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Effects of Lifestyle Modification on Body Mass Index and Blood Pressure Control in Hypertensive Middle-Aged Women

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ABSTRACT

Aims Given the importance of lifestyle modification on hypertension control, the present study aimed to investigate the effect of lifestyle training intervention on blood pressure and body mass index in patients with hypertension in Darab, Iran.

Materials & Methods The present randomized controlled intervention study was conducted on 80 middle-aged women with hypertension referred to health houses of Darab in 2018. The cluster sampling was performed, and participants were assigned to experimental and control groups by a simple random method (40 participants in each of the experimental and control groups). The participants' lifestyle, BMI, and blood pressure were measured before and two months after the intervention and were analyzed by SPSS 20 using the paired t-test, independent t-test, and chi-square test.

Findings No significant differences were seen between experimental and control groups before the intervention in terms of health-promoting components ($p>0.05$), Systolic ($p=0.73$), and Diastolic blood pressure ($p=0.22$), and BMI ($p=0.43$). In contrast, there were statistically significant differences between the two groups after intervention in terms of health-promoting components, systolic and diastolic blood pressure ($p<0.05$). No significant difference was seen in terms of body mass index ($p=0.52$).

Conclusion Lifestyle modification effectively reduces systolic and diastolic blood pressure in the short term, independent of its impact on BMI.

Keywords Lifestyle; Hypertension; Body Mass Index; Women

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Introduction

Hypertension is a risk factor for non-communicable diseases and refers to systolic blood pressure higher than 140 mmHg and/or diastolic blood pressure higher than 90 mmHg [1, 2]. The prevalence of hypertension varies from 6% to 24% in the world. According to studies in Asian and Pacific countries, hypertension is from 5% to 47% in men and 7% to 38% in women [3]. Studies in other countries have reported the prevalence of 18 to 72 percent among men and women [4, 5].

Several studies have been conducted on the prevalence of hypertension in Iran, which varies from 8.4% to 49.5% [6]. In a systematic review, Mirzaei *et al.* reported that the overall pooled prevalence of hypertension in Iran was 22% (23.6% in men, 23.5% in women) [7]. Following hypertension, its control is significant to minimize the chance of complications [8]. Despite global efforts, hypertension control rates are meager in low- and middle-income countries [9]. Studies in Iran indicate that 48.1% of hypertension patients are treated, controlled only in 21.3% of patients. In central regions, 10.1% are controlled; and this rate is equal to 41% and almost the same among men and women [10].

Lifestyle is a determinant of incidence and control of hypertension [11]. It refers to all self-control behaviors controlled by a person, such as eating, sleep and rest habits, physical activity, exercise, weight control, tobacco prevention, immunization, and stress coping [12]. Overweight and obesity are associated with high blood pressure [13]. Individual lifestyle is specifically involved in the creation of hypertension, and its modification requires practical training. Many studies have provided evidence about positive changes in lifestyle and behaviors due to patient education [14, 15].

Middle age is a necessary period of women's life. Moving through median age is a transition from youth to aging as a growth stage that is the most significant part of adult life. The most important issue, which threatens the physical health of Iranian women, is a series of inadequate nutrition, inactivity, and obesity that can lead to cardiovascular diseases and metabolic syndrome. More than 50% of the Iranian female population is overweight [16].

Health education interventions seek to provide opportunities for people to acquire the necessary information and skills to make high-quality decisions. Selecting the most appropriate educational methods and media for transmitting data to the audience is essential in educational planning to facilitate learning. Given the importance of hypertensive disease control and the role of lifestyle in this field, the present study aimed to investigate the effects of lifestyle training intervention on blood pressure and body mass index control in women with hypertension.

Materials and Methods

This educational controlled intervention study was conducted from May to October 2018 on middle-aged women with hypertension referred to Health Houses of Darab, Iran. The 80 women were recruited for the study through the cluster sampling method. Given that Darab city has 80 health houses, each health house was considered as a cluster, and four health houses were randomly selected. Two health houses were selected as the control group and the other two as the experimental group by simple randomization. Afterward, 20 participants were selected randomly from each health house through systematic random sampling (Diagram 1). Based on similar studies [17], and considering α=0.05, 1-β=0.80, and 10% attrition rate, and using the NCSS PASS 15 software, the sample size was computed as 40 participants in each group. The participants were 30-59 years old women with primary hypertension for at least six months and didn't have cardiovascular diseases and diabetes that consent to participate in the study. Participants who withdrew from the study at any time; and missed more than two education sessions were excluded from the study.

