JOURNAL OF COMPLEMENTARY MEDICINE RESEARCH

RESEARCH ARTICLE

The effect of improving dietary habits derived from Persian Medicine on blood pressure in adults with pre-hypertension: A randomized controlled clinical trial

HOSSEIN ABOLHOSSEINI[1], MOHAMMAD SETAYESH[1*], MAHDIEH NAMAYANDEH[2], AMIN SALEHI-ABARGOUEI[3], FARZANEH SAMEI[4], MOHAMMAD HOSSEIN SOLTANI[5]

[1]Department of Persian Medicine, faculty of Persian Medicine, Kerman University of Medical Sciences, Kerman, Iran

[2]Department of Statistics and Epidemiology, School of Public Health, Yazd Shahid Sadoughi University of Medical Sciences, Yazd, Iran

[3]Nutrition and Food Security Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

[4]Akbari Comprehensive Urban Health Center, Yazd Shahid Sadoughi University of Medical Sciences, Yazd, Iran

[5]Yazd Cardiovascular Research Center, Shahid Sadoughi University of Medical sciences, Yazd, Iran

**Corresponding Author*

ABSTRACT

Introduction: Blood pressure is one of the most common diseases in industrialized countries and it is one of the important causes of atherosclerosis and can cause various problems. Pre-hypertension is defined as systolic blood pressure from 120—139 mmHg or diastolic blood pressure from 80—89 mmHg. Numerous studies have shown that if this blood pressure continues, it increases the risk of cardiovascular diseases, including hypertension. The aim of this study was to investigate the effect of improving eating habits, derived from Persian medicine, on blood pressure in adult patients with pre-hypertension.

Material and Methods: The target population was people with pre-hypertension who were registered in the comprehensive health system. Patients were randomly divided into intervention and control groups after getting acquainted with the study, obtaining informed consent, and having inclusion and exclusion criteria. After measuring blood pressure and anthropometric characteristics, the questionnaire of dietary habits based on Persian medicine was completed by the intervention group and its score was calculated. After training the intervention group of Persian-based dietary habits, their blood pressure and the anthropometric characteristics were measured again after one month. After collecting data, the data were analyzed by SPSS version 20 and a significance level of 0.05 was considered.

Results: A total of 84 patients were enrolled in the study, out of which 50 were male (59.5%) and 34 were female (40.5%). The mean age of patients was 44.38 ± 6.462 years (31—55). The mean changes in systolic (10.357 ± 7.59 vs. 3.92 ± 6.71) and diastolic blood pressure (3.0.3 ± 6.01 vs. -0.07 ± 5.98) in the intervention and the control groups were statistically significant when a comparison was carried out between their values at the beginning and the end of the study. The results showed no significant difference between the mean changes, in weight, waist size, body mass index, and fat mass index in the intervention and the control groups, at the beginning and end of the study, despite a further decrease in the intervention group.

Conclusion: Since lifestyle modification is one of the effective interventions in lowering blood pressure in people with hypertension, inclusion of a diet modification program derived from Persian medicine can be helpful in regulating blood pressure. Since Persian medicine is also a preventive medicine, observing the essential set principles, especially eating and drinking, can be useful in preventing chronic diseases such as hypertension. Thus, further studies are needed in the future with a larger sample size.

KEYWORDS:
eating habits; hypertension lifestyle; pre-hypertension traditional persian medicine

ARTICLE HISTORY:
Received April 12, 2021
Accepted May 20, 2021
Published June 22, 2021

DOI:
10.5455/jcmr.2021.12.02.13

VOLUME: 12
ISSUE: 2
ISSN: 2146-8397

INTRODUCTION

Hypertension is the cause of 6% of adult mortality and the third leading cause of death in the world (1). Hypertension is a growing health problem worldwide. It has been estimated that 29% of the adults over the age of 18 in the United States have high blood pressure (2). In Iran, the prevalence of hypertension in the age group of 15 years to 64 years is reported to be 26.6% (3). In another study, the prevalence of hypertension among the people of Iran was 26.21% and the prevalence of pre-hypertension was 47.1% (4).

Hypertension is defined as systolic blood pressure greater than 140 mmHg and diastolic blood pressure above 90 mmHg, and pre-hypertension is defined as a systolic blood pressure between 120 mmHg and 139 mmHg and a diastolic blood pressure between 80 mmHg and 89mmHg (5). For every 20 mmHg systolic or 10 mmHg diastolic increase in BP, there is a doubling of mortality from both IHD and stroke. If the rise in blood pressure is controlled with age, it can prevent the increase in cardiovascular disease and stroke (5). Emphasis has been placed on lifestyle modifications to prevent and control hypertension (6).

