

ORIGINAL ARTICLE

Effect of Teaching Intervention Based on Health Action Process Approach on Self-care behavior in Older People with Hypertension: A Quasi-experimental Study

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ABSTRACT

Background: Aging is considered a natural developmental process in which physical, psychological, and social changes occur; hypertension can be one of these problems. Structured teaching, like the Health Action Process Approach (HAPA), may improve self-care and health in chronic conditions. This study aimed to examine the effect of teaching intervention based on HAPA on self-care behavior in older people with hypertension.

Methods: This quasi-experimental study was performed from October 2023 to March 2024 at Valiasr health services center affiliated with Jahrom University of Medical Sciences; 70 older people were divided into an intervention group (35 subjects) and a control group (35 subjects). Teaching intervention was carried out based on HAPA for the intervention group through seven teaching sessions over seven weeks. Data were collected using demographic and Hypertension Self-care Profile at baseline and 2 months post-intervention. Data were analyzed using SPSS 21 with the Chi-square test, Fisher test, Wilcoxon, and Mann-Whitney tests. Statistical significance was considered for P value<0.05.

Results: The median of self-care was not significantly different between the control (median: 51(IQR: 54-45)) and intervention groups (median: 50(IQR: 58-47)) before the intervention (P=0.26). Two months after the intervention, the median of self-care was significantly different between the intervention (median: 73(IQR: 74-71)) and control groups (median: 50(IQR: 54-45)) (P<0.001).

Conclusions: The HAPA could improve self-care behavior in older people with hypertension. It is suggested that healthcare authorities should pay attention to HAPA in teaching and preventive programs for self-care behavior in older people with hypertension.

Keywords: Aged, Elderly, Health Services, Hypertension, Self-Care.

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INTRODUCTION

Aging is considered a natural developmental process in which physical, psychological, and social changes occur. It is a progressive and irreversible phenomenon.¹ According to the estimate of the Iranian Statistics Center in 2023, the elderly population of Iran has reached 9 million and 521 thousand people.² The elderly population in Iran will also increase from 3.7% in 2005 to 6.11% in 2025 and 8.30% in 2050.³ According to the World Health Organization (WHO), the number of older people will be 2 billion by 2050, and one out of five people will be older.⁴

In aging, the function of body systems declines gradually. Hypertension is one of the common and chronic diseases affecting the quality of life. Unlike most diseases, hypertension has no external presentation and is called the silent killer. In 90 percent of cases, the cause of hypertension is unknown.⁵ Studies have shown that the risk of hypertension increases with ageing. Other causes of hypertension include race, sex, genetics, smoking, obesity, inactivity, and diet.^{5, 6} Hypertension has various prevalence rates in societies and 10 – 60 percent is reported in various countries. In a study in Iran, the prevalence of this disease is reported 20 percent. About 37% of Iranian adult population has high blood pressure. 46% of them are in the pre-hypertension stage. Also, 51% of them are unaware of their disease.⁷

One of the important factors in controlling high blood pressure is self-care, the importance of which has been emphasized by the WHO. Self-care is conscious, learned, and purposeful actions and activities performed by a person to preserve life and ensure and improve the health of himself and his family.⁸ Self-care interventions are so effective in hypertension that systolic and diastolic blood pressure decrease by 5 and 4.3 mmHg, respectively.⁷ Self-care includes regular check-ups of blood pressure, lack of smoking, exercise, healthy diet, avoidance of stress, weight loss, and regular intake of prescribed medications.

