Original Article

The Effects of a Self-Management Program Based on the 5 A's Model on Self-Efficacy among Older Men with Hypertension

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Abstract

Background: Aging population is progressively increasing. Older adults suffer from the different chronic health conditions such as hypertension. Behavior change is a key strategy for effective hypertension management. Successful behavior change necessitates the adequate self-efficacy. **Objectives:** This study aimed to evaluate the effects of a self-management program based on the 5 A's model on self-efficacy among the older men with hypertension. **Methods:** This randomized controlled trial was conducted in 2016–2017 on older men with hypertension in Ramsar, Iran. In total, 60 eligible participants were randomly allocated to an intervention and a control group. The participants in the intervention group were offered a self-management program based on the 5 A's behavior change model. Data were collected using a demographic questionnaire, a hypertension assessment form, the Self-Efficacy for Managing Chronic Disease Scale, and the hypertension Self-Efficacy Scale. Self-efficacy scales were completed for participants both before and 12 weeks after the intervention onset. The paired- and independent-sample *t*, Wilcoxon signed-rank, Mann–Whitney U, and Chi-square tests were used in the data analysis. **Results:** The pretest mean scores of hypertension self-efficacy in the intervention and the control groups were, respectively, 48.62 ± 11.71 and 44.65 ± 15.4, which significantly increased to 79 ± 13.13 and 62.06 ± 15.38 at posttest ($P < 0.001$). Moreover, the pretest mean scores of chronic disease management self-efficacy in these groups significantly increased from, respectively, 5.64 ± 1.28 and 5.35 ± 1.40 at pretest to 8.05 ± 1.29 and 6.12 ± 1.48 at posttest ($P < 0.001$). The pretest–posttest mean differences of the mean scores of both types of self-efficacy in the intervention group were significantly greater than the control group ($P < 0.001$). **Conclusion:** The self-management program based on the 5 A's model is effective in significantly improving the self-efficacy among older men with hypertension.

Keywords: *Hypertension, Nursing, Self-efficacy, Self-management*

Introduction

Because of advances in the medical sciences and improvements in life expectancy in recent years, the number of older adults is progressively increasing.[1] Older adults suffer from a wide range of health problems so that 80% of adults over 65 have at least one chronic illness.[2]

Hypertension is among the most prevalent chronic conditions. Estimations show that there will be 1.5 billion adults with hypertension around the world by 2025, with 14%–34% of cases in Iran. Hypertension and its complications are responsible for 9.4 million of the total 17 million deaths caused by cardiovascular diseases.[3,4]

Hypertension is managed through lifestyle change and antihypertensive medications. Self-management

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is a key factor behind the successful lifestyle change and hypertension management.[5] By definition, self-management is the individual's ability to reduce or manage his/her symptoms, treat his/her physical, mental, and psychological problems, change his/her lifestyle, and have an optimal life with his/her chronic illness.[6] A study found that the effective self-management significantly reduced blood pressure among people with uncontrolled hypertension and resulted in more cost-effective use of healthcare resources.[7]

Self-management ability is determined by different factors, chiefly self-efficacy.[8] According to Bandura's Social Cognitive Theory, self-efficacy is the individual's belief and confidence in his/her ability to successfully accomplish self-care tasks to obtain favorable results. Self-efficacy is a major contributor to successful lifestyle change, close treatment adherence, and positive health outcomes among chronically-ill patients.[9]

Knowledge and performance are the two key components of self-efficacy.[10] Accordingly, the interventions and programs with educational components can be used to promote self-efficacy.[11] An earlier study reported the effectiveness of a self-management program in hypertension management through persuading patients to change their behaviors, adhere to their dietary and treatment regimens, and perform physical activity.[12] However, in another study, a self-management program was not significantly effective on self-efficacy of hypertensive patients.[13] Song and Nam have also reported that a self-management intervention could not affect the sodium intake in Korean adults with prehypertension.[14] The 5 A's behavior change model is an evidence-based practical model for behavior change in different conditions. This model has five steps, namely, assess, advice, agree, assist, and arrange. The patient's health problems are identified in the assess step, and then, the results of assessment are used in the advice step to inform the patient about his/her problems, possible health risks, and benefits of behavior change. In the agree step, the trainer and the patient agree on behavior change goals and necessary plans for achieving the goals. In the assist phase, the patient is provided with the necessary training or counseling, if any, and in the arrange step, follow-up plans are developed and implemented.[15]

The 5 A's model can be used by hospital nurses to improve the patient outcomes. However, further studies are still needed to demonstrate its effectiveness in improving outcomes among patients with chronic illnesses.[16]

Objectives

The present study was carried out to evaluate the effects of a self-management program based on the 5 A's model on self-efficacy among men with hypertension.