Lifestyle modification is necessary to control blood pressure in patients with hypertension and pre-hypertension. Recommended lifestyle modifications include weight reduction to maintain normal body weight, adopting the Dietary Approaches to Stop Hypertension (DASH) plan, increasing physical activity, and limiting alcohol consumption (7).

One of the main ways to reduce or modulate hypertension is to choose a healthy lifestyle as studies have shown a relationship between hypertension and choosing the correct type of lifestyle (8). Most researches on dietary modification suggest that dietary modification not only controls the risk factors for hypertension but it is also involved in controlling other risk factors of cardiovascular disease such as weight, fat, alcohol consumption, and diabetes (9). One study found that high prevalence of overweight, obesity, and high blood pressure in people is associated with their unhealthy eating habits and lifestyles (10). The World Health Organization emphasizes on both lifestyle changes and training on dietary habits to control hypertension (11). In Iran, while comparing the eating habits of patients with hypertension with that of other people without hypertension, it has shown a lack of healthy eating habits in patients with hypertension and has revealed the relationship between lifestyle and hypertension (12). Since the principles of Persian medicine pay attention to the prevention of a disease prior to its treatment, six principles have been identified by it, which are called Setteye Zaroorieh (The six principles). If these principles are observed by a person, the person will suffer less from the disease, and if any disease occurs, as a first step the dietary habits should be corrected by the person before starting drug-based treatment. These six principles include (i) air, (ii) eating and drinking, (iii) movement and stillness, (iv) retention and excretion of excretory substances, (v) sleeping and waking, and (vi) sensual symptoms (13). One of these principles is eating and drinking, and Persian traditional medicine has mentioned recommendations for proper eating and drinking habits (14). Considering the importance of dietary habits in the prevention and control of hypertension and other chronic diseases, the present study was conducted to investigate the effect of improving dietary habits, derived from Persian medicine, on blood pressure in people with pre-hypertension. Dietary recommendations based on traditional Persian medicine used in this study are given in Table 1.

Table 1: Dietary recommendations based on Persian medicine.

Row	Recommendations
1	Advise to chew food enough
2	Avoid eating while feeling full
3	Stop eating before feeling completely full
4	Observe the variety of food between different meals, but consume one type of food in one meal
5	Avoid eating delays when feeling hungry
6	Avoid fruits, salads, yogurt, and drinks with food and eat them between meals
7	Avoid sleeping and doing strenuous activity after eating
8	Avoid exercise and bathing immediately after eating
9	Appropriate time interval between dinner and bedtime
10	Keep calm while eating
11	Avoid eating hot or cold food
12	Avoid drinking cold water
13	Avoid drinking water with food except when thirsty and necessary
14	Avoid drinking water during exercise and bathing except when thirsty

MATERIALS AND METHODS

This clinical trial was performed on patients with pre-hypertension with information registered in the comprehensive health delivery system. For the participation of these patients in this study, they were invited to the Akbari Comprehensive Urban Health Center in Yazd. Patients were randomly divided into intervention and control groups

after getting acquainted with the study, obtaining informed consent, and having inclusion and exclusion criteria.

Inclusion criteria included: pre-hypertensive patients without any evidence of secondary hypertension, age range 25—55 years, minimum diploma education. Exclusion criteria were patients with hypertension in the later stages of the disease, those who suffered from complications following dietary measures, having cardiovascular disease, and those who did not follow the relevant recommendations for more than one or two consecutive weeks.

Sample size

The sample size was calculated according to the following formula.

$N=2*\{Z1-\alpha+Z1-\beta ð0\}*s2$

Considering the first type error of 5% and the second type error of 10% and the minimum difference of 5 mmHg and the standard deviation of 7.5 mmHg, 50 people were calculated for each group.