The data collection tool included two sections: the first part was a demographic information form, including participants' age, education level, job, marital status, economic status, smoking, and history of hypertension in family members, the second part was Walker's Lifestyle Questionnaire. Walker's Lifestyle Questionnaire (Health Promoting Lifestyle Profile-2) was provided based on the Pender's Health Promotion Model to determine how well people perform health-promoting behavior [18]. It consisted of 52 items with a 4-point Likert Scale (1= never, 2= sometimes, 3= often, 4= always). Six sub-scales of the lifestyle questionnaire included responsibility for health (9 items), physical activity (8 items), nutrition (9 items), interpersonal relations (9 items), spiritual growth (9 items), and stress management (8 items). The range of total score of health-promoting behavior was 52-208, and scores were measured in comparison to the median of 130, so that a score less than the median was referred to undesirable lifestyle, and a score higher than the median indicated a desired lifestyle. Cronbach's alpha for lifestyle subscales and total questionnaire was above 0.8. [14]. Health Promoting Lifestyle Questionnaire was completed before and two months after the intervention in the experimental and control groups.

The participants' weight, height, and blood pressure were measured by a good and reliable digital calibrated medical scale, a wall-mounted stadiometer (both SECA models made in Iran), and

an ALPK2 500-gv mercury sphygmomanometer (made in Japan).

The study was approved by the Ethics Committee of Shiraz University of Medical Sciences. All of the participants signed an Informed consent form before filling out the questionnaire. They informed that their participation was voluntary and could withdraw from the study if they were unwilling to continue participation. Blood pressure was measured by a trained clinical specialist. After measuring the weight and height of participants and their systolic and diastolic blood pressure, the participants completed Walker's Lifestyle Questionnaire. Educational interventions were designed and implemented based on the experimental group's weaknesses (physical activity, stress management, and nutrition). The educational intervention consisted of five 50-60-minute sessions that were held weekly (Table 1). The healthy lifestyle in middle age people package [19] was used to provide the training material. The control group received no intervention. Blood pressure was measured before and two months after the intervention in experimental and control groups.

