critically ill). Systematic sampling technique was applied on the recruited 669 respondents until the sample size of 322 was got. The sample population of 322 participants was thirty participants in excess of the calculated minimum sample size of 292, to accommodate for attrition. Thus, data analysis was based on the final study sample of 322 participants.

Research Protocol

The study was done in 2 phases. Phase 1 was the first contact with the patient when the socio-demographic data and blood pressure (BP) were taken. Counselling on lifestyle behaviours such as regular exercise, eating of adequate fruits and vegetables, moderate alcohol intake, stoppage of smoking was undertaken using "Five As" (ask, assess, advise assist, arrange) technique [17] for the intervention group by the principal investigator.

Assess – current behaviour, importance of changing it, self efficacy, stage of readiness, social support.

Advise – give clear, specific, and personalized behaviour change, including information about personal health harms/benefits.

Agree – collaboratively on the behaviour to target (may be several), next steps based on stage of readiness.

Assist – self-help and/or counselling including goal setting and action planning to develop skills, confidence, support to achieve goals.

Arrange – follow-up (in person or by telephone) to discuss progress, barriers, adjusting plan.

Each counselling session for each participants lasted about 30 – 45 minutes. Each session started with an open-ended interrogative communication using lay language. The author provided clear and thorough information and adequate time was allowed for respondents questions. The participants had one session of counselling. However, there were reinforcements of the counselling through reminders to the participants every two weeks for a period of twelve weeks after the phase 1. This was achieved with phone calls and Short Message Services (SMS).

The control group were routinely attended to, without counselling throughout the period of study. However, at the end of the study, the control group were given a lifestyle counselling too. This phase lasted for 12 weeks.

Phase 2 commenced after phase 1 and lasted for 8 weeks. This phase involved blood pressure check. The post-intervention data collection was carried out in both the intervention and control groups three months after the intervention.

Data Collection and Instruments

Questionnaire was used to obtain information on socio-demographic variables, pre-intervention. Three research assistants namely; a resident doctor, a nurse and a health information officer were used.

An Accosson(R) brand Mercury Sphygmomanometer made in England with appropriate cuff and stethoscope was used to measure the blood pressure of the patients in the sitting position using the left arm. A cuff with bladder that was 12-13cm x 35cm and a larger one for fat arms was used at the upper two-third (2/3) of the arm (i.e. an appropriate-sized cuff with bladder encircling at least 80% of the arm). Sphygmomanometer cuff was placed at heart level. The cuff was inflated palpating the radial artery and the inflation was continued until 20-30mmHg above the disappearance of the radial pulse. The stethoscope diaphragm was then placed over the brachial artery in the ante- cubital fossa and the cuff deflated, allowing the mercury to fall gradually about 2mmHg per second. First appearance of sound (phase 1 Korotkoff) was used for systolic blood pressure (SBP), and a phase 5 Korotkoff sound (disappearance of sound) was used to measure diastolic blood pressure (DBP). The BP was recorded to the nearest 2mmHg. Two measurements were taken after the patient has been allowed to sit for 5-10mins and an average value was taken. Mean arterial pressure (MAP) was calculated from SBP and DBP.

A cut off level of both < 140mmHg and < 90mmHg for systolic and diastolic blood pressure respectively was considered good BP control. When either or both the systolic and diastolic blood pressure is ≥ 140mmHg and ≥ 90mmHg respectively was recorded, it was considered poor BP control.

Statistical Analysis

All data collected was analysed, using the Statistical Package for Social Sciences (SPSS) for Windows software version 17.0. Frequency tables were generated for relevant variables. Means, standard deviations and percentages were determined as appropriate. The means and standard deviation (SD) were calculated for continuous variables while categorical

variables were analysed using proportions. Test of significance was done using Student's t-test. The student t-test was used to compare the means when there were only 2 means to compare. P-value of equal or less than 0.05 was taken to be statistically significant.

