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Research Article

IMPACT OF PHARMACIST INTERVENTION IN SCREENING AND EDUCATION ON BLOOD PRESSURE IN A RURAL AREA IN SOUTHERN INDIA

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ABSTRACT

Objective: Hypertension (HTN) expends a consequential public health concern on cardiovascular health status and health-care systems in India. The effectuation of the pharmaceutical care program in the health care is an extremely important need to achieve the optimum therapeutic effect. The objective of the study was to assess the impact of pharmacist intervention on patient's blood pressure (BP) level, quality of life (QOL), and knowledge, attitude, and practice (KAP) of hypertensive patients.

Methods: A randomized controlled pilot study was carried out for 6 months. The hypertensive patients were randomized into control and intervention group based on age, and both the groups were interviewed using KAP and WHO QOL-BREF questionnaires, screened BP, respectively, at baseline and each follow-up after post counseling section to the intervention group. The effect of pharmacist intervention on QOL and KAP among control and intervention was statistically analyzed by paired t-test using SPSS version 16.

Results: The total sample studied was 60, of which 20 (33.33%) were males and 40 (66.67%) were females. In our study, the QOL score for each domain of both intervention and control groups were almost poor ($p>0.05$) at baseline and for the intervention group, a highly significant improvement ($p<0.001$) was observed for all domains in final follow-up. KAP score of intervention group also showed a significant improvement ($p<0.001$) from baseline to final follow-up. In this study, intervention group showed a significant mean reduction of systolic BP from baseline 150.13±25.670 to final follow-up 145.33±12.914.

Conclusion: The results of the study showed a significant improvement in the patient's KAP toward different aspects of HTN and QOL following pharmacist mediated counseling. Involvement of pharmacy practitioners in the management of HTN significantly improves QOL and KAPs.

Keywords: Hypertension, Quality of life, Knowledge, Attitude and practice, Pharmacist intervention, Patient counseling.

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INTRODUCTION

High blood pressure (BP) is the leading cause of cardiovascular disease (CVD) and deaths around the world. It is estimated that elevated BP alone causes about 50% of CVD worldwide, and it is associated with at least 7.6 million deaths per year worldwide (13.5% of all deaths), making it the prominent risk factor for CVD [1]. In 2000, over 972 million adult populations were predicted to have hypertension (HTN) and this quantity is anticipated to rise to 1.56 billion by the year 2025 [2].

HTN expends a consequential public health concern on cardiovascular health status and health-care systems in India [3]. HTN is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India [4]. From an analysis of multinational data on the global burden of HTN, 20.6% of Indian men and 20.9% of Indian women were suffering from HTN in 2005. The rates of HTN in percentage are forecast to go up to 22.9 and 23.6 for Indian men and women, respectively, by 2025 [1].

Recent surveys reveal continuing deficiencies in the awareness, treatment, and management of HTN. In many incidents, failure to accomplish BP goals may be determinable to the poorness of patients' knowledge, perception, attitudes, and lifestyle practices [5]. In HTN, knowledge and attitudes of the patients can affect compliance, the BP control, morbidity, and mortality of the patients. Comorbidity associated with HTN may influence how person with HTN rate with their quality of life (QOL). Poor management of HTN leads to several complications and end organ damage that ultimately impairs the health-related QOL in the individuals [6]. Reliable knowledge about drift in BP is needed to understand its dietary, lifestyle, and pharmacological determinants within populations. The effectuation of the pharmaceutical care program in the health care is an extremely important need to accomplish the optimum therapeutic effect that improves patient's QOL [7].

METHODS

The randomized controlled pilot study was carried out for 6 months in the rural areas of Komarapalayam, Tamil Nadu. A total of 60 patients were enrolled as subjects based on inclusion criteria (patients diagnosed with HTN of either sex, aged between 20 and 80 years with or without comorbidities) and exclusion criteria **(**patients with cognitive and psychiatric problems, pregnant and lactating women, pediatric population).

The study received approval from the Institutional Ethical Committee about the work to be carried. After obtaining informed consent from the patient, the demographic data (age, gender, social status, economic status, and diagnosis and drug usage) were collected using a suitable data collection form. Total 60 hypertensive patients were randomized into control (n=30) and intervention (n=30) group based on age. The study design was divided into the baseline, 1st visit and 2nd visit with a difference of 1 month for each visit. The baseline demography data, BP levels, knowledge, attitude, and practice (KAP), and QOL scores were obtained from control and intervention group. After incorporation of baseline data, the patient counseling was given only for intervention

group by orally, visually, and by providing patient information leaflets (PIL) between periods of each follow-up. The BP level, scores of KAP and QOL were obtained for both intervention (after each post counseling session) and control groups at the end of 1st and 2nd visit.

