Impact of Patient Counselling on Knowledge, Attitude, and Practice in Hypertension Management

Hossamaldeen Bakrey[1*], Karan Trehan[2], Shubham Thakur[3], Abdulkadir Abdu[4], Narayana Goruntla[5]

[1]Department of Pharmaceutical Sciences, Guru Nanak Dev University, Amritsar, Punjab, India 143005. hossambakrey99@gmail.com
[2]Department of Pharmaceutical Sciences, Guru Nanak Dev University, Amritsar, Punjab, India 143005. ktrehan81@gmail.com
[3]Department of Pharmaceutical Sciences, Guru Nanak Dev University, Amritsar, Punjab, India 143005. shubhamdthakur@gmail.com
[4]Department of Pharmaceutical Sciences, Guru Nanak Dev University, Amritsar, Punjab, India 143005. gaduraabdu61@gmail.com
[5]Department of Pharmaceutical Sciences, Guru Nanak Dev University, Amritsar, Punjab, India 143005. narayanagoruntla@gmail.com

*Corresponding author: Hossamaldeen Bakrey, Department of Pharmaceutical Sciences, Guru Nanak Dev University, Amritsar, Punjab, India 143005. hossambakrey99@gmail.com

Abstract

Hypertension, a leading cause of cardiovascular disease and premature death globally, has shown a prevalence rate of 27.1% in Sudan based on a recent epidemiological study. Both urban and rural populations in Sudan have experienced a significant increase in the occurrence of hypertension. Alarmingly, approximately half of the hypertensive patients in Sudan have uncontrolled blood pressure. The objective of this study was to assess the knowledge, attitudes, and practices (KAP) related to hypertension management using a pre-validated questionnaire. A prospective randomized control trial was conducted over a period of six months in the General Medicine department of Mastaura General Hospital, Kassala State, Sudan. The study enrolled patients aged 18 years and older, regardless of gender, who had hypertension and coexisting conditions. Patients who were unwilling to participate or unable to respond to the questionnaire in Arabic or English were excluded. A total of 1,234 patients were initially enrolled in the study. Demographic details such as gender, age, education, occupation, and lifestyle habits were compared among the participants. Eventually, 640 patients completed the study. The majority of the patients were males (68.1%), and the disease was more prevalent among males, possibly due to social habits like smoking and tobacco chewing. Females accounted for 31.8% of the participants. The study revealed a statistical relationship between factors such as age, gender, lifestyle habits, and coexisting conditions. Furthermore, the study demonstrated a positive correlation between education level and awareness of hypertension, as higher education increased knowledge and understanding of chronic health conditions. In conclusion, pharmacist-mediated patient counselling on disease management, risk factors, lifestyle modifications, medication adherence, and drug therapy significantly improved the knowledge, attitudes, and practices related to hypertension management. Additionally, the study indicated that pharmacist counselling led to a significant reduction in blood pressure in the intervention group compared to the control group.

Keywords: Attitude; Counselling; Hypertension; Impact; Knowledge; Management; Practice.