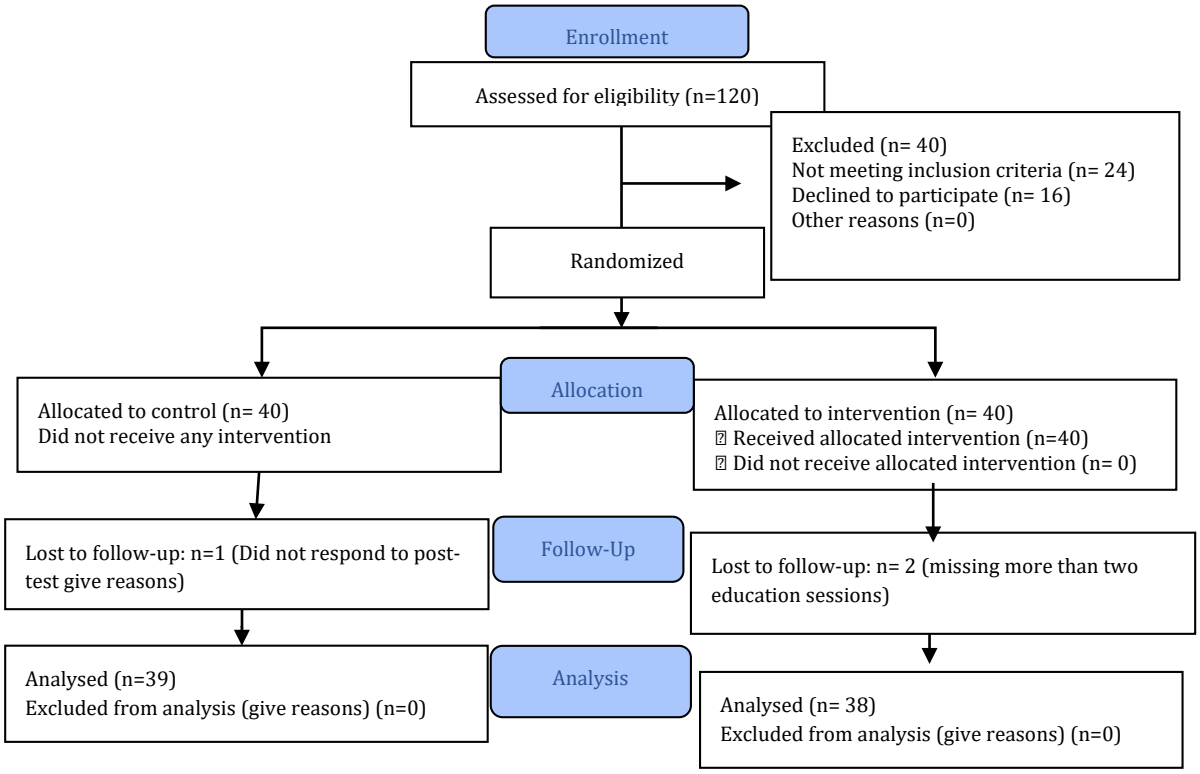

Diagram 1) CONSORT flow diagram of participants through the study

Table 1) The training intervention program

Session	Purpose	Training subject	Training method	Instructor
First	Introduction, training goals, the importance of a healthy lifestyle in the individual health	Prevention of chronic diseases and particular emphasis on hypertension and body mass index. Definition, importance, and symptoms of hypertension	Lecture, video	A medical doctor, a health care provider
Second	Raising awareness and improving individual attitude towards healthy nutrition	Healthy nutrition and its importance in preventing hypertension, foodstuff groups, observance of healthy food, and emphasizing three principles, namely balance and diversity in diet and low salt intake in hypertension	Lecture, group discussion, and question and answer (Q & A)	A nutritionist and a medical doctor
Third	Increasing the knowledge and attitude of people towards body mass index	Definition of BMI, its importance in disease prevention and control, and roles of physical activity and exercise in the control and prevention of hypertension, as well as beneficial effects of practice in the treatment of disease; appropriate middle-aged exercise and routine physical activity (at least 30 minutes of moderate-intensity physical activity in 5 days per week or 25 minutes of high-intensity physical activity in 3 days per week.	Educational videos and posters	A medical doctor, a health care provider
Fourth	Stress management	Ways to control stress and the effect of stress control skills on hypertension	Lecture, group discussion, and Q & A	Mental Health Expert
Fifth	Improving Healthy Lifestyle	Summing up and reviewing the content of previous sessions	Lecture, group discussion, and Q & A	health care provider

Data were analyzed using the SPSS 20. Data normality was assessed by the Kolmogorov-Smirnov analysis. The frequency, mean and standard deviation indices were used to describe data. The paired t-test for groups comparisons, independent t-test for between-groups comparisons, and chi-square test for comparing the distribution of demographic variables between experiment and control groups were used to analyze data. The significance level was set at 0.05 for all tests.

Findings

Totally 80 women participated in the study. The mean±SD age was 49.40±7.69 in the control group, and it was 49.40±7.69 in the experimental group. Results of the Chi-square test showed that there was no significant difference between experimental and control groups in terms of marital status, occupation, economic status, tobacco use, and history of blood pressure in family members (p>0.05), but there was a significant difference between the experimental and control groups in term of education levels (p=0.001; Table 2). Also, results of the independent t-test indicated that there was no significant difference between the experimental and control groups in terms of age, BMI, and systolic and diastolic blood pressure (p>0.05)

Table 2) Comparing frequency distribution of demographic characteristics and background study variables of participants between groups

Variable		Group		p-value
		Control N (%)	Experimental N (%)	
Marital status	Married	34 (85)	34 (85)	0.83
	Single	3 (7.5)	1 (2.5)	
	Separated	3 (7.5)	5 (12.5)	
Education level	Illiterate	12 (31.6)	15 (38.5)	0.001
	Primary school	21 (55.2)	4 (10.3)	
	Secondary school	5(13.2)	17 (43.6)	
	High school/diploma	0	2 (5.1)	
	Academic	0	1 (2.5)	
Job	Household	38 (95)	38 (95)	0.76
	Self-employed	1 (2.5)	2 (5)	
	Employee	1 (2.5)	0	
Economic status	Rich	10 (25)	7 (17.5)	0.95
	Medium	26 (65)	27 (67.5)	
	Poor	4 (10)	6 (15)	
Smoking	Yes	2 (5)	1 (2.5)	0.87
	No	38 (95)	39 (97.5)	
History of hypertension in family members	Father	15(42.9)	10 (32.3)	0.08
	Mother	19 (54.3)	12 (38.7)	
	Sister	1 (2.8)	6 (19.4)	
	Brother	0	3 (9.6)	