Content of counseling was designed as follows

Before 1st follow-up

- Audiovisuals session about general awareness of HTN (causes, diagnosis, normal values of BP, complications) in first 2 weeks of 1st month
- Audiovisual session and oral counseling on lifestyle modifications (Emphasized information about salt intake moderation; adopting a healthy eating plan in line with dietary approaches to stop HTN diet; weight reduction; physical exercise; cessation of risk factors (smoking and alcohol intake); prevention of complication) in 3rd and 4th weeks of 1st month.

Before 2nd follow-up

- Drug compliance (importance of drugs on disease, how to take, and common side effects) in first 2 weeks of 2nd month
- PIL about the disease, dietary plan, management of smoking, weight reduction in 3rd and 4th weeks of the 2nd month.

Statistical analysis

The gathered data were statistically analyzed by computer software package (SPSS), version 16 based on paired *t*-test. An alpha error level of p<0.001 showed a highly significant improvement.

RESULTS

The total sample studied was 60, of which 20 (33.33%) were males and 40 (66.67%) were females (Table 1). Age-wise distribution (Table 1) shown that most of the hypertensive patients were more in the age range of 51-60 (28.33%) and 61-70 (25%). There was a high prevalence of HTN in illiterate group (45%) than primary (20%), secondary (28.33%), and graduate (6.67%) (Table 1).

The percentage of body mass index (BMI) of hypertensive patients (Table 2) in control group was distributed as underweight (0%), normal weight (33.33%), overweight (40%), and obese (26.67%) and the percentage of BMI of hypertensive patients (Table 2) in intervention group as underweight (3.33%), normal weight (43.33%), overweight (33.33%), and obese (20%). Patients with lack of physical activity were 80% and 83.37% in control and intervention group, respectively (Table 2).

The stages of HTN (according to JNC7) (Table 2) in control group as pre-HTN (16.67%), stage 1 HTN (66.66%), and stage 2 HTN (16.67%) and the stages of HTN (according to JNC7) (Table 2) in intervention group as pre-HTN (16.67%), stage 1 HTN (53.33%), and stage 2 HTN (30%).

Comparison of QOL scores in both intervention and control groups

Domain 1 (physical health)

Scores of intervention group from baseline to second follow-up (Table 3) revealed that mean increases in physical health from 13.07±1.172 to 16.47±1.502 which was statistically significant (p<0.001). Whereas in control group, the score from baseline to second follow-up (13.03±1.189 to 13.00±1.083) was statistically nonsignificant (p>0.05).

Domain 2 (psychological)

Scores of intervention group from baseline to second follow-up (Table 3) showed that mean increases in psychological health from 12.47±1.252 to 15.17±0.874 which was clinically significant (p<0.001). Whereas in control group, the score from baseline to second follow-up (12.03±1.474 to 11.67±1.348) was nonsignificant (p>0.05).

Domain 3 (social)

Scores of intervention group from baseline to second follow-up (Table 3) showed that mean increases in a social relationship from 13.33±1.807 to 15.93±2.273 which was clinically significant (p<0.001). Whereas in the control group the score, from baseline to second follow-up (13.07±1.856 to 12.80±2.592) was statistically nonsignificant (p>0.05).

Domain 4 (environment)

Scores of intervention group from baseline to second follow-up (Table 3) revealed that mean increases in environment health from 12.93±1.311 to 17.23±1.357 which was clinically significant (p<0.001). Whereas in control group, the score from baseline to second follow-up (12.60±1.734 to 12.93±1.799) was statistically nonsignificant (p>0.05).

In this study, a gradual improvement in the QOL scores was observed in the intervention group patients, whereas, in control group, patients score was not significant (Table 3).

