

Effects of Self-Care Model on Blood Pressure Levels and Self-care agency in Patients with Hypertension

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1. Introduction

Hypertension, also known as high blood pressure and primarily encountered in adults and especially elderly individuals, is a cause of death of 7.6 million people per year and is diagnosed in 90 million people every year (Lawes, Vandur Hoorn, Rodgers, 2008; Nixon, Müller, Lawy, Falvey, 2009). According to the World Health Organization, hypertension is one of the leading causes of death and affects almost 1 billion people worldwide (Nixon, Müller, Lawy, Falvey, 2009; 2007 ESH-ESC, 2007). In Turkey, according to a 2003 study, hypertension incidence is 31.8% overall, 36.1% for women and 27.5% for men (Altun et al., 2005). High blood pressure is a risk factor for cardiovascular diseases and can lead to myocardial infarction, stroke, congestive heart failure, and kidney failure (Kaya et al., 2009). Hypertension is preventable with changes in lifestyle. Self-care is key for dealing with chronic health problems including hypertension (Goahr et al., 2008). Public health nurses can help individuals with hypertension to perform self-care with appropriate instruction and reinforcement. Therefore, the role of a nurse in self-care of hypertension patients includes planning, administering, and evaluating the nursing interventions as follows: training the individual in lifestyle changes, increasing awareness of potential complications of hypertension, and observing behavioral changes following such instruction (Pearson, Vaughan and Fitzgerald, 2000).

Aim: The aim of this study was to determine the effect of nursing interventions on blood pressure levels after using the self-care model and self-care agency in patients with hypertension.

2. Materials And Methods

2.1 Research Design

This study involved a pretest-posttest quasi-experimental model and included a control group.

Study Population and Sampling

The study population was composed of adult patients living in the city center of Erzurum who were diagnosed with hypertension at least 3 months prior to the start of the study. The sample was composed of 110 consecutively recruited hypertension patients, 55 in the control group and 55 in the experimental group. Power analysis indicated a directional significance level, at 0.7 effect size, 0.05 significance level, and 0.95 rate of population presentation. The patients were randomized to the experimental or control group. Six of the patients withdrew after the study start, and their data were not evaluated; thus, data analysis was conducted on results from 104 patients, 53 in the experimental group and 51 in the control group. The inclusion criteria consisted of the following: above 18 age, absence of auditory or visual problem that would hinder communication, absence of a diagnosed psychiatric disease, and the ability to read and write.

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2.2. The Data Collection Instruments

Data collection included questionnaires querying the demographic features of the study participants, a follow-up form, and the exercise of self-care agency scale. Arterial blood pressures of the patients were measured with a manual sphygmomanometer.

Demographic Feature Form

After considering the literature, we prepared a data collection instrument to gather data about descriptive features of the patients. The nine items queried age, gender, educational status, marital status, medical insurance status, length of time since hypertension diagnosis, concomitant disease, household status (who lived with the patient), and information about medications taken (2 items about medications).

Patient Follow-up Form

This form was designed by the researcher to gather personal data such as name, surname, telephone number, dates of nurse home visits, blood pressure values, and height and weight recorded by the patient.

Self-care Agency Scale

The self-care agency scale was developed by Kearney and Fleischer in 1979 and translated to Turkish, tested for validity and reliability by Nahcivan (Nahcivan, 2004). It is composed of 43 items aiming at evaluating self-care capabilities. The scale has 35 items containing the self-care capabilities of patients. The items are scored using a five-item Likert type scale from 0 to 4. The highest possible score is 140. Higher score indicates higher self-care agency. Cronbach's alpha of the scale was 0.89 (Nahcivan, 2004) and 0.91 in our study.

2.3. Data Collection

For the pretest data, we administered the demographic questionnaire, follow-up form, and self-care agency scale to both test and control groups. After pretesting, nurses visited patients in the test group at home four times once a week. At every visit, nurses measured arterial blood pressure and administered planned nursing interventions based on the self-care model; interim testing data were collected using the self-care agency scale and manual sphygmomanometer. Four weeks after interim testing, posttest data collection consisted of the follow-up form and self-care agency scale.

