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Original Article

EFFECT OF A PHARMACIST INTERVENTION ON SELF MANAGEMENT PRACTICES AMONG HYPERTENSIVE-DIABETIC PATIENTS RECEIVING CARE IN A NIGERIAN TERTIARY HOSPITAL

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ABSTRACT

Objective: The objective of this study was to evaluate the effect of a pharmacist-led intervention on self-management practices among hypertensive-diabetic patients receiving care in a Nigeria tertiary hospital.

Methods: The study adopted a prospective, longitudinal; single-blind, two-arm randomised controlled trial to implement a pharmacist-led educational intervention on hypertension management among patients in Federal Medical Centre Lokoja, Kogi State. All the patients who met the eligibility criteria and gave their written consent to participate in the study were recruited into the study randomized in the intervention group (IG) and Control (CG). Data was collected using Hypertension Self Care Activity Level Effects (H-SCALE) questionnaire. The retrieved questionnaires were first coded into Microsoft Excel (2014) for cleaning of errors, after which the data was exported into the Statistical Product and Services Solutions (SPSS for windows, Version 16.0. SPSS Inc. 2007, Chicago, USA) software. Descriptive statistics such as frequencies, percentages and mean scores were used to summarise the data. All responses were first presented as frequencies and percentages. Chi-square was used to determine the correlation between socio-demographic and patients' clinical characteristics. Independent sample t-test and paired sample t-test were used to compare differences between and within groups.

Results: At baseline, more patients in the control group were adherent to their medications 16 (11.5) and had low salt diets 47 (33.8) than patients in the intervention group. However, more patients in the intervention group were non-smokers 127 (88.8) and engaged more in physical activity 38 (26.6) than patients in the control group. However, more of the patients in the control group were adherent to weight management practices 38 (27.3) than patients in the intervention group 36 (25.2), at baseline. All the patients in both study groups reported to have taken alcohol in the past seven days. It can be seen that, patients in the intervention group at endpoint, differed positively from the control group at baseline in adherence to medication, physical activity, reducing alcohol consumption and smoking cessation. It can also be observed that the baseline intervention group differed positively from the endpoint in medication adherence ($t=-26.045$, $p<0.001$); physical activity ($t=-15.081$, $p<0.001$); weight management practices ($t=-5.479$, $p<0.0010$, and alcohol consumption $9t=-11.550$, $p<0.001$).

Conclusion: A pharmacist led educational intervention had a positive impact on the self-management practices of hypertensive-diabetes patients.

Keywords: Hypertension, Self-management practices, Blood pressure control, Pharmacist intervention

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INTRODUCTION

The burden of hypertension and diabetes has been on the increase because of the increasing adult population and changes in lifestyles of Nigerians [1]. Studies have identified patient's lack of knowledge related to self-management in terms of adherence to medications, and modification of lifestyle behaviours, as major factors that contribute to the poor control of blood pressure [2]. Self-management practices are needed as patients try to make themselves healthy by exercising at least three times in a week, losing weight and changing their eating habit. Self-management practices are those activities people undertake to create order, discipline and control in their lives [2]. Hypertension self-care activities are important in the management of hypertension as recommended by the Joint National Committee on Prevention, Detection, Evaluation and Treatment of hypertension [3]. Studies have demonstrated the effects of self-care behaviours in the proper management of hypertension [4]. Medication adherence alone has proven not to be sufficient in the optimal management of blood pressure [5]. Recent studies have shown that patients who take their medications without engaging in dietary changes or physical activity have no higher rate of improved blood pressure than those who engaged in dietary changes and physical activities without taking their medications as at when due [6]. Also, studies have proved that adherence to hypertension self-care activities could lead to optimal control of blood pressure, increased efficacy of antihypertensive medications, reduced complications, morbidity and mortality [7]. The objective of this study was to evaluate the effect of a pharmacist-led intervention on self-management practices among hypertensive-diabetic patients receiving care in a Nigeria tertiary hospital.

MATERIALS AND METHODS

The study adopted a prospective, longitudinal, single-blind, two-arm randomized controlled trial to implement a pharmacist-led Educational intervention on Hypertension management and evaluate the effect on self-care behaviours. This section of the study was conducted among patients receiving care at the Federal Medical Centre Lokoja (FMCL). The hospital is a tertiary healthcare institution owned by the Federal Government of Nigeria. It offers specialized health services to patients from around the state, as it serves as the topmost referral centre for almost all the primary and secondary healthcare facilities within and outside the state. Ethical consideration for this study was obtained from the Health Research and Ethics committee, Federal Medical Centre Lokoja, Kogi State (Approval number: NHREC/05/01/2008B-FA00002458-1RB00002323).

All the hypertensive/diabetic patients, who provided written consent to participate in the study and met the eligibility criteria were included in the study. The eligibility criteria were: Ambulatory patient; patients who had hypertension with only diabetes mellitus type II co-morbidity; patients who were aged ≥ 18 y and ≤ 70 y; patients who must have received at least one anti-hypertensive drug during the 30 d period preceding the beginning of the recruitment; patients who have no history of significant cardiac complications in the past 6 mo; patients who history of compliance with regular clinic visits within the last 2 y; those who are not pregnant prior to recruitment; patients who are able to communicate freely in English language and patients who gave their consent to participate. All the patients who met the eligibility criteria and gave their written consent to participate in the study were recruited into the study

randomised in the intervention group (IG) and Control (CG). Patients were recruited into the study within a one-month period during which their baseline characteristics were collected. At baseline, there was an initial assessment interview for all patients where a professional/therapeutic relationship was established with them. This initial assessment interview comprised of: a) Collection of patient-specific data including age, gender, occupation, religion, educational status, family history of hypertension, presence of co-morbidity, income level, smoking status, alcohol consumption, height, weight, fasting blood sugar. b) Completion of Self-management practices (H-SCALE) questionnaire About 3 mo after the baseline, a meeting was scheduled between patients in the intervention group and the principal investigator. At the first meeting (education intervention), which lasted for almost 90 min, the patients were taught the basic things they should know on medication adherence, physical activity, weight management, low salt diet, smoking cessation and alcohol reduction.

About 6 mo after the baseline, a second meeting was scheduled between the patients in the intervention group and the principal investigator. The objective was to gain a firm commitment of the patients towards self-care and crucial lifestyle modifications. The pharmacist delivered an interactive presentation while simulating some therapeutic challenges. The features of this meeting also included: Agreed clear educational objectives, agreed clear behavioural objectives, stimulation of active participation, use of concise graphics, highlight and repeat essential messages.

After 9 mo from baseline, a third meeting was scheduled between the patients in the intervention group and the principal investigator. The key objectives of this meeting were: Re-iterate key points agreed during meeting two; Enable two-way feedback, Address any ongoing implementation difficulties.

The outcome measure was adherence to hypertension self-management practices. The retrieved questionnaires were first coded into Microsoft Excel (2014) for cleaning of errors, after which the data were exported into the Statistical Product and Services Solutions (SPSS for windows, Version 16.0. SPSS Inc. 2007. Chicago, USA) software. Descriptive statistics such as frequencies, percentages and mean scores were used to summarise the data. All responses were first presented as frequencies and percentages. Chi-square was used to determine the correlation between socio-demographics and patients' clinical characteristics. Independent sample t-test was used to compare the difference between the intervention group and control group, while paired sample t-test was used compare the difference in the intervention group at baseline, 3months, 6months and 9months. For all statistical analysis, 2-tailed association was considered with the significance level set at $p<0.05$.

RESULTS

Socio-demographic characteristics of hypertensive patients

Majority of the patients were aged 46-55 y in the intervention group and 36-45 y in the control group. There were more males than females in both the intervention and Control. More than half of the patients were self-employed and a very good number of the patients were civil servant. More than 99% of the patients in the intervention group and 97% of the patients in the control group have formal education. About half of the patients in the intervention and control group have a family history of hypertension [table 1].

Table 1: Socio-demographic characteristics of hypertensive patients N = (IG= 143; CG= 141)

Variable	IG n (%)	CG n (%)
Age		
18-25	2 (1.4)	0 (0)
26-35	18 (12.6)	14 (9.9)
36-45	35 (27.5)	46 (32.6)
46-55	47 (32.9)	33 (23.4)
56-65	37 (25.9)	36 (25.5)
>65	4 (2.8)	12 (8.5)
Gender		
Male	72 (50.3)	78 (55.3)
Female	71 (49.7)	63 (44.7)
Occupation		
Civil servant	56 (39.2)	64 (45.4)
Self employed	66 (46.2)	63 (44.7)
Unemployed	19 (13.3)	12 (8.5)
Retired	2 (1.4)	2 (1.4)
Educational status		
No formal education	1 (0.7)	3 (2.1)
Primary	7 (4.9)	9 (6.4)
Secondary	49 (34.3)	60 (42.6)
Tertiary	86 (60.1)	69 (48.9)
*FH of hypertension		
Yes	85 (59.4)	75 (53.2)
No	58 (40.6)	66 (46.8)

*FH = Family history; IG: Intervention group; CG: Control group

Table 2: Hypertension self-care activity level effects (H-Scale) of patients at baseline

Domain	IG N= 143		CG N= 139	
	Adherent n (%)	Non-adherent n (%)	Adherent n (%)	Non-adherent n (%)
Medication adherence	8 (5.6)	135 (94.4)	16 (11.5)	123 (88.5)
Low salt diet	44 (30.8)	99 (69.2)	47 (33.8)	92 (66.2)
Smoking	127 (88.8)	16 (11.2)	118 (84.9)	21 (15.1)
Physical activity	38 (26.6)	105 (73.4)	29 (20.9)	110 (79.1)
Weight management	36 (25.2)	107 (74.8)	38 (27.3)	101 (72.7)
Alcohol consumption	0 (0)	143 (100)	0 (0)	139 (100)

IG = intervention group CG = Control group

Self-care activities of patients in the intervention and control groups at Baseline

At baseline, more patients in the control group were adherent to their medications 16 (11.5) and had low salt diets 47 (33.8) than patients in the intervention group. However, more patients in the intervention group were non-smokers 127 (88.8) and engaged more in physical activity 38 (26.6) than patients in the control group. More of the patients in the control group were adherent to weight management practices 38 (27.3) than patients in the intervention group 36 (25.2). All the patients in both study group reported to have taken alcohol in the past seven days [table 2].

Self-Care activities at 9 mo post-intervention

From table 3, the intervention group reported more adherence in their medications 106 (96.4) than patients in the control group 38 (39.2). It was observed that about 97 (88.2%) of the patients in the intervention group were adherent to low salt diets while only 11 (11.3) of the patients in the control group were adherent to low salt diets. While none of the patients in the control group reported to be physically active, about 107 (97.3) patients in the intervention group reported that they were physically active in the past seven days. Also a majority of the patients in the intervention group 72 (65.5) were adherent to weight management practices unlike patients in the control group 26 (26.8). More patients in the intervention group reduced their alcohol consumption 46 (41.8) when compared to patients in the control group 12 (12.4).

From table 4, it can be seen that the intervention group at the endpoint differed from the control group at baseline in adherence to medication, physical activity, reducing alcohol consumption and smoking cessation.

Table 3: Hypertension self-care activity level effects (H-Scale) of patients at 9 mo

Domain	IG N= 110		CG N= 97	
	Adherent n (%)	Non-adherent n (%)	Adherent n (%)	Non-adherent n (%)
Medication adherence	106 (96.4)	4 (3.6)	38 (39.2)	59 (60.8)
Low salt diet	97 (88.2)	13 (11.8)	11 (11.3)	86 (88.7)
Smoking	105 (95.5)	5 (5.5)	83 (85.6)	14 (14.4)
Physical activity	107 (97.3)	3 (2.7)	0 (0)	97 (100)
Weight management	72 (65.5)	38 (34.5)	26 (26.8)	71 (73.2)
Alcohol consumption	46 (41.8)	64 (58.2)	12 (12.4)	85 (87.6)

IG = intervention group CG = control group

Table 4: Independent sample t-test for H-scale of intervention group endpoint and control group baseline

	Mean (SD)	t	p-value
Medication adherence	0.848 (0.035)	24.111	<0.001*
Low salt diet	-0.0500 (0.060)	-0.832	0.406
Physical activity	0.767 (0.042)	18.320	<0.001*
Weight management	0.064 (0.060)	1.079	0.282
Alcohol consumption	0.562 (0.042)	13.345	<0.001*
Smoking	-0.112 (0.039)	-0.290	0.004

*p significant at<0.05

Table 5: Change in H-SCALE at Baseline, 3 mo and 9 mo in the intervention group

H-SCALE	Baseline and 9 mo			3 mo and 9 mo			6 mo and 9 mo		
	Mean difference	t	p-value	Mean difference	t	p-value	Mean difference	t	p-value
Medication adherence	-0.886 (0.348)	-26.045	<0.001*	-0.324 (0.509)	-6.513	<0.001*	-0.124 (0.385)	-3.298	0.001*
Low salt diet	0.038 (0.619)	0.631	0.530	0.019 (0.511)	0.342	0.733	0.010 (0.656)	0.148	0.882
Physical activity	-0.705 (0.479)	-15.081	<0.001*	-0.114 (0.320)	-3.663	<0.001*	0.000 (0.196)	0.000	1.000
Weight management	-0.257 (0.481)	-5.479	<0.001*	-0.034 (0.538)	-0.598	0.552	-0.191 (0.480)	-0.407	0.685
Alcohol consumption	-0.562 (0.499)	-11.550	<0.001*	0.356 (0.549)	6.050	<0.001*	0.190 (0.482)	4.047	<0.001
Smoking	0.067 (0.347)	-1.968	0.052	-0.019 (0.195)	-1.000	0.320	-0.010 (0.259)	-0.376	0.707

From table 5, it can be observed that the baseline intervention group differed from the endpoint in medication adherence t=-26.045, p<0.001; physical activity t=-15.081, p<0.001; weight management practices t=-5.479, p<0.001 and alcohol consumption t=-11.550, p<0.001

DISCUSSION

In this study, physical activity was increased by 70.5%, whereas there was 25.7% increase in the weight management practices engaged by these hypertensive/diabetic patients. Although patients reduced their intake of salt diets by 3.8%, there was a 56.2% increase in their alcohol consumption. Patients in the intervention group reduced their smoking by 6.7%. Reduced salt consumption has been associated with a decrease in blood pressure [8]. The amount of salt recommended by the 2007 WHO guideline is 5g/daily [9]. A systematic review of randomised controlled trials has proved that a reduction in salt intake reduced blood pressure in adults who have or do not have hypertension [10]. An increase in salt intake as a matter of fact, have been associated with the risk of developing cardiovascular diseases and stroke [11]. On the contrary, recent studies have expressed concern that reduced sodium intake can lead to an adverse effect on health like unhealthy changes in blood lipids and renal function [12]. Exercise has been found to potentially reduce SBP in hypertensive patients [13]. Physical inactivity has been identified as an important modifiable risk factor in the development of hypertension [14]. It has been observed that exercise can lead to as much as 5-7 mmHg reduction in both the SBP and DBP [15]. More frequent exercise can lead to a sustained reduction in blood pressure [16]. Furthermore, hypertensive patients who smoke are more likely to develop severe forms of hypertension including malignant and renovascular hypertension [17]. In a study to determine the association between smoking and blood pressure, it was observed that there were no significant dose-dependent effects of smoking on blood pressure indices [18]. While some studies show a positive relationship between smoking and blood pressure [19], other studies have shown that there

is an inverse association between smoking and blood pressure [20]. However, evidence has shown that smoking causes direct endothelial damage, which could lead to endothelial dysfunction and impairment of endothelium-dependent coronary vasodilatation [21]. It is because smoking produces a significant change in forearm hemodynamic affecting both small and large arteries [22], that probably, it could be important in the pathophysiology of hypertension.

Limitations of the study

It is evident that the described pharmaceutical care model provides a significant reduction in blood pressure in the patient population studied. This model is applicable with site-specific modifications to a wide variety of practice settings, including community pharmacy, as it requires few resources to operate. However, some limitations of the study were:

Firstly, the sustained, long-term effectiveness of this model was not tested. The long-term advantages of this model remain to be evaluated.

Secondly, the study required significant efforts by the investigators in terms of time allocations that may preclude management of a large patient load.

Thirdly, cost analysis of this intervention was not performed. Documentation of cost-effectiveness on a long-term basis by preventing costly hypertension-related complications would enhance the validity of such a model.

Fourthly, a self-report measure was used to assess medication adherence. This could be subject to recall bias which may affect the precision of measurement.

CONCLUSION

There was an improvement in the self-management practices among hypertensive-diabetes patients who received a pharmacist intervention. Patients who received an intervention also had a significant improvement in their blood pressure control, blood sugar control and body mass index. A pharmacist-led intervention improved patient's adherence to their medications, physical activity and weight management practices.

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AUTHORS CONTRIBUTIONS

Ukoha-kalu collected the data at the study site, analysed the data and wrote the manuscript. Adibe and Ukwe reviewed and edited the manuscript and supervised the project.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest.

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