1. INTRODUCTION

Hypertension (HTN) is a chronic disorder that requires close monitoring and control of blood pressure (BP) to prevent cardiovascular disease, stroke and end stage renal disease [1]. Globally, 26% of population are affected by hypertension and 7.6 million deaths are reported [2]. A person is said to be hypertensive if systolic blood pressure is more than 140 mm of Hg or diastolic blood pressure more than 90 mm of Hg. Clinical manifestation of hypertension includes severe headache, fatigue, vision problem, chest pain, difficulty breathing, irregular heartbeat, blood in urine etc. If untreated, overtime this extra pressure can increase your risk of a heart attack, stroke kidney disease and vascular dementia. Depending on the cause high blood pressure can be diagnosed as primary or secondary hypertension. Primary hypertension can occur due to smoking, obesity drinking alcohol excessively, lack of exercise etc. On the other chronic steroidal therapy, crushing syndrome, chronic kidney disease, reno vascular disease and pheochromocytoma can lead to secondary hypertension. It can also occur through excessive use of some drugs such as amphetamine, cyclosporine, oral contraceptive pills NSAIDS/COX-2 inhibitors etc. Recently in Sudan, an epidemiological study shown a prevalence of 27.1% [3]. There was a rapid raise in the prevalence of HTN among both urban and rural people in the country [4]. In Sudan about half of the patients with HTN have uncontrolled BP [5]. The major reason for the uncontrolled HTN is medication non-adherence and lack knowledge regarding medications, lifestyle changes and non-pharmacological measures available to control BP level [6]. Uncontrolled high blood pressure will increase the morbidity, mortality and healthcare costs. This gives an urgent requirement of educational activities to improve the knowledge, medication adherence, and BP control. Patient's Knowledge, Attitude, and Practices (KAP) towards hypertension management is a very important outcome measure used to check the effect of any educational intervention. Hypertension can be treated by pharmacological and non-pharmacological methods. Non pharmacologically it can be treated by reducing sodium intake, reducing alcohol consumption, eating more fruits and vegetable, eating more fibre, by quitting smoking and start exercising. This study aims to evaluate the impact of pharmacist delivered counselling on KAP levels and control of BP in the hypertensive patients from various regions of Kassala district, Sudan.

2. MATERIALS AND METHODS

This is prospective randomized control trial. The study was carried out for a period of six months. The trial enrolled all patients who were at least 18 years old and had co-morbid conditions such as hypertension, regardless of gender. Patients who refused to participate and were unable to respond to the questionnaire in Arabic and English were excluded from the study.

2.1. Subjects and Location for Data Collection

640 patients were enrolled in the study comprising 320 participants in each arm (test, control). The study was conducted in the General Medicine department of Mastaura General Hospital, Kassala State, Sudan.

2.2. Ethical considerations

The study was performed after getting ethical clearance from the Institutional Review Board with a registration number of RIPER/IRB/2018/ and in accordance with ICHGCP and CONSORT guidelines.

2.3. Overall study plan

Utilizing Epi-Info software, the study's participant count was determined by taking into account a 10% difference in mean blood pressure between the intervention and control groups, 80% power, and a 5% margin of error. After taking into consideration the 10% dropout rate, each arm needs 320 participants. A total of 1234 patients were approached to take part in the trial, and 640 of them were randomly assigned to the test and control groups using a straightforward randomization procedure. After a thorough explanation of the study's goals and outcomes, participants' verbal and written informed consent was obtained. A suitably designed, pre-validated KAP questionnaire was used to collect the data from the study participants. There were three sections to the questionnaire. Socio-demographic data are collected in Part A, patient knowledge of hypertension and its management techniques are collected in Part B, and patient attitudes and practises about the management of hypertension using pharmacological and non-pharmacological measures are collected in Part C. In order to determine the knowledge levels of study participants, a questionnaire with a total of 14 questions was used. Each question had a '1' score for the right response and a '0' score for the incorrect one. The obtained knowledge score of each participant was translated into percentage by using a formula obtained score divided by maximum expected score multiplied with 100. Bloom's cutoff criteria state that a person has strong knowledge if they score between 80% and 100%, moderate knowledge if they score between 60% and 70%, and bad knowledge if they score below 60% [8]. By ranking seven statements on a 3-point Linkert's scale, attitudes toward management of hypertension were evaluated. The statement on Likert's scale has positive and negative responses ranges from 3- agree, 2- neither agree or nor disagree, and1- disagree. The maximum score expected was 21 and a minimum of 7. A person is deemed to have a positive attitude toward managing their hypertension if their score is greater than 50% and less than 50% indicates a negative attitude. Rational practice towards hypertension management was assessed by using eight questions. Each correct answer was given '1' score and wrong answer as '0'. If person score ≥ 80%, considered as rational practice and < 80%, considered as irrational practice towards hypertension management. At baseline socio-demographic information like age, gender, marital status, educational status, occupation, comorbidities, BMI and Blood pressure levels were gathered from both test and control group. The pharmacist offered one-on-one counselling to patients in the test group. The counselling focused on hypertension definition, regular monitoring of BP and body weight, Dietary approach to stop hypertension (DASH) diet, physical exercise, stress management, salt restriction, lifestyle changes (Smoking and alcohol) and regular intake of medications as per physician instructions. Participants in the control group will get the doctor's customary care. Three visits made up the entirety of the study: baseline, the first follow-up (after three months), and the second follow-up (after six months). Finally, by comparing two groups at each follow-up visit, the influence of pharmacist-mediated counselling on KAP levels and BP management was evaluated.

