

## SELF-EFFICACY ANALYSIS OF HEALTH PROMOTING BEHAVIORS OF HYPERTENSIVE PATIENTS IN RAFSANJAN

Leili Mazar<sup>1</sup>, Yaser Salimabadi<sup>2</sup>, Mostafa Nasirzadeh<sup>3</sup>, Ensieh Safarian<sup>4</sup>

<sup>1,4</sup>Student Research Committee, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

<sup>2,3</sup>Department of Health Education and Health Promotion, School of Health, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

Address for Correspondence:

**Mostafa Nasirzadeh**

Department of Health Education and Health Promotion, School of Health, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

Emails: mnasirzadeh13@rums.ac.ir

Date Received: May 19, 2019

Date Revised: Aug 31, 2019

Date Accepted: Sep 19, 2019

### Contribution

LM and ES and YS involved in the data acquisition and writing manuscript. MN designed the study, performed the data analysis and interpretation. YS and MN helped to evaluate and edit the manuscript.

**All authors declare no conflict of interest.**

This article may be cited as: Mazar L, Salimabadi Y, Nasirzadeh M, Safarian E. Self-efficacy analysis of health promoting behaviors of hypertensive patients in Rafsanjan. Pak Heart J 2019; 52 (04):313-8

### ABSTRACT

**Objective:** To analyze self-efficacy of the patients suffering from hypertension in Rafsanjan (South of Iran).

**Methodology:** The current correlational study was conducted in Rafsanjan University of Medical Sciences, Rafsanjan, Iran, using a simple random sampling. Hypertensive patients of health centers in Rafsanjan were selected. The data collection tool was a questionnaire consisting of two parts: a demographic and a self-efficacy part. Data analysis was done in using Chi-square tests, independent t-tests, Pearson correlations and one-way ANOVAs utilizing version 18 of the SPSS.

**Results:** Total of 385 patients were included. The mean age of the patients was  $61.39 \pm 10.98$  years, 96 of whom being males (24.9%). More than 76% of the patients had a BMI of more than 25. Mean score and standard deviation for self-efficacy of the patients were  $64.3 \pm 15.1$ . The highest self-efficacy scores were associated with regular drug use, and the lowest scores were related to regular physical activities and stress control and management. There was a significant correlation between the mean score for self-efficacy and the variables of age, duration of the disease, systolic blood pressure, diastole and social support ( $p < 0.05$ ). Yet, no significant correlation was obtained with other independent and background variables ( $p > 0.05$ ).

**Conclusion:** The perceived self efficacy of participants was higher than average, the high score was related to regular medicine in take and regular referral to physician. The lowest score was related to regular physical activity behavior and stress control and management. Self Efficacy had a significant relationship with variables such as age duration of disease, systolic and diastolic pressure.

**Key Words:** Self-efficacy, Health promotion, Behavior, Hypertension.

## INTRODUCTION

Cardiovascular disorders are illnesses that affect the cardiovascular system and blood circulation. They are among the main causes of mortality in men and women of different ethnic backgrounds.<sup>1</sup> Hypertension is a common and recurrent chronic disease characterized by a systolic blood pressure of 140 mm Hg and a diastolic blood pressure higher than 90 mm Hg.<sup>2</sup> According to the World Health Organization, one out of every five adults in the world suffers from high blood pressure.<sup>3</sup> According to research conducted in different regions of Iran, the prevalence of hypertension in some regions are as follows: Isfahan (11%), Chaharmahal Bakhtiari (17%), Zanjan (17.5%) and Arak (18.9%).<sup>4</sup> Due to a lack of obvious and recognizable symptoms and unpleasant side effects, this illness is called the silent killer.<sup>5</sup> Hypertension doubles the risk of cardiovascular diseases, including coronary artery disease, congestive heart failure, ischemic and hemorrhagic strokes, kidney failure and peripheral arterial disease, and causes heart enlargement and visual and cognitive impairment.<sup>6</sup> Various studies indicate that the life quality of people with hypertension is lower than healthy people, and that hypertension is a risk factor for developing depression.<sup>4,7,8</sup> Hypertension is the cause of death in 49% of cases of cardiovascular diseases.<sup>6</sup> The predominant risk factors that predict this disease include inheritance, genetics, inappropriate nutrition, alcohol and tobacco consumption, low self-esteem, low levels of education, insomnia, psychological factors, and social factors such as urbanization, followed by inertia. Tensions, family issues and environmental stress are also risk factors for this disease.<sup>1,3,8-12</sup> Despite all the above-mentioned factors, this chronic disease can be prevented and treated. Controlling most of these factors depend on individual behavior, and the patient plays a key role in adopting health promotion behaviors to prevent secondary complications. In the process of treating the illness, the patient's participation in treatment is of great importance, but the patient's role in controlling the process of behavior change is mostly neglected. Self-efficacy is the confidence that the person feels about doing a particular activity.<sup>2</sup> Therefore, promoting self-efficacy is an important means for active participation in treatment and behavior change, which leads to improved self-care in patients. Given the importance of the subject and the specific role of behavioral factors in the development of the disease and the resulting consequences and the lack of similar studies in this area.