Self-care program is categorized into four levels: physical self-care, psychological self-care, social self-care, and spiritual self-care. The ability of self-care decreases by aging, and the need for help is considered a risk factor for low self-care in older people.⁹ Considering the importance of self-care in the elderly, there is a need to use programs that can increase self-care. Structured educational approaches in the field of self-care can lead to improvement of performance and health of patients with chronic diseases.¹⁰ Various models such as the 5A model, health belief, Orem's self-care theory, etc. have been used in the world to promote self-care in the blood pressure of the elderly.^{9, 11} However, for health promotion, the models are often too general because in the models, regardless of the special needs of a specific subgroup, all the variables involved must be considered in the interventions.¹¹ One of the approaches that seems effective in self-care is health action process approach (HAPA).¹² It allows to predict behavior and reflects possible casual mechanisms for changing behavior.¹¹ This approach consists of three stages of pre-intender (The person did not intend to perform the behavior), intender (A person intends to perform a behavior, but the intention has not yet turned into an action), and action (The person performs the desired behavior). In this approach, the process of changing health behavior consists of motivational and volitional phases. Motivational phase is a process in which a person intends to act or change a high-risk behavior and focus on beliefs. In this phase, HAPA suggests that risk awareness, outcome expectancy, and action self-efficacy influence the intention to perform the behavior.¹² Volitional phase is a process that includes converting intention into actual behavior. The structures of the voluntary stage are the planning process, coping self-efficacy, and recovery self-efficacy.¹⁰ This approach has been successfully able to predict various health behaviors, predicting between 31% and 69% of intention changes and between 15% and 73% of behavior changes. According to this

approach, there is a relationship between the intent of behavior, planning, self-efficacy, and changing behavior. Therefore, the planning process, together with other variables and structures of this approach, shows that by dividing people into two motivational and volitional stages, it is possible to achieve correct and appropriate behavior change as a good predictor.^{12, 13} Investigating the effect of implementing the HAPA on the self-care of the elderly with high blood pressure has received less attention in previous research. However, the results obtained from the implementation of the HAPA have been effective in other chronic diseases. Studies have shown that the HAPA could result in a healthy diet, decreasing inactivity behavior and promotion of physical activity in women with gestational diabetes.^{13, 14} The HAPA has been used to describe a variety of health behaviors, and the relative superiority of this model over the others is that other social cognitive models have been criticized mainly because of the intention-behavior gap. As a comprehensive model of self-regulation, the HAPA proposes a distinction between pre-intentional motivational processes that lead to a behavioral intention and post-intentional volitional processes that lead to actual behavior.¹³

The number of elderly patients suffering from high blood pressure has increased significantly in recent years due to various reasons, and with timely diagnosis and targeting in the treatment and proper control of this condition in the elderly population, it is possible to have a great impact on their quality of life. Self-care training is changing the behavior of patients with chronic diseases for a long period of time and even until the end of life.¹⁴ Therefore, the importance of old age on one hand and high blood pressure on the other hand requires a change in people's behavior.¹⁵ On the other hand, the HAPA is more comprehensive than other models including health belief model. It includes planning and action control to bridge between motivational and volitional behavior factors.¹³

Given the number of older people is increasing rapidly in Iran, it is necessary to identify their needs in the cultural, social, and economic contexts. This study aimed to examine the effect of teaching intervention based on health action process approach on self-care in older people with hypertension.

MATERIALS AND METHODS

This quasi-experimental study was conducted on older people with hypertension at Valiasr comprehensive health services center affiliated with Jahrom University of Medical Sciences from October 2023 to March 2024. The research population included all elderly people referred to the center who were suffering from high blood pressure and had health records. This study was single-blinded so that the statistician who analyzed the data was blind to the group allocation.

Inclusion criteria for older people were a written consent form, confirmation of high blood pressure by a health services center physician (Blood pressure above 140/90 mmhg), age over 60 years, literate individuals, no history of physical and psychological diseases, and substance use according to the record. Exclusion criteria were being absent for more than two times in teaching sessions, taking medications affecting consciousness, not being available, and being unwilling to participate in the study.

Based on previous study,¹⁵ considering means of self-efficacy in the intervention group (16.43 ± 3.88) and control group (13.50 ± 4.71), confidence interval=95%, power 80% and Effect size=0.68, 70 older people were selected.

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_1 - \mu_2)^2} = \frac{(1.96 + 0.84)^2 (3.88^2 + 4.71^2)}{(16.43 - 13.5)^2} \approx 35$$

The convenience sampling was used to select the samples. Out of the 110 available

elderly people, 25 people did not participate in the study and 15 people did not meet the inclusion criteria. Thus, 70 of them were eligible based on the inclusion criteria. The participants were divided into two intervention (35 subjects) and control groups (35 subjects).

In this study, data were collected using demographic and self-care behavior questionnaires. Demographic questionnaire included questions on age, sex, marital status, history of comorbidity, education, income level, and duration of hypertension. For assessment of self-care behavior in this study, Hypertension Self-care Profile (HTN-SCP) was used. It was developed by Han and colleagues in 2014 and tested on American Korean subjects.¹⁶ This tool is four-dimensional and consists of 20 items that focus on self-care behaviors in patients with hypertension. Items are scored on a 4-point Likert scale never or seldom 1, sometimes 2, often 3, always 4. Score ranges 26–74. A higher score indicates greater self-care.

This questionnaire includes four dimensions for dietary regimen (items 3, 4, 5, 6, 7, 9, 10, 11 and score ranges 8 – 32), medication regimen (items 1, 14, 15, 16, 20 and score ranges 5 – 20), food labeling (items 2, 8 and score ranges 2 – 8), and disease management (items 12, 13, 17, 18, and 19 and score ranges 11 – 14). Items 12 and 13 are reverse scored. Higher scores indicate greater self-care dimensions. Han et al. show that item-total correlations ranged from 0.20 to 0.63 for behavior scale, meeting the cutoff set a priori at 0.15. Internal consistency reliability coefficients ranged from 0.83 to 0.93.¹⁶

Its psychometric properties were examined by Gheshlagh et al. (2019) in Iran including face, content, and construct validity. According to exploratory factor analysis, four factors were extracted including diet (3 – 7, 9 – 11), medication regimen (1, 14 – 16, 20), food label (2, 8), and disease management (12, 13, 17 – 19). In the confirmatory factor analysis, the fit of the four-factor model of the self-care construct was confirmed based on standard indices (root mean square error

of approximation=0.067, comparative fit index=0.96, normed fit index=0.92, and parsimonious normed fit index=0.80). The content and construct validity (with exploratory and confirmatory factor analysis) have been investigated, and the reliability of the dimensions of this questionnaire has been determined between 0.83 and 0.93. Internal consistency of the tool in terms of alpha Cronbach was reported 0.86 in this study.¹⁷ In the current study, the content validity of the tool was confirmed by five nursing experts in the fields of medical–surgical and community health nursing, and its reliability was validated through a pilot study with 30 participants, yielding a Cronbach's alpha coefficient of 0.81.

After the participants were allocated to the intervention and control groups, the investigator explained the aims of the study for the two groups. They were asked to attend the center based on a schedule to meet the investigator and agreed to take part in the study. Then, the aims of the study were explaining, and the questionnaires were distributed to be completed. If the elderly had problems such as hand tremors, the researcher completed the questionnaire by asking the elderly.

According to the schedule for the intervention group, the subjects were asked to attend the group on certain days at the center. Therapeutic, physical, diet, and drug recommendations were presented, and their questions were answered. Contact details were provided to all participants. Group sessions based on constructs of the HAPA were seven sessions (Table 1), and each lecture and group discussion session were held one hour weekly. The teaching program was developed based on the constructs of the HAPA. The scientific content of the training program was approved by the supervisor and advisors (two specialists in community health nursing and one specialist in medical-surgical nursing); also, reliable sources were used in this field.^{18, 19} The training program was implemented by the researcher (the first author). The place of implementation of the training program was Valieasr Comprehensive Health Center.

Table 1: Teaching program based on health action process approach in older people with hypertension