Methods

Design, setting, and participants

As a single-blind randomized controlled trial, this study was conducted in 2016–2017 on older men with hypertension who referred to health-care centers in Katalom and Sadat Shahr city in Ramsar, Iran.

The sample size was calculated using the results of two previous studies with self-efficacy mean scores of 4.14 ± 0.33 and 3.61 ± 1.14 in the intervention and the control groups, respectively.[17,18] Accordingly, the output of the sample size calculation formula $([Z_{1-\frac{a}{2}}+Z_{1-\beta}]^2[\delta_1^2+\delta_2^2]/[\mu_1-\mu_0]^2)$ showed that 60 patients were needed.

The participants were recruited through convenience sampling. Inclusion criteria were a definite diagnosis of hypertension by a physician at least 6 months before recruitment to the study, an age of 60–74, a self-efficacy score of <50% of the possible total score, willingness to participate in the study, ability to speak and understand Persian, basic literacy skills, no mental impairments(as determined using the abbreviated mental test),[19] ability to perform the activities of daily living (as determined using the Activities of Daily Living Scale),[20] no visual or hearing impairments, no work experience in health-care systems, no significant stressful life events in the past 3 months (such as a significant loss), accessibility for telephone follow-up, and no history of malignancies, heart or kidney failure, hyperthyroidism, or psychiatric disorders (as determined based on the patients' medical records). We only included the male patients due to gender differences respecting self-care and hypertension management abilities.[21] The participants were excluded if they voluntarily withdraw from the study, developed serious physical or mental problems, were hospitalized in hospital settings, or died during the study. For random allocation to either an intervention or a control group, each patient was randomly assigned with a number of 0–60 and then, patients with even numbers were allocated to the intervention group and patients with odd numbers were allocated to the control group.

Data collection

Four instruments were used for data collection. The first was a demographic questionnaire with items on age, marital and employment status, education level, income, housing status, weight, and height. The

second instrument was a researcher-made hypertension assessment form which included items on the history of hypertension, factors contributing to hypertension, symptoms of hypertension (such as dizziness and nosebleed), antihypertensive medications, nutritional status, rest and sleep, physical activity, and systolic and diastolic blood pressures.

The third instrument was the Self-Efficacy for Managing Chronic Disease Scale. The six items of this scale were scored on a ten-point scale from 1 (not at all confident) to 10 (totally confident). The total score of the scale was 1–10 and higher scores reflected the higher self-efficacy. The reliability of the scale was confirmed elsewhere with a Cronbach's Alpha of 0.93.[22] For validity assessment in the present study, ten faculty members affiliated to Fatemeh-Zahra School of Nursing and Midwifery, Ramsar, Iran, assessed the content validity of the scale and requested some amendments. The requested amendments were made to the scale. Moreover, its reliability was confirmed in this study with a Cronbach's alpha of 0.79.

The fourth instrument was the hypertension Self-Efficacy Scale. This scale contained six items on limiting sodium intake, weight loss, increasing physical activity, consuming a diet high in fruits and vegetables, abstaining from alcohol or consuming alcohol in moderation, and medication compliance.[23] In an earlier study on Iranians, the alcohol-related item had been removed from the scale.[1] Similarly, we removed this item from the scale after conducting a pilot study and performing content validity assessment. Therefore, the Hypertension Self-Efficacy Scale used in this study contained five items. The items were scored on a five-point scale from 0 (No chance at all) to 100 (Completely certain). The total score of the scale was 0–100, which was calculated through summing up item scores and dividing the sum score by the number of the items. Higher scores reflected the higher self-efficacy.

The study instruments were completed for all participants in both groups before and after the implementation of the self-management program. All instruments were completed for patients by the first author through the interview method.

Intervention

The patients in the control group solely received routine care services, while their counterparts were offered a self-management program based on the 5 A's model in addition to the routine care services. The intervention was implemented by the first author in 12 weeks in the following five steps.

Step 1, Assess: In this step, the patient's knowledge, beliefs, and behaviors were assessed using the researcher-made hypertension assessment form.

Step 2, Advice: In this step, the problems identified in the previous step were reported to the patient and he/she was informed about the risks associated with hypertension and its poor management as well as the significance and the benefits of behavior change. Steps 1 and 2 were taken in the 1st week of the study intervention.