The present study was conducted to analyze the self-efficacy of health promotion behaviors in hypertensive patients, so that the authorities and planners can use the results to make the right decisions, policies, and plans, and design interventions based on credible scientific evidence and information. Also, people may study the results of the study to adopt voluntary healthy behaviors to improve their quality of life.

## METHODOLOGY

The statistical population of the present analytical-correlational study consists of all the patients with hypertension who have health records in health centers in Rafsanjan. The sample size was calculated according to the statistical advisor's opinion and considering a significance level of 95%. The random sampling method was a multi-stage method. This research was concluded

from the research plan no. 96154 of Vice- Chancellor for Research and Technology at Rafsanjan University of Medical Sciences (Ethical code: IR.RUMS.REC.1396.171).

At first, four centers were randomly selected and then, according to the proportion of sample size and the number of patients covered by each center, the participants were selected and invited to enter the study. Inclusion criteria were having a follow-up record for treatment in health centers, being a resident of Rafsanjan, and having been ill for at least six months. Those who had incompletely filled out the questionnaires and those who had no intention of participating in the study were excluded from the study. The data were collected through self-reporting questionnaires filled out by the participants and interviews with a public health expert. The data gathering tool of this study was a two-part questionnaire, taken from the study by MirzaeiAlavijeh et al.<sup>2</sup> The first part contains demographic information and background questions with twelve questions about age, sex, occupation, level of education, marital status, family income status, body mass index, the patient's blood pressure, suffering from other diseases such as diabetes, and the patient's assessment of family support after diagnosis. The second part of the questionnaire was related to understanding self-efficacy activities recommended by physicians and health experts to reduce hypertension with ten items, including reducing or stopping salt intake, physical activities, exercise and walking, increased consumption of fruit and vegetables, regular consumption of drugs, reduced sugar intake, regular visits to the doctor, reduced consumption of red meat, reduced consumption of fat, anger control and management, stress reduction and self-esteem. Responses to the items were calibrated in a Likert scale with the five scales never, seldom, sometimes, often and always; every item was scored 0, 25, 50, 75, and 100, respectively. The data were analyzed using Chi-square tests, Pearson correlation tests, independent t-tests and one-way ANOVAs in version 18 of the SPSS software, with the significance level set at 0.05.

## RESULTS

The number of participants in the study was 385, with an average age of  $61.39 \pm 10.98$  years and range of 30 to 85 years. Ninety-six of the participants were men (24.9%) and 289 (75.1%) were women. The mean systolic blood pressure of the patients was  $125.93 \pm 14.83$  mm of Hg. The mean diastolic blood pressure was  $78.37 \pm 10.61$  mm of Hg and the mean duration of the disease was  $6.87 \pm 5.75$  years. About 46% of the patients had history of other illnesses. The mean score for the patients' BMI was  $28.3 \pm 4.58$  kg/m<sup>2</sup>, which was higher in women as compared with men. In other words, 76.6% of the patients had a BMI greater than 25 kg/m<sup>2</sup>. The mean score and standard deviation of the patients' self-efficacy was  $64.31 \pm 15.01$  (range 0-100). This means that 64% of the participants were sure that they had managed to follow disease-control behaviors after being diagnosed with the disease.