2.4. Statistical Analysis

Epi-Info 7 for Dos version 3.5.1software (Centres for Disease Control and Prevention, Clifton Road Atlanta, USA) was used to analyze collected data from all study participants. Descriptive statistics including frequency, proportion, mean, and standard deviation were used to represent the baseline demographic and clinical data. Analytical statistics like chi-square and un-paired t test were used to assess the significant effect of patient counselling on blood pressure and KAP percentage levels. P value less than 0.05 was considered as statistically significant result.

3. RESULTS AND DISCUSSION

In Our Study the most of patient were males (68.1%). Men were more likely to get this disease because of their social behaviours of smoking and chewing tobacco. The percentage of females were 31.8%. The mean age of our study was 54.2 ± 6.4 in intervention and 58.4 ± 7.9 in the control group. In our study only 30% of the patients are literates. In our study the systolic B.P mean score at base line is 176.4 ± 34.2 and mean score is 180 ± 29.4 at second follow up and p-Value is <0.0001 when compared to other study the systolic B.P at base line is 153.3 ± 8.93 and final fallow up is 128.50 ± 7.86 and P-Value is 0.0027 in our study the mean diastolic B.P 92.4 ± 13.9 and final follow up is 85.3 ± 9.2 when compared to other study the mean diastolic B.P at base line is 88.11 ± 5.94 and at final follow up is 89.23 ± 5.23. The most important finding of the current study revealed that majority of the hypertension patients had good knowledge (57.1%) and good attitude (64.7%). In respect with the attitude, more than 64% of the respondents showed good attitude. This finding agrees with other studies that revealed a high percentage (60-90%) of hypertensive patients who reported good attitude. Table 2 Shows socio-demographic profile of the study participants. Most of patients were male gender, married, university level education, private job, smokers, and diabetes as a major co-morbid condition. All the demographic and clinical characteristics like BP, BMI, and duration of HT was matched between intervention and control groups. Table 3 shows the knowledge levels of the study participants in both intervention and control groups. The knowledge regarding definition of hypertension, blood pressure levels, complications, non-pharmacological management, medication adherence, and regular check-ups was improved in the intervention group compared to control group. There were high knowledge levels at final follow-up in intervention group. In control group there was no improvements in the knowledge levels on follow-up visits A total of 1234 Patients were enrolled into Study. Better patient counselling and treatment were necessary for the hypertensive patient to get their blood pressure under control and to improve their quality of life in terms of their health. A pharmacist is qualified to offer patient counselling as an intervention with the goal of reaching a specific result that will enhance the patient's health. A study conducted in Jordan on 200 hypertensive patients attending primary health care centres suggested that most of the participants were knowledgeable and had positive attitudes towards hypertension. The findings of other studies in Saudi Arabia, Nigeria, Ghana, and Pakistan indicated that there is a clear need for health education of hypertensive patients. The degree of education was directly correlated with the knowledge score, which was expected given that higher education raises people's awareness of health-related concerns, particularly those that are connected to their chronic conditions. According to research by Bushara *et al*., there was a 38.2% prevalence of hypertension in rural

north Sudan, and there was a substantial correlation between age, obesity, illiteracy, and diabetes mellitus. The increased prevalence of hypertension might be attributed to rapid urbanization. Ahmed *et al*. have shown that the prevalence of obesity in Sudan was around 21% among 7,239 subjects. Their data showed that obesity was associated with hypertension [7]. The world health organization (WHO) has supported to decrease salt intake in Sudanese people in order to decrease prevalence of hypertension in the region. There is also an associated risk of sugar intake with hypertension. Jayalath *et al*. showed in systemic review and meta-analysis of 6 large cohort studies (total population 240,508) among them 79,251 with hypertension, that sugar intake is associated with risk of hypertension [8].