Step 3, Agree: A written agreement was made with the patient on the goals of behavior change and the necessary activities for achieving the goals. Accordingly, for every problem identified in the first step, an activity plan was developed based on the established goals. To ensure the patients adherence to the activities, a list of the intended activities was created for each patient and he/she was asked to provide a written daily report in a notebook, with the help of his/her family members, about his/her engagement in the activities.

Step 4, Assist: In this step, the patients and their family members were invited to attend two 1-h training sessions held in a health-care center in Ramsar, Iran. The patients were divided into three 10-person groups and two training sessions were held for each group. Trainings were provided using the lecture and the question-and-answer methods and were related to the blood pressure measurement, normal range of blood pressure, physical activity, healthy eating, smoking cessation, and fruit and vegetable consumption.[23] One week after group training sessions, individualized trainings were also provided to each patient to address his/her educational needs. Individualized trainings were provided either face-to-face in the study setting or over the phone.

Step 5, Arrange: Each patient's performance was assessed from the 3rd to the 10th week of the study intervention. Accordingly, daily phone calls in the first 2 weeks, and then weekly phone calls in the rest weeks were made with each patient to ensure his/her adherence to the established goals and the determined activity plan. Moreover, each patient's status was assessed every 4 weeks through personal face-to-face sessions. In these sessions, patient's written reports in the notebook were also assessed.

Data analysis

Data were analyzed through the SPSS Program Version 16.0 (IBM Corp. Armonk, New York, USA). Data were presented using mean, standard deviation, absolute frequency, and relative frequency. Within- and between-group comparisons respecting the variables with normal distribution were, respectively, made through the paired- and the independent-sample *t*-tests, while the same comparisons respecting variables with

nonnormal distribution were, respectively, made through the Wilcoxon signed-rank and the Mann–Whitney U or the Chi-square tests. Significance level in all statistical analyses was set at <0.05.

Ethical considerations

Necessary approvals for this study were obtained from the Health Research Center and the Ethics Committee of Babol University of Medical Sciences, Babol, Iran (ethical approval code: MUBABOL.HRI.REC.1395.62). The study was registered at the Iranian Registry of Clinical Trials (registration code: IRCT2017020632413N1). After making necessary arrangements with the authorities of the study setting, eligible patients were briefed over the phone about the study aims and invited to participate in the study at will. The patients who agreed to participate were asked over the phone to attend the study setting at a particular date and time, where they were fully briefed about the study aims and methods. The study intervention was began after all the patients provided with written informed consent.

Results

In total, 60 patients were recruited to this two-group study. One patient was excluded from each group and thus, the study was completed with 29 patients in each group–58 in total [Figure 1]. The means of participants' age in the intervention and the control groups were 67.55 ± 5.01 and 68.34 ± 5.00, respectively. The independent-sample *t* and the Chi-square tests showed no statistically significant between-group differences respecting the participants' demographic characteristics and systolic and diastolic blood pressures [$P > 0.05$; Table 1].

The pretest mean scores of hypertension self-efficacy in the intervention and the control groups were 48.62 ± 11.71 and 44.65 ± 15.4, respectively. At posttest, these values significantly increased to 83.79 ± 13.13 and 62.06 ± 15.38, respectively [$P < 0.001$; Table 2]. Although the between-group difference respecting the pretest mean score of hypertension self-efficacy was not statistically significant ($P = 0.279$), the posttest mean score of hypertension self-efficacy in the intervention group was significantly greater than the control group ($P < 0.001$). In addition, except for the medication adherence subscale ($P = 0.74$), the pretest–posttest mean differences of hypertension self-efficacy, and its other four subscales in the intervention group were significantly greater than the control group [$P < 0.001$; Tables 2 and 3].

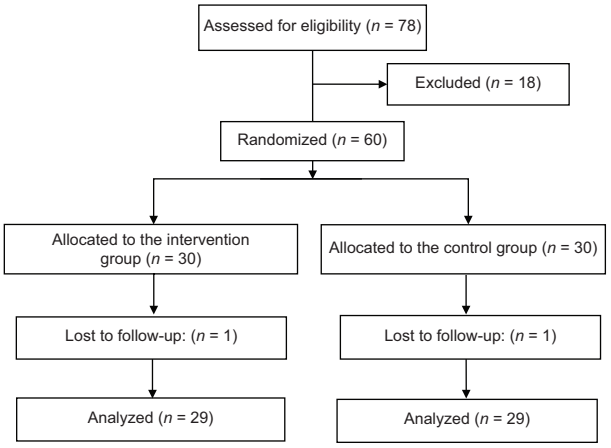

Figure 1: The flow diagram of the study

Table 1: Between-group comparisons with respect to the participants' demographic characteristics