The highest self-efficacy scores were associated with regular medicine use and regular meetings with the physician, and the lowest self-efficacy scores were related to regular physical activity behaviors and stress control and management as shown in table 1. There was a significant relationship between the mean self-efficacy score with age, duration of disease, and systolic and

diastolic blood pressures ( $p < 0.05$ ) (Table 2). The self-efficacy score of patients who described their familial-social support as high was 70%, and those who reported poor support had a self-efficacy score of 59%. The results of a one-way analysis of variance showed significant differences ( $p < 0.001$ ), meaning

that social support had an effect on patient's self-efficacy. In this study, no significant relationship was obtained between mean self-efficacy scores and other independent and background variables such as BMI, gender, education, occupation and suffering from other diseases ( $p > 0.05$ ).

**Table 1: Distribution of the Frequency of the Answers and the Educational Priorities of Patients with Hypertension in Rafsanjan to Self-Efficacy Questions**

Self-efficacy	Answering scale n (%)					Mean $\pm$ SD	Educational priorities
	Never	Seldom	Sometimes	Often	Always		
Regular physical activities	62 (16.2)	98 (25.6)	94 (24.5)	70 (18.3)	59 (15.4)	47.78 $\pm$ 32.58	1
Control and management of stress	19 (4.9)	80 (20.8)	118 (30.6)	117 (30.4)	51 (13.2)	56.56 $\pm$ 27.07	2
Red meat consumption reduction	14 (3.6)	77 (20.1)	122 (31.8)	120 (31.3)	51 (13.3)	57.62 $\pm$ 26.22	3
Control and management of anger	19 (4.9)	69 (18)	119 (31)	122 (31.8)	55 (14.3)	58.14 $\pm$ 26.98	4
Increasing the consumption of fruit and vegetable	3 (0.8)	43 (11.3)	138 (36.1)	134 (35.1)	64 (16.8)	63.94 $\pm$ 23.13	5
Sugar consumption reduction	21 (5.5)	42 (10.9)	97 (25.3)	114 (29.7)	110 (29.7)	66.28 $\pm$ 29.05	6
Fat consumption reduction	29 (7.6)	50 (13.1)	74 (19.4)	84 (22)	145 (38)	67.41 $\pm$ 32.52	7
Salt consumption reduction	9 (2.4)	37 (9.7)	95 (24.9)	116 (30.4)	124 (32.5)	70.28 $\pm$ 26.72	8
Regular meetings with the physician	2 (0.5)	52 (13.5)	79 (20.5)	86 (22.3)	166 (43.1)	73.51 $\pm$ 27.64	9
Regular medicine intake	2 (0.5)	24 (6.3)	41 (10.7)	60 (15.6)	257 (66.9)	88.55 $\pm$ 23.68	10

**Table 2: The Correlation between Mean Self-Efficacy Score of the Patients with Other Variables**

Variable	Mean $\pm$ SD	Pearson correlation					
		X1	X2	X3	X4	X5	X6
Self-efficacy (X1)	64.3 $\pm$ 16.01	1					
Age (X2)	61.39 $\pm$ 10.98	0.12*	1				
Systole (X3)	125.93 $\pm$ 14.83	-0.15**	0.07	1			
Diastole (X4)	78.37 $\pm$ 10.61	-0.19**	-0.08	0.6**	1		
Duration of the disease (X5)	6.87 $\pm$ 5.75	0.1*	0.3**	-0.01	-0.05	1	
Body mass index (X6)	28.3 $\pm$ 28.3	-0.05	0.3**	0.1*	0.1**	-0.08	1