Procedure

Preparation of a questionnaire: The statistical population of the research included experts in the field of Persian medicine in the stage of designing and adapting tools, and examining face and content validity. At this stage, purposive sampling method was used, for which the questionnaire was given to seven specialists, including five specialists in traditional Persian medicine and two epidemiologists. The study tools of the questionnaire included two areas: eating management and drinking management, which had 17 items in the field of eating management and 5 items in the field of drinking management. The scoring method was considered numerically in the range between 1 and 3, and the highest score (three) was given if the correct option was selected by the person. In the validity evaluation, two dimensions of validity ratio (CVR) and content validity index (CVI) were used. Regarding the CVR, the necessity and the usefulness of the questions were investigated and, the relevance of the questions was investigated for CVI. Further, the questionnaire was distributed among the study population, and the structural validity and the reliability of the same were examined. Cronbach's alpha was used to assess the reliability after completing the questionnaire by forty people. Cronbach's alpha above 0.9 was considered excellent, followed by good (0.7—0.9), moderate (0.5—0.7), and unacceptable (less than 0.5), in which only acceptable questions in the internal validity section were analyzed.

Execution of the study: After preparing the questionnaire and confirming its reliability and validity, the invited people in the two groups were put under the supervision of a physician to be treated if there arose any need for it.

At the beginning of the study, blood pressure, weight, waist circumference, neck circumference, body fat mass, body mass index (BMI), blood triglyceride, and cholesterol of both the groups were measured and recorded. The control group was required to follow a diet for 1 month to control blood pressure according to anthropometric characteristics. The status of observing this food recipe by the subjects was ensured once a week over the phone. All the subjects were required to complete all forms of nutrition and physical activity. After 1 month, their blood pressure and anthropometric characteristics were measured again. In the intervention group, in addition to all the above measures, they were asked to complete a questionnaire on their food habits, based on traditional Persian medicine at the beginning of the project. After completing the questionnaire, they were taught how to eat and drink water properly from the perspective of Persian medicine according to the questions asked in the questionnaire. During the next month, they were asked to follow a diet related to controlling blood pressure, as well as the trained dietary habits. After 1 month, in addition to the measures described in the control group, the food habits questionnaire based on traditional Persian medicine was completed again and the results were recorded.

Blood pressure of the patients were measured by a physician according to JNC-7 instructions and using a Beurer blood pressure monitor made in Germany (BM16) which was calibrated before the start of the project.

Blood triglycerides and cholesterol were measured in the hospital laboratory. Weight and fat mass were measured with Beurer digital scale.

For randomization, the limited randomization method and the Random Allocation Rule model were performed. Balls of two colors and shapes were poured into a container, in which the name of a group was specified inside each ball, and the patient was made to select one of these balls. The intervention and the control groups were accordingly determined.

Data Analysis

Cronbach's alpha was used to check the internal consistency of the questionnaire and confirmatory factor analysis and AMOS software were used to evaluate the construct validity.
After collecting data, the data were analyzed by SPSS version 20 and a P value of 0.05 was considered to be statistically significant.

Ethical Considerations

A written letter of introduction was obtained from university officials and research centers. The purpose of the study was explained to all participants and their written consent was obtained. All patients' information was kept confidential. Ethics-related declarations of the Helsinki Ethics Research Committee of the University of Medical Sciences were considered. The project was approved by the Research Council of the Faculty of Persian Medicine (Ethics Code: IR.KMU.1398.732). Also, the clinical trial study protocol has been registered in the Iranian Clinical Trial Registration

Center under the code IRCT20200524047558N1.

RESULTS

Questionnaire: In the content validity study, the average content validity ratio was 0.99. Content validity index was 0.86 in terms of relevance. According to experts, questions with a CVI above 0.79 are acceptable and questions above 0.6 should be revised. Only four questions were revised and the other questions were approved. Face validity was 4.1 for all questions in the five-point Likert scale. Based on confirmatory factor analysis, RMSEA index was 0.05. Furthermore, GFI and CFI indices and the ratio of chi-square index to degree of freedom were 0.91, 0.93, and 1.8, respectively. The results of fit indices in factor analysis indicated a good fit of the model. In this model, questions 1 to 22 were loaded on the eating habits factor. The factor load for all the questions was higher than 0.4, showing that there was no need to change all the questions based on the factor load. The internal consistency of the questionnaire was reported based on Cronbach's alpha coefficient of 0.805, indicating that the questionnaire had a strong internal consistency.

Baseline Characteristics

In this study, a total of 84 patients were included in the study, out of which 50 were male (59.5%) and 34 were female (40.5%). The mean age of the patients was 44.38 ± 6.462 years (31—55).

Basic information of groups. In the following tables, the basic information of both intervention and control groups is included:

The basic characteristics of the intervention and the control group that was examined by independent t-tests are shown in Table 2.