Table 1: Demographic profile of participants

Parameters	Total number of patients (n=60) (%)
Gender wise distribution	
Male	20 (33.33)
Female	40 (66.67)
Age categories	
21-30 years	1 (1.67)
31-40 years	3 (5)
41-50 years	14 (23.33)
51-60 years	17 (28.33)
61-70 years	15 (25)
71-80 years	10 (16.66)
Educational status	
Illiterate	27 (45)
Primary	12 (20)
Secondary	17 (28.33)
Graduate	4 (6.67)

Table 2: Demographic characteristics of control and intervention group

Parameters	Control (n=30) (%)	Intervention (n=30) (%)
BMI (kg/m^2)		
Under weight (<18.49)	0 (0)	1 (3.33)
Normal weight (18.50–24.99)	10 (33.33)	13 (43.33)
Overweight (25.00–29.99)	12 (40)	10 (33.33)
Obese (≥30.00)	8 (26.67)	6 (20)
Physical activity		
Exercise	6 (20)	5 (16.66)
Lack of exercise	24 (80)	25 (83.37)
JNC 7 classification of HTN		
Pre-HTN (SBP = 120–139 or DBP=80–89)	5 (16.67)	5 (16.67)
Stage 1 HTN (SB=140–159 or DBP=90–99)	20 (66.66)	16 (53.33)
Stage 2 HTN (SBP=≥160 or DBP=≥100)	5 (16.67)	9 (30)

BMI: Body mass index, HTN: Hypertension, DBP: Diastolic blood pressure, SBP: Systolic blood pressure

Comparison of KAP score of hypertensive patients in both control and intervention groups

In this study, at baseline both the intervention and control groups, patients showed poor KAP toward HTN (Table 4).

Knowledge

Scores of intervention group from baseline to second follow-up (Table 4) revealed that mean increases in knowledge from 1.87±1.358 to 5.83±0.461 which was clinically significant (p<0.001). Whereas in control group, the score from baseline to second follow-up (2.00±1.083 to 2.47±1.224) was statistically nonsignificant (p>0.05).

Attitude

Scores of intervention group from baseline to second follow-up (Table 4) showed that mean increases in attitude from 4.37±1.299 to 5.97±0.183 which was clinically significant (p<0.001). Whereas in control group, the score from baseline to second follow-up (4.37±1.474 to 4.40±1.567) was statistically nonsignificant (p>0.05).

Practice

Scores of intervention group from baseline to second follow-up (Table 4) showed that mean increases in practice from 5.23±1.794 to 7.40±1.653 which was clinically significant (p<0.001). Whereas in control group, the score from baseline to second follow-up (5.07±1.552 to 5.13±1.502) was statistically nonsignificant (p>0.05).

The changes in BP measurements of the intervention and control groups before and after patient counseling were described in (Table 5). In this study, the intervention group showed a significant mean reduction of systolic BP from baseline to 2nd follow-up (150.13±25.670 to 145.33±12.914).

Table 3: QOL score for intervention and control group in HTN patients

QOL	Mean±SD		t-value	p-value	Significance level
	Intervention	Control			
Domain 1 (physical health)					
Baseline	13.07±1.172	13.03±1.189	0.166	>0.05	Non-significant
1st follow-up	14.77±1.431	13.03±1.098	5.794	<0.001	Highly significant
2nd follow-up	16.47±1.502	13.00±1.083	11.77	<0.001	Highly significant
Domain 2 (psychological)					
Baseline	12.47±1.252	12.03±1.474	1.282	>0.05	Non-significant
1st follow-up	13.83±1.464	11.93±1.413	0.573	<0.001	Highly significant
2nd follow-up	15.17±0.874	11.67±1.348	11.727	<0.001	Highly significant
Domain 3 (social relationship)					
Baseline	13.33±1.807	13.07±1.856	0.718	>0.05	Non-significant
1st follow-up	13.73±2.180	12.83±2.479	1.568	>0.05	Non-significant
2nd follow-up	15.93±2.273	12.80±2.592	5.123	<0.001	Highly significant
Domain 4 (environment)					
Baseline	12.93±1.311	12.60±1.734	0.874	>0.05	Non-significant
1st follow-up	15.13±1.570	12.97±1.938	5.360	<0.001	Highly significant
2nd follow-up	17.23±1.357	12.93±1.799	12.302	<0.001	Highly significant

p>0.5; non-significant, p<0.01; significant, p<0.001; highly significant. HTN: Hypertension, QOL: Quality of life, SD: Standard deviation

Table 4: KAP score for the intervention and control group in HTN patients

KAP	Mean±SD		t-value	p-value	Significance level
	Intervention	Control			
Knowledge					
Baseline	1.87±1.358	2.00±1.083	−0.486	>0.05	Non-significant
1st follow-up	5.07±0.583	2.37±1.351	10.807	<0.001	Highly significant
2nd follow-up	5.83±0.461	2.47±1.224	14.809	<0.001	Highly significant
Attitude					
Baseline	4.37±1.299	4.37±1.474	0.000	>0.05	Non-significant
1st follow-up	5.90±0.403	4.37±1.497	5.350	<0.001	Highly significant
2nd follow-up	5.97±0.183	4.40±1.567	5.805	<0.001	Highly significant
Practice					
Baseline	5.23±1.794	5.07±1.552	0.407	>0.05	Non-significant
1st follow-up	6.10±1.626	5.13±1.548	2.436	<0.01	Significant
2nd follow-up	7.40±1.653	5.13±1.502	5.959	<0.001	Highly significant

p>0.5; non-significant, p<0.01; significant, p<0.001; highly significant. KAP: Knowledge, attitude and practice, HTN: Hypertension, SD: Standard deviation