\*Significant at the level of 0.05

\*\* significant at the level of 0.01

## DISCUSSION

The high prevalence of hypertension worldwide and the serious complications that the disease brings about for the organs of the body have caused this disease to be a serious health problem in all societies. Activities such as daily blood pressure check-up, visiting health centers regularly, changing one's lifestyle, such as quitting smoking, avoiding over-consumption of alcohol, using a healthy diet through increased chicken and fish consumption, reducing red meat consumption, taking five servings of fruit and vegetables daily, reducing salt intake to less than five grams per day, minimizing saturated and unsaturated fats, having regular and daily physical activities, and doing aerobic exercises, reducing and managing stress and maintaining self-esteem, controlling and managing anger, observing the recommendations of the physician and taking prescribed medications by the physician are behavioral determinants in controlling and preventing hypertension.<sup>3,11-12</sup>

The behavioral determinants of the disease have a major role in the development of the disease and the associated consequences. The patient plays an important role in the implementation and conduction of the above-mentioned behaviors. So, adopting healthy behaviors (self-efficacy) is very effective in controlling the disease. Self-efficacy means the individual's confidence in their ability to perform self-care activities in a regular manner, in a way that desirable results are achieved.<sup>2</sup> Therefore, self-efficacy is an important means for active participation in the treatment and designing of evidence-based interventions designed to change behavior in order to promote self-care in patients, control hypertension and avoid secondary outcomes. In the present study, the average score of the patients' self-efficacy was 64%. This means that 64% of the participants believed that they had managed to perform activities for controlling the disease. In a study conducted by Hazavehie et al. on 289 hypertensive patients aged over 30 years in the villages of Hamadan, it was found that self-efficacy of the patients was 76%.<sup>13</sup> Also, the self-efficacy score of hypertensive patients in the MA study was about 72%.<sup>14</sup> And in the study by Kamran et al. which was performed on 671 hypertension patients in Ardabil, the score was about 80%.<sup>15</sup> Therefore, based on the self-efficacy scores of patients who are slightly above average, it is recommended that appropriate interventions be planned, implemented and evaluated using behavior change theories. It is also possible to enhance social health of the patients through developing individual skills.

In this study, the highest self-efficacy score for health promotion behaviors was related to the regular consumption of medicine, which is similar to the results of the study by Mirzaei Alavijeh et al. and Saad et al.<sup>2,16</sup> This may be due to the effect of physicians' advice for patients, patients' awareness of the need for regular and timely taking of medicine and the observation of the immediate effects of drugs. Also, the lowest self-efficacy score was associated with stress management behaviors and regular physical activities.

Stress and psycho social tensions are the risk factors independent of age and gender. Other factors are the classical physical factors of heart disease that increase cardiovascular reactions and help the onset or continuation of cardiovascular diseases through the mechanisms of psychiatric, neurological,

physiological and the stimulation of the autonomic nervous system, especially the sympathetic section.<sup>17</sup>

In the present study, almost half of the patients were confident that they could manage their stress and anxiety. Therefore, in order to empower the patients, stress management trainings, regular and periodic referral of patients for psychological counseling by the experts in health centers, using relaxation techniques, listening to music, yoga, deep breathing and a cognitive-behavioral intervention that is a combination of contraceptive techniques and cognitive-behavioral techniques are recommended to reduce the stress experienced by individuals and to increase their ability.<sup>18,19</sup>

Also, regular physical activity was a behavior about which patients reported a poor self-efficacy. The World Health Organization has identified physical activity as one of the four main factors for controlling cardiovascular diseases.<sup>20</sup> In this research, the patient's confidence in performing physical activities was undesirable; whereas in Mularcik's research on the self-efficacy of hypertensive patients, the self-efficacy associated with physical activity was about 75%, which is desirable.<sup>21</sup> Designing and implementing a training program based on behavioral change theories such as the trans-regional Model, creating safe health protection environments with enough space for physical activities in all neighborhoods, using appropriate educational materials and tools such as posters and pamphlets with scientific contents based on the requirements and simple physical activities throughout the day without the need for expensive equipment or even without the need to go out of one's house, especially for the elderly, are all recommended to increase physical activities.<sup>22-24</sup> In this study, behaviors such as regular use of medication and reduced consumption of fat were more common among women, while physical activities and exercise were higher among men. And there was a significant difference between the two sexes in this regard. Therefore, it is necessary to pay attention to the gender of the participants in the formulation and implementation of educational programs. Another important background variable was age. There was a significant correlation between age and self-efficacy, in terms of reduced salt and red meat intake. Motlagh et al., in their research concerning the women referring to health centers in Yazd, found that as women get older, the amount of their sodium intake decreases, which is consistent with the results of the present study.<sup>25</sup> There was no significant relationship between the mean score for self-efficacy behaviors of hypertensive patients and the level of education and economic situation. These findings are not in line with the results of the study by Barati et al. and Mazlomi et al.<sup>26,27</sup> This inconsistency may be due to the fact that most of the participants reported their salary to be average, and most of them had elementary education.