Characteristics	Groups[a]		*P*
	Intervention	Control	
Age (years)	67.55 ± 5.01	68.34 ± 5.00	0.549[b]
Systolic blood pressure (mm Hg)	145.52 ± 19.74	145.52 ± 16.16	0.99[b]
Diastolic blood pressure (mm Hg)	81.03 ± 14.72	77.59 ± 11.84	0.33[b]
Weight (kg)	75.65 ± 9.48	78.41 ± 11.84	0.332[b]
Height (cm)	167.17 ± 5.23	166.26 ± 5.82	0.532[b]
Body mass index (kg/m^2)	27.34 ± 3.98	28.42 ± 3.70	0.289[b]
Housing status			
Private	26 (89.7)	28 (96.6)	0.611[c]
Rented	3 (10.3)	1 (3.4)	
Income			
Sufficient	17 (58.6)	15 (51.72)	0.35[c]
Insufficient	12 (41.4)	14 (48.28)	
Education level			
Illiterate	3 (10.3)	2 (6.9)	0.08[c]
Basic literacy	2 (6.9)	5 (17.2)	
Below high school diploma	7 (24.1)	8 (27.6)	
High school diploma	10 (34.5)	9 (31.1)	
Academic	7 (24.1)	5 (17.2)	
Number of children			
Up to one	1 (3.4)	0	0.6[c]
Two	4 (13.8)	4 (13.8)	
Three and more	24 (82.8)	25 (86.2)	
Marital status			
Single	1 (3.4)	0	0.26[c]
Married	27 (93.1)	27 (93.1)	
Divorced	1 (3.4)	0	
Widowed	0	2 (6.9)	
Employment status			
Employee	1 (3.4)	0	0.398[c]
Farmer	3 (13.3)	7 (24.1)	
Retired	18 (62.1)	17 (58.6)	
Self-employed	7 (24.1)	5 (17.2)	

[a]Data presented as *n* (%) or mean ±SD, [b]Independent samples *t*-test; [c]Chi-square test

At pretest, the mean scores of chronic disease management self-efficacy in the intervention and the control groups were 5.64 ± 1.28 and 5.35 ± 1.40, respectively. The between-group difference was not statistically significant (P = 0.413). At posttest, these values significantly increased to 8.05 ± 1.29 and 6.12 ± 1.48, respectively (P < 0.001). Between-group difference respecting the posttest mean score of chronic disease management self-efficacy was statistically significant (P < 0.001). Moreover, the pretest-posttest mean difference of chronic disease management self-efficacy in the intervention group was significantly greater than the control group [P < 0.001; Table 2].

Discussion

This study aimed to evaluate the effects of a self-management program based on the 5 A's model on self-efficacy among men with hypertension. The study findings indicated the effectiveness of the intervention in improving both hypertension self-efficacy and chronic disease management self-efficacy. These findings are in line with the findings reported in two earlier studies.[17,9] However, contradictory to our findings, a study reported the insignificant effects of a self-management program on self-efficacy. Such insignificant effects may be because participants in that study were mostly illiterate or barely literate, and hence, long-term interventions might have been needed for improving their self-efficacy.[24] These findings highlight the importance of developing self-management programs based on the needs and the characteristics of the target population.

The study findings also showed the effectiveness of the self-management program in significantly reducing sodium intake by the participants. An earlier study also reported the same finding.[25] The significant effects of the self-management programs in these two studies may be because the dietary regimens in these studies were the dietary approaches to stop hypertension diet plan which included the use of fruits, vegetables, nuts, beans, and low-fat dairy products. However, a study in Korea reported the insignificant effects of a self-management program on sodium intake among patients with hypertension. The authors of that study attributed this insignificant result to the cultural aspects of eating as well as eating habits in Korea, where people usually eat their meals with their families, friends, or colleagues. Another explanation for these contradictory findings may be the fact that our participants were exclusively males, while males constituted half of the sample in that study. Moreover, men in Korea have no significant roles in buying and preparing foods for their families,[14] while

Table 2: Within- and between-group comparisons with respect to the mean scores of hypertension self-efficacy and chronic disease management self-efficacy[a]

Self-efficacy	Before	After	P[b]	Mean difference
Hypertension				
Intervention group	48.62 ± 11.71	83.79 ± 13.13	<0.001	35.17 ± 12.06
Control group	44.65 ± 15.40	62.06 ± 15.38	<0.001	17.41 ± 6.63
P[c]	0.275	<0.001	-	<0.001
Chronic disease management				
Intervention group	5.64 ± 1.28	8.05 ± 1.29	<0.001	2.40 ± 0.96
Control group	5.35 ± 1.40	6.12 ± 1.48	<0.001	0.77 ± 0.66
P[c]	0.413	<0.001	-	<0.001

