

## Research Paper

## Effects of Telenursing on the Management of Self-care Behaviors in Patients With Chronic Hypertension



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## ABSTRACT

**Background:** The high prevalence of hypertension worldwide and its severe effects on various body organs are major health concerns in every community. The present study aims to evaluate the effects of telenursing on the management of self-care behaviors in patients with chronic hypertension.

**Methods:** This randomized clinical trial was conducted on two groups with a pretest-posttest. The sample population included 82 patients with hypertension referred to comprehensive urban and rural health service centers in Garmsar City, Iran who were initially selected via two-stage cluster sampling and allocated into two groups of intervention and control by permuted block randomization (six patients in each block). Data were collected using a demographic questionnaire, the hypertension self-care profile, and phone follow-up, which were completed at the beginning of the study. The patients received a two-hour training session. The intervention group was followed up (telenursing) for three months, and the control group received routine care. After the intervention, the self-care questionnaire in patients with chronic hypertension was completed by both groups. Data were analyzed with SPSS software, version 25 using the Mann-Whitney U test, paired t-test, and the analysis of covariance (ANCOVA).

**Results:** Telenursing increased the mean score of a healthy diet by 1.3 units ( $P=0.04$ ) and the score of disease management by 1.19 units ( $P=0.004$ ). However, the intervention had no significant effects on weight ( $P=0.09$ ), supervision of the awareness of food labeling ( $P=0.38$ ), and medication regimen ( $P=0.62$ ).

**Conclusion:** According to the results, it is recommended to use this method to manage the disease and dietary habits of patients with chronic hypertension.

**Keywords:** Hypertension, Telenursing, Self-care

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## 1. Introduction

The high prevalence of hypertension worldwide and its severe effects on various body organs are major health concerns in every community [1]. This disease is the cause of 7.5 million deaths in the world [2] and accounts for annually about 13% of global mortality [3]. Hypertension is a leading cause of preventable death and a significant risk factor for patients with cardiovascular diseases [4]. Hypertensive patients are at a higher risk of developing cardiovascular diseases compared to those with normal blood pressure (4.5 times) [5].

According to the World Health Organization (WHO), the prevalence of chronic, non-communicable diseases (including hypertension) has been increasing worldwide, especially in developing countries [6]. Hypertension adversely influences the global and national economy, and direct and indirect budgets should be allocated to its management. The direct costs account for disease diagnosis and treatment, while the indirect costs are associated with the disease-related loss of efficiency in the patients [7]. Some of the predisposing factors of hypertension include obesity, an unhealthy diet, salt overuse, inadequate physical activity, alcohol consumption, and smoking habits [6].

The routine treatment included necessary physician visits, drug administration, and delivering essential care points by physicians or health service center healthcare providers. Self-care and disease control are vital in managing hypertension by minimizing complications. The critical self-care behaviors in this regard are healthy dietary habits, physical activity, stress management, interpersonal relationships, spiritual empowerment, and health responsibility [8].

Self-care is essential to the treatment of chronic diseases, especially hypertension [9]. Through self-care, patients use their knowledge, skills, and abilities to independently maintain their health [10]. Chronic patients require constant follow-up [11] because continuous follow-up is considered an inherent element of healthcare services. Patients who are properly followed up are more likely to improve their unhealthy habits compared to others [12]. Adherence to self-care in chronic patients is paramount, and patients can positively influence their comfort, functional abilities, and disease course by developing self-care skills [13]. On the other hand, chronic diseases are often long-term and progress steadily. Therefore, these patients need constant care, training, and recommendations that should be provided by the healthcare team. Health training in chronic patients can enhance their self-care and self-efficacy [14].

There is global consensus regarding the fact that self-care plays a pivotal role in the management of chronic patients; if these patients are engaged in their care process (e.g. proper medication use, monitoring of health changes, and maintaining a healthy lifestyle), the management of chronic diseases can be successfully achieved [15]. Self-care refers to the activities that an individual performs to maintain or promote their lifestyle, health, and well-being, while preventing and treating their disease. Nurses can help these patients address the needs that maintain their health and well-being [16]. Therefore, self-care leads patients to functional empowerment, positive influence on their disease course, and overcoming the challenges that hinder a healthy lifestyle [17].