RESULTS

The total sample size was 322. The mean age (SD) of the respondents was 60.9 ± 10.2; the age group 50-59 had the highest numbers of respondents (34.2%), while age group 40-49 had the least numbers of respondents (13.0%). The male to female ratio is 0.97:1.

Household size was less than 5 in 81.4% of the respondents and 28.6% of the respondents were below poverty level, earning less than 1.25USD per day. (Table1). The socio-demographic characteristics of the intervention and control group were similar. There was no statistically significant difference in the age, gender, type of family, household size, education status and income of the respondents (Table 2).

Table 1. Socio-demographic characteristics of the respondents (N = 322)

Variables	Frequency (n)	Percent (%)
Age in years		
Mean ± SD	60.9 ± 10.2	
40 – 49	42	13.0
50 – 59	110	34.2
60 – 69	98	30.4
70+	72	22.4
Sex		
Male	159	49.4
Female	163	50.6
Type of family		
Monogamy	265	82.3
Polygamy	57	17.7
Household size		
≤ 5	262	81.4
6 – 9	55	17.1
≥ 10	5	1.5
Educational level		
None	13	4.0
Primary	39	12.1
Secondary	80	24.9
Tertiary	144	44.7
Postgraduate	46	14.3
Average monthly income		
Above poverty level (≥$1.25/day)	230	71.4
Below poverty level (<$1.25/day)	92	28.6

Table 2. Comparison of socio-demographic characteristics between intervention and control groups

Variables	Intervention group (n = 161)	Control group (n = 161)	$\chi 2$	Df	P value
Age in years					
*Mean ± SD**	61.3 ± 9.7	60.5 ± 10.3	0.715	320	0.475
(Min - Max)	(40 - 87)	(40 - 84)			
n (%)					
40 – 49	18 (11.2)	24 (14.9)	1.570	3	0.666
50 – 59	58 (36.0)	52 (32.3)			
60 – 69	51 (31.7)	47 (29.2)			
70+	34 (21.1)	38 (23.6)			
Sex					
Male	76 (47.2)	83 (51.6)	0.609	1	0.435
Female	85 (52.8)	78 (48.4)			
Type of family					
Monogamy	128 (79.5)	137 (85.1)	1.727	1	0.189
Polygamy	33 (20.5)	24 (14.9)			
Household size					
≤ 5	134 (83.2)	128 (79.5)			0.350*
6 – 9	26 (16.2)	29 (18.0)			
≥ 10	1 (0.6)	4 (2.5)			
Educational level					
None	8 (5.0)	5 (3.1)	2.778	4	0.596
Primary	19 (11.8)	20 (12.4)			
Secondary	35 (21.70	45 (28.0)			
Tertiary	73 (45.3)	71 (44.1)			
Postgraduate	26 (16.2)	20 (12.4)			
Average monthly Income					
Above poverty level (≥$1.25/day)	111(68.9)	119 (73.9)	0.974	1	0.324
Below poverty level (<$1.25/day)	50 (31.1)	42 (26.1)			;;

*Fishers exact test

Table 3 showed that there was no statistically significant difference in mean SBP, DBP and MAP of the intervention and control group pre intervention; however there was a statistically significant difference in the mean SBP, mean DBP and mean MAP among the intervention and control group post-intervention (130.9 ± 10.9 vs 145.6 ± 11.3, 79.1 ± 7.7 vs 86.5 ± 7.0 and 96.4 ± 8.1 vs 106.2 ± 7.6). The p-value of mean SBP and mean DBP was < 0.001 respectively. Also, the mean change in SBP and DBP were higher in the intervention group than the control group, and the differences were statistically significant, p <0.001.

As shown in table 4, the mean SBP of respondents decreased from 144.8 to 130.9 in the intervention group (difference of 13.8) while in the control group the difference was 0.3. The mean DBP decreased from 86.4 to 79.1 in the intervention group (difference of 7.3) while in the control group the difference was 0.9. The differences in both systolic and diastolic blood pressure were statistically significant in the intervention group, p < 0.001 post-intervention, while only

the DBP was statistically significant in the control group, p = 0.004.