In addition to individual behaviors, social support (especially the family) is an important external factor that plays an effective role in promoting self-efficacy. Social support is considered to be the availability of people who are there for the individual and show affection and support in stressful conditions, incidents and diseases.<sup>28</sup> The results of this study showed that patients who enjoy higher levels of family support had higher levels of confidence in adopting health promotion behaviors. Lee et al. and Gąsiorowski et al. showed that patients who received more support from their families were able to control their disease in a

more effective way<sup>29,30</sup>. Also, Gienae et al. introduced family support as a decisive factor in following the diet therapy<sup>31</sup>. Therefore, given the role and importance of the family in protecting patients, it is suggested that health care providers involve families in the treatment of individuals and encourage them to play a more active role. Also, in case of individuals who live alone, it is advised that the treatment team provide more support for them as one of the sources of social support. In the present study, 77.6% of the participants had a BMI of more than 25. This was compared with the results of Webster et al. and Xu et al., which indicated that body mass index was a major contributor to hypertension<sup>32,33</sup>. There was a direct correlation between systolic blood pressure and the age of the participants; these results were in line with the results of the study conducted by Kalanei et al.<sup>34</sup> There is also a direct correlation between systolic blood pressure and body mass index, which is in contradiction with the results of the study by Fattahi et al.<sup>35</sup> They reported that there is an inverse relation between systolic blood pressure and body mass index. Accordingly, it is essential to adopt weight loss policies.

## CONCLUSION

The perceived self-efficacy of the participants in this study was higher than average in relation to health promotion behaviors against hypertension. Regarding the sub scales of self-efficacy, the highest score was related to regular medicine intake and regular referral to the physician. The lowest score was related to regular physical activity behaviors and stress control and management. Self-efficacy had a significant relationship with variables such as age, duration of disease, and systolic and diastolic blood pressures. Due to the uncertainty of patients regarding regular physical activities and stress management, designing, implementing and evaluating the theory-based interventions are suggested in order to promote patients' self-efficacy. Also, stakeholders need to pay more attention to the gender of the audience. They also need to address the requirements of each group.