Training and counseling enhance self-care in various patients [14]. Today, mobile communication has provided an opportunity to continue the process of care and merge into the patient's daily life activities [18]. Based on Behzad and Mackoy's studies, telenursing is effective in care provision, cost reduction, and easy access to proper care [19, 20]. Furthermore, telenursing can improve the relationship between patients and healthcare providers, thereby increasing the quality of life (QoL) of patients through providing access to critical information when needed. In this follow-up approach, patients can save time, and treatment costs can decrease with a type of nursing care that does not require the patient to commute for long hours [21]. Telenursing also helps patients and their families actively participate in the home care process and adhere to the treatment regimen with more knowledge, awareness, and self-confidence [22].

Telenursing conveys large amounts of information within a short time and provides patients with the opportunity to find answers to their questions at home [18]. Currently, the COVID-19 pandemic has led to decreased referrals in chronic hypertensive patients, thereby increasing their care and treatment needs. The present study aimed to evaluate the effects of telenursing on the management of self-care behaviors in patients with chronic hypertension.

## 2. Methods

### Study design

This two-group clinical trial was conducted with a parallel pretest-posttest design. Two-stage cluster sampling method was used. Initially, five out of ten centers were selected (two urban and three rural) afterward, 85 patients were selected from five health centers based on the inclusion criteria. Written informed consent was

obtained from the research units, and they were divided into two groups of intervention and control by permuted block randomization. R software was recruited for this purpose. Twenty blocks containing 6 letters (A-F) were created. The first three letters (A, B, C) were allocated to the intervention group, and the others (D, E, F) to the control group.

### Inclusion and exclusion criteria

The inclusion criteria of the study included age of 30-75 years, nativity, access to a phone, confirmed diagnosis of hypertension by a family physician, absence of cognitive disorders, and basic literacy. The exclusion criteria included lack of response to phone calls for two consecutive weeks, death, immigration, hospitalization during the study period, and incomplete questionnaires.

### Research instruments

A demographic questionnaire consisted of two sections. The first section included information about age, gender, body mass index (BMI), mean blood pressure, contact number, etc. The second section contained information about family disease history, disease duration, disease control method, hospitalization within the past six months, and disease history (e.g. cardiovascular diseases).

The hypertension self-care profile (HTN-SCP) was the main research tool of this study, which was developed by Han et al. in 2014 [10], and its psychometric analysis was performed by Ghanei et al. in Iran in 2018 [23]. The HTN-SCP has four domains of diet, food labeling, drug regimen, and disease management. The items of the scale are scored based on a four-point Likert scale (always=4, often=3, occasionally=2, seldom/never=1). The score range of the HTN-SCP is 20-80, and the higher scores indicate better self-care.

The reliability of the HTN-SCP was determined by the pretest-posttest design on 20 patients after two repetitions and confirming the internal consistency (Cronbach's alpha: 0.8). The blood pressure of the subjects was measured using the Brisk pressure monitor (model: HS20A), and the weight was measured using a Seca scale (model: 703), and their height was measured using a stature meter (2 m).

### Procedures

After explaining the research objectives and methods, written informed consent was obtained from the participants. First, the demographic questionnaire and the

HTN-SCP were completed. The participants received a training session (2 h) by the necessary protocols during the COVID-19 pandemic. In this session, information was provided on the nature of the disease, the associated complications, the importance of medication therapy, and self-care training (quitting smoking, stress and anxiety management, healthy nutrition, weight loss, physical exercise, health responsibility, and blood pressure measurement at home).

To measure blood pressure, the participants initially rested for 10 minutes. The pressure monitor was used to measure their blood pressure three times at five-minute intervals from their right hand while the researcher (first author) was seated, and the mean value was recorded as the systolic and diastolic blood pressure [24].

After recording the initial data of the intervention group, the researcher performed a phone follow-up for three months. During the first month, the patients were contacted via phone twice per week, followed by once per week in the second and third months. The researcher contacts the patients during working hours, and the mean duration of each contact was 15 minutes. In the conversation, the questions were asked about the general health of the patients, encouraging to adhere to recommendations, general and specialized care, follow-up of educational needs, presenting solutions, and answering their questions. The contents of the phone conversations were recorded for each patient in specific forms so that the findings can be re-evaluated in the following calls.

During the intervention, the control group received routine care (the routine care included visiting necessary physicians and delivering essential care points by health care providers). Four patients from the control group and seven patients from the intervention group were excluded due to not responding to phone calls for two consecutive weeks. At the final stage, the self-care scale was completed again, and the blood pressure of the patients was also measured.

### Statistical analysis

Data were analyzed in SPSS software, version 25 using t-test, Fisher's exact test, the Mann-Whitney U test, and the analysis of covariance (ANCOVA) at the significance level of 0.05.

### 3. Results

The mean age of the patients was  $54.18 \pm 9.55$  and  $54.24 \pm 8.71$  years in the intervention and control groups, respectively. In terms of gender, 28% of the patients were men, and 72% were women. Regarding education level, most patients (67.1%) had primary education. In addition, most patients were married (85.4%), and the income of the majority (47.5%) was sufficient. The mean age and height of the patients had no significant differences between the intervention and control groups ( $P > 0.05$ ). In addition, no significant differences were

observed between the study groups in terms of gender, marital status, education level, occupation status, and income (Table 1).

According to the results of ANCOVA, telenursing increased the mean score of healthy nutrition by 1.3 units ( $P = 0.04$ ) and the score of disease management by 1.19 units ( $P = 0.004$ ). On the other hand, telenursing had no significant effects on increasing the awareness of food labeling ( $P = 0.38$ ) and drug regimen ( $P = 0.62$ ) (Table 2).

**Table 1.** Frequency distribution of demographic characteristics in intervention and control groups

Variables	No. (%)		P	
	Intervention (n=41)	Control (n=41)		
Gender*	Female	29(70.7)	30(73.2)	0.8
	Male	12(29.3)	11(26.8)	
Marital status**	Single	0(0)	1(2.4)	0.15
	Married	33(80.5)	37(90.2)	
	Divorced	1(2.4)	1(2.4)	
	Widowed	7(17.1)	2(4.9)	
Education level**	Illiterate	2(4.9)	5(12.2)	0.18
	Primary	26(63.4)	29(70.7)	
	Secondary	8(19.5)	4(9.8)	
	High school diploma	3(7.3)	1(2.4)	
	Associate degree	0(0)	2(4.9)	
Occupation status**	Academic	2(4.9)	0(0)	0.76
	Worker	1(2.4)	1(2.4)	
	Employee	2(4.9)	1(2.4)	
	Housewife	28(68.3)	29(70.7)	
	Self-employed	10(24.4)	8(19.5)	
Income status**	Retired	0(0)	2(4.9)	0.55
	Poor	3(7.3)	2(5.1)	
	Moderate	13(31.7)	17(43.6)	
	Favorable	20(48.8)	18(46.2)	
	Excellent	5(12.2)	2(5.1)	

\*Chi-square; \*\*Fisher's exact test

**Table 2.** ANCOVA results on variables in intervention and control groups

Variables	Coefficient	Std. Error	Std. Coefficient	Hypothesis Testing	P
Healthy nutrition	-1.3	0.65	0.21	-2.05	0.04
Awareness of food labeling	-0.23	0.27	-0.11	-0.87	0.38
Drug regimen	-0.17	0.36	-0.05	-0.49	0.62
Diseases management	-1.19	0.40	0.33	-2.98	0.004

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#### 4. Discussion

The present study was conducted to evaluate the effects of telenursing on the management of self-care behaviors in patients with chronic hypertension. According to the results, telenursing significantly affected the variables of healthy nutrition and disease management, while it had no significant effect on the variables of weight, awareness of food labeling, and drug regimen. Iso et al. [25] conducted an observational case study regarding community-based training sessions to control hypertension, reporting that non-therapeutic training led to the blood pressure control and the reduction of systolic blood pressure within six months, and the effects persisted for up to one and a half years after the intervention in the case group. In another study, Behzad et al. [19] stated that empowerment based on phone follow-up had a positive impact on the total score of self-efficacy in hypertensive elderly, which is consistent with the results of the present study. The researchers believe that since in chronic diseases, the patient's compliance with the long-term treatment process decreases, therefore they should be supported to continue the treatment and regular follow-up leads to the patient's empowerment.

The study conducted by MacKoy et al. [20] aimed to evaluate the effectiveness of remote health technology on hypertension self-care rather than considering their high costs. According to the findings, the high costs of hospitalization and emergency care in patients with hypertension make remote health care a beneficial alternative in this regard. The integration of remote health care into care provision, increasingly associated with mobile phone health care, can increase the capacity of healthcare providers and improve the access of patients to clinical management and self-care. Notably, the aforementioned studies were interventional, and their findings are consistent with the results of the present study. The only difference is that these studies were conducted under different circumstances than the COVID-19 pandemic, and the lack of recent limitations helped the longitudinal nature of some of these studies.

Previous studies imply that training is the most effective approach to promoting awareness, improving self-care, and lifestyle modification. In the study by Mohammadi et al. [18], dietary compliance was 35.54% and 47.82% in the case and control groups, respectively before the intervention. After the follow-up, the rate in the case and control groups was estimated at 17.77% and 56.61%, respectively, and the difference was considered significant.

In the study conducted by Worsely [26], a positive significant correlation was observed between the nutritional awareness and behavior of the subjects. Furthermore, Mir Qutbi et al. [27] conducted a study in Tehran City, Iran, during 2009-2010 to evaluate the awareness and performance of consumers regarding food labeling. Kim et al. [28] conducted a similar study in Korea in 2008 to assess the behavior of clients toward food labeling in the food markets of Spain. According to the obtained results, most consumers paid attention to the food label (especially the production and expiration dates) while shopping.

According to the study by Ghojani et al. [29], more than 75% of consumers paid attention to food labels while shopping, and checking the production and expiration dates was the main purpose of these individuals; a less significant motivation was also to check the net weight of the product and obtain information about additives/colorants. Meanwhile, attention to food labeling is reported to be 78% in the United States. In the study conducted by Chung [30], Korean consumers were concerned with food labeling in 66% of the cases. Furthermore, the results obtained by Shine [31] on Irish consumers indicated that 81% read the food labels of the products that they intended to purchase, while only 81% relied on this information to purchase food products.

According to the results of Schupp et al.'s study [32], approximately 50% of Louisiana residents were aware of food labeling, and the majority relied on the information mentioned on food labels; this is inconsistent with the results of the present study, and the discrepancy is

rather acceptable. In the communities where years of advertisement and training have been dedicated to issues, such as food health, consumers have become more sensitive about the subject; this is incomparable to the situations of several regions in Iran due to cultural, social, and economic differences. In Iran, food health and awareness may be a novel subject incomprehensible to numerous consumers. Although efforts are ongoing in this regard, serious endeavors should be made to raise public awareness through the mass media and with the help of authorities so that this index can be improved and optimized soon. Long-term problems and suffering in chronic diseases increase the sensitivity of patients to diet so that by controlling it, they can reduce the severity of their pains and have a better QoL.

According to the research conducted by Ghochani et al. [29], attention to the nutritional information on food labels was low in the evaluated samples, which can be due to inadequate nutritional awareness and lack of a proper nutrition culture in the participants. Furthermore, consumers pay more attention to nutritional information and food components than retailers. This issue can be attributed to the consumers' interest and motivation to have a healthy diet and comply with modern nutritional recommendations. Other reasons for the inattention of retailers and consumers to food labeling can be illiteracy, unreadable labels, lack of conviction, disinterest, lack of motivation, lack of time, and ambiguity of food labels.

In the study conducted by Bayrami et al. [33], taking medicine was the most frequent compared to other self-care behaviors and had a favorable status. In the mentioned study, 85% of the participants regularly used their medication. In the present study, no significant correlations were observed between self-care behaviors and the demographic characteristics of the participants. According to Clegg [34], phone follow-up can enhance lifestyle and promote healthy behaviors, while also improving the management of chronic diseases by the patients, thereby helping their families to actively partake in the care of the patients at home.

In a review study conducted by Kotb et al. [35], treatment adherence was evaluated in patients with coronary artery diseases, and the obtained results indicated a significant difference between the intervention and control groups in this regard. This is consistent with the study conducted by Kamrani et al. [36], while inconsistent with the results of Celler et al. [37], Clegg et al. [34], Kamrani [36], and Kotb's studies [35]. The main limitation of our study was the COVID-19 pandemic and the concerns of the participants. Compliance with treatment and medication are crucial chal-

lenges in chronic patients, and its lack can lead to severe complications, such as disease progression and disability, which may require hospitalization. Another limitation was the low literacy of the patients with hypertension, which made it difficult to obtain information and provide feedback to the patients. In addition, we used questionnaires for data collection, and patient-reported outcome bias may have affected the results.

## 5. Conclusion

According to the results, telenursing can improve the nutritional status and disease management of patients with chronic hypertension. Therefore, it is recommended to use telenursing as an approach to provide care services to these patients, as well as a training method. Patient training plays a pivotal role in disease control and the reduction of disease complications in chronic patients. Nurses are essential to the training process of these patients to promote disease prevention and treatment. Since chronic patients require both training and regular, constant follow-up, telenursing, and phone follow-up can be effective tools in this regard.

## Ethical Considerations

### Compliance with ethical guidelines

The study protocol was approved by the Ethics Committee (Ethics Code: IR.MEDSAB.REC.1399.127), and the clinical trial has been registered under the code IRCT20201105049279N1.

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### Authors' contributions

All authors equally contributed to preparing this article.

### Conflict of interest

The authors declared no conflict of interest.

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