Table 3. Summary of mean blood pressure and mean change in blood pressure of respondents

Variables	Intervention group (n = 161)	Control group (n = 161)	T	Df	P value
Pre-intervention					
Mean SBP (mmHg)	144.8 ± 11.5	145.9 ± 11.5	-0.843	320	0.400
Mean DBP (mmHg)	86.4 ± 7.7	87.4 ± 7.6	-1.176	320	0.240
Mean MAP (mmHg)	105.9 ± 8.4	106.9 ± 8.3	-1.108	320	0.268
Post-intervention					
Mean SBP (mmHg)	130.9 ± 10.9	145.6 ± 11.3	-11.871	320	< **0.001**
DBP (mmHg)	79.1 ± 7.7	86.5 ± 7.0	-9.078	320	< **0.001**
MAP (mmHg)	96.4 ± 8.1	106.2 ± 7.6	-11.232	320	< **0.001**
SBP change (mmHg)					
Mean change	-13.9 ± 10.8	-0.3 ± 2.6	-15.306		< **0.001***
Range	-60.0 to 2.0	-25.0 to 12.0			
DBP change (mmHg)					
Mean change	-7.3 ± 6.3	-0.9 ± 3.8	-12.631		< **0.001***
Range	-30.0 to 8.0	-25.0 to 0.0			

** Mann-Whitney U test*

Table 4: Intra-group difference in the mean blood pressure of the respondents

Variables	Pre-intervention	Post-intervention	Paired-sampled T-test
	Intervention Group		
Mean SBP (mmHg)	144.8 ± 11.5	130.9 ± 10.9	T=16.365, df=160; p<**0.0001**
Mean DBP (mmHg)	86.4 ± 7.7	79.1 ± 7.7	T=14.710,df=160;p< **0.0001**
	Control Group		
Mean SBP (mmHg)	145.9 ± 11.5	146.5 ± 11.3	T=1.275,df=160;p=0.0204
Mean DBP (mmHg)	87.4 ± 7.6	86.5 ± 7.0	T=2.883, df=160;p=**0.004**

DISCUSSION

The pre-intervention mean SBP in the intervention and control group was 144.8 ± 11.5 and 145.9 ± 11.5 respectively while the mean DBP was 86.4 ± 7.7 and 87.4 ± 7.6 in the intervention and control group respectively. The pre-intervention mean MAP was 105.9 ± 8.4 and 106.9 ± 8.3 for the intervention and control group respectively. The pre-intervention BP finding in this study was similar to the randomised trial study by Eriksson *et al* who found mean SBP of 146 ± 16.4 and 145 ± 17.4, mean DBP of 88 ± 7.5 and 87 ± 8.5[18] in Bjorknas, Sweden. It was also similar to mean SBP and DBP of 143±17 and 80 ± 12, found in a descriptive cross-sectional study carried out in a semi-urban community in Umuahia,[19] 149 ± 19.33 and 93.48 ± 13, found in a prospective study done to determine the level of blood pressure control among patients receiving treatment for hypertension in Port Harcourt.[20] However, a lower mean SBP, DBP and MAP of 129.21 ± 20.77, 84.51 ± 14.50 and 99.36 ± 16.22 was found in a population study in Enugu.[21] The difference could be because the study with lower mean values was from general population different from among hypertensive population.