Results of the independent t-test indicated that there were no statistically significant differences between experiment and control groups before the intervention in terms of physical activity, nutrition, stress management, systolic and diastolic blood pressure, and BMI (p>0.05), but statistically significant differences between them were seen after intervention except BMI (p<0.05; Table 3).

Results of the paired t-test indicated that while there was no significant difference in the control group before and after intervention in all variables, the experimental group before and after intervention in physical activity, nutrition, stress management, systolic and diastolic blood pressure variables was different (p<0.05) but the difference was not significant in terms of BMI (p>0.05; Table 3).

Table 3) Comparison of mean±SD of study variables before and after intervention in two groups

Variable	Group		p-value
	Experiment	Control	
Responsibility			
Before	27.52±5.41	26.75±3.01	0.3
After	29.00±4.22	25.67±4.92	0.002
p-value	0.01	0.1	-
Physical activity			
Before	15.22±4.26	16.75±7.63	0.27
After	20.25±3.25	15.50±5.02	0.001
p-value	0.001	0.38	-
Nutrition			
Before	27.97±5.50	26.42±4.15	0.15
After	29.72±3.18	27.77±3.41	0.01
p-value	0.04	0.21	-
Spirituality			
Before	27.92±4.86	27.42±4.31	0.1
After	30.42±3.12	26.60±4.22	0.001
p-value	0.001	0.47	-
Inter-personal relations			
Before	28.1±5.44	27.55±5.22	0.21
After	30.25±3.61	28.15±3.57	0.01
p-value	0.005	0.51	-
Stress management			
Before	21.3±4.24	19.77±2.77	0.06
After	23.90±3.12	20.32±2.21	0.01
p-value	0.001	0.62	-
Health-promoting behavior			
Before	148.05±20.90	147.48±15.64	0.1
After	163.55±14.83	145.98±15.99	0.001
p-value	0.001	0.2	-
Systolic blood pressure			
Before	126.50±16.72	125.05±20.50	0.73
After	119.50±15.72	124.42±20.25	0.001
p-value	0.001	0.7	-
Diastolic blood pressure			
Before	80.75±8.28	81.50±6.71	0.22
After	77.25±7.15	82.50±7.16	0.001
p-value	0.01	0.41	-
BMI			
Before	28.64±5.21	29.61±5.79	0.43
After	28.82±5.12	29.60±5.78	0.52
p-value	0.45	0.34	-

Discussion

The present study aimed to investigate the effects of lifestyle training on blood pressure and body mass index control in middle-aged women with hypertension referred to health houses of Darab County in 2018.

The lifestyle intervention resulted in lower mean systolic blood pressure in the experimental group than the control group in the present study. The finding was consistent with studies by Rezaei *et al.,* who have studied the impact of family-based healthy lifestyle group discussion on the control of hypertension in Urmia, Iran [14], Seangpraw, *et al.,* who evaluated educational intervention with a dietary approach for blood pressure control among the elderly in Thailand [20], and Nganou *et al.* who investigated the impact of education on blood pressure control in patients with uncontrolled hypertension in Africa [15]. Lifestyle and dietary modification significantly reduce systolic blood pressure in hypertensive patients; hence, modifying hypertensive patients' lifestyles can be added to drug therapy as the first line of treatment.

In the present study, lifestyle intervention resulted in lower mean diastolic blood pressure in the experimental group than the control group. This finding was consistent with Prasanna *et al.* [21] and Blumenthal *et al.* [22], who investigated the effects of lifestyle modification on hypertension control. In this study, the training intervention increased physical activity in the experimental group compared to the control group. The finding was in line with the results of some other studies [23]. There was no significant difference between mean nutrition scores in the experimental and control groups before the intervention in the present study. However, the difference was significant after the intervention, consistent with Beigi *et al.* [24] and Cicolini *et al.* [25].

