The Effect of Educational Intervention Based on Chronic Care Model on the Management of Hypertension

Hipertansiyonu Olan Bireylerde Kronik Bakım Modeli Temelli Eğitimin Hastalık Yönetimine Etkisi

ORIGINAL ARTICLE

ABSTRACT

Objective: This study was conducted to examine the effect of planned educational intervention based on the chronic care model on the management of patients with hypertension. The chronic care model is a framework for organizing and improving chronic illness care, based on a proactive, planned approach that incorporates patient self-care, provider, and system-level interventions. Several instruments have been developed to evaluate the effects of chronic care model implementation on care and treatment outcomes. The Patient Assessment of Chronic Illness Care questionnaire is used in the instrument to evaluate the delivery of care for patients.

Methods: The study was performed as a prospective study conducted with a controlled semi-experimental pattern in matched groups. Totally 30 patients including 15 intervention and 15 control group patients matched in terms of socio-demographic features were monitored for 6 months. The intervention group was trained and monitored by a professional team in line with the components of the model. Life quality scale, hypertension information questions, and chronic care assessment scale were applied to both groups at the beginning and in the sixth month of the study.

Results: In the intervention group, positive developments were observed such as improved life quality, improvement in metabolic values, increase in knowledge levels, and satisfaction with chronic care management, and additional comorbidity, which facilitates the end-organ damage of hypertension, was not detected.

Conclusions: It was determined that the educational intervention conducted through chronic care model turned out to be influential in terms of improving the metabolic signs and quality of life of patients with hypertension.

Keywords: Nursing, chronic care model, hypertension

ÖZ

Amaç: Bu araştırma, hipertansiyonu olan hastalarda kronik hastalık modelini temel alan planlı bir eğitim programının hipertansiyon yönetimine etkisini incelemek amacıyla planlanmıştır. Kronik bakım modeli, kronik hastalık bakımını organize etmek ve iyileştirmek için hasta öz bakımını, bakım vericiler ve sistem düzeyinde müdahaleleri içeren proaktif, planlı bir yaklaşıma dayalı olarak yapılandırılmış bir modeldir. Kronik bakım modeli uygulamasının bakım ve tedavi sonuçları üzerindeki etkilerini değerlendirmek için çeşitli araçlar geliştirilmiştir. Bunlardan biri olan Kronik Hastalık Bakımının Hasta Değerlendirmesi anketi, hastalara verilen bakımın değerlendirmek için kullanılan bir araçtır.

Yöntem: Çalışma, eşleştirilmiş gruplarda kontrollü yarı deneysel desende ileriye dönük bir çalışma olarak planlanmıştır. Sosyodemografik özellikler açısından eşleştirilen 15 girişim ve 15 kontrol grubu hasta olmak üzere toplam 30 hastanın 6 ay boyunca izlemi yapılmıştır. Girişim grubu, modelin bileşenleri doğrultusunda profesyonel bir ekip tarafından eğitilmiş ve izlenmiştir. Yaşam kalitesi ölçeği, hipertansiyon bilgi düzeyi soruları ve kronik bakım hasta değerlendirme ölçeği her iki gruba da başlangıçta ve çalışmanın altıncı ayında uygulanmıştır.

Bulgular: Girişim grubunda yaşam kalitesinde iyileşme, metabolik değerlerde iyileşme, bilgi düzeylerinde artış, kronik bakım yönetiminden memnuniyette olumlu yönde gelişmeler gözlenmiş ve hipertansiyonun uç organ hasarını kolaylaştıran ek komorbidite saptanmamıştır.

Sonuç: Kronik bakım modeli ile gerçekleştirilen planlı eğitimin hipertansiyonu olan hastaların metabolik belirtilerini ve yaşam kalitelerini iyileştirmede etkili olduğu belirlenmiştir.

Anahtar Kelimeler: Hemşirelik, kronik bakım modeli, hipertansiyon

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Hypertension is a public health problem concerning all parts of society and creates a significant economic burden as a disease requiring lifelong treatment.[1-4] Chronic disease management includes the treatment of the disease and preparing and strengthening the patients to help them gain self-management skills.[5] Among the models of chronic disease management, the most well-known, the most frequently used, and the most effective one is chronic care model (CCM).[6] The main point of the model identified by Wagner et al[7-9] is the "existence of a fruitful interaction between the health care team and the patient." According to the model, the "patient" motivated by a relation of knowledge, skill, and trust and the "health care team" having the necessary expertise, knowledge and sources can take effective decisions for a high-quality care and conduct an effective chronic disease care management by using the available sources.[10,11] This research was conducted to evaluate the effects of the use of the CCM in patients with hypertension on quality of life and clinic results and to conduct a study concerning the use of this model in chronic diseases in Turkey.

Methods

Research Design: The research was conducted in the nephrology polyclinic of a university hospital for 6 months with a controlled semi-experimental design in matched groups.

Population and Sample: Population of the research consisted of all patients who applied to and followed in the nephrology polyclinic. According to the power-analysis method, 40 patients constituted the sample of the research (Figure 1).