The post-intervention showed that mean SBP in the intervention and control group was 130.9 ± 10.9 and 145.6 ± 11.3 respectively, while the mean DBP was 79.1 ± 7.7 and 86.5 ± 7.0 respectively. Also, the mean MAP post-intervention was 96.4 ± 8.1 and 106.2 ± 7.6 in the intervention and control group respectively. The differences in the mean blood pressures were statistically significant, p< 0.001. This was similar to a retrospective study on adherence to international guidelines on treatment of hypertension carried out at University of Benin Teaching Hospital (UBTH), Benin City, Nigeria where the post treatment mean SBP and DBP in the males was (131.8 ± 11.6, and 84.3 ± 7.5) and females (132.3 ± 11.5 and 83.2 ± 7.6)[22] respectively. The mean change in SBP of the intervention and control group was -13.9 ± 10.8 and -0.3 ± 2.6, while the mean change in DBP of the intervention and control group was -7.3 ± 6.3 and-0.9 ± 3.8 respectively. The differences in mean changes were statistically significant, p < 0.001. This was higher than the mean change in SBP (-4.7 ± 10.5 and -1.6 ±11.7) and DBP (-3.8 ± 5.0 and -1.5 ±4.9) in the intervention and control group of the Bjorknas` study.[18] It may mean that long term effect of lifestyle on blood pressure was not sustained, and besides only exercise and diets were given as intervention and the participants had co-morbidity. In this study, patients in the intervention group in addition to their taking of medications (which was probably enhanced because of their involvement in the study), were appropriately counselled on lifestyle modifications and this may be responsible for the difference between the two groups. Pre-intervention showed SBP control rate of 72(44.7%) and 69(42.9%) and DBP control rate of 130(80.7%) and 126(78.3%) in the intervention and control group respectively. This was higher than 5.0% (males) and 17.5% (females), found in a household survey on prevalence,

awareness and control of hypertension in Nsukka,[23] 12.4% found in a prospective study among hypertensive in Zaria,[24] 24.2 % found in a prospective descriptive cross sectional study among patients receiving treatment for hypertension in Port Harcourt,[20] and 35.7% found in a prospective study among hypertensive patients in a tertiary hospital in Ilorin,[25] respectively. The disparity in the blood pressure control was probably due to the fact that, this study was carried out in the Family practice setting where the Physicians had been trained to inform, educate and counsel patients about hypertension using an effective communication skills in a patient-centred manner. This probably serves in reducing the effect of misconception and health beliefs about hypertensive disorder that had been reported in previous studies to be among the factors responsible for low adequate blood pressure control rates. There is a misunderstanding among the hypertensive patients that hypertension is an intermittent disease that only needs treatment in the presence of symptoms or external stress.[26, 27]

Post-intervention showed a SBP control rate of 135 (83.9%) in the intervention group and 68 (42.2%) in the control group and a DBP control rate of 157 (97.5%) in the intervention group and 131 (81.4%) in the control group respectively. This was similar to post intervention blood pressure control of 86.05% in Lagos.[28] In this study, blood pressure control was found to be statistically significantly higher in the intervention group compared with the control group. This study corroborated the fact that single and multiple lifestyle interventions have substantial effects on BP, and that the effects of modifications are dose- and time-dependent.[29, 30] The benefit of counselling on healthy lifestyle is not limited to the control of blood pressure but also in the prevention of complications of hypertension and other chronic cardio-metabolic disorders associated with hypertension.[31]

Patient-centred approach used in this study included activities such as listening to patients, considering their priorities, developing collaborative goals and eliciting coping suggestions that are congruent with patient values, preferences and social environment. These are at the heart of the 5As approach[14] and often advocated as a useful framework for primary care health professionals to provide brief interventions for lifestyle modification in the clinical setting.[13] The 5As counselling framework employed in the intervention group in this study guided the physician to assess risk, current behaviour, and readiness to change, advise change of specific behaviours, agree and collaboratively set goals, assist in addressing barriers and securing support, and arrange for follow-up.[32]

CONCLUSION

Despite the short intervention period, the results showed an improved blood pressure control. Improved lifestyle modifications and better blood pressure control in the intervention group, was attributed to Physician counselling because antihypertensive medications were not altered.

LIMITATIONS

Lifestyle behaviour was assessed based on report by patients, which might be an over or under-estimation of actual practice. The intervention period was short. The respondents were matched for socio-demographic factors only.

RECOMMENDATION

A longer follow up would probably ensure sustenance of the nutritional changes, lifestyle behaviours, enhance maintenance and avoid relapses. Further research of longer duration is needed to determine if the effect of lifestyle counselling on BP is sustainable.

Conflict of Interest

None declared.

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