Table 5: Mean score of systolic and diastolic blood pressure of the intervention and control groups before and after counselling

Blood pressure	Mean±SD			
	Intervention		Control	
	Baseline	After follow-up 2	Baseline	After follow-up 2
SBP	150.13±25.670	145.33±12.914	146.97±13.75	150.50±11.985
DBP	85.83±12.109	86.67±4.011	84.13±7.678	87.77±4.272

SBP: Systolic blood pressure, DBP: Diastolic blood pressure, SD: Standard deviation

DISCUSSION

The randomized controlled study focuses on the impact of pharmacist-provided patient counseling and education on patient's KAP and QOL among hypertensive patients. In this study, female hypertensive population was higher than males. The postmenopausal women are at greater risk of cardiovascular problems in India as well as globally, and this risk increases with age [8]. Estrogen receptor-dependent mechanisms regulating vascular tone include endothelium-independent vasodilatation, increases in nitrous oxide bioavailability, inhibition of growth of vascular smooth muscle cell, inhibition of the vascular renin-angiotensin-aldosterone system and endothelin system, and inhibition of the sympathetic nervous system. The physiological withdrawal of estrogen among postmenopausal women generates changes in their fat distribution pattern and BP [9]. Another study also has reported that prevalence of HTN among women increased with higher BMI, waist-height ratio, waist-hip ratio, menopause status, unemployment status, nuclear family set up, low educational status, and higher socioeconomic status [10].

The proportions of HTN, as well as the mean systolic and diastolic BP, were found to increase steadily with an increase in age. Changes of BP with age might be due to the changes in the vascular system [11]. Peculiar features of large and small arteries that occur with aging include endothelial dysfunction, vascular remodeling, inflammation, calcification, and increased stiffness [12]. Another study also showed a significant positive correlation of systolic as well as diastolic BP with age [13].

HTN prevalence decreased with higher education and high prevalence of HTN in the low educated group might be the result of low tendency of these people to pay attention to their health and not being informed enough about the things to do or not to do for HTN. Furthermore, low education usually accompanies low income, which causes a further barrier to getting the medication [14].

Physical inactivity and BMI were correlated with higher levels of BP [15]. The mechanism responsible for obesity-linked variations in the pressure-natriuresis curve like enhanced sympathetic tone, activation of the renin-angiotensin system, hyperinsulinemia, structural changes in the kidney, and elaboration of adipokines (hormones produced in fat itself) such as leptin [16]. Reduction on the tensional levels is due to the expansion of the plasmatic volume, in the improvement of the endothelial function and in the action improvement and increase on the insulin sensitivity in the skeletal musculature. The exercise is also able to promote the angiogenesis by increasing the blood flow into the skeletal muscles and the cardiac muscle. Significant improvement in BP occurred only with aerobic exercise [17]. The prevalence of stage 1 and stage 2 HTN was higher in the older subjects. Changes of BP with age might be due to the changes in the vascular system [11,18].

In this study, a gradual improvement in the QOL scores was observed in the intervention group patients, whereas, in control group, patients score was not significant. Another study also showed that there was a positive influence of pharmacist mediated counseling on QOL [19].

In both the groups, patients had poor KAP at baseline. KAP Scores of the hypertensive patients were poor at baseline due to lack of patient education about disease, drugs, and lifestyle modification which reduces self-management skills and further complications. There was need for more enlightenment and proper education of hypertensive patients about the disease and other relevant issues relating to the disease [20].

In this study, the intervention group showed a significant mean reduction of systolic BP after pharmacist mediated counseling. The previous study also showed similarities with these results [21].

CONCLUSION

The results of the study showed a significant enhancement in the QOL of patients following pharmacist mediated counseling since there was an improvement in QOL score from baseline to final follow-up. The applied health education was an effective tool that implicated a significant change in patient's KAP toward different aspects of HTN. HTN affects the QOL of patients and suggests that education has a major role in improving health-care outcomes. Involvement of pharmacy practitioners in the management of HTN significantly improves overall QOL and KAP.

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