For the control group, posttest data were collected at the interim testing 4 weeks after pretest data and by making a home visit 8 weeks after study start.

2.4. Nursing Interventions

Nursing interventions for the patients in the test group were administered according to nursing diagnosis and determined depending on the self-care needs of each patient. Possible diagnoses were "imbalanced nutrition less than body requirements, fluid volume surplus, activity intolerance, sexual dysfunction, knowledge deficit, and anxiety about potential for incorrect compliance with ineffective therapeutic regimen management: individual and family. Although the diagnoses of individual lacking the ability to administer the treatment plan, with a knowledge deficit, fluid volume surplus, and anxiety about potential for incorrect compliance with ineffective therapeutic regimen management (individual and family) were solved after intervention; sexual dysfunction, anxiety, activity intolerance, and nutrition surplus diagnoses were not solved.

2.5. Data Analysis

Coding and data analysis were conducted using SPSS, version 16.0, software for Windows. We used percentage, arithmetical mean, and standard deviation to examine the descriptive features and Student t test to compare pretest and posttest scale score means between the test and control groups and to analyze the difference between the intragroup pretest and posttest score means in the test group; we also used t test to compare dependent groups in terms of nursing diagnoses before and after intervention. We analyzed repetitive measurements using the Mc Nemar and Mauchly tests.

2.6. Ethical Considerations

Informed written consent was obtained for all study participants. In addition, Chief Physician of Ataturk University Aziziye Research Hospital and the Ethical Board of Ataturk University, Faculty of Health Sciences approved this study.

3. Results

Most study participants were married and had at least primary school education. All patients in the test group and a majority of the patients in the control group had a social insurance. In addition, 82.7% of the patients in the test group and 88.5% of the patients in the control group live with their spouses and/or children (Table 1). We used the Mauchly test to determine differences between blood pressure mean measurements within the test group. Mauchly test was applied, and statistically significant differences were found between the measurements (Table 2).

We observed significant decreases in the posttest systolic blood pressure levels of the patients in the test group compared with pretest values ($p < 0.01$). Similarly, we found that the decreased diastolic blood pressure of the patients in the control group was statistically significant ($p < 0.05$) (Table 3).

Differences between the pretest self-care agency mean scores of the test and control groups were not statistically significant ($t: 0.220, p > 0.05$). We found a statistically significant difference of the mean scores of self-care agency ($t: 2.912, p < 0.05$) for pretest and posttest values for test and control groups (Table 4); the difference between interim test mean scores was statistically insignificant ($t: 1.425, p > 0.05$) (Table 4). Regarding intragroup results, the difference between the test group mean values were significant ($p < 0.01$), but the difference between the mean scores of the control group was not significant ($p > 0.05$).

Although there was no statistically significant difference when comparing pretest and posttest blood pressure measurements for diagnoses of surplus nutrition, activity intolerance, anxiety, and sexual dysfunction ($p > 0.05$), we did find a statistically significant difference in blood pressure when tested before and after nursing interventions ($p < 0.05$ and $p < 0.01$) (Table 5).

4. Discussion

The aim of the current study was to investigate the effectiveness of the nursing care for patients with hypertension according to Orem's self-care agency model and to compare our results with those of the existing literature. Similar to the others' results, we found a difference in systolic and diastolic blood pressure values obtained from the repetitive measurements of the test group (Table 2). Appel et al. and Fleishmann et al. reported a decrease in the systolic and diastolic blood pressures for interventions such as reduced sodium intake, weight loss, increased physical activity, and limitation of alcohol intake (Appel et al., 2006; Fleischmann et al., 2004). Erci et al. found decreased systolic and diastolic blood pressure modeled after the Watson study (Erci et al., 2003). Although only systolic blood pressure measurement was included, Kurcer also observed a decrease in those measurements following advised changes in lifestyle (Kurçer and Özbay, 2011).