Data Collection Tools: For collecting data, researcher used the socio-demographic features form prepared in consideration of the literature and expert views and the following forms (Figure 1).
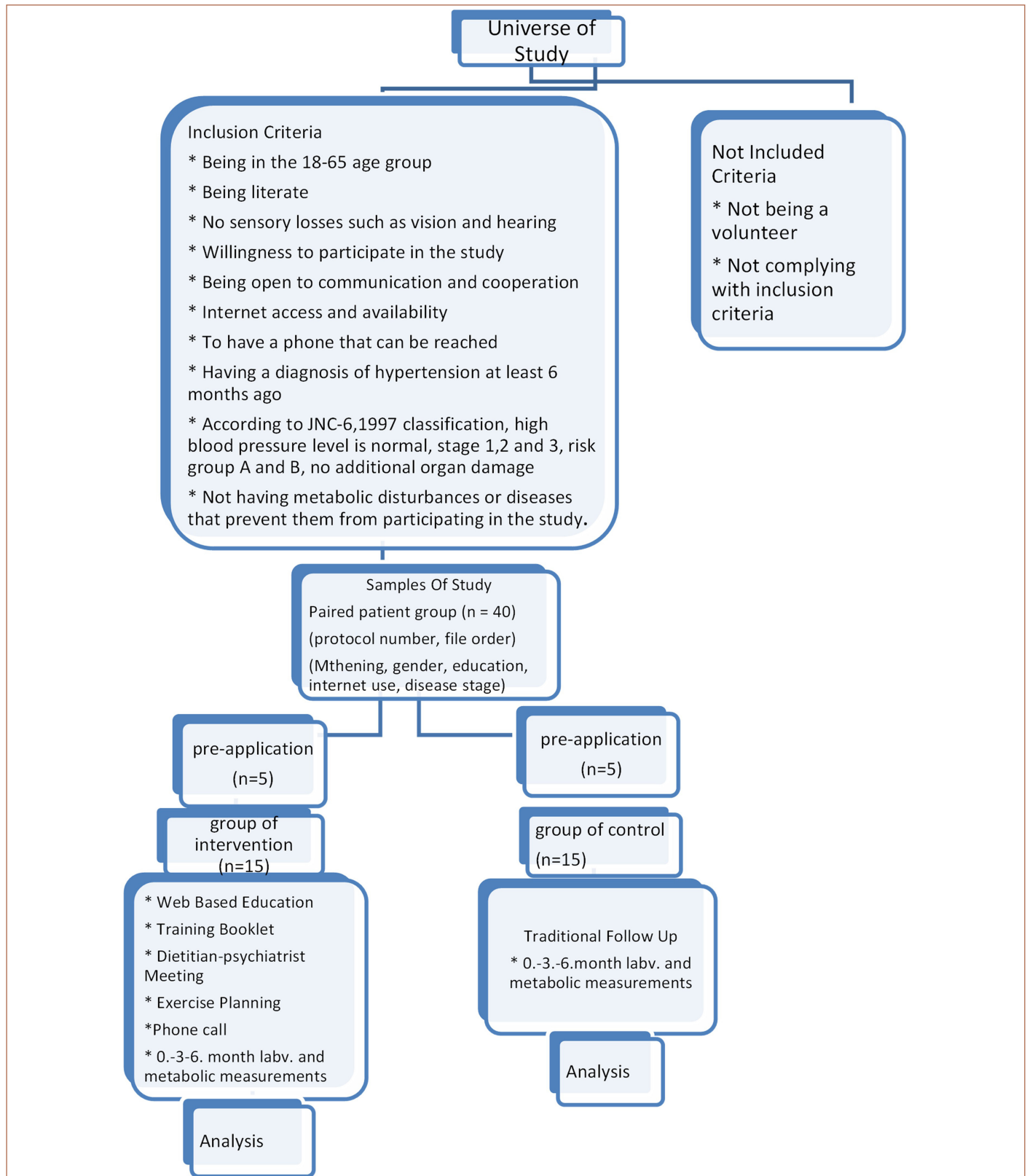
Integration of CCM into the Study: The application of the chronic care model components is shown in Figure 2.
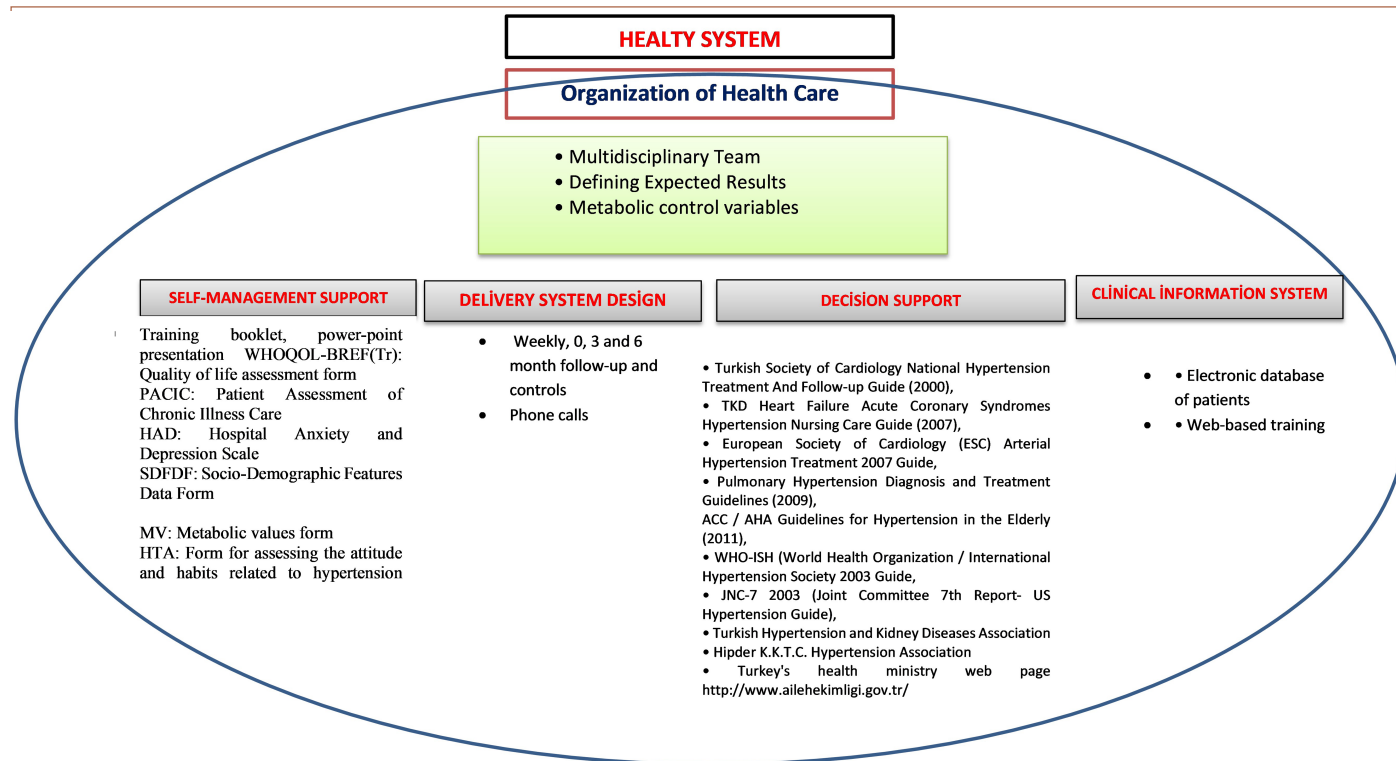
Organization of Health Care