Table 2: Comparison of demographic, clinical, and laboratory information of the intervention and the control groups. (Basic characteristics of participants)

Baseline	Group	Mean	SD	P
Age	Intervention	43.43	6.41	1.0
	Control	45.33	6.45	
Systolic blood pressure	Intervention	133.93	5.96	0.622
	Control	132.12	6.26	
Diastolic blood pressure	Intervention	85.05	6.43	0.258
	Control	84.0	5.2	
Weight	Intervention	78.82	11.45	0.527
	Control	83.12	12.62	
Waist size	Intervention	96.95	6.15	0.006
	Control	100.33	9.48	
Neck size	Intervention	37.52	3.37	0.394
	Control	38.27	2.97	
Body mass index	Intervention	28.91	3.04	0.082
	Control	29.83	4.08	
Triglyceride	Intervention	186.83	85.95	0.671
	Control	182.15	94.13	
Cholesterol	Intervention	180.12	34.64	0.283
	Control	184.61	44.53	
Fat mass index	Intervention	34.59	6.65	0.777
	Control	35.3	7.35	

SD, Standard deviation.

Independent t-tests showed that the two groups were completely identical in terms of all characteristics except waist circumference.

Comparison of micronutrient basic characteristics and physical activity of the intervention and the control groups are shown in Table 3.

Table 3: Micronutrient basic characteristics of intervention and control groups.

The type of quantities	Group	Baseline	SD	P1
Energy	Intervention	1663.46	262.3	0.907
	Control	1673.11	247.24	
Protein	Intervention	68.85	14.82	0.826
	Control	68.15	13.78	
Carbohydrate	Intervention	241.16	36.74	0.537
	Control	244.48	34.0	
Fat	Intervention	48.52	15.04	0.865
	Control	48.22	14.11	
Cholesterol	Intervention	392.2	227.67	0.769
	Control	425.74	241.01	
Saturated fatty acids	Intervention	15.32	5.88	0.526
	Control	15.35	5.42	
MUFA	Intervention	14.17	4.76	0.835
	Control	14.24	4.66	
PUFA	Intervention	11.98	5.8	0.924
	Control	12.29	5.18	
Sodium	Intervention	823.52	358.87	0.733
	Control	851.14	464.72	
Potassium	Intervention	2008.43	617.3	0.909
	Control	1986.75	618.98	
Fe	Intervention	18.35	3.02	0.692
	Control	18.62	3.21	
Calcium	Intervention	601.3	249.54	0.506
	Control	630.73	258.5	
Magnesium	Intervention	158.62	46.01	0.157
	Control	159.6	41.47	
Total fiber	Intervention	14.26	4.25	0.486
	Control	14.21	4.19	
Sugar	Intervention	50.16	20.72	0.807
	Control	48.08	19.41	
Physical activity	Intervention	39.04	8.61	0.515
	Control	37.94	6.79	

SD, standard deviation; MUFA, Mono unsaturated fat; PUFA, Poly-unsaturated fat;

Independent t-tests showed that the two groups were completely identical in terms of all characteristics.

The status of the intervention and the control groups was evaluated in pairs (before and after 1 month) using Student's t-test and the results are shown in Table 4. According to the results, in the intervention group, there was a significant difference between systolic blood pressure, diastolic blood pressure, weight, waist circumference, neck circumference, body mass index, triglyceride, and body fat mass before and after the intervention ($P < 0.05$). Furthermore, the findings showed that there was no statistically significant difference between the two stages in terms of the comparison of the mean, andthe difference between blood cholesterol before and after the intervention. In the control group, except for changes in diastolic blood pressure and blood triglycerides, there was a significant difference between the other parameters of the two stages ($P < 0.05$).

Table 4: Outcomes for the intervention and control in comparison with baseline.

Intervention	Comparison of before and after stage of the intervention group		t-test value	Degrees of freedom	Significance level
	Mean	SD			
Changes in systolic blood pressure	10.357	7.593	8.84	41	0.000
Changes in diastolic blood pressure	3.238	6.011	3.491	41	0.001
Weight changes	1.65	2.23	4.774	41	0.000
Waist size changes	2.61	2.33	7.25	41	0.001
Neck size changes	0.39	0.49	5.2	41	0.00
Body mass index changes	0.586	0.759	5.2	41	0.00
Triglyceride changes	52.1	75.22	3.863	30	0.00
Cholesterol changes	8.87	25.89	1.908	30	0.066
Fat mass changes	0.85	0.84	6.58	41	0.00
Comparison of before and after stage of the control group					
Changes in systolic blood pressure	3.92	6.71	3.79	41	0.00
Changes in diastolic blood pressure	-0.071	5.98	0.077	41	0.939
Weight changes	1.13	1.29	5.66	41	0.001
Waist size changes	1.76	2.69	4.23	41	0.001
Neck size changes	0.416	0.714	3.77	41	0.001
Body mass index changes	0.427	0.517	5.35	41	0.001
Triglyceride changes	17.69	54.712	1.58	32	0.072
Cholesterol changes	16.39	42.3	2.22	32	0.033
Fat mass changes	0.69	1.21	3.66	41	0.001