CONCLUSION

According to the findings of the current study, patient counselling by a pharmacist about diseases, risk factors, lifestyle changes, medication adherence, and drug therapy for hypertension dramatically increased knowledge, attitudes, and practice levels in the field. The study also demonstrates that receiving pharmacist counselling significantly lowers blood pressure in the intervention group compared to the control group. In order to improve economic, clinical, and humanistic outcomes, the current study advises the health care sector to use pharmacy services in chronic illnesses.

ACKNOWLEDGEMENT

References

1. Linda, M.. Knowledge, attitude and practices towards risk factors for hypertension in Kinondoni municipality, Dar es Salaam. *Dar Es Salaam Medical Students' Journal*, *14*(2), 59-62, **(2007)**.

2. Knight, E. L., Bohn, R. L., Wang, P. S., Glynn, R. J., Mogun, H., & Avorn, J. Predictors of uncontrolled hypertension in ambulatory patients. *Hypertension*, *38*(4), 809-814 **(2001)**.

3. Kaur, K., Sharma, S. K., Kaur, G., Deepika, Sharma, D., & Rai, H. Practices of hypertensive patients visiting OPD at DMC & H, Ludhiana. *Nursing & Midwifery Research Journal*, *3*(2), 65-70, **(2007)**.

4. Lawes, C. M., Vander Hoorn, S., & Rodgers, A. Global burden of blood-pressure-related disease, 2001. *The Lancet*, *371*(9623), 1513-1518, **(2008)**.

5. Terry, D. F., Pencina, M. J., Vasan, R. S., Murabito, J. M., Wolf, P. A., Hayes, M. K., ... & Benjamin, E. J. Cardiovascular risk factors predictive for survival and morbidity-free survival in the oldest-old Framingham Heart Study participants. *Journal of the American Geriatrics Society*, *53*(11), 1944-1950, **(2005).**

6. Al Sowielem, L. S., & El Zubier, A. G. Compliance and knowledge of hypertensive patients attending PHC centres in Al-Khobar, Saudi Arabia. *EMHJ-Eastern Mediterranean Health Journal, 4 (2), 301-307,* **(1998)**.

7. Awadalla, H., Elmak, N. E., El-Sayed, E. F., Almobarak, A. O., Elmadhoun, W. M., Osman, M., ... & Ahmed, M. H. Hypertension in Sudanese individuals and associated risk factors: the critical intersection between salt and sugar intake. *Cardiovascular Diagnosis and Therapy*, *8*(4), 432 **(2018)**.

8. Jayalath, V. H., de Souza, R. J., Ha, V., Mirrahimi, A., Blanco-Mejia, S., Di Buono, M., ... & Sievenpiper, J. L. (Sugar-sweetened beverage consumption and incident hypertension: a systematic review and meta-analysis of prospective cohorts. *The American journal of clinical nutrition*, *102*(4), 914-921, **(2015)**.