a. *Multidisciplinary Team's Duties, and Responsibilities:* Multidisciplinary team consisted of internal medicine specialist, internal medicine specialist nurse, dietician, and psychologist. Internal medicine specialist carried out the physical examinations and system diagnosis of the patients to be included in the study, determined the laboratory requests, assessed the monthly patient data, and shared the results with the team. The internal medicine specialist nurse collected and assessed the data, planned and executed the training, arranged weekly interviews and monthly controls, and assessed the data. The psychiatrist assessed the suitability of the patients for the study, assessed the patients having adaptation problems with respect to lifestyle changes in monthly controls, and also played roles in teaching the coping methods to patients, and applied and interpreted the hospital anxiety and depression scale. Dietician planned the diet programs together with the patients and determined the calorie needs of diet programs.

b. *Identification of Objectives and Expected Results:* The objectives of the study were determined in line with the

following points that are considered to have impact on the success of the disease management: Since hypertension is a chronic disease, its management requires a long and effective time. In the management of hypertension, patient is prioritized, not the disease. It requires a multidisciplinary teamwork with the patient, and team members need to work in an effective and cooperative manner. It is important to determine the lifestyle and habits of the patient in the treatment of hypertension. Each patient diagnosed with hypertension displays different behaviors, and thus, different approaches might be needed for each patient. Care and follow-up plans should be developed by determining the compliance/incompliance of patients to treatment and lifestyle changes, and the trust of the patient in care and treatment team is important in compliance with disease. Health education should be constant and accessible in hypertension; behavior change takes time and therefore, it requires follow-up and motivation. Patient education is planned, considering the faith and cultural values of the patient.

c. *Metabolic Control Variables:* Metabolic control variables were determined as fasting plasma glucose, serum total cholesterol, serum low-density lipoprotein (LDL)-cholesterol, serum high-density lipoprotein (HDL)-cholesterol, fasting serum triglycerides, human hemolysate glycated hemoglobin (HbA1C), spot urine, glomerular filtration rate, electrocardiogram, height, weight, waist circumference, and body mass index.

d. *Self-Management Support:* A training manual was prepared to collect the information about the disease and Power-Point presentations were prepared for individual trainings. Data collection forms were applied to determine the factors affecting compliance with the treatment, and data were shared with the patients (Figure 2) as training manual, Power-Point presentation, and web education page [the website remained open for 2 years, www.ygulbin.com].

I. *Delivery System Design:* In both control and intervention groups, data forms were filled out at the beginning [zeroth month] and at the end [sixth month] of the study. An intermediate control was carried out in the third month for metabolic values (Table 1). During preparation, a web page was designed to start the web-based training to the patients in the intervention group through internet connection from their houses. In the hospital where the study was conducted, a database which could be accessed only with a personal password was created and the team members followed the patients through this database. Tension measuring training was provided to the patients in the intervention group by using 5A method so that the follow-up form could be used at home. Through phone calls, patients were engaged to comply with the program. Situations preventing the compliance of patients and solution proposals were discussed.

II. *Decision Support:* Evidence-based manuals were used in the patient and patient-related training (Figure 2).

III. *Clinical Information Systems:* An electronic patient file was created for each patient included in the study in the database taken from the data processing center

Universe of Study

Inclusion Criteria

* Being in the 18-65 age group

* Being literate

* No sensory losses such as vision and hearing

* Willingness to participate in the study

* Being open to communication and cooperation

* Internet access and availability

* To have a phone that can be reached

* Having a diagnosis of hypertension at least 6 months ago

* According to JNC-6,1997 classification, high blood pressure level is normal, stage 1,2 and 3, risk group A and B, no additional organ damage

* Not having metabolic disturbances or diseases that prevent them from participating in the study.