## REFERENCES

- Bakhtiari A, Neshatdoust HT, Abedim A, Sadeghi M. Effectiveness of group therapy based on detached mindfulness meta-cognitive model on hypertension. *ClinPsychol Personal*2013;1(8):47-62.
- MirzaeiAlavijeh M, Nasirzadeh M, Jalilian F, Mostafavei F, Hafezi M. Self-efficacy of health promotion behaviors in hypertensive patients. *Daneshvar Med*2012;19(98):1-9.
- World Health Organization. Q&As on hypertension. Geneva: WHO; 2015.
- Ebadi A, Refahi A, Yaser S. Comparison of the quality of life in men with and without hypertension. *Sci J HamdanUniv Med Sci*2010;20(1):5-13.
- SotodehAsl N, NeshatDust HT, Kalantari M, Talebi H, Khosravi AR. Comparison of effectiveness of two methods of hope therapy and drug therapy on the quality of life in the patients with essential hypertension. *J ClinPsychol*2010;2(1):27-34.
- Mahmud F, Tahereh S, Sooma M, Samira F, Farshid A, ShirinGZ. A Survey of initial symptom of hypertension in hypertensive patients referred to special clinics of Kermanshah University of Medical Sciences in 2014. *J ParamedSci*2015;4(3):246-54.
- Ebadi A, Kelarijani RB, Malmir M, Shamsi A, Ghanbari R. Comparison of quality of life in military and non-military men with hypertension. *J Mil Med*2011;13(3):189-93.
- Araghchian M, Seifrabiee M, Zeraati F, Rasouli B. The survey of depression frequency in hypertensive patients. *Sci J HamdanUniv Med Sci*2007;16(4):37-41.
- Michas G, Karvelas G, Trikas A. Cardiovascular disease in Greece; the latest evidence on risk factors. *Hellenic J Cardiol*2018; [Epub ahead of print].
- Nguyen B, Bauman A, Ding M. Association between lifestyle risk factors and incident hypertension among middle-aged and older Australians. *Rev EpidemiolSantePublique*2018;66(5):260-1.
- Mahanta TG, Mahanta B, Deuri A, Baruah S, Rasailey R, Mahanta B. Determinants of hypertension amongst school going adolescents aged 13–15 years in Assam. *ClinEpidemiol Glob Health*2018;6(3):137-42.
- Vakili M, Hosseini N, Farzaneh Z, FalahatiAghda M, Fazelpour V, Hosseini A, et al. Factor associated with Hypertension of over 30 years old rural population in Es l a m a b a d G h a r b – 2 0 1 3 . *T o l o o - e - Behdasht*2014;14(6):119-25.
- Hazavehei MM, Dashti S, Moeini B, Faradmal J, Shahrabadi R, Yazdi AH. Factors related to self-care behaviors in hypertensive individuals based on health belief mode. *Koomesh*2015;17(1):37-44.
- Ma C. An investigation of factors influencing self-care behaviors in young and middle-aged adults with hypertension based on a health belief model. *Heart Lung*2018;47(2):136-41.
- Kamran A, Azadbakht L, Sharifirad G, Mahaki B, Mohebi S. The relationship between blood pressure and the structures of Pender's health promotion model in rural hypertensive patients. *J Educ Health Promot*2015;4:29.
- Saad AM, Younes ZM, Ahmed H, Brown JA, Al Owesie RM, Hassoun AA. Self-efficacy, self-care and glycemic control in Saudi Arabian patients with type 2 diabetes mellitus: a cross-sectional survey. *Diabetes Res ClinPract*2018;137:28-36.
- HeidariPahlavian A, Gharakhani M, Mahjub H. A comparative study of stressful life events and stress coping strategies in coronary heart disease patients and non-patients. *Avicenna J Clin Med*2010;17(3):33-8.
- Izady A, Pashaeipoor SH. The effect of stress management training on the stress level of cardiac admitted patients. *J Nurs Midwifery ShahidBeheshtiUniv Med Sci*2011;21(73):1-5.
- Abdolazim S, Mahnaz MH, Hassan ASM, Mehran S, Shahriar S. The effectiveness of cognitive-behavioral stress

- management intervention on general health patients with cardiovascular disease. *JundishapurSci Med J* 2017;15(6):757-66.
20. World Health Organization. Cardiovascular disease, Strategic priorities. Geneva: WHO; 2018.
  21. Mularcik KA. Self-efficacy toward health behaviors to improve blood pressure in patients who receive care in a primary care network [Thesis]. United States: Ohio State University; 2010.
  22. World Health Organization. Physical activity, key facts. Geneva: WHO; 2018.
  23. Faraji R, Latifi H, Sadeghi M. Survey of the physical activity motives among Iranian academic community. *ResUniv Sports J* 2015;2(7):99-115.
  24. Moeini B, Jalilian M, Hazavehei M, Moghim A. Promoting Physical Activity in Type 2 Diabetic Patients: a theory-based intervention. *J Health Syst Res* 2012;8(5):824-33.
  25. Motlagh Z, Mazloomi S, Khosravi M, Morowatisharifabad M, Askarshahi H. Salt Intake Among Women Refer to Medical Health Centers, Yazd, Iran, 2011. *J ShaheedSadoughiUniv Med Sci* 2011;19(4):550-60.
  26. Barati M, Darabi D, Moghimbeigi A, Afsar A. Self-regulation behaviors of hypertension and related factors among hypertensive patients. *J FasaUniv Med Sci* 2011;3(1):60-6.
  27. Mazlomi SS, Mirzaii A, Ardakani MA, Baghianimoghadam MH, Falahzