[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

Original Article

Mid-term Impact of Home-based Follow-up Care on Health-related Quality of Life of Hypertensive Patients at a Teaching Hospital in Ilorin, Nigeria

OA Bolarinwa[1,2], MH Juni[1], MZ Nor Afiah[1], MS Salmiah[1], TM Akande[2]

[1]Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia, [2]Department of Epidemiology and Community Health University of Ilorin, Ilorin, Nigeria

Abstract

Background: Health-related quality of life (HRQoL) is an important clinical outcome assessment in hypertension management, given the lifelong (chronicity) nature and the need for daily self-management for hypertensive patents. Of some of the studies that implemented home-based interventions on hypertension globally, the HRQoL is rarely used as a primary outcome measure. This study developed, implemented, and assessed the impact of home-based follow-up care (HBFC) on HRQoL of hypertensive patients attending outpatients' clinics in Ilorin, Nigeria. **Materials and Methods:** A total of 149 and 150 patients were randomized to intervention and usual care (control) groups, respectively. A 12-month task-shifting (nurse-driven) HBFC intervention was administered to intervention group. The mid-term impact of intervention on HRQoL was assessed after 6 months intervention. Data were analyzed with intention-to-treat principle. Treatment effects were measured with the *t*-tests, analysis of covariance, and multivariate analysis of covariance analysis. Significant levels were set at $P < 0.05$ and 95% confidence interval. **Results:** The between-group treatment effect was not statistically significant ($P > 0.05$), whereas the within-group treatment effects were statistically significant for both the intervention and control arms ($P < 0.05$) at 6 months. After controlling for age and baseline HRQoL, the intervention group had an improved physical component of HRQoL than the control group. The intervention group also had statistically significant improvement in blood pressure control, medication adherence, and symptom counts ($P < 0.05$). **Conclusion:** The HBFC intervention for hypertensive patients impacted positively on physical component of HRQoL after controlling for baseline HRQoL and age of the patients at 6 months post-intervention.

Keywords: *Home-based care, hypertension, Ilorin, quality of life*

Date of Acceptance:
28-Sep-2018

Introduction

The implication of the increasing hypertension in Nigerian population is that it is presently overwhelming the health system, reducing the quality of care, and increasing the cardiovascular diseases (CVDs) and mortality attributable to both hypertension and CVDs.[1-3] Studies in Nigeria have described interrelated challenges to hypertension care. Currently, the care of hypertensive patients takes place almost entirely in health facilities, thereby reducing the access to care.[4-6] Many studies[1-3,7] have shown that hypertension consistently contributes over 20% of total hospital utilization quota in Nigeria, thereby overwhelming the health facilities, increasing the workload of some highly

Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_246_17

Address for correspondence: Prof. MH Juni, Department of Community Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
E-mail: hanafiah_juni@upm.edu.my

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Bolarinwa OA, Juni MH, Nor Afiah MZ, Salmiah MS, Akande TM. Mid-term impact of home-based follow-up care on health-related quality of life of hypertensive patients at a teaching hospital in Ilorin, Nigeria. Niger J Clin Pract 2019;22:69-78.

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

skilled personnel, and reducing the overall quality of care.

Despite the high quota of healthcare utilization attributable to hypertension, up to three-quarters of hypertensive patients are still not on treatment in the general Nigerian population even when treatment was indicated in almost half of these numbers.[8] Because of the chronic nature of hypertension, patients suffering from it are expected to be seen on a regular basis by the health worker for check-up in what is termed "follow-up visits." Interestingly, while the healthcare service coverage for hypertension is observed to be inadequate, studies in Nigeria have shown high default rate among hypertensive patients attending clinics for follow-up visits. Over 40% default rate had been reported among hypertensive patients by their third follow-up visit.[9]

In addition, social support which has been shown to assist patients with hypertension to have better clinical outcome[10] will not be achievable with hospital management alone. Therefore, to implement and sustain successful hypertensive control strategies in Nigeria, access to medical care for patients and quality of healthcare should be ensured and sustained. In addition, there is need to re-align and simplify the management strategies of hypertension, reduce the hospital bureaucracy, bring the healthcare services closer to the patients in the community to garner social support for their treatment, and allow task-shifting practice (by allowing other healthcare professionals to participate more in the care of chronic diseases in a multidisciplinary approach). Such approach has been adjudged to be feasible at home or in a community setting.[11-14]

In chronic conditions such as hypertension, HRQoL, in particular, is an important outcome, given their lifelong (chronicity) nature and the need for daily self-management.[15] Although some studies have implemented intervention studies on hypertension globally, almost all of them evaluated their studies using medical/clinical outcomes assessment such as blood pressure (BP) control and hypertensive complications.[16-18] Specifically, hypertension interventional studies that adopted HRQoL to assess patient's outcome are very sparse.[19-21] So far in the literature, no intervention studies on hypertension were sighted in the study area (Ilorin, Nigeria) that used HRQoL to evaluate study outcome. The main objective of this study is to implement and determine the impact of home-based follow-up care (HBFC) intervention on the HRQoL of hypertensive patients in Ilorin, Nigeria. It is hypothesized that "there is no significant difference between the HRQoL of patients followed up at home and those followed up at the hospital after controlling for baseline HRQoL."

Conceptual framework of the study

The home-based follow-up intervention in this study comprised four interrelated strategies as discussed in an earlier published article.[22] The conceptual framework adopted the revised version of Wilson and Cleary causal model of HRQoL.[23] This model postulated five levels of health influence by ecological factors, namely (i) intrapersonal factors (characteristics of individual), (ii) interpersonal factors (formal and informal social support systems), (iii) institutional factors (organizations such as schools and healthcare facilities), (iv) community factors (relationships among institutions and informal social networks in a defined area), and (v) public policy. These five levels were later re-classified into individual characteristics and environmental characteristics.[23]

According to Figure 1, the home-based care model (the study intervention) influenced the framework both at individual functioning and environmental levels. The individual functioning is influenced through hypertension education and counseling session (HECS) which offered counseling and health education to hypertensive patients on lifestyle modification. The content of the HECS included cessation of smoking and alcohol, structured and measured exercise, and dietary advice (reduce salt intake, high caloric, and cholesterol containing diets).[19,21,24,25] Moreover, the individual functioning was also influenced by assessing adherence level of the patients and then offering adherence counseling.[26-28]

At the environmental level, home-based care follow-up intervention is aimed at increase in access to healthcare to hypertensive patients and reduce waste of time and bureaucratic bottlenecks usually experienced at the health facility. These are with a view to improve quality of care and accessibility to care of hypertensive patients. In addition, this intervention was administered by trained and professionally competent nurses in the form of task-shifting strategy.[11,26] The intervention also involved monthly follow-up visits involving home-based blood pressure and body mass index (BMI) monitoring by the nurses with a view to give medical advice and counseling to the patients at home. This measured the biological function with the aim of monitoring its performance. The information and evidences gathered at the environment level through the task-shifting home-based care in turn help to improve and strengthen the HBFC strategies.

The influences of home-based intervention on individual and environment characteristics were hypothesized to

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

influence the biological functions which in turn are BP control and weight gain control. Medication adherence is a major factor in an individual function that has the potential of influencing the biological function and hitherto the symptoms of the illness. The resultant effect of these on symptoms would reduce the symptoms of hypertension complication, CVD, and other target organs damage (assessed using symptom count). As shown in the conceptual framework [Figure 1], these variables formed the intermediate outcomes for this study and are therefore precursors for the HRQoL, which is the primary outcome measurement. Covariates are identified in this conceptual framework as factors that could influence both the dependent variables (HRQoL) and also have effects on either or both independents variable (intervention) and intermediate variables. These were sort after in this study and appropriately treated for in the analysis.

Materials and Methods

Study design

The method for this study was discussed in detail in earlier literature.[22] The research design was an intervention study with an unblinded individual open randomized controlled trial (RCT). The study was unblinded because it is not feasible to blind the home-based care intervention (with an appropriate placebo) without compromising effectiveness of the intervention. The trial was registered with the Pan African Clinical Trial Registry (PACTR) with identification number PACTR201606001671335.

Study population and randomization

A total of 149 and 150 patients attending medical and general outpatient's clinics of the University of Ilorin Teaching Hospital (UITH) were randomized into intervention and usual care (control) groups, respectively.

Intervention

The HBFC guidelines were developed, implemented, and assessed after 6 months of follow-up for mid-term assessment. Patients in the intervention group were followed-up at home every month by two teams of HBFC personnel comprising a senior nurse, a junior nurse, and a nurse assistant per team. The teams were trained on the HBFC guidelines and algorithm.[22] Each team was supervised by trained doctors from UITH, Ilorin, Nigeria. Another set of four research assistants (independent of the HBFC teams) were trained to collect baseline and follow-up data for the study. The HBFC guideline was face-validated with group of experts after development. This was validated for content, appropriateness, and relevance to the setting.

Data collection

Data were collected using the pretested and validated questionnaires. The reliability tests were conducted on two-licensed tools of the questionnaire, namely section four on medication adherence (MMAS-8) and section five on HRQoL (SF-36v2). The reliability tests conducted using MMAS-8 tool analyzed after question 5 were reversed and this gave a satisfactory Cronbach's α score of 0.75. The SF-36v2 analysis software, version 5.0, used for this study also analyzed the internal consistency reliability of the tool using Cronbach's α score. Two (vitality and social function) out of the eight scales of SF-36v2 fell short of the 0.75 cut-off points. The medical outcomes were measured using properly calibrated equipment; Omron® BP monitor, Omron® weighing scale, and Leicester® Standiometer for BP, weight, and height, respectively. The height (m) and weight (kg) were used to calculate BMI (kg/m^2), which was in turn categorized into underweight, normal, overweight, and obese. The standard operation procedures were developed and compliance was monitored regularly so as to reduce both intra- and interobserver errors. Interrated reliability was assessed for the clinical and quality of life measurement, and all measurements were found to be significantly reliable for this study.

Scoring of variable

The norm-based scoring of SF-36v2 was adopted for HRQoL as against the old manual SF-36v2. We interpreted the norm-based scores (mean = 50, SD = 10) as a numeric scale rather than proportion score (0–100) of the anchor-based scoring SF-36.[29] Adherence to treatment by the patients was assessed by ranking MMAS-8 scale as low, medium, or high. The BP was analyzed as numeric and categorical values. The height and weight were used to calculate (weight/height^2) and rank BMI accordingly to underweight, normal, overweight, and obese.

Data analysis

Hypothesis testing was explored basically with independent *t*-test and analysis of covariance (ANCOVA) at baseline and 6 months. The main dependent variable (numeric) was HRQoL, while the main independent variable (IV) was type of intervention (categorical). Importantly, ANCOVA was used for controlling baseline (pretest) HRQoL scores as covariates. This was a major outcome measurement for this research because the ANCOVA interpreted the treatment impact of intervention on HRQoL while controlling for the baseline quality of life and other likely covariates (age). All the assumptions of the ANCOVA were met. Other variables like grade of

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

hypertension, BP control, comorbidity, complications, gender, socioeconomic status, and age were explored as independent variables, possible predictors, and/or covariates based on their biological plausibility.

Multivariate analysis of covariance (MANCOVA) was used to further analyze the impact of the study's intervention on the combined physical and mental component summaries of HRQoL, while controlling for potential covariates such as age and baseline HRQoL. Wilk's λ was used for overall model fit for MANCOVA analysis. In both analyses, Bonferroni adjustment was applied to significance level, which was interpreted as $P < 0.025$ ($\alpha/2$). The two-way interactions of the factors and covariates were determined using interaction coefficients at significant level of $P > 0.05$ in the model. The homogeneity of variance and that of covariance matrix was tested with Levene's test and Box's M test, respectively. These two assumptions were assumed with a $P > 0.05$ in order to fail to reject hypothesis of equality of variances and covariance matrix. Other assumptions of independent observations and normality of residuals were checked.

Analyses of within and between effects of intervention on four intermediate outcomes (BP control, symptom count, BMI, and adherence to medication) were modeled using "generalized estimating equation" (GEE). The GEE model's only assumption is simple random sampling of subjects representing a population. In this study, the data set was restructured to cluster-like repeated variables (pre and post) for the four intermediate outcomes in order to model using GEE. The GEE output produced odds ratio for each of the four intermediate outcomes in a combined model. Significant levels were set at $P < 0.05$ and 95% confidence interval.

Results

According to the Consolidated Standard of Reporting Trial (CONSORT)[30] diagram shown in Figure 2, 12 patients in the intervention group and two patients in the control group did not take up allocation into study groups. After 6 months of follow-up, 17 patients and 29 patients were lost to follow-up in the intervention and control groups, respectively, giving attrition rates of 19.5 and 20.7% (20% combined attrition) for the intervention group and the study group, respectively. The reasons for attrition were: traveling (18), discontinuation by the patients (13), relocation (10), and mortality (5). Comparing the sociodemographic characteristics of the respondents at baseline showed no significant difference between the two study groups [Table 1]. Similarly, the disease and drug history, morbidity experience, and the outcome measurements [Table 2] were also significantly similar ($P > 0.05$) between the two groups at baseline.

Table 3 shows the impact of intervention on physical and mental components of HRQoL, respectively, before and after controlling (adjustment) for baseline HRQoL and age, using ANCOVA. Although there was marginally improved HRQoL at post-intervention for both physical (1.43) and mental components (1.26), but these did not attain statistical significance with unadjusted ANCOVA. However, the intervention group [adjusted mean (SE) = 53.21 (0.50)] have significantly increased physical component of

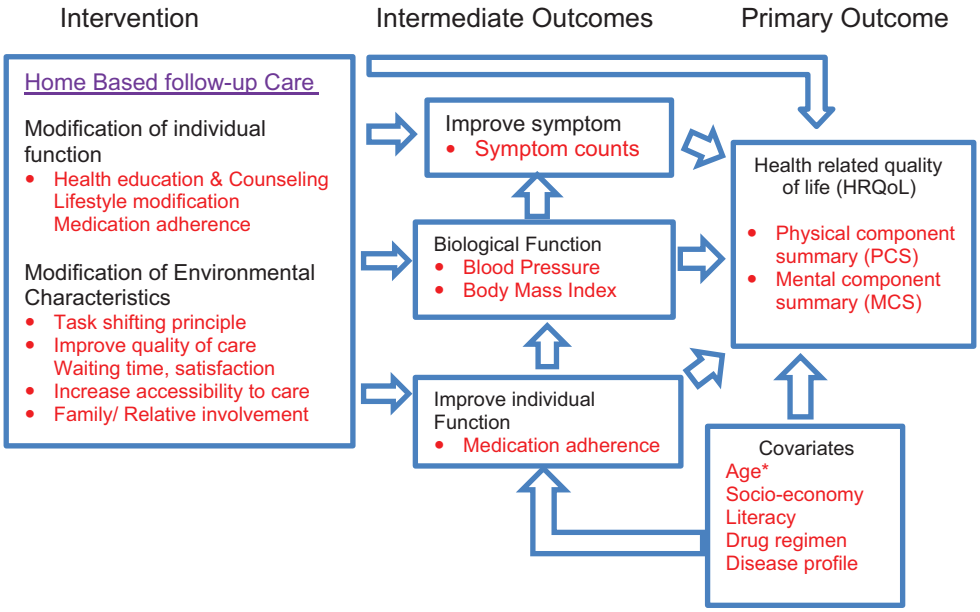

Figure 1: Conceptual framework (adapted from causal model of HRQoL by Ferrans *et al.*, 2005)

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

Table 1: group equivalence of sociodemographic characteristics

Sociodemography	Frequency (%)		Test statistics (df)	*P*
	Intervention (*n*=149)	Control (*n*=150)		
Mean age±sd	61.4±11.1	60.9±10.6	0.327 (297)[b]	0.744
Age				
40-49	18 (12.1)	16 (10.7)	3.549 (4)[a]	0.471
50-59	48 (32.2)	47 (31.3)		
60-69	44 (29.5)	58 (38.7)		
70-79	29 (19.5)	21 (14.0)		
>80	10 (6.7)	8 (5.3)		
Gender				
Male	35 (23.5)	33 (22.0)	0.094 (1)[a]	0.759
Female	114 (76.5)	117 (78.0)		
Ethnic group				
Yoruba	144 (96.6)	139 (92.7)	2.335 (1)[a]	0.126
Other tribes	5 (3.4)	11 (7.8)		
Religion				
Islam	101 (67.8)	96 (64.0)	0.477[a]	0.490
Christianity and other	48 (32.2)	54 (36.0)		
Literacy level				
Not literate	39 (26.2)	32 (21.4)	3.787[a] (4)	0.436
Primary education	17 (11.4)	11 (7.3)		
Secondary education	24 (16.1)	29 (19.3)		
Higher education	68 (45.6)	75 (50.0)		
Marital status				
Married	120 (80.5)	109 (72.7)	2.582[a]	0.108
Widowed/divorced	29 (19.50)	41 (27.3)		
Main job				
Small business	85 (57.0)	89 (59.3)	0.761 (4)[a]	0.944
Civil service	19 (12.8)	17 (11.3)		
Large business	5 (3.3)	4 (2.7)		
No paid job	21 (14.1)	18 (12.0)		
Others	19 (12.8)	22 (14.7)		
Poverty index per				
<1 Usd	21 (14.1)	108 (8.7)	2.270 (2)[a]	0.321
1-<2 Usd	29 (19.5)	29 (19.3)		
>2 Usd	99 (66.4)	13 (72.0)		

[a]chi-square test; [b]independent *t*-test. Df=Degree of freedom; sd=Standard deviation

HRQoL (P = 0.013) than the control group [adjusted mean (SE) = 51.44 (0.50)] after adjusted for baseline HRQoL and age [Table 3]. The slightly higher mental HRQoL observed among the intervention group [adjusted mean (SE) = 52.66 (0.75)] over the control group [adjusted mean (SE) = 51.74 (0.75)] was not statistically significant (P = 0.387) [Table 3]. On MANCOVA, the result of the combined components of HRQoL showed that only physical HRQoL attained statistical significance (F = 5.776, P = 0.017) using a Bonferroni correction (α level of 0.025). The mean physical HRQoL indicated [Table 4] that those patients on home-based care (intervention) have higher physical HRQoL [mean (SE) 53.18 (0.50)] than the control group [mean (SE) 51.48 (0.50)] after controlling for the baseline HRQoL and the age.

Many patients in the intervention group [75 (54%)] significantly became symptoms-free at 6 months post intervention compared with the patients in the control group [57 (38%)], and this was found to be statistically significant (P < 0.001) [Table 5]. Similarly, at post intervention, more patients in the intervention group had significantly higher (P = 0.041) BP control [128 (85.9%)] than those in the control group [115 (76.6%)] [Table 5]. The adherence to medication was also found to be statistically higher (P < 0.001) among those in the intervention group [117 (78.5%)] than those in the control group [73 (48.7%)]. The slight weight improvement observed among the intervention group (36.2%) over the control group (32%) did not attain statistical significance [Table 5]. The result of GEE model

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

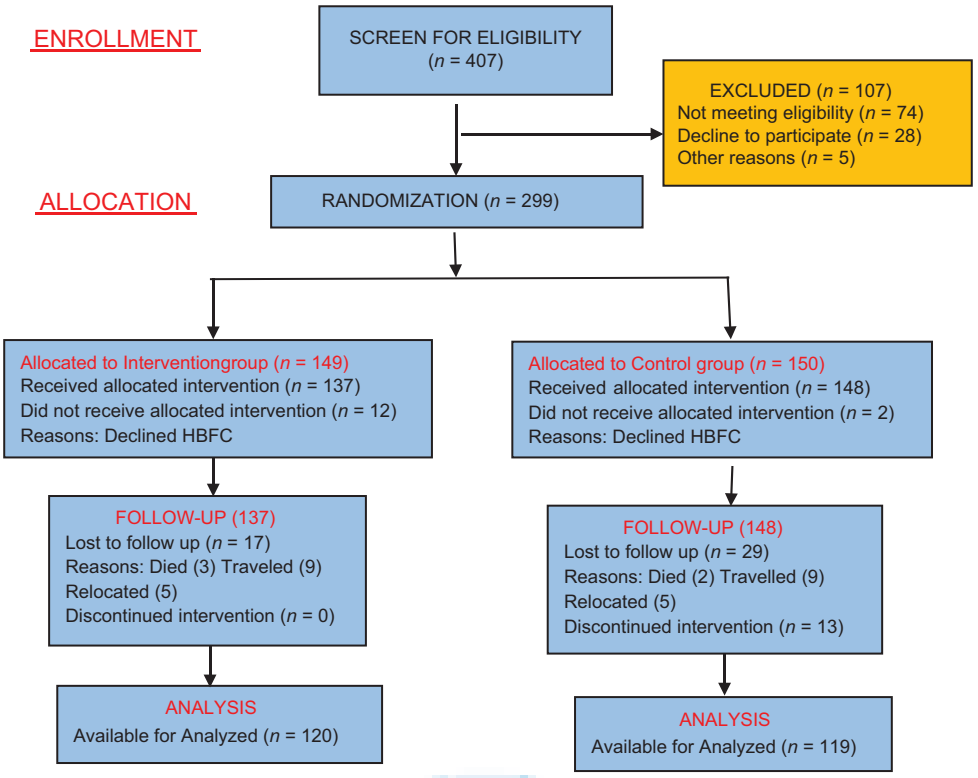

Figure 2: CONSORT Flowchart showing randomization and attrition (adapted from Schulz, Altman, and Moher 2010)

Table 2: Group equivalence of intermediate outcome measures

Intermediate outcomes	Frequency (%)		Test statistics (df)	*P*
	Intervention (*n*=149)	Control (*n*=150)		
Symptoms count (*n*=219)			2.96 (3)[a]	0.962
None	40 (26.8)	40 (26.7)		
1	37 (24.8)	41 (27.3)		
2	47 (31.6)	46 (30.7)		
>3	25 (16.8)	23 (15.3)		
Mean SBP±SD (mmHg)	139.39±23.79	140.57±21.90	−0.443 (297)[b]	0.658
Mean DBP±SD (mmHg)	86.58±12.11	87.27±11.63	−0.502 (297)[b]	0.616
Mean BMI±SD	28.16±6.5	28.15±5.7	0.026 (297)[b]	0.979
BMI			2.797 (3)[c]	0.440
Underweight	5 (3.4)	01 (0.7)		
Normal	48 (32.2)	46 (30.7)		
Overweight	45 (30.2)	49 (32.6)		
Obese	51 (34.2)	54 (36.0)		
Medication adherence			0.315 (2)[a]	0.870
Low	16 (10.7)	19 (12.7)		
Medium	37 (24.8)	38 (25.3)		
High	96 (64.5)	93 (62.0)		
Component summaries				
PCS	48.66±7.62	49.30±7.81	−0.712[b]	0.477
MCS	47.65±10.33	46.44±9.59	1.055[b]	0.292

[a]Chi-square test; [b]Independent *t*-test; [c]Fisher's exact test. df=Degree of freedom; SD=Standard deviation; BP=Blood pressure; SBP=Systolic BP; DBP=Diastolic BP; BMI=Body mass index; PCS=Physical component summary; MCS=Mental component summary

combined within and between subjects' effects of intervention was shown in Table 6. Although the odd of having BP controlled was increased by intervention (adjusted odd 1.243), this was not statistically significant (P = 0.341). Similarly, the intervention did not have any impact on improving

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

Table 3: Pairwise comparisons of impact on physical and mental health-related quality of life at postintervention after controlling for baseline physical health-related quality of life and age (analysis of covariance)

Study groups	Mean of PCS	Mean difference (95% CI)	*P*	η^2
Physical				
Intervention	53.04[a] (6.85)	5.38 (−0.25-3.10)	0.094[d]	0.009
Control	51.61[a] (7.81)			
Intervention	53.21[b] (0.50)	1.78[c] (0.38-3.17)	0.013[e,*]	0.021
Control	51.44[b] (0.50)			
Mental				
Intervention	52.83[a] (9.65)	1.26 (−0.91-3.43)	0.255[d]	0.004
Control	51.57[a] (9.44)			
Intervention	52.66[b] (0.75)	0.92[c] (−1.17-3.00)	0.387[e]	0.003
Control	51.74[b] (0.75)			

*Significance at 0.05; [a]Unadjusted mean (SD); [b]Adjusted mean (SE); [c]Adjusted mean difference (95% CI) with Bonferroni adjustment; [d]Univariate ANOVA; [e]ANCOVA test applied. SD=Standard deviation; SE=Standard error; CI=Confidence interval; PCS=Physical component summary; ANCOVA=Analysis of covariance

Table 4: Pairwise comparisons of intervention's impact on combine physical and mental health-related quality of life at postintervention after controlling for baseline health-related quality of life and age (multivariate analysis of covariance)

Study group	Dependent variable	Marginal mean (SE)	Mean difference (95% CI)	*F*-statistic	*P*	Partial η^2
Intervention	PCS	53.16 (0.50)	1.70 (0.31-3.10)	5.776	0.017*,**	0.019
Control		51.48 (0.50)				
Intervention	MCS	52.74 (0.74)	1.07 (−0.98-3.13)	1.055	0.305[a]	0.004
Control		51.67 (0.74)				

*Significant at $P < 0.05$, **Significance with Bonferroni adjustment (0.05/2=0.025). Overall model (Wilk's λ test) fit at P=0.046, F-statistic=3.122, partial η^2=0.021. All assumptions were met and all the two-way interactions were not significant. SE=Standard error; PCS=Physical component summary; MCS=Mental component summary; CI=Confidence interval

Table 5: Impact of intervention on intermediate outcomes using Chi-square test (between subjects effect)

Intermediate outcomes	Frequency (%)		χ^2 (df)	*P*
	Intervention (*n*=149)	Control (*n*=150)		
Symptoms count				
None	79 (53.0)	57 (38.0)	18.517 (3)	<0.001*
1	45 (30.2)	44 (29.3)		
2	22 (14.8)	27 (18.0)		
>3	3 (2.0)	22 (14.7)		
BP control				
Control	128 (85.9)	115 (76.7)	4.192 (1)	0.041*
Uncontrolled	21 (14.1)	35 (23.3)		
Body mass index				
Underweight	3 (2.1)	2 (1.3)	1.077 (3)	0.790
Normal	54 (36.2)	48 (32.0)		
Overweight	40 (26.8)	46 (30.7)		
Obese	52 (34.9)	54 (36.0)		
Medication adherence				
Low (<6)	6 (4.0)	25 (16.6)	30.498 (2)	<0.001*
Medium (6-7.99)	26 (17.5)	52 (34.7)		
High (8)	117 (78.5)	73 (48.7)		

*Significant. Control=SBP <140 mmHg/DBP <90 mmHg, uncontrolled=SBP >140 mmHg/DBP >90 mmHg. BP=Blood pressure; SBP=Systolic BP; DBP=Diastolic BP

BMI (adjusted odd 0.817, P = 0.385). However, there were statistically significant odds of having reduced symptom counts (adjusted odd 1.407, P = 0.035) and better adherence to medication (adjusted odd 2.041, $P < 0.001$) from the baseline to 6 months post intervention [Table 6].

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

Table 6: Tests of within and between subject effects of intervention on intermediate outcomes using generalized estimating equation

Variable	Wald χ^2	df	Adjusted odds (95% CI)	*P*
BP control	0.908	1	1.243 (0.794-1.946)	0.341
Improved symptoms	4.446	1	1.407 (1.024-1.932)	0.035*
Normal BMI	0.756	1	0.817 (0.517-1.289)	0.385
Adherence to medication	14.796	1	2.041 (1.419-2.935)	<0.001*

*Significant. BP=Blood pressure; CI=Confidence interval; BMI=Body mass index

Discussion

This study is pragmatic in nature. Therefore, the intention-to-treat analysis adopted for this study usually gives a very modest assessment of the treatment effect[31] than the per-protocol analysis which involves exclusion of the missing data from the final analysis. Researchers believe that the masking effect of intention-to-treat analysis gives the natural scenario in clinical practice where the patients for one reason or the other may not complete the health intervention program.[31] The attrition rate recorded by this study was greater than the one recorded by researcher[32] in a RCT study on hypertension. The attrition is, however, lower than other similar RCT studies on hypertension, many of which recorded over 25% attritions.[19-21] Researchers[33] have varying opinions about the cut-off point for attrition in RCT studies but the general concession was that internal validity may not be assured with a study of over 20% attrition. Therefore, this study was within the acceptable attrition level at which the internal validity of the study is assured.

The sociodemographic, clinical, and quality of life characteristics of both the intervention and control groups were comparable and similar at baseline. These findings showed the outcome of successful randomization procedures during the recruitment phase. The randomization has effectively reduced the selection bias that could be associated with this research by making the intervention group and the control group look similar at the baseline.

The ANCOVA analysis revealed statistically significant impact of the study on the physical component of HRQoL. Although there was adjusted effect size for the mental component, this was found to be not statistically significant. These findings were corroborated by MANCOVA analysis, which showed a statistically significant effect size on physical HRQoL only. Therefore, there is significant difference between the HRQoL (physical component) of patients followed up at home and those follow-up at hospital after controlling for baseline HRQoL and age of the patients. Although many RCT studies on HRQoL of hypertension reported statistically improved treatment effects between the groups of study, none of the reviewed study employed intention-to-treat analysis or norm-based scoring of SF-36v2.[19,20,24,32]

This finding from this study literarily means that the intervention significantly impacted on physical component of HRQoL of hypertensive patients in Ilorin, Nigeria after the baseline HRQoL and age of the patients were statistically controlled. It therefore connotes the importance of other factors that could confound and biased the interventional study's outcome. Expectedly, this study had earlier reported age as a major determinant and predictor of HRQoL, and hence the need to control for its effect on the post intervention HRQoL. Therefore, the gradual improvement observed in this study could be the beginning of changes in HRQoL which over time (after 12 months) could achieve statistical significance difference outcome. The HRQoL was identified as long-term impact assessment of health outcome of patients[23,34] because it is a subjective self-evaluation of an individual satisfaction or dissatisfaction with life over a long term.

The study showed statistically significant odds (1.41) of having a reduced symptom from the study intervention and another significant odd (2.04) of becoming more adherent to medication from the study intervention. Although the BP control has an odd of 1.24 from the study intervention on GEE modeling, this was found not statistically significant. Comparatively, other studies on home-based care for hypertension have also reported improvement of medication adherence and BP.[20,21,24,32] The improvement in medication adherence in this study was perhaps because of medication adherence counseling session of the hypertension (HECS) of the intervention program. This invariably led to better BP control and reduction in symptom frequency observed in the intervention group. Many RCT studies have reported BP control in home-based care intervention study on hypertension with usually improved BP.[35,36] These have shown a consistency in the importance of home-based intervention to address hypertension, as demonstrated in this study. Any effective strategy that lowers patients BP will consequently reduce the cardiovascular complications of hypertension and has the propensity to improve the HRQoL.[8,37] None of the RCT studies reviewed applied symptom counts (frequency) as an outcome assessment, thereby limiting comparability of the findings with other studies.

The findings of this study are in agreement with the conceptual framework of the study [Figure 1]. The

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

conceptual framework hypothesized a sequence of HBFC influencing the individual and environmental factors through the hypertension HECS and adherence counseling. These in turn would lead to improvement in adherence to medication and lifestyle modification. Biologically, the latter would result in improvement in biological functions such as BP control, which in succession resulted in reduction of symptom frequency. The symptom frequency which is the feelings of wellness as perceived by patients hitherto caused improvement in the quality of life perceived by the patients.

Conclusion and Recommendation

The HBFC intervention by this study impacted on the physical component of HRQoL at 6 months post intervention after controlling for baseline HRQoL and age of the patients. Short-term impact assessment of the study and masking effect of intent-to-treat were identified as likely reasons for the initial nonsignificant difference between the intervention and control groups. Mental component of HRQoL was not impacted upon by the intervention. Symptom count, medication adherence, and BP control were positively impacted upon by the home-based follow-up intervention. One of the major strengths of this study is that it pioneered home-based care for hypertensive patients in Nigeria. By so doing, it established the feasibility of home-based care study for use in a low-resource country. From the available literatures, there are only few RCT interventional studies on hypertension. The RCT studies have been adjudged as one of the best forms of evidence-based research. This study also pioneered this form of RCT study on hypertensive patients in Nigeria. It is recommended that there is need for more studies on intervention and HRQoL among hypertensive patients in Nigeria.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Kolo PM, Jibrin YB, Sanya EO, Alkali M, Peter Kio IB, Moronkola RK. Hypertension-related admissions and outcome in a tertiary hospital in northeast Nigeria. Int J Hypertension doi: 10.1155/2012/960546.
2. Onwuchekwa AC, Chinenye S. Clinical profile of hypertension at a University Teaching Hospital in Nigeria. Vasc Health Risk Manage 2010;6:511-6.
3. Ukoh VA. Admission of hypertensive patients at the University of Benin Teaching Hospital, Nigeria. East Afr Med J 2007;84:329-35.
4. van de Vijver S, Akinyi H, Oti S, Olajide A, Agyemang C, Aboderin I, Kyobutungi C. Status report on hypertension in Africa—Consultative review for the 6th session of the African Union Conference of Ministers of Health on NCD's. Pan African Med J 2014;16. doi: 10.11604/pamj. 2013.16.38.3100.
5. Hendriks ME, Wit FW, Akande TM, Kramer B, Osagbemi GK, Tanović Z, *et al*. Effect of health insurance and facility quality improvement on blood pressure in adults with hypertension in Nigeria: A population-based study. JAMA Intern Med 2014;174:555-63.
6. Suleiman A, Sulaiman S, Albarq A. Hospital admission and poor adherence to antihypertensive therapy: Is there any relationship. Int J Pharm Pharm Sci 2010;2:38-46.
7. Oguanobi NI, Ejim EC, Onwubere BJ, Ike SO, Anisiuba BC, Ikeh VO, *et al*. Pattern of cardiovascular disease amongst medical admissions in a regional teaching hospital in Southeastern Nigeria. Nigerian J Cardiol 2013;10:77.
8. Nelissen HE, Hendriks ME, Wit FW, Bolarinwa OA, Osagbemi GK, Bindraban NR, *et al*. Target organ damage among hypertensive adults in rural Nigeria: A cross-sectional study. J Hypertension 2014;32:487-94.
9. Ike SO, Anisiuba BC, Onwubere BJ, Ikeh VO. Clinic attendance compliance pattern of adult hypertensive Nigerians seen at UNTH, Enugu. Orient J Med 2003;15:1-7.
10. Osamor PE. Social support and management of hypertension in south-west Nigeria: Cardiovascular topic. Cardiovasc J Africa 2015;26:29-33.
11. Ogedegbe G, Gyamfi J, Plange-Rhule J, Surkis A, Rosenthal DM, Airhihenbuwa C, *et al*. Task shifting interventions for cardiovascular risk reduction in low-income and middle-income countries: A systematic review of randomised controlled trials. BMJ Open 2014;4:e005983.
12. Brust JC, Shah NS, Scott M, Chaiyachati K, Lygizos M, van der Merwe TL, *et al*. Integrated, home-based treatment for MDR-TB and HIV in rural South Africa: An alternate model of care [Perspectives]. Int J Tuberculosis Lung Dis 2012;16:998-1004.
13. Shah MS, Ahmad A, Khalique N, Afzal S, Ansari MA, Khan Z. Home-based management of acute diarrhoeal disease in an urban slum of Aligarh, India. J Infect Dev Countries 2011;6:137-42.
14. Thiam S, Thwing J, Diallo I, Fall FB, Diouf MB, Perry R, *et al*. Scale-up of home-based management of malaria based on rapid diagnostic tests and artemisinin-based combination therapy in a resource-poor country: Results in Senegal. Malaria J 2012;11:334.
15. Poljičanin T, Ajduković D, Šekerija M, Pibernik-Okanović M, Metelko Ž, Mavrinac GV. Diabetes mellitus and hypertension have comparable adverse effects on health-related quality of life. BMC Public Health 2010;10:12.
16. Bernocchi P, Scalvini S, Bertacchini F, Rivadossi F, Muiesan ML. Home based telemedicine intervention for patients with uncontrolled hypertension: A real life-non-randomized study. BMC Med Informatics Decision Making 2014;14:52.
17. Bosworth HB, Olsen MK, Grubber JM, Neary AM, Orr MM, Powers BJ, *et al*. Two self-management interventions to improve hypertension control a randomized trial. Ann Intern Med 2009;151:687-95.
18. Anderson C, Rubenach S, Mhurchu CN, Clark M, Spencer C, Winsor A. Home or hospital for stroke rehabilitation? Results of a randomized controlled trial. Stroke 2000;31:1024-31.
19. Aghajani M, Ajorpaz NM, Atrian MK, Raofi Z, Abedi F, Vartoni SN, Soleimani A. Effect of self-care education on quality of life in patients with primary hypertension: Comparing lecture and educational package. Nurs Midwifery Stud 2013;2:71-6.
20. Saleem F, Hassali MA, Shafie AA, Haq N, Farooqui M, Aljadhay H, *et al*. Pharmacist intervention in improving

[Downloaded free from http://www.njcponline.com on Thursday, January 31, 2019, IP: 197.90.36.231]

hypertension-related knowledge, treatment medication adherence and health-related quality of life: A non-clinical randomized controlled trial. Health Expect 2015;18:1270-81.
21. Wal P, Wal A, Bhandari A, Pandey U, Rai AK. Pharmacist involvement in the patient care improves outcome in hypertension patients. J Res Pharm Pract 2013;2:123.
22. Bolarinwa OA, Juni MH, Mohd Zulkefli NA, Salmiah MS, Akande TM. Impact of hypertension home-based care on health related quality of life of Nigerian patients: Research concept, framework and methodology. Int J Public Health Clin Sci 2016;3:131-51.
23. Ferrans CE, Zerwic JJ, Wilbur JE, Larson JL. Conceptual model of health-related quality of life. J Nurs Scholarsh 2005;37:336-42.
24. Ebid AH, Ali ZT, AFGhobary M. Case report: Blood pressure control in hypertensive patients: Impact of an Egyptian pharmaceutical care model. J Appl Pharm Sci 2014;4:93.
25. Kabir M, Iliyasu Z, Abubakar LS, Jibril M. Compliance to medication among hypertensive patients in Murtala Mohammed Specialist Hospital, Kano, Nigeria. J Community Med Prim Health Care 2004;16:16-20.
26. Adeyemo A, Tayo BO, Luke A, Ogedegbe O, Durazo-Arvizu R, Cooper RS. The Nigerian Anti-Hypertensive Adherence Trial (NA-HAT): A community-based randomized trial. J Hypertension 2013;31:201.
27. Côté I, Moisan J, Chabot I, Grégoire JP. Health-related quality of life in hypertension: Impact of a pharmacy intervention programme. J Clin Pharm Ther 2005;30:355-62.
28. Odusola AO, Hendriks M, Schultsz C, Bolarinwa OA, Akande T, Osibogun A, *et al*. Perceptions of inhibitors and facilitators for adhering to hypertension treatment among insured patients in rural Nigeria: A qualitative study. BMC Health Serv Res 2014;14:624.
29. Bolarinwa OA, Ameen HA, Sanya EO, Kolo PM, Durowade KA, Uthman MM, *et al*. Pattern and predictive factors of health-related quality of life of patients with hypertension, diabetes and concomitant hypertension with diabetes in Ilorin, Nigeria. Nigerian Postgrad Med J 2016;23:182.
30. Schulz KF, Altman DG, Moher D. CONSORT 2010 statement: Updated guidelines for reporting parallel group randomized trials. Ann Intern Med 2010;152:726-32.
31. Altman DG, Schulz KF, Moher D, Egger M, Davidoff F, Elbourne D, *et al*. The revised CONSORT statement for reporting randomized trials: Explanation and elaboration. Ann Intern Med 2001;134:663-94.
32. Hu Y, Zhu J. Quality of life of patients with mild hypertension treated with captopril: A randomized double-blind placebo-controlled clinical trial. Chin Med J 1999;112:302-7.
33. Dumville JC, Torgerson DJ, Hewitt CE. Reporting attrition in randomised controlled trials. BMJ: Br Med J 2006;332:969.
34. Kring DL. Using the revised Wilson and Cleary model to explore factors affecting quality of life in persons on hemodialysis. Dissertation submitted to the Faculty of The Graduate School at the University of North Carolina. 2008: Available from: http://libres.uncg.edu/ir/uncg/f/umi-uncg-1532.pdf. [Lst accessed on 2015 Feb 24].
35. Pezzin LE, Feldman PH, Mongoven JM, McDonald MV, Gerber LM, Peng TR. Improving blood pressure control: Results of home-based post-acute care interventions. J Gen Intern Med 2011;26:280-6.
36. Feldman PH, McDonald MV, Mongoven JM, Peng TR, Gerber LM, Pezzin LE. Home-based blood pressure interventions for blacks. Circ Cardiovasc Qual Outcomes 2009;2:241-8.
37. Ogunlana MO, Adedokun B, Dairo MD, Odunaiya NA. Profile and predictor of health-related quality of life among hypertensive patients in south-western Nigeria. BMC Cardiovasc Disord 2009;9:25.