Not Included Criteria

* Not being a volunteer

* Not complying with inclusion criteria

Samples Of Study

Paired patient group (n = 40)

(protocol number, file order)

(Mthening, gender, education, internet use, disease stage)

pre-application (n=5)

pre-application (n=5)

group of intervention (n=15)

group of control (n=15)

* Web Based Education
* Training Booklet
* Dietitian-psychiatrist Meeting
* Exercise Planning
*Phone call
* 0.-3-6. month labv. and metabolic measurements

Traditional Follow Up
* 0.-3.-6.month labv. and metabolic measurements

Analysis

Analysis

Figure 1. The schematic flow chart of the study for sample selection: the power of the study was determined as 90% in α = 0.05 reliability coefficient. According to the power-analysis method, 30 patients including 15 intervention and 15 control group patients constituted the sample of the research.

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HEALTY SYSTEM

Organization of Health Care

- Multidisciplinary Team
- Defining Expected Results
- Metabolic control variables

SELF-MANAGEMENT SUPPORT

Training booklet, power-point presentation WHOQOL-BREF(Tr): Quality of life assessment form PACIC: Patient Assessment of Chronic Illness Care HAD: Hospital Anxiety and Depression Scale SDFDF: Socio-Demographic Features Data Form

MV: Metabolic values form HTA: Form for assessing the attitude and habits related to hypertension

DELİVERY SYSTEM DESİGN

- Weekly, 0, 3 and 6 month follow-up and controls
- Phone calls

DECİSİON SUPPORT

• Turkish Society of Cardiology National Hypertension Treatment And Follow-up Guide (2000),
• TKD Heart Failure Acute Coronary Syndromes Hypertension Nursing Care Guide (2007),
• European Society of Cardiology (ESC) Arterial Hypertension Treatment 2007 Guide,
• Pulmonary Hypertension Diagnosis and Treatment Guidelines (2009),
ACC / AHA Guidelines for Hypertension in the Elderly (2011),
• WHO-ISH (World Health Organization / International Hypertension Society 2003 Guide,
• JNC-7 2003 (Joint Committee 7th Report- US Hypertension Guide),
• Turkish Hypertension and Kidney Diseases Association
• Hipder K.K.T.C. Hypertension Association
• Turkey's health ministry web page http://www.ailehekimligi.gov.tr/

CLİNİCAL İNFORMATİON SYSTEM

- • Electronic database of patients
- • Web-based training

Figure 2. Integration of chronic care model (CCM): CCM describes the key elements of a health care system that promotes high-quality chronic disease care. The model has 6 basic components. Health systems benefit from community-based programs that enhance chronic disease care by creating an environment of organized efforts to improve chronic disease care. Self-management support programs use strategies to increase patient knowledge, empowerment, motivation, confidence, and self-management skills. Delivery systems include those designed for effective chronic care management and the use of a registry for scheduled and follow-up visits. Clinical practice teams use tools to support patient assessment and evidence-based patient care decisions. Information systems measure the success of treatments across the patient population and provide appropriate reminders at the point of care. The efficient interactions between informed patients taking an active role in their care and expert care providers, with evidence-based guidelines.

of the hospital. The database explained above can be accessed only through a password so that only team members can have access to them, interference in the study data is prevented, and patient privacy and confidentiality are protected as the ethical dimension of the study.

IV. *Social Sesources and Policies:* Exercise programs: in line with the address information of the intervention patients, purpose/content of the study was discussed with the gyms of municipalities and patients were made to benefit from these facilities for free. For the patients preferring private gyms, it was ensured that discounts were made for them.

Statistical Analysis

The calculator program G*Power software was used for the calculation of the sample size [G*Power V. 3.1.9 2; Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany].[31] The power of the study was determined as 90% in $\alpha = 0.05$ reliability coefficient. The effect size of the intervention was evaluated by following Cohen's d criteria. The intervention has a large effect on patient assessment of chronic illness care

(PACIC) scale total points [$d = 1.06$]. The Statistical Package for Social Sciences v18.0 Software (PASW Statistics 18, SPSS Inc., Chicago, Ill, USA) was used for statistical analysis.[32] In the statistical analysis of the data, number and percentage distribution, *t* test, analysis of variance, chi-square and Mann–Whitney *U* tests, and general linear model repeated measures define factor[s] at repeated measurements. Statistical analyses were carried out by a biostatistics expert.

Ethical Consents

Written and verbal consents were received from the patients for conducting the research. Ethics committee permission was obtained from the institution where the research was conducted [number: B.30.2.EGE.0.20.05.00/OY/649/268; decision no:13-3.3/12]. Permissions for the use of scales and model were taken via e-mail. As ethical responsibility, the same training, training materials, and exercise opportunities were provided to the patients in the control group at the end of the research. Since all examinations to be used in the study were performed in the polyclinics where patients received service during their routine controls, the patient or researcher was not charged a fee.

Table 1. Data Collection Process and Program Timing of the Study

Note: The vertical labels "Group of intervention" and "Group of control" appear between the row labels and the time-point columns, both on the beginning side and on the termination side.

	The Beginning	First Month	Second Month	Third Month	Fourth Month	Fifth Month	The Termination at Sixth Month
SCDF	X						
Laboratory and metabolic measurements	x			X			x
MV	X						X
HTA	X						X
HTI	X						X
WHOQOL	X						X
PACIC	X						X
HADS	X						
Training	X	X	X		X	X	
Appointment	X	X		X	X	X	
Telephone call	XX	XX	XX		X	X	
Team meeting via electronic database							

SCDF, sociodemographic characteristics data form; WHOQOL-BREF(Tr), quality of life assessment form; PACIC, patient assessment of chronic illness care; HADS,Hospital Anxiety and Depression Scale; SDFDF, socio-demographic feature data form; MV, metabolic values form; HTA, form for assessing the attitude and habits related to hypertension; HTI, information about hypertension.

X: once a month.

XX: twice a month.

Results

In the study, 40% of the patients included are female. While average age of the patients in the intervention group is 49.6 ± 9.67, the average age of those included in the control group is 51.4 ± 10.47 (Table 2). When the duration of hypertension is examined, it is seen that 46.7% of the patients in the intervention group had hypertension for 0-12 months, while this rate was 53.3% among the control group patients. As for the rates of patients having hypertension for more than 3 years, they are 26.7% and 20% in the intervention and control groups, respectively (Table 3). The difference between the changes in the 6-month fasting blood glucose (FBG) averages of both groups was found to be statistically significant ($F=3.28$ $P = .04$). In the statistical analysis of the measurement results among groups, it was determined that the difference between the changes in HbA1c values of the groups was highly significant according to the measurement times ($F = 5.0$ $P = .01$) (Table 4). Changes in the sixth month score averages related to the quality of life among the intervention and control groups were found to be statistically significant in all subscales ($U = 0.00$ $P <.001$) (Table 5). The score averages of patients in the Chronic Disease Care Assessment Scale Patient Form were 1.93 ± 8.68 in the intervention group and 1.81 ± 7.07 in the control group in the zeroth month and 4.53 ± 3.62 in the intervention group and 1.86 ± 3.77 in the control group at the sixth month. The changes between the scale score averages in both groups were found to be statistically significant in the sixth month ($U=0.00$ $P <.001$) (Table 6). A statistically significant decrease was observed in the mean arterial pressure values of the patients in the intervention group in the zeroth and sixth months and the difference between groups was found to be statistically significant (Table 7).

Discussion

This study examined the effect of training and follow-up programs based on Wagner's CCM on disease management in individuals with hypertension. It was concluded that, consistent with the H4 hypothesis of the study, mean arterial blood pressure, waist circumference, body weight, body mass index, HbA1C, and FBG levels were significantly improved in the intervention group. Similarly, in the study conducted by Stroebel et al[12] with 149 patients, 117 of whom were hypertensive, based on the care model, HbA1C levels decreased from 9.68 mmol/mol to 8.44 mmol/mol. In the same study, LDL levels decreased from 174.2 (33.3) mg/dL to 130.6 (43.2) mg/dL.[12] In the study conducted by Goderis et al[13], HbA1C levels were reduced by 0.4%, while LDL levels were reduced by 16% (13). In the study conducted by Hiss et al[14], significant decreases were observed in HbA1C and systolic/diastolic blood pressure levels between the groups, but no difference was found in cholesterol levels in parallel to the study. In the study conducted by Carter et al.[15] a decrease was observed in body mass index and a decrease of 7% mmol/mol was determined in HbA1C level, but no change

Table 2. Socio-Demographic Characteristics of Patient

Socio-Demographic Characteristics	Intervention Group		Control Group		Total		X^2, P
	n	%	n	%	n	%	
Gender							
Female	6	40	6	40	12	40	.00
Male	9	60	9	60	18	60	.64
Age	X̄	SD	X̄	SD	X̄	SD	t = −0.34
	49.6	9.67	51.4	10.47	50.4	11.15	P = .73
	Min:32 Max: 65		Min:33 Max: 65		Min:32 Max: 65		
Marital status							
Married	13	86.7	13	86.7	26	86.7	.00
Single	2	13.3	2	13.3	4	13.3	.70
Education status							
Literate	2	13.3	2	13.3	4	13.3	
Primary school	1	6.7	1	6.7	2	6.7	.00
High school	3	20	3	20	6	20	1,0
University	9	60	9	60	18	60	
Profession							
Housewife	2	13.3	2	13.3	4	13.3	
Officer/employee	7	46.7	7	46.7	14	46.7	.00
Free	1	6.7	1	6.7	2	6.7	1.0
Retired	5	33.3	5	33.3	10	33.3	
Total	15	50	15	50	30	100	

SD, standard deviation.

was determined in blood pressure averages. Only decreases in blood pressure averages determined in the intervention group in the study conducted by Foy[16] and in body mass index values in the study conducted by Lee[17] showed significant differences between the groups. Likewise, Chia[18] found that the use of CCM reduced blood pressure in patients. On the other hand, Chia criticized the studies based on CCM by arguing that they lacked well-designed randomized studies in which the effects of the constituent components on the clinical outcomes were examined separately and that studies specific to the patients with hypertension were absent. Yet still, Chia[18] underlined that the model improved the patient results, and only randomized controlled and cost-effective studies are needed to determine which component is effective and to what extent.

The superiority of the study to other studies in the literature is that a sample specific to hypertension was used, and its limitation was that the sample size was not big enough to be generalized to the population of hypertension patients in Turkey, and the cost results were not taken into consideration, and similar to the other studies in the literature, there was lack of clarity about which component of the model was effective on patient results. Therefore, study designs allowing for a 2-way evaluation of model components and data results might be suggested for future studies. However, in the adaptation of these studies to the model, it would be appropriate

to be in contact with the designer of the model or with the institutions granting permission for the initiative. When we evaluate the results of the study, it was determined that a training follow-up and lifestyle change program based on CCM improved metabolic values of hypertensive patients. In addition, engagement and awareness-raising of patients and this program must be considered as a continuous service. It is envisaged that the implementation of similar programs before the emergence of comorbidities and end-organ damage due to hypertension in primary health care services will be cost-effective interventions by increasing the quality of life among patients for the future and decreasing co-morbidity/mortality and recurrent hospitalizations. In H_2 hypothesis, a significant increase was found in the mean scores of the CCM Assessment Scale in the intervention group. The mean total scale score was 2.4 ± 0.87 in the study conducted by Rick et al.[19] it was 2.34 ± 0.94 in the reliability and validity study conducted by İncirkuş,[20] it was 2.77 ± 0.86 for patients with cardiovascular diseases (CVD), and 2.89 ± 0.89 for patients with chronic obstructive pulmonary disease (COPD) in the study conducted by Cramm.[21] Although the total scale score obtained in the study was slightly lower compared to the literature, it was found to be higher than Üstünova's result, 1.69 ± 0.37, in COPD patients.[22] Like the results of these studies, it was determined in the study that the patients with hypertension were dissatisfied with the health services they received. Although

Table 3. Distribution of Patients According to the Features of Hypertension Disease

	Intervention Group		Control Group		Total		X^2, P
	n	%	n	%	n	%	
Duration of hypertension disease							0.21 P=.97
0-12 months	7	46.7	8	53.3	15	50	
13-24 months	2	13.3	2	13.3	4	13.3	
25-36 months	2	13.3	2	13.3	4	13.3	
37 months and more	4	26.7	3	20	7	23.4	
Frequency of health control							0.60 P=.89
0-3 months	2	13.3	3	20	5	16.7	
4-6 months	6	40	5	33.3	11	36.6	
Once a year	4	26.7	5	33.3	9	30	
For complaint/prescription	3	20	2	13.3	5	16.7	
Tension drug usage							0.00 P=.65
Yes	12	80	11	73.3	23	76.7	
No	3	20	4	26.7	7	23.3	
Information about the used tension drug							3.77 P=.92
Know	10	83.3	10	90.9	20	87	
Does not know	2	16.7	1	9.1	3	13	
Disease out of hypertension							6.74 P=.45
None	8	53.3	9	60	17	56.7	
DM	3	20	4	26.7	7	23.3	
Hashimoto thyroiditis	3	20	2	13.3	5	16.7	
Osteoporosis	1	7.7	-	-	1	3.3	
Hypertension diagnosis in the family							0.68 P=0.34
None	2	13.3	3	20	5	16.7	
Mother	7	46.7	3	20	10	33.3	
Father	5	33.3	7	60	12	40	
Sibling	1	6.7	2	13.3	3	10	
Total	15	100	15	100	30	100	

DM, diabetes mellitus.

these studies were conducted in different countries (Germany, Netherlands, Malaysia, etc.), it is seen that the patients with chronic illnesses are dissatisfied with health care services, chronic diseases are a common problem in the whole world, and health systems need urgent arrangements and changes in this regard. Another finding reached in the study was that the mean scores of the "follow-up/coordination subscale" were lower at the zeroth month and at the sixth month compared to the other subscale mean scores. Similarly, the lowest score was obtained in the studies of Rosemann et al[23], Üstünova[22], Aragones et al[24], Glasgow et al[25], and Incirkus[20]. It is seen that the results obtained point out similar problems, and in chronic disease care, patient care insufficiency is experienced mostly with respect to continuous monitoring, follow-up, lack of coordination between health institutions, and continuous interaction with the patient. This problem shows that health-care teams need to change their methods in chronic disease care and that health policies of countries need to be revised. The increase observed in the subscale scores of the intervention group in the sixth month of the study was accepted as an indicator that a well-organized system, which encourages and integrates patients in care services, completes their information deficiencies and allows for the solution decisions to be taken jointly, is the right step. The need for an increase in the number of studies for applying the scale to hypertension-specific patient groups was considered as a secondary outcome. In the patients in the intervention group, significant increases were determined in the WHOQOL-BREF(Tr) quality of life score averages. This finding is consistent with the H_3 hypothesis of the study.

Table 4. Metabolic Variables of Patients

Laboratory Parameters		Intervention Group $\bar{X} \pm SD$	Control Group $\bar{X} \pm SD$	t	P
Fasting blood glucose	0 month	99.26 ± 17.55	103.40 ± 20.92	−0.58	.56
	3 months	98.46 ± 14.88	107.00 ± 22.05	−1.24	.22
	6 months	91.20 ± 14.79	119.80 ± 54.00	−1.97	.05
		F=594.18; F=283.85 P<.001 P<.001			
HbA1C	0 month	5.51 ± 1.00	5.68 ± 1.05	−0.46	.64
	3 months	5.43 ± 0.87	6.14 ± 1.78	−1.37	.17
	6 months	5.13 ± 0.80	6.18 ± 1.61	−2.26	.03
		F=583.58; F=273.15 P<0,001 P<.001			
Total cholesterol	0 month	232.60 ± 33.62	234.46 ± 39.43	−0.14	.89
	3 months	219.53 ± 29.56	229.86 ± 39.81	−0.80	.42
	6 months	203.86 ± 25.46	219.73 ± 46.31	−1.16	.25
		F=969.62; F=474.69 P<.001 P<.001			
Total triglyceride	0 month	163.66 ± 77.25	170.00 ± 67.02	−0.24	.81
	3 months	155.06 ± 60.44	163.13 ± 57.72	−0.37	.71
	6 months	138.53 ± 53.94	145.53 ± 49.10	−0.37	.71
		F=90.52; F=118.39 P<0,001 P<0,001			
Weights changes	0 month	84.87 ± 16.33	81.20 ± 11.11	0.71**	.47
	3 months	82.56 ± 15.69	81.53 ± 11.50	0.20**	.84
	6 months	81.17 ± 15.26	82.53 ± 11.70	−0.27**	.78
		F=417.18; F=769.96 P<.001 P<.001			
Waist circumference changes	0 month	100.80 ± 12.16	83.73 ± 7.90	4.56**	<.001
	3 months	99.73 ± 7.90	82.87 ± 7.71	4.52**	<.001
	6 months	98.90 ± 12.06	84.00 ± 8.29	3.94**	<.001

F=1016.588; F=1670.30
P<.001 P<.001

HbA1C, human hemolysate glycated hemoglobin; SD, standard deviation.
**P: statistical significance between 3-6 months.

Table 5. Average Scores of WHOQOL-BREF (TR) Quality of Life Assessment Scale

WHOQOL-BREF (TR) Domains	Groups	0 Month $\bar{X} \pm SD$	U	P	6 Months $\bar{X} \pm SD$	U	P
Physical	Intervention	7.10 ± 1.66	93.00	.42	17.13 ± 1.24	0.00	<.001
	Control	7.60 ± 1.47			7.33 ± 1.58		
Mental	Intervention	8.83 ± 1.85	59.00	.03	17.06 ± 1.10	0.00	<.001
	Control	7.36 ± 1.36			7.30 ± 1.45		
Social relations	Intervention	12.13 ± 1.06	93.50	.41	16.44 ± 1.02	0.50	<.001
	Control	11.66 ± 1.50			11.62 ± 0.95		
Environmental	Intervention	7.43 ± 1.74	107.00	.82	16.98 ± 1.03	0.00	<.001
	Control	7.56 ± 1.48			7.70 ± 1.39		

SD, standard deviation.

Table 6. Average Scores of the PACIC

Monitoring		0 Month			6 Months		
PACIC Domains	Groups	X̄ ± SD	U	P	X̄ ± SD	U	P
Patient activation	Intervention	2.31 ± 2.84	101.00	.62	4.7 ± 1.55	2.00	<.001
	Control	2.13 ± 1.99			2.13 ± 1.99		
Delivery system/practice design	Intervention	2.95 ± 3.29	87.00	.28	4.82 ± 0.51	0.00	<.001
	Control	2.48 ± 2.23			2.24 ± 2.08		
Goal setting/tailoring	Intervention	1.7 ± 2.19	107.00	.81	4.64 ± 0.94	0.00	<.001
	Control	1.6 ± 2.06			1.73 ± 1.34		
Problem solving/contextual	Intervention	1.8 ± 1.47	91.50	.36	4.38 ± 1.30	0.00	<.001
	Control	1.73 ± 1.67			1.8 ± 1.52		
Follow-up/coordination	Intervention	1.56 ± 1.88	112.00	.98	4.28 ± 2.72	0.00	<.001
	Control	1.45 ± 1.99			1.66 ± 1.23		
Total score		1.93 ± 8.68	83.50	.23	4.53 ± 3.62	0.00	<.001

PACIC, patient assessment of chronic illness care; SD, standard deviation.

Table 7. Changes in MAP of Patients by Months

Follow-up	Groups	X̄ ± SD	Min.	Max.	F
0 month	Intervention	104.33 ± 14.24	96 446	112 220	9.009
	Control	98.01 ± 14.71	95 572	109 975	P <.001
1 months	Intervention	102.77 ± 13.00	93 157	107 371	
	Control	98.32 ± 14.57	92 864	105 895	
2 months	Intervention	100.26 ± 12.83	92 010	105 134	
	Control	98.21 ± 13.93	92 385	105 706	
3 months	Intervention	99.37 ± 11.76	91 787	105 092	
	Control	99.36 ± 13.52	89 867	106 160	
4 months	Intervention	98.57 ± 11.85	90 249	106 391	
	Control	99.18 ± 14.08	90 499	105 928	
5 months	Intervention	99.04 ± 12.02	91 871	106 849	
	Control	99.45 ± 13.60	91 389	106 985	
6 months	Intervention	98.44 ± 12.01	91 923	106 983	
	Control	99.87 ± 13.98	92 123	107 610	

MAP, mean arterial pressure.

Göçgeldi (2008)[26] reported that the quality of life of the patients with hypertension, which was assessed through SF-36, was low.[26] In the study, score averages of both groups in physical, environmental, mental, and social relations subscales in the zeroth month were determined to be about 7.50. The lowest score was found in the physical dimension with 7.10. This is an expected finding when the physical effects of hypertension such as fatigue and headache are considered. Improvements in metabolic values and blood pressure values of the patients in the intervention group are also interpreted as the indicator of quality of life and physical and psycho-social impacts of the disease. Due to chronic diseases, quality of life and self-care power of individuals are adversely affected, and morbidity and mortality risks increase. This makes the management of

chronic diseases important in the country and in the world. Management of chronic diseases includes not only treating the disease but also ensuring that the patient acquires self-management skills and preparing and strengthening the patient to learn how to live with the disease through various education-training methods. It has been reported that the expectations of both patients and healthcare professionals are not met adequately in effective management of the disease. Expectations of patients are to be informed constantly about their diseases, have uninterrupted access to care, be in contact with professionals all the time, arrangement/facilitation of healthcare procedures, and learn how to cope with symptoms such as fatigue, sleep disorders, depression, anger, and stress. Attitude and knowledge of the healthcare

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professionals and establishment of the effective communication technique play a key role in the management of chronic diseases.

In line with the data obtained, CCM was accepted as a care model which yielded positive outcomes when it was applied to patients with hypertension, which is a chronic disease, and could lead to improvements in the metabolic values of patients. However, the limitation of the application of the model was the lack of clarity about which component of the model contributed to these results and to what extent. The same limitation had been reported in the previously conducted studies, as well. In the use of the model, both individual (healthcare professionals and patients) and societal arrangements are in question. In other words, interventions are required at the level of patients, healthcare providers, and the system to achieve success in the implementation of the model. Therefore, it is thought that assessing the interventions and arrangements concerning these 3 components through scales showing how they affect one another and then demonstrating the effect of the whole on patient results will be more fruitful than examining their impacts on patient results on an individual basis. The CCM is a multi-faceted model requiring a meticulous assessment and organization. The success of the model is directly associated with increasing and supporting the self-care powers of chronic patients and assessment and follow-up of patients by healthcare professionals as a team along with arrangements at the level of the national health system.

A systematic review conducting a thematic synthesis of the studies where the model was applied (Boehmer, 2018) included only the study conducted by Crabtree et al[27] as the study examining patients with hypertension as specific patient group. Thus, the study is expected to pave the way for further research. In the country, polyclinic services are provided for patients with hypertension in both cardiology and nephrology departments in many research hospitals. Particularly with patients having primary-phase hypertension, the delivery of these services by a team consisting of experts from departments such as internal medicine, cardiology, psychiatry, physical medicine and rehabilitation, dietician, psychology, and physical training sports in a way like study and the application of the program with institutional support will prevent additional organ damage and enhance quality of life.

However, what needs to be emphasized is that the implementation of similar programs in primary healthcare services before the emergence of comorbidities and end-organ damage due to hypertension will be cost-effective interventions by increasing the quality of life among patients for the future and decreasing co-morbidity/mortality and recurrent hospitalizations, and this finding is supported by literature, as well.[28] The implementation of CCM in the national health system will play an effective role in reducing the disability retirement and subsequent expenditures associated with chronic illnesses by affecting the emergence of comorbidity. In particular, the use of similar health programs within the scope of private health insurance will balance the damage/premium ratio in the long

term as it will prolong the duration of people at risk group to develop chronic diseases and make private health insurance more accessible and affordable for everyone. In the study, meetings were held with the public or private gyms in the vicinities of patients included in the intervention group and they were made to make use of these gyms. In an organization where the CCM is supported by the national health system, it is considered that there will be easy and accessible services for individuals with chronic diseases through contracts such as discounts, incentives, and rent advantages to be made by these institutions. At the same time, as a secondary gain, these services can turn into campaigns or projects for the whole society to prevent sedentary lifestyle. The Austrian Health System, which devotes a large budget and time to scientific studies on obesity and sedentary lifestyle prevention, has made use of the game "Pokémon," which is now widely used on smartphones, to increase social mobility and reduce obesity.[29]

Nowadays, COVID pandemic affected the continuity of chronic care drastically, casting light on pre-existing weak spots in chronic care organization. Face-to-face consultations had to be ceased and focus should be shifted toward COVID care. In most practices, there was no proactive reach out to patients with chronic diseases and multidisciplinary teamwork was pushed to the back burner and it was seen that there was a need for new care organizations for chronic disease care. Danhieux et al[30] stated important ways to improve are implementing the CCM through stratification of the patients according to their needs and planning in anticipation of flare-ups or a second wave in their study. They stated 2 important pathways: a more systematic implementation of the CCM, which could be achieved by better training of general practitioners in practice management, and the establishment of a stable financing structure supporting staff (nurses and dieticians) so that they can play a role in managing chronic patients in times of a crisis. This will help to quickly switch between acute and chronic services and will improve continuity of care.[30]

Conclusion

Implementation of clinical guidelines significantly improves patients' assessment of the quality of care. Guidelines must be actively integrated into hospitals or primary healthcare institutions' practices to reach optimal outcomes. The CCM could be an ideal, multidimensional, systemic, and integrated approach to optimize all components of hypertension management.

The difficulty and importance of chronic patient follow-up during the pandemic process are also supported in this study. The fact that CCM model used in the study enables the continuity of patient follow-up and has been seen as a model that allows the patient and the healthcare provider to be in constant communication during long pandemic periods.

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