In the present study, there was no significant difference between mean scores of stress management in experimental and control groups before the intervention, but there was a difference in mean scores of stress management between groups after the intervention that was in line with many studies [18, 23, 26, 27].

In this study, lifestyle education did not cause a decrease in the body mass index of participants in the experimental group probably because weight loss is time-consuming and the two-month follow-up period of this study did not provide enough time for losing weight. The finding was inconsistent with Jorvand *et al.* [28], probably due to a regular weight loss program and a specific diet in the two mentioned studies compared to the present study.

The study was conducted on women; thus, the results may not be generalizable to men. The short duration of the follow-up period is the other limitation of this study, so whether participants would maintain these lifestyle modifications for a long time remains unanswered. On the other hand, the training program did not affect body mass index since weight loss is time-consuming. Therefore, it is suggested that longer interventions maintain the changes in longer times and the effectiveness of the interventions on the BMI.

Conclusion

The lifestyle intervention in middle-aged women with hypertension lead to lower systolic and diastolic blood pressure, increased physical activity, improved nutrition, and stress management. Therefore, it is recommended that lifestyle modification educational interventions be included in routine women's health care programs.

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Conflicts of Interests: The present paper was derived from a student thesis (No. 17511) at Shiraz University of Medical Sciences, and there was no conflict of interest.

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References

1- Yilmaz V, Umay E, Gundogdu I, Aytul Cakci F. Effect of primary hypertension on treatment outcomes of patients with postmenopausal osteoporosis: A 5 year follow up retrospective study. High Blood Press Cardiovasc Prev. 2019;26(1):61-7.

2- Esteghamati A, Etemad K, Koohpayehzadeh J, Abbasi M, Meysamie A, Khajeh E, et al. Awareness, treatment and control of pre-hypertension and hypertension among adults in Iran. Arch Iran Med. 2016;19(7):456-64.

3- Rajpura J, Nayak R. Medication adherence in a sample of elderly suffering from hypertension: Evaluating the influence of illness perceptions, treatment beliefs, and illness burden. J Manag Care Pharm. 2014;20(1):58-65.

4- Negi PC, Chauhan R, Rana V, Vidyasagar, Lale K, Epidemiological study of non-communicable diseases (NCD) risk factors in tribal district of Kinnaur, HP: A cross-sectional study. Indian Heart J. 2016;68(5):655-62.

5- Yusufali AM, Khatib R, Islam S, Alhabib KF, Bahonar A, Swidan HM, et al. Prevalence, awareness, treatment and control of hypertension in four middle east countries. J Hypertens. 2017;35(7):1457-64.

6- Sarki AM, Nduka CU, Stranges S, Kandala NB, Uthman OA. Prevalence of hypertension in low-and middle-income countries: A systematic review and meta-analysis. Medicine. 2015;94(50):1959.

7- Mirzaei M, Moayedallaie S, Jabbari L, Mohammadi M. Prevalence of hypertension in Iran 1980–2012: A systematic review. J Tehran Univ Heart Cent. 2016;11(4):159. [Persian]

8- Eghbali M, Khosravi A, Feizi A, Mansouri A, Mahaki B, Sarrafzadegan N. Prevalence, awareness, treatment,

control, and risk factors of hypertension among adults: A cross-sectional study in Iran. Epidemiol Health. 2018;40:2018020.
9- Vedanthan R, Bernabe-Ortiz A, Herasme OI, Joshi R, Lopez-Jaramillo P, Thrift AG, et al. Innovative approaches to hypertension control in low-and middle-income countries. Cardiol Clin. 2017;35(1):99-115.
10- Ebrahimi M, Heidari-Bakavoli AR, Mazidi M, Moohebati M, Azarpazhooh MR, Nematy M, et al. Prevalence of hypertension, pre-hypertension and undetected hypertension in Mashhad, Iran. Mediterr J Nutr Metab. 2016;9(3):213-23.
11- Bruno CM, Amaradio MD, Pricoco G, Marino E, Bruno F. Lifestyle and hypertension: An evidence-based review. J Hypertens Manag. 2018;4(1):1-10.
12- Pengpid S, Vonglokham M, Kounnavong S, Sychareun V, Peltzer K. The prevalence, awareness, treatment, and control of hypertension among adults: The first cross-sectional national population-based survey in Laos. Vasc Health Risk Manag. 2019;15:27-33.
13- Afsargharehbagh R, Rezaie-Keikhaie KH, Rafiemanesh H, Balouchi A, Bouya S, Dehghan B. Hypertension and pre-hypertension among Iranian adults population: A meta-analysis of prevalence, awareness, treatment, and control. Curr Hypertens Rep. 2019;21(4):27.
14- Rezaei B, Khademvatan K, Alinejad V. The impact of family-oriented lifestyle-based group discussion on the controlling hypertension. Nurs Midwifery J. 2016;14(6):535-542. [Persian]
15- Nganou-Gnindjio CN, Domning HGK, Mfeukeu-Kuate L, Hamadou B, Kamdem F, Bediang G, et al. Effect of therapeutic group education on adherence and blood pressure control among uncontrolled hypertensive patients in Sub Saharan Africa. World J Cardiovasc Dis. 2018;8(3):183-95.
16- Djalalinia S, Saeedi Moghaddam S, Sheidaei A, Rezaei N, Naghibi Iravani SS, Modirian M, et al. Patterns of obesity and overweight in the iranian population. Front Endocrinol. 2020;11:42.
17- Aghamolaei T, Ghanbarnejad A. Validity and reliablity of the Persian health-promoting lifestyle profile II questionnaire. J Res Health. 2015;5(3):358-65.
18- Nejati S, Zahiroddin A, Afrookhteh G, Rahmani S, Hoveida S. Effect of group mindfulness-based stress-reduction program and conscious yoga on lifestyle, coping strategies, and systolic and diastolic blood pressures in patients with hypertension. J Tehran Heart Cent. 2015;10(3):140-8.
19- Kalantari N, Motlagh ME, Allameh M, Tohidi M, Tabatabaei M, Nickhah M, et al. The healthy lifestyle in middle age people. Tehran: Iran ministry of health; 2016. [Persian]
20- Seangpraw K, Auttama N, Tonchoy P, Panta P. The effect of the behavior modification program dietary approaches to stop hypertension (DASH) on reducing the risk of hypertension among elderly patients in the rural community of Phayao, Thailand. J Multidiscip Healthc. 2019;12:109-18.
21- Prasanna DG, Gopinath C, Yadavender Reddy KB, Rajasekhar G, Chandrakanth P, Sravanakumari S. Effect of lifestyle modifications on blood pressure in hypertensive patients. Int J Pharm Sci Res. 2015;6(12):5159-63.
22- Blumentha JA, Sherwood A, Smith PJ, Mabe S, Watkins L, Lin P, et al. Lifestyle modification for resistant hypertension: The TRIUMPH randomized clinical trial. Am Heart J. 2015;170(5):986-94.
23- Rakhshan M, Najafi H, Valizadeh GA. Lifestyle of patients with atrial fibrillation following self-management interventions: A randomized clinical trial. J Caring Sci. 2019;8(2):83-8.
24- Babaee Beigi MA, Zibaeenezhad MJ, Aghasadeghi K, Jokar A, Shekarforoush S, Khazraei H. The effect of educational programs on hypertension management. Int Cardiovasc Res J. 2014;8(3):94-8.
25- Cicolini G, Simonettib V, Comparcini D, Celibertic I, Nicola MD, 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.
26- Beune EJAJ, Van Charante EPM, Beem L, Mohrs J, Agyemang CO, Ogedegbe G, et al. Culturally adapted hypertension education (CAHE) to improve blood pressure control and treatment adherence in patients of African origin with uncontrolled hypertension: Cluster-randomized trial. PLos One. 2014;9(3):90103.
27- Shayesteh H, Mansoriyan M, Mirzaie A, Sayehmiri K. Survey of the effect of educational intervention on the nutrition physical activity and stress management of patients with hypertension among the rural population of Aligoudarz County of Lorestan Province in 2015. J Ilam Univ Med Sci. 2016;24(2):54-62. [Persian]
28- Jorvand R, Valizadeh A, Karami B, Shahvali F, Valizadeh F. Effect of healthy nutrition education on the body mass index (BMI) of health volunteers in Ilam Province. Health Educ Health Promot. 2016;4(2):25-34. [Persian]