The changes in the mean difference of systolic and diastolic blood pressure are shown in Table 5. There was a significant difference between the mean of systolic and diastolic blood pressure in the intervention group and the control group when compared with that of baseline (before and after) ($P < 0.05$).

Table 5: Comparison of mean difference between systolic blood pressure (before and after) in the intervention and the control groups.

Systolic blood pressure	Sum of squares	Degrees of freedom	Average of squares	Ratio F	Significance level
Between groups	933.33	1	933.33	19.896	0.0001
Intergroup	3846.61	82	46.91		
Comparison of mean diastolic blood pressure difference (before and after) in intervention and control groups					
Between groups	198.1	1	198.1	5.511	0.021
Intergroup	2947.45	82	35.94		

The comparison of the mean difference between triglyceride and cholesterol of the intervention and the control groups is shown in Table 6. The results showed no significant difference between the mean of before-and-after changes of triglyceride and cholesterol of the intervention and the control groups in the previous stage ($P > 0.05$) but there was a significant difference between the mean of before-and-after changes in triglycerides in the intervention and the control groups before and after intervention ($P < 0.05$), ($F = 8.779$). No significant difference was found between the mean before-and-after changes of cholesterol in the intervention and the control groups before and after ($F = 1.07$) ($P > 0.05$).

Table 6: The mean of before-and-after changes of triglyceride and cholesterol in the intervention and the control groups.

Triglyceride	Sum of squares	Degrees of freedom	Average of squares	Ratio F	Significance level
Between groups	26503.247	1	26503.247	8.779	0.001
Intergroup	247561.726	82	3019.045		
Cholesterol					
Between groups	1009.545	1	1009.54	1.07	0.13
Intergroup	76902.39	82	937.83		

Systolic blood pressure after 30 days (by gender) shows that the number of men and women in the control and the intervention groups are 25 and 17 by gender for each group, respectively.

The mean systolic blood pressure in men of the control group (129.92) after 30 days is higher than the mean in women (125.65). Also, the comparison of systolic blood pressure in the second stage of the intervention group showed mean systolic blood pressure in women (125.12) and men (122.52), which was higher among the women of this group. According to the results of Table 7, a significant difference was found between the mean of before-and-after systolic blood pressure based on the gender in the intervention and the control groups ($P < 0.05$).

Table 7: Mean systolic blood pressure changes in the intervention and control groups before and after by gender

	Comparison of before-and-after stage of the intervention group		t-test value	Significance level
	Mean	SD		
Changes in systolic blood pressure (before and after) of men in intervention group	11.24	7.728	7.18	0.00
Changes in systolic blood pressure of women in the intervention group before and after (women intervention group)	9.059	7.267	5.14	0.00
Changes in systolic blood pressure of men in the control group before and after (men control group)	2.24	4.746	2.36	0.027
Changes in systolic blood pressure of women in the control group before and after (women control group)	6.412	8.404	3.146	0.028

Comparison of diastolic blood pressure after 30 days based on gender shows that the number of men and women in the intervention and the control groups were 25 and 17 for each group, respectively. The mean diastolic blood pressure of men (85.56) after 30 days was higher than the mean of diastolic blood pressure of women (81.88) in the control group. The mean value in this group was higher among men as compared with that of women.

In addition, the comparison of diastolic blood pressure in the next stage of the intervention group showed that the mean diastolic blood pressure of men and women were 81.12 and 82.28, respectively. The average value, in this group, was higher among men as compared with that of women. Also, the findings showed that the mean diastolic blood pressure of men and women was 81.12 and 82.28 after intervention, respectively. The mean value, in this group, was higher among men compared with that of women.

There was a significant difference between men and women in terms of before-and-after mean changes of diastolic blood pressure in the intervention group ($P < 0.05$; Table 8). However, no significant difference was found in the before-and-after mean difference of diastolic blood pressure in men and women in the control group ($P > 0.05$).