[a]Data presented as mean ±SD, [b]Wilcoxon signed-rank test, [c]Mann–Whitney U test

Table 3: Within- and between-group comparisons with respect to the mean scores of hypertension self-efficacy subscales[a]

Subscales	Before	After	Mean difference	P[b]
Sodium intake				
Intervention group	43.96 ± 23.76	88.79 ± 17.14	33.62 ± 21.41	<0.001
Control group	46.55 ± 20.88	63.79 ± 18.40	14.65 ± 17.05	
Weight loss				
Intervention group	43.96 ± 23.76	88.79 ± 17.14	33.62 ± 21.41	<0.001
Control group	46.55 ± 20.88	63.79 ± 18.40	14.65 ± 17.05	
Physical activity				
Intervention group	43.10 ± 22.05	81.89 ± 21.01	38.79 ± 21.73	<0.001
Control group	31.89 ± 25.78	53.44 ± 23.83	21.55 ± 11.02	
Fruits and vegetables consumption				
Intervention group	45.68 ± 17.76	82.75 ± 20.15	37.06 ± 20.72	<0.001
Control group	42.24 ± 24.18	61.20 ± 21.73	18.96 ± 17.23	
Medication adherence				
Intervention group	70.68 ± 15.04	92.24 ± 16.50	21.55 ± 14.52	0.074
Control group	60.34 ± 23.63	75.00 ± 21.12	14.65 ± 14.20	

[a]Data presented as mean ±SD, [b]Mann–Whitney U test

men in Iran, particularly in the sociocultural context of the present study, can ask family members to prepare special diet (i.e., low sodium). The findings of the present study also showed the effectiveness of the study intervention in promoting weight loss among patients with hypertension. This is in line with the findings of two previous studies[26] and contradicts the findings of another one.[27] This contradiction may be because follow-up in that study consisted only of a single phone call in a 2 month. It is noteworthy that frequent follow-ups are needed for successful behavior change.

We also found that significant improvement in the physical activity subscale of hypertension self-efficacy. An earlier study also reported the same.[28]

However, another study found that although a self-management model was effective in reducing blood pressure, it had no significant effects of physical activity. In that study, half of the participants had no credible information about hypertension. Moreover, most of them used diuretics, which have side effects such as malaise and fatigue and hence might have reduced the patients' ability to engage in physical activity.[29]

The self-management program in the present study also had significant positive effects on fruit and vegetable consumption. A previous study also reported the same finding,[30] while another reported a contradictory finding.[31] Eating behaviors are affected by a wide range of factors such as attitudes, competency in preparing foods, and socioeconomic status.

The study findings revealed the insignificant effects of the self-management program on patients' medication adherence. This is inconsistent with the findings of a previous study.[32] Medication adherence greatly depends on patients' knowledge about medications.[33] Thus, its improvement necessitates the educational interventions to improve patients' knowledge and understanding of medications.[30] The insignificant effects of our intervention on medication adherence can be because most patients in the intervention group had secondary and higher education and were aware of the timely use of their medications.

This study was conducted on a small sample of hypertensive men selected only among the clients referring to a number of health-care centers in North Iran. Therefore, multicenter studies, –both on men and women, are suggested to investigate if the implemented model is effective in women and other subcultures. Another limitation of the present study was the probable leakage of information from participants in the intervention group to their counterparts in the control group due to their relationships with each other in the community settings. Of course, we attempted to improve the participants' adherence through periodical follow-up telephone calls. However, personal, familial, and environmental factors might have affected the participants' ability to adhere to the self-management program. Due to the small sample size, we could not assess the effects of these factors on the clients' adherence. Conducting larger studies may also help researcher to analyze the effects of these confounding factors. It is also recommended to assess the effects of a similar program on illiterate or barely literate older adults with hypertension. Moreover, observational assessment methods need to be employed in future studies in this area to produce more reliable results.

Conclusion

This study concludes that the self-management program based on the 5 A's model has significant positive effects on different aspects of the self-efficacy, except for medication adherence self-efficacy. Therefore, health-care authorities are suggested to design in-service training programs and train all health-care providers working in health-care centers on the implementation of the 5 A's model. Then, health-care providers would be able to implement this model on their clients with hypertension.

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Conflicts of interest

There are no conflicts of interest.

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