Session	Construct	Subject
First	Understanding risk	<ul style="list-style-type: none"> - Being familiar with hypertension and its signs in aging - Importance of hypertension and its contributing factors - Being familiar with complications of hypertension
Second	Expected Outcomes	<ul style="list-style-type: none"> - Effect of hypertension on older people's life - Importance of blood pressure monitoring - Importance of continuing self-care in maintenance of health in older people with hypertension - Being familiar with serious outcomes and significant complications related to lack of drug regimen in hypertension - Being familiar with significance of diet in aging
Third	Self-efficacy of action	<ul style="list-style-type: none"> - Being familiar with various treatments of hypertension - Medication regimen - Being familiar with hypertension care in patients and families - Appropriate diet - Skill require for checking blood pressure - Daily intake of hypertension medication - 30-minute physical activity at least five times per week - Weight control - Stress management - Interpersonal relationship skills - Interpersonal conflict management
Fourth	Planning action	<ul style="list-style-type: none"> - Importance of planning - How to plan appropriately - Planning for disease management - Planning for weight control - Planning for appropriate physical activity
Fifth	Planning for coping	<ul style="list-style-type: none"> - Planning for coping and management of factors affecting the program - Appropriate strategy for continuing the program
Sixth	Self-efficacy of coping	<ul style="list-style-type: none"> - Responsibility for health - Identifying Stress resources and stress management - Relaxation technique - Guided imagery technique - Reinforcing positive thoughts
Seventh	Self-efficacy of recovery	<ul style="list-style-type: none"> - Factors influencing in self-actualization - Failure experience in disease management and restoring - Having sense of purposeful following personal achievement and inner satisfaction

Follow-up of self-care in older people was conducted using telephone contacts, texting, and attending consultations over two months. Then, control and intervention groups attended the health service center to complete the questionnaire. For the control group, due to the effectiveness of the implementation of the HAPA on the self-care behavior of the elderly with high blood pressure, educational content (educational booklets) was also sent to the control group.

Data were analyzed using the SPSS version 21. Shapiro-Wilk test was used to examine the normality of data. The Chi square test and Fisher test were used for the comparison

of demographic variables in the control and intervention groups. Wilcoxon test was used for comparison of the medians of self-care and its dimensions in the intervention and control groups. Mann-Whitney U was used for the comparison of the control and intervention groups. Statistical significance was determined at $P < 0.05$.

This study was conducted according to the Helsinki Declaration, considering all considerations related to the design of this study. This study was approved by the ethics committee at Jahrom University of Medical Sciences (IR.JUMS.REC.1402.025). All participants signed the informed consent form.

Table 2: Demographic variables in the control and intervention groups

Variable	Intervention group	Control group	P value
	N (%)	N (%)	
Sex			
Female	17(48.60)	21(60)	0.34*
Male	18(51.40)	14(40)	
Marital status			
Single	2(5.70)	0(0)	0.49**
Married	33(94.30)	35(100)	
Education			
Under diploma	29(82.90)	25(71.40)	0.49**
Diploma and upper	5(14.30)	6(17.10)	
Bachelor	1(2.80)	3(8.60)	
Master	0(0)	1(2.90)	
Income			
Low	18(51.40)	21(60)	0.47**
Moderated	17(48.60)	13(37.10)	
High	0(0)	1(2.90)	
History of comorbidity			0.09*
Yes	20(57.10)	13(37.10)	
No	15(42.90)	22(62.90)	

*Chi-square test; **Fisher test

Older people with hypertension were assured that their participation is voluntary. Participants' right to withdraw from the study was preserved without any changes in their care. Participants' characteristics were anonymous, and all the collected data were confidential.

RESULTS

In this study, 70 old people with hypertension took part in the two groups of intervention (35 subjects) and control (35 subjects) with no drop-out. As presented, most subjects in the control groups were women, and more than half of those in the intervention group were men. Their means of age were 67.46 ± 5.25 in the control group and 66.71 ± 4.34 years in the intervention group. Also, the means of disease duration were 7.34 ± 5.73 years in the control group and 7.77 ± 7.04 years in the intervention group. Results showed that the control and intervention groups were not significantly different in terms of demographic variables before the intervention ($P > 0.05$) (Table 2).

Analysis also showed that the median of self-care was not significantly different between the control and intervention groups

before the intervention ($P = 0.26$). Results of Wilcoxon test showed that the median of self-care increased significantly two months after the intervention (median: 73(IQR: 74-71) (compared to before it (median: 50(IQR: 58-47)) ($P < 0.001$). Results of the Wilcoxon test showed that there was no significant difference in self-care two months after the intervention (median: 50(IQR: 54-45) compared to before the intervention (median: 51(IQR: 54-45)) in the control group ($P = 0.13$). Two months after the intervention, the median of self-care in the intervention group significantly increased compared to the control group ($P < 0.001$) (Table 3).

There were statistically significant differences between the intervention and control groups two months after the intervention in self-care dimensions including dietary regimen ($P < 0.001$), medication regimen ($P < 0.001$), food labeling ($P < 0.001$), and disease management ($P < 0.003$) (Table 3).

DISCUSSION

After the intervention, the median of self-care behavior in the intervention group significantly increased compared to the control group.

Table 3: Comparison of the median of self-care and dimensions between the intervention and control groups before and two months after the intervention

Variable	Time	Intervention group	Control group	P value*
		Median(Q ₃ -Q ₁)	Median(Q ₃ -Q ₁)	
Dietary regimen	Before the intervention	21(23-20)	19 (23-16)	0.12
	2 months after the intervention	28(29-27)	19 (23-15)	<0.001
	Difference	6(7-5)	0(0-0)	<0.001
	P value**	<0.001	0.14	
Medication regimen	Before the intervention	12(15-11)	15(16-13)	0.07
	2 months after the intervention	19(20-18)	15(16-13)	<0.001
	Difference	6(8-3)	0(0-(-1))	<0.001
	P value**	<0.001	0.81	
Food labeling	Before the intervention	2(4-2)	2(3-2)	0.20
	2 months after the intervention	8(8-8)	2(3-2)	<0.001
	Difference	6(6-4)	0(0-0)	<0.001
	P value**	<0.001	0.37	
Disease management	Before the intervention	11(13-11)	11(12-11)	0.29
	2 months after the intervention	14(14-11)	11(13-12)	<0.003
	Difference	4(6-3)	0(0-0)	<0.002
	P value**	<0.003	0.45	
Self-care	Before the intervention	50(58-47)	51(54-45)	0.26
	2 months after the intervention	73(74-71)	50(54-45)	<0.001
	Difference	20(26-17)	0(1-(-1))	<0.001
	P value**	<0.001	0.13	

*Mann-Whitney U; **Wilcoxon

In addition, after the intervention, the median of self-care behavior increased significantly compared to before the intervention in the intervention group. However, the media of self-care behavior was not significantly different before and after the intervention in the control group, which shows teaching intervention using the HAPA was effective on self-care behavior in older people with hypertension.

Results of teaching interventions based on the HAPA in other chronic conditions are consistent with the results of this study. Some studies in the same line with the results of this study examined the effect of the HAPA on factors contributing to physical activity in people with hypertension, which was found to be effective.²⁰⁻²³ In line with the present study, in a study, HAPA model led to improved self-care behaviors in cerebral infarction patients.²⁴ A systematic review conducted showed that the patient activation concept used in the theory-based interventions including HAPA, health belief model, social cognitive theory, and PRECEDE-PROCEED was effective in self-care behaviors (physical activity,

healthy diet, food care, and self-monitoring) among patients with hypertension and type 2 diabetes.^{25, 26} Our findings support the results of the other studies, indicating that action plannings such as HAPA are effective approaches to improve health and self-care behaviors.^{23, 27} HAPA model considers that the interaction between affective factors and cognitive behavior plays an important role in maintaining and changing individual self-care behavior.¹⁴ Based on HAPA, which is a behavior change with motivation, patients are encouraged to carry out healthy behaviors such as healthy diet, physical activity, and medication adherence.²¹ In this regard, the results of a study showed that providing appropriate training to people with hypertension can have a positive effect on control, knowledge, and self-care in community-based settings.²⁸

Results of the analysis showed that the median of self-care behavior in medication regimen and disease management dimensions in the intervention groups significantly increased after the intervention compared to before it.

However, it was not significantly different before and after the intervention in the control group. Adherence to diet and medication is crucial in patients with hypertension, and the factors that lead to non-adherence should be put in intervention programs and healthcare policies.⁷ The HAPA provides potentially complementary perspectives to inform the identification of determinants of medication adherence.¹⁴ In a study, it was reported that the HAPA significantly improved the diet and medication adherence, intention, and task self-efficacy one month and six months after the intervention among patients with type 2 diabetes.²⁹ The result of a study showed that the increasing level of awareness of individuals using theory-based interventions had an effective role in promoting medication regimens in patients with hypertension.²⁶ This study indicated that a multi-faceted relevant intervention such as HAPA was essential to depict the outcome of improved intention and motivation and permanent self-care behaviors among the elderly.

The results of the present study showed that the median score of the self-care behavior of the elderly with high blood pressure in terms of dietary regimen and food labels was higher after the intervention than before the intervention in the intervention group; however, in the control group before and after the intervention it did not have a statistically significant difference. The significance of food labels is becoming increasingly apparent, as they have become an essential reference for consumers. Understanding food labels may be important for patients to follow dietary recommendations. This is particularly true for patients with chronic illnesses such as hypertension, heart failure, diabetes, and obesity.³⁰ In this regard, a study revealed that optimal management of food labels was important when dealing with chronic diseases, and effective health action intervention could help improve overall health status.³¹ In line with the present study, the results of an investigation showed that education of food labeling with teaching intervention increased

consumer awareness of food and beverage healthiness at the point of purchase.³² Another study also showed the effectiveness of a health intervention led by community health workers on food label use.³³ A study conducted in Iran reported that a HAPA-based intervention increased the adolescents' intake of fruit and vegetables one month and six months following the intervention.²⁷ In line with the present study, the results of a study confirmed the effectiveness of applying the HAPA to the dietary behavior of students. Analysis of the mediating effect suggested that action planning was the mediating variable between behavioral intention and dietary behavior, which proved the continuity of the HAPA in the dietary behavior of students.¹⁴ The elderly in the training class mentioned lack of awareness, forgetting medications, not having a suitable place for the elderly to exercise, being unwilling to consume healthy foods because of the consumption of fried foods and animal oil as obstacles to self-care behavior. Education of the principles of proper nutrition based on the HAPA model in high blood pressure, self-care, dietary and medication adherence for the elderly were justified. Thus, we were able to overcome this behavioral barrier by suitable educational methods. The result of this study was opposite to those of several studies conducted with the aim of the effect of HAPA on eating behavior changes in patients with hypertension and coronary disease. This results showed that the behavior of patients with hypertension in following the diet did not change after the intervention, while the eating style of patients with coronary artery disease during 6 months improved, and they had a healthier diet.^{34, 35} This clear difference can be attributed to the presence of a specific event in acute coronary syndrome; this event may have acted as a strong motivational factor in the direction of dietary change. The fear of having another coronary event, which would increase the risk of death, could be the reason for these patients to adopt healthier diets, particularly if the fear was associated with posttraumatic growth.³⁵

The use of HAPA was the strength of this study. This model is more comprehensive than other models including health belief models. It includes planning and action control to bridge between motivational and volitional behavior factors. Using a self-report questionnaire was the limitation of this study. Self-report of self-care could not be related to real and practical behavior in life in older people.

CONCLUSION

Teaching intervention based on HAPA model has a positive impact on all dimensions of self-care behavior of the elderly with high blood pressure. This research underscores the potential of the HAPA model as a practical and accessible strategy to enhance self-care functions in the educational and clinical setting, ultimately benefiting both the elderly and the quality of healthcare they provide. The findings of this research can help healthcare providers design effective programs to improve self-care behaviors among the elderly with hypertension and address problems in these groups of elderly. Performing such programs could be cost-benefit and inexpensive because adherence to self-care behaviors can prevent and decrease complications of hypertension among the elderly, so it is suggested that this approach should be used in future studies. The findings in this research were for the elderly referring to the South Fars health centers in Iran, so further research is needed to determine the generalizability to other areas in Iran and other countries improving self-care behaviors.

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Authors' Contribution

Conceptualization and study design were done

by AD, FZ, REA, and HH. Data collection was carried out by FZ. AD and FZ performed data management, analysis, and interpretation. AD and FZ prepared the initial manuscript draft, and critical revisions for important intellectual content were conducted by AD, REA, and HH. All authors read and approved the final version of the manuscript and take responsibility for the integrity and accuracy of the data analysis. The corresponding author attests that all listed authors meet the authorship criteria.

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Conflict of Interest

None declared.

Declaration on the use of AI

The authors of this manuscript declare that no artificial intelligence (AI) was used during the writing process.

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