Table 8: Comparison of before-and-after mean diastolic blood pressure between intervention and control groups by gender.

	Comparison of before and after stage of the intervention group		t-test value	Significance level
	Mean	SD		
Changes in diastolic blood pressure before and after in men (intervention group)	2.88	5.833	2.469	0.021
Changes in diastolic blood pressure before and after in women (intervention group)	3.765	6.408	2.422	0.028
Changes in diastolic blood pressure before and after in men (control group)	-0.64	5.751	0.556	0.583
Changes in diastolic blood pressure before and after in women (control group)	0.765	6.389	0.494	0.628

According to Tables 7 and 8, it can be said that systolic and diastolic blood pressure of both men and women had significant changes in the intervention group, but there was no difference between men and women. In the control group, blood pressure changes were the same in both the genders, showing that gender has no effect on change.

Weight distribution after 30 days in the intervention group: two were normal, 14 were obese, and 26 were overweight. In the control group: one was normal, 16 were obese, and 25 were overweight.

The results presented in Table 9 reveals that the difference between before-and-after systolic blood pressure in overweight and obese people of the intervention group and overweight people of the control group had a significant difference ($P < 0.05$), but no significant difference was seen in obese people of the control group ($P > 0.05$).

Table 9: Changes in mean of before-and-after systolic blood pressure in the intervention and the control groups based on overweight and obesity.

Variable	Comparison of before and after stage of the intervention group		t-test value	Significance level
	Mean	SD		
Overweight people in the intervention group	10.269	7.857	6.665	0.00
Obese people in the intervention group	10.6	7.642	5.372	0.000
Overweight people in the control group	4.375	4.897	4.376	0.00
Obese people in the control group	2.563	6.25	1.64	0.122

The results presented in Table 10 show no significant difference between the mean diastolic blood pressure in overweight people of the intervention and the control groups and obese people in the control group ($P > 0.05$), but this difference was significant in obese people of the intervention group ($P < 0.05$)

Table 10: Changes in mean of before-and-after diastolic blood pressure in the intervention and the control groups based on overweight and obesity.

Variable	Comparison of before and after stage of the intervention group		t-test value	Significance level
	Mean	SD		
Overweight people in the intervention group	2.038	5.355	1.941	0.064
Obese people in the intervention group	5.4	6.843	3.065	0.009
Overweight people in the control group	-0.583	5.389	-0.53	0.601
Obese people in the control group	-0.63	5.882	-0.043	0.967

The results showed (despite a greater decrease in the intervention group than the control group) that there was no significant difference between the mean changes (before and after) in weight, waist size, fat mass index, and body mass index in the intervention and the control groups ($P > 0.05$).

DISCUSSION

Hypertension is one of the most common diseases in industrial and non-industrial countries and it is one of the important causes of atherosclerosis and can cause various problems. If left untreated, 50% of patients with high blood pressure die from coronary heart disease and congestive heart failure, 33% die due to stroke-, and 10 to 15% due to kidney complications. Other organs, such as the eyes and large arteries, can also be affected (15).

Major studies in the field of nutrition and blood pressure have focused on the consumption of foods and beneficial and harmful foods for hypertension, and only few studies have been done on how to eat or eating habits. For example, one study found that in addition to sodium, other nutrients in foods such as potassium, magnesium, calcium, and fiber were involved in the etiology of adult hypertension. A meta-analysis showed that this sodium restriction had a significant effect on the elderly people with hypertension, but its benefits were small in people with normal blood pressure. Later, Sacks et al., by studying the simultaneous and separate effects of low-sodium diet and Dietary Approaches to Stop Hypertension (DASH) observed that the DASH diet lowers blood pressure at all levels of sodium intake (16).

While this study is more about how to consume food and water, and its relationship with blood pressure.

According to the traditional Persian medicine texts, high blood pressure can be related to Imtila (accumulation of natural or abnormal fluids in the body), which is defined in Persian medicine (17). Disorders that lead to indigestion and the production of improper humors mixture can also be a

cause of high blood pressure. Adherence to dietary recommendations based on traditional Persian medicine in these people can lead to a reduction in Imtila and also the production of appropriate humors (18).

Many studies have been done on lifestyle modification and its effect on chronic diseases, but only limited studies on lifestyle modification have been done based on what is called HEFZO SSEHE in traditional Persian medicine and its effect on chronic diseases.