As for comparison of mean values of blood pressures before and after nursing intervention, we found a difference between the test and control groups for systolic blood pressure but not for diastolic blood pressure values (Table 3). There are other factors that affect risk for hypertension such as family history of hypertension, patient age, and use of single or combined drugs; these may have affected our results. Overall, it is likely that nursing care of these hypertensive individuals using the self-care agency model was effective in reducing systolic blood pressure levels. Other intervention such as reducing sodium intake, increasing physical activity, losing over weight or limiting alcohol consumption may have resulted in a decrease of blood pressure levels (Svetkely et al., 2005; Hacıhasanoğlu and Gözüm, 2011; Garcia-Pena et al., 2001).

Pretest self-care agency score means were 93.11 ± 11 in the test group and 94.13 ± 22.33 in the control group before intervention (Table 4). Düzöz found scores for self-care agency of 100.04 ± 17.62 (Düzöz, 2005). In another study by Bakoğlu and Yetkin in hypertensive patients, self-care agency mean score is 98.9 ± 20.1 (Strömberg et al., 2003). These are the results of descriptive studies and are similar to those of the current study.

We did not find a statistically significant difference in pretest mean scores for self-care agency when comparing the test and control group (Table 4). Interim test self-care agency scores do not have a significant difference in mean scores for self-care agency compared with pretest results (Table 4). Differences in self-care agency mean scores in the control group were similar to that of the test group. This may have resulted from the fact that there were more patients living with their family, spouse, or children in the control group compared with the test group, indicating that social support can be an important determinant of blood pressure intervention outcomes.

In a study in patients with congestive heart failure, Stromberg et al. found increased self-care behavior scores in both the test and control groups (Kars, 2004). In the present study, we found significant differences in posttest means of self-care agency scores for the test and control groups four weeks after intervention. As expected, pretest results for self-care agency mean scores were the lowest of the repetitive measurements, and scores in the posttest results were the highest (Table 4).

Intragroup comparison showed significant increases of the self-care agency mean scores for the test group. Thus, determined nursing interventions applied using the self-care model increased self-care agency of these hypertensive patients. Similar results have been reported for follow-up nursing care in patients undergoing peritoneal dialysis (Aylaz and Erci, 2009) or in those with myocardial infarction (Kars, 2004).

The percentage of patients with the following problems changed from pretest to posttest as follows: imbalanced nutrition less than body requirements of 80.0% to 64.9%, fluid volume surplus from 66.7% to 43.2%, and activity intolerance from 17.8% to 13.5% (Table 5). The four-week study period was probably too short to expect differences because of changes in nutritional behaviors. Because there were no significant changes in surplus nutrition, we would not expect to see changes in capacity for activity because that can stem from excess weight.

A statically significant difference was found in the diagnosis of fluid volume surplus before and after intervention for knowledge deficit but not for anxiety (Table 5). Other studies report elimination of knowledge deficit after nursing interventions (Leung et al., 2005; Fahey, Schrocder, Ebrahim, 2005). The fact that there was no significant difference in the diagnosis of anxiety statistically may result from the limited opportunity to follow-up on anxiety attacks and the stress levels in the household. In a study by Hacıhasanoğlu in patients with chronic diseases, the authors reported that as people age, anxiety and depression mean scores increase; this happened more so at 70 years of age and older (Hacıhasanoğlu, Karakurt, Yıldırım, Uslu, 2005). Although 51.1% of study participants have ineffective therapeutic regimen management (individual) before intervention, this decreased to 10.8% after intervention. Fleischman et al. provided the orientation of the hypertensive patients to the treatment through structured education (Fleischman et al., 2004). The rate of sexual dysfunction was 4.4% before intervention and 2.7% after intervention but was not statistically significant. Ineffective therapeutic regimen management (family) was 28.9% before intervention and 8.1% after intervention, a statistically significant difference. Nursing interventions should therefore be improved for sexual dysfunction, anxiety, activity intolerance, and nutrition surplus.

5. Conclusion

In the light of the present findings, we conclude that home nursing care for patients with hypertension using the self-care model was effective in decreasing the blood pressure levels of hypertensive patients and increasing self-care agency. Thus, we recommend that home nursing care of hypertensive patients should utilize the self-care agency model. Further studies with alternative methodologies are needed to study and compare the effectiveness of other models in patients with hypertension (i.e., Web, classroom, or telephone-based interventions). Efforts toward improvement of self-care agency scale should be aiming at specific features of hypertension to more accurately measure self-care agency.

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Table 1: Descriptive Features of the Study Participants

Demographic Features	Experimental		Control		Total	
	N	%	N	%	N	%
Gender						
Woman	23	43.4	24	47.1	47	45.2
Man	30	56.6	27	52.9	57	54.8
Marital Status						
Married	44	83.0	45	88.2	89	85.6
Single	9	17.0	6	11.8	15	14.4
Social Insurance						
Yes	53	100	45	88.2	98	94.2
No	0	0	6	11.8	6	5.8
People Living with Him / Her						
Spouse and/or children	43	82.7	46	88.5	89	85.6
Alone	5	9.6	4	7.7	9	8.7
Other	4	7.7	2	3.8	6	5.8
BMI	29.79± 5.48		27.89±4.25			

Table 2: Table 2. Pre-Test, Interim Test and Post-Test Blood Pressure Values of the Patients in the Experimental Group

Application Times	Experimental Group	
	Systolic Blood Pressure X ± SD	Diastolic Blood Pressure X ± SD
Pre-test blood pressure	145.00±20.04	80.18± 15.37
1st intervention week blood pressure	140.67±17.10	79.11± 14.58
2nd intervention week blood pressure	135.23±17.84	75.22±13.72
3rd intervention week blood pressure	135.12±14.86	77.90±14.40
4th intervention week blood pressure	130.51±13.56	72.05±11.51
Blood pressure 4 weeks after intervention	130.27±14.62	74.32± 14.05
	Maunchly's W: .563 f: 4.10, p<0.01	Maunchly's W: .288 f: 1.35, p<0.01

Table 3: Pre and Post-test Mean Blood Pressure Measurements

	Blood Pressure Means			
	Experimental Group		Control Group	
	Systolic X ± SD	Diastolic X ± SD	Systolic X ± SD	Diastolic X ± SD
Pre-test	145.00± 20.04	80.18± 15.37	141.96± 24.82	83.72± 14.27
Post-test	130.51± 13.56	72.05± 11.51	136.76± 22.36	80.27± 15.18
	t:4.834 p<0.01	t:1.928 p>0.05	t: 1.611 p>0.05	t: 2.107 p<0.05

Table 4: Pre-test, Interim Test and Post-test Self-Care Agency Mean Scores

Self-Care Agency Scale Mean Scores	Experimental Group	Control Group	Test and Significance
	X ± SD	X ± SD	
Pre Test	93.11± 25.03	94.13± 22.33	t: 0.220 p>0.05
Interim Test	109.94±22.66	99.38± 19.42	t: 1.425 p>0.05
Post Test	113.77± 20.52	100.38± 18.48	t: 2.912 p<0.05
	t:1.68 p<0.01	t: 2.91, p>0.05	

**Table 5: Nursing Diagnoses Before and After Patient Interventions in the Test Group
(McNemar test applied)**

	Experimental Group								p
	Before Intervention				After Intervention				
	Yes		No		Yes		No		
	S	%	S	%	S	%	S	%	
Imbalanced Nutrition Less Than Body Requirements	36	80.0	9	20	24	64.9	13	35.1	$p>0.05$
Fluid volume surplus	30	66.7	15	33.3	16	43.2	21	56.8	$P<0.05$
Intolerance in activity	8	17.8	37	82.2	5	13.5	32	86.5	$p>0.05$
Anxiety	12	26.7	33	73.3	4	10.8	33	89.2	$p>0.05$
Lack of knowledge	44	97.8	1	2.2	0	0	37	100	$P<0.01$
Ineffective therapeutic regimen management: individual	23	51.1	22	48.9	4	10.8	33	89.2	$P<0.05$
Sexual dysfunction	2	4.4	43	95.6	1	2.7	36	97.3	$p>0.05$
Ineffective Therapeutic Regimen Management: family	13	28.9	32	71.1	3	8.1	34	91.9	$P<0.05$