Table 1: Baseline socio-demographics and clinical profile of study participants

Variables	Intervention (n=320) Frequency (%)	Control (n=320) Frequency (%)	Total (n=640) Frequency (%)	Chi-square value	*P* value
Mean age (±SD)	54.2 ±6.4	58.4 ±7.9	56.6	-	0.136
Gender					
Male	218 (68.1)	206 (64.3)	424 (66.2)	1.006	0.315
Female	102 (31.8)	114 (35.6)	216 (33.7)		
Marital status					
Married	195 (60.9)	212(66.2)	407(63.5)	1.950	0.162
Single	125 (39.1)	108(33.7)	233(36.4)		
Education					
College/university	105(32.8)	118(36.8)	223(34.8)		
Primary school	72(22.5)	73(22.8)	145(22.6)		
High school	75(23.4)	76(23.7)	151(23.5)	3.022	0.388
No education	68(21.2)	53(16.5)	121(18.9)		
Occupation					
Farmer	40(12.5)	42(13.1)	82(12.8)		
House wife	35(10.9)	36(11.2)	71(11)		
Private job	170(53.1)	160(50)	330(51.5)	0.715	0.949
Government job	55(17.1)	59(18.4)	114(17.8)		
Others	20(6.2)	23(7.8)	43(6.7)		
Life style habits					
Smoker	125(39)	126(39.3)	251(39.2)		
Alcoholic	-	-	-	0.440	0.802
Tobacco chewing	80(25)	86(26.8)	166(25.9)		
Others	115(35.9)	108(33.7)	223(34.8)		
Co-morbidities					
Diabetes	185(57.8)	189(59)	374(58.4)		
Heart failure	20(6.2)	15(4.6)	35(5.4)		
CAD	10(3.1)	12(3.75)	22(3.4)	1.860	0.761
MI	15(4.6)	20(6.2)	35(5.4)		
None	90 (28.1)	84 (26.2)	174(27.1)		
Duration of HT(Y)					
Mean (±SD)	6.82 ±5.2	7.34 ±3.4	7.01 ±4.9	-	0.231
BMI (kg/m^2)	26.6 ± 5.2	28.3 ± 6.4	27.5 ±4.8	-	0.342
BP (mm of Hg)					
Systolic BP	176.4 ±34.2	180 ± 29.4	179.9 ±28.7	-	0.089
Diastolic BP	92.4 ± 13.9	98 ± 18.5	95.6 ± 15.4	-	0.062

SD: Standard Deviation, Intervention: Pharmacist-mediated counselling, Control: Care by physician,
CAD: Coronary Artery Disease, COPD: Chronic Obstructive Pulmonary Disease

Table 2: Knowledge about hypertension and its management among study participants at the end of study

Variable	Intervention (n=306) Frequency (%)			Control (n=310) Frequency (%)		
Knowledge about definition of hypertension	70 (22.8)	138 (45)	254 (83)	74 (23.8)	80 (25.8)	86 (27.2)
Knowledge about normal blood pressure level	60 (19.6)	135 (44.1)	266 (86.9)	66 (21.2)	88 (28.3)	95 (30.6)
Knowledge about common symptoms presented in hypertension	75(24.5)	129(42.1)	244(79.7)	82(26.4)	89(28.7)	96(30.9)
Knowledge about blood pressure can raise without any warning symptom	63(20.5)	133(43.4)	245(80)	77(24.8)	84(27)	92(29.6)
Knowledge about untreated hypertension may cause damage to kidney, heart, brain, and eyes.	79(25.8)	159(51.9)	273(89.2)	85(27.4)	92(29.6)	99(31.9)
Knowledge about hypertension is a lifelong disease	77(25.1)	155(50.6)	275(89.6)	83(26.7)	88(28.3)	96(30.9)
Knowledge about smoking is one of the major risk factor to develop hypertension	69(22.5)	149(48.6)	293(95.7)	75(24.1)	87(28)	98(31.6)
Knowledge about obesity is one of the major risk factor to develop hypertension	66(21.5)	155(50.6)	299(97.7)	77(24.8)	83(26.7)	94(30.3)
Knowledge about regular check-ups like blood pressure, blood glucose, BMI, lipid profile, and cardiovascular tests required in hypertensive patients	72(23.5)	176(57.5)	288(94.1)	76(24.5)	84(27)	93(30)

Knowledge about salt restriction will improve blood pressure control	55(17.9)	120(39.2)	294(96)	73(23.5)	79(25.4)	87(28)
Knowledge about stress is associated to increase blood pressure levels	64(20.9)	136(44.4)	275(89.8)	69(22.2)	71(22.9)	93(30)
Knowledge about regular exercise helps in control of blood pressure	63(20.5)	144(47)	269(87.9)	76(24.5)	83(26.7)	95(30.6)
Knowledge about DASH diet?	**54(17.6)**	133(43.4)	278(90.8)	69(22.5)	77(24.8)	84(27)
Knowledge about importance of adherence towards anti-hypertensive medications	59(19)	155(50.6)	269(87.9)	64(20.6)	78(25.1)	89(28.7)

DASH = Dietary approach to stop hypertension;