Regarding the modification of eating habits based on Persian traditional medicine, a study by Kazemeini et al. showed that this modification is useful in reducing HgA1C and lowering blood triglycerides and cholesterol in diabetic patients. The results of lowering triglycerides were consistent with the results of this study, but lowering blood cholesterol in this study did not change significantly. The reason for this finding can be explained by comparing the quarterly period of the above study with that of 1 month of the same (19).

Allorizi et al. examined the effect of these recommendations on chronic constipation compared with lactulose syrup, indicating that these recommendations were useful in treating constipation (20).

Another study by Zahra Gorji and Chupani showed that if you follow the recommendations of a diet based on Persian traditional medicine, it can improve the symptoms of fatty liver and also help in losing weight without reducing the calorie intake (21).19 This was consistent with the results of this study, in which weight loss was greater in the intervention group than in the control group.

In this study, 84 patients were included in the study with a mean age of 44.38 years. In this study, it was found that the means of before-and-after changes of systolic blood pressure in the intervention group and the control group were significantly different ($P < 0.05$). But there was no significant difference between the mean systolic blood pressure of the intervention and the control groups in the previous stage ($P > 0.05$). It was also found that there was a significant difference between the mean changes in diastolic blood pressure in the intervention and the control groups in the previous and next stages ($P < 0.05$), while there was no significant difference in the mean diastolic blood pressure in the previous stage.

A study by Lee Long et al. showed a direct relationship between nutrition, body mass index, and blood pressure (22). The results showed a good performance in the process of biological changes on the intervention group during 1 month, where a favorable improvement toward the health standard was found in comparison with the control group.

In a study by Parasana et al., lifestyle changes and dietary modifications were found to be linked to a significant reduction in systolic and diastolic blood pressure in patients with hypertension. The researchers found that lifestyle modifications in patients with hypertension could be added to drug therapy as a first line of treatment, increasing the effectiveness of antihypertensive drugs and reducing the risk of coronary heart disease (9).

The study by Margrison et al. examined the relationship between dietary pattern and blood pressure in Australians, where the dietary pattern included high-fiber bread, pasta, noodles and rice, meat dishes, chicken and egg dishes, as well as mixed grains salty nuts, low consumption of milk and yogurt (low fat), and vegetable juice. This study showed that dietary pattern was positively related to energy and sodium intake, and blood pressure was inversely related to potassium intake (23).

The results of the study show that the mean changes in systolic and diastolic blood pressure of the intervention group decreased compared with the mean changes in systolic and diastolic blood pressure of the control group at the end of the study period. Therefore, modification of eating habits, based on traditional Persian medicine can be useful in controlling hypertension in people with hypertension.

CONCLUSION

Since lifestyle modification is one of the effective interventions in lowering blood pressure in people with hypertension, its inclusion in the lifestyle modification program of dietary habits, especially dietary habits based on Persian medicine, can be helpful in regulating blood pressure. Since Iranian medicine is also a preventive medicine, observing the essential set principles, especially eating and drinking, can be useful in preventing chronic diseases such as hypertension and diabetes, and it is recommended that more studies be conducted in the future with a larger sample size.

REFERENCES

1. Centers for Disease C, Prevention. Vital signs: Prevalence, treatment, and control of hypertension--United States, 1999-2002 and 2005-2008. MMWR Morb Mortal Wkly Rep. 2011;60(4):103-8. PMID:21293325.
2. Fryar CD, Ostchega Y, Hales CM, Zhang G, Kruszon-Moran D. Hypertension prevalence and control among adults: United States. 2015-2016. , NCHS Data Brief.2017(10) (Suppl 289)
3. Esteghamati A, Meysamie A, Khalilzadeh O, Rashidi A, Haghazali M, Asgari F, Kamgar M, Gouya MM, Abbasi M. Third National Surveillance of Risk Factors of Non-Communicable Diseases (SuRFNCD-2007) in Iran: Methods and results on prevalence of diabetes, hypertension, obesity, central obesity, and dyslipidemia. BMC public health. 2009 Dec;9(1):1-10.
4. Aghaei Meybodi HR, Khashayar P, Rezai Homami M, Heshmat R, Larijani B. Prevalence of hypertension in an Iranian population. Renal failure. 2014 Feb 1;36(1):87-91
5. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL, Jones DW, Materson BJ, Oparil S, Wright Jr JT, Roccella EJ. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: The JNC 7 report. Jama. 2003 May 21;289(19):2560-71.
6. Jameson JL, Kasper DL, Longo DL, Fauci AS, Hauser SL, Loscalzo J. Harrison's principles of internal medicine. 20 ed.

McGraw-Hill Education United States; 2018:1900
7. Nesbitt SD. Treatment options for prehypertension. Current opinion in nephrology and hypertension. 2007 May 1;16(3):250–5. http://dx.doi.org/10.1097/01.hjh.0000492384.63294.f6.
8. Prasanna Dg, Gopinath C, Reddy Ky, Rajasekhar Dg, Chandrakanth P, Sravanakumari S. Effect of lifestyle modifications on blood pressure in hypertensive patients. Int J Pharm Sci Res. 2015;6(12):5159.
9. Mahan LK, Raymond JL. Krause's food & the nutrition care process-e-book. Elsevier Health Sciences; 2016 May 17.
10. Awosan KJ, Ibrahim MT, Essien E, Yusuf AA, Okolo AC. Dietary pattern, lifestyle, nutrition status and prevalence of hypertension among traders in Sokoto Central market, Sokoto, Nigeria. Int j nutr metabol. 2014 Jan 31;6(1):9–17.
11. World Health Organization, International Society of Hypertension Writing Group. 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. Journal of hypertension. 2003 Nov 1;21(11):1983–92.
12. Cicolini G, Simonetti V, Comparcini D, Celiberti I, Di Nicola M, Capasso LM, et al. Efficacy of a nurse-led email reminder program for cardiovascular prevention risk reduction in hypertensive patients: A randomized controlled trial. Int J Nurs Stud. 2014;51(6):833–43.
13. Ibn-e-Sina A. Al-qanun fit-tib [The canon of medicine]. Beirut, Lebanon: Alamle-al-Matbooat Institute. 2005.
14. Borhani M, Khoshzaban F, Jodeiri B, Naseri M, Kamalinejad M. Diet and food in Iranian traditional medicine: Hints for further research. Inte j preventive med. 2014 Nov 16;5(11):1480.
15. . Babaei, M. The effect of lifestyle modification educational intervention on blood pressure control in Patients with hypertension. J Education Community Health. 2016 Jun 10;3(1):12-9.21.
16. Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, Obarzanek E, Conlin PR, Miller ER, Simons-Morton DG, Karanja N. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. New England jmed. 2001 Jan 4;344(1):3–10.
17. Ghods R, Gharooni M, Amin G, Nazem E, Nasrabadi AN. Hypertension from the perspective of Iranian traditional medicine. Iranian Red Crescent Medical Journal. 2014 Mar;16(3).
18. Gharooni M, Ghods R, Gholamreza AM, Nazem E, Nasrabadi AN. Probable etiology of hypertension according to the Iranian traditional medicine. Iranian journal of public health. 2014 Jun;43(6):851.
19. Kazemeini SK, Emtiazy M, Mosavat SH, Rahmanian M, Lotfi MH, Owlia F, Khivah A. The efficacy of the diet therapy based on Traditional Persian Medicine on blood glucose and lipid profile in adults with type 2 diabetes mellitus patients: A randomized controlled clinical trial. Bali Med J. 2017 Jan 1;6(1):192–7.
20. Alorizi SM, Fattahi MR, Saghebi SA, Salehi A, Rezaeizadeh H, Nimrouzi M, Zarshenas MM. Assessment of the impacts of traditional Persian medical schemes and recommendations on functional chronic constipation compared to a classic medicine lactulose, a randomized clinical trial. JComplementary Integrative Med. 2015 Dec 1;12(4):325–31.
21. Gorji Z, Choopani R, Ghamarchehreh ME, Dehghan S. Diet-related improvement of non-alcoholic fatty liver based on Iranian traditional medicine (Persian Medicine): Case report. Asian JTraditional, Complementary Alternative Med. 2019 Mar 1;2(1–2):8–15.
22. Lelong H, Galan P, Kesse-Guyot E, Fezeu L, Hercberg S, Blacher J. Relationship between nutrition and blood pressure: A cross-sectional analysis from the nutrinet-santé study, a french web-based cohort study. Am j hypertension. 2015 Mar 1;28(3):362–71.
23. Margerison C, Riddell LJ, McNaughton SA, Nowson CA. Associations between dietary patterns and blood pressure in a sample of Australian adults. Nutrition j. 2020 Dec 1;19(1):5.