Table 3: Attitude towards hypertension and its management

Variable	Intervention (n=306) Frequency (%)			Control (n=310) Frequency (%)		
Hypertension effects both rich and poor **Agree** Neither agree or nor disagree Disagree	164 (53.5) 120(39.2) 22(7.1)	186(60.1) 110(35.9) 10(3.2)	233(76.1) 66(21.5) 7(2.2)	169(54.5) 95(30.6) 46(14.8)	174(56.1) 96(30.9) 40(12.9)	178(57.4) 97(31.2) 35(11.2)
Prolong raise in blood pressure may cause damage to brain, kidney, eye and heart **Agree** Neither agree or nor disagree Disagree	85(27.7) 165(53.9) 56(18.3)	103(33.6) 160(52.2) 43(14)	140(45.7) 152(49.6) 14(4.5)	93(30) 180(58) 37(11.9)	95(30.6) 189(60.9) 26(8.3)	99(31.9) 202(65.1) 9(2.9)
Moderate amount of drinking may allowed in hypertensive patient **Agree** Neither agree or nor disagree Disagree	80(26.1) 190(62) 36(11.7)	85(27.7) 182(59.4) 39(12.7)	99(32.3) 179(58.4) 28(9.1)	85(27.4) 175(56.4) 50(16.1)	89(28.7) 204(65.8) 17(5.4)	93(30) 198(63.8) 19(6.1)
Quit smoking will helps in control of BP **Agree** Neither agree or nor disagree Disagree	130(42.4) 40(13) 136(44.4)	147(48) 35(11.4) 124(40.5)	159(51.9) 30(9.8) 117(38.2)	139(44.8) 44(14.1) 127(40.9)	140(45.1) 51(16.4) 119(38.3)	155(50) 52(16.7) 103(33.2)
DASH diet, regular exercise and stress management will reduce the risk of cardiovascular disease **Agree**	78(25.4) 120(39.2) 108(35.2)	89(29) 115(37.5) 102(33.3)	99(32.3) 110(35.9) 97(31.6)	88(28.3) 135(43.5) 87(28)	92(29.6) 143(46.1) 75(24.1)	95(30.6) 149(48) 66(21.2)

Neither agree or nor disagree Disagree						
Medication alone can't control blood pressure **Agree** Neither agree or nor disagree Disagree	120(39.2) 110(35.9) 76(24.8)	137(44.7) 100(32.6) 69(22.5)	147(48) 95(31) 64(20.9)	123(39.6) 72(23.2) 115(37)	135(43.5) 70(22.5) 105(33.8)	139(44.8) 66(21.2) 117(37.7)
Adherence towards medication, diet and exercise play a vital role in control of BP **Agree** Neither agree or nor disagree Disagree	130(42.4) 96(31.3) 80(26.1)	139(45.4) 92(30) 75(45.5)	148(48.3) 89(29) 69(22.5)	140(45.1) 110(35.4) 60(19.3)	144(46.4) 111(35.8) 55(17.7)	147(47.4) 115(37) 48(15.4)
How often do you check your BP **Weekly once** **Two weeks once** **Monthly once** Six months once Yearly once	80(26.1) 95(31) 96(31.3) 25(8.1) 10(3.2)	89(29) 99(32.3) 98(32) 15(4.9) 5(1.6)	95(31) 102(33.3) 100(32.6) 6(1.9) 3(0.98)	120(38.7) 97(31.2) 63(20.3) 10(3.2) 20(6.4)	125(40.3) 102(32.9) 33(10.6) 30(9.6) 20(6.4)	135(43.5) 105(33.8) 40(12.9) 15(4.8) 15(4.8)
How often you will do brisk walking (Any exercise) **Daily** **Three times in a week** Weekly once Monthly twice None of the above	80(26.1) 70(22.8) 60(19.6) 51(16.6) 45(14.7)	85(27.7) 79(25.8) 55(17.9) 47(15.3) 40(13)	91(29.7) 85(27.7) 50(16.3) 42(13.7) 38(12.4)	75(24.5) 76(24.5) 63(20.3) 52(16.7) 44(14.1)	79(25.4) 80(25.8) 60(19.3) 55(17.7) 36(11.6)	82(26.4) 79(25.4) 57(18.3) 53(17) 39(12.5)

Are you taking diet as per your physician advice? **Yes** No	175(57.1) 131(42.8)	182(59.4) 124(40.5)	195(63.7) 111(36.2)	177(57) 133(42.9)	182(58.7) 128(41.2)	189(60.9) 121(39)
Do you add extra amount of salt to your food Yes **No**	112(36.6) 194(63.3)	109(35.6) 197(64.3)	92(30) 214(69.6)	66(21.2) 244(78.7)	63(20.3) 247(79.6)	52(16.7) 258(83.2)
Do you smoke cigarette/any nicotine containing products Yes **No**	66(21.5) 240(78.4)	59(19.2) 247(80.7)	52(16.9) 254(83)	73(23.5) 237(76.4)	75(24.1) 235(75.8)	81(26.1) 229(73.8)
Do you consume binge amount of alcohol on a regular basis Yes **No**	31(10.1) 275(89.8)	26(8.4) 280(91.5)	14(4.5) 292(95.4)	15(4.8) 295(95.1)	17(5.4) 293(94.5)	13(4.1) 297 (95.8)
Are you taking your medication as per your physician advice **Yes** No	195(63.7) 111(36.2)	215(70.2) 91(29.7)	225(73.5) 81(26.4)	233(75.1) 77(24.8)	235(75.8) 75(24.1)	237(76.4) 73(23.5)
Have you ever missed your medicine in last one week Yes **No**	96(31.3) 210(68.6)	81(26.4) 225(73.5)	75(24.5) 231(75.4)	99(31.9) 211(68)	102(32.9) 208(67)	107(34.5) 203(65.4)

Table 4: Adequacy of knowledge, attitude, and practice regarding hypertension and its management at baseline and follow-up visits

Variable	Intervention N=306	Control N=310	Chi-square	*P* value
Baseline				
Knowledge				
Good knowledge	76 (24.8)	82 (26.4)		
Moderate knowledge	92(30)	99 (31.9)	0.948	0.330
Poor Knowledge	138 (45)	129(41.9)		
Attitude				
Positive attitude	112 (36.6)	105(33.8)	0.501	0.471
Negative attitude	194 (63.3)	205(66.1)		
Practice				
Rational practice	98 (32)	108(34.8)	0.432	0.214
Irrational practice	208 (67.9)	202(65.1)		
First follow-up (After three months)				
Knowledge				
Good knowledge	120 (39.2)	85 (27.4)		
Moderate knowledge	102 (33.3)	107(34.5)	2.412	0.041
Poor Knowledge	84 (27.4)	118(38)		
Attitude				
Positive attitude	160 (52.2)	115(37)	1.420	0.032
Negative attitude	146 (47.7)	195(62.9)		
Practice				
Rational practice	169 (55.2)	110(35.4)	3.464	0.023
Irrational practice	137 (44.7)	200(64.5)		
Final follow-up (After six months)				
Knowledge				
Good knowledge	175 (57.1)	88 (28.3)		
Moderate knowledge	109 (35.6)	110(35.4)	3.672	0.012
Poor Knowledge	22 (7.1)	112		
Attitude				
Positive attitude	198 (64.7)	119(38.3)	4.823	0.001
Negative attitude	108 (35.2)	191(61.6)		
Practice				
Rational practice	196 (64)	115(37)	4.762	0.001
Irrational practice	110 (35.9)	195(62.9)		

Table 5: Effect of pharmacist medicated counseling on mean Blood pressure

Variable	Intervention	Control	Pvalue
Baseline			
BP (mm of Hg)			
Systolic BP	176.4 ±34.2	180 ± 29.4	0.089
Diastolic BP	92.4 ± 13.9	98 ± 18.5	0.062
1st Follow-up (After 3 months)			
BP (mm of Hg)			

Systolic BP	168 ± 18.2	179 ± 20.1	0.043
Diastolic BP	90.4 ± 12.3	97 ± 18.2	0.031
2nd Follow-up (After 6 months)			
BP (mm of Hg) Systolic BP	148 ± 15.5	172 ± 18.4	0.002
Diastolic BP	85.3 ± 9.2	96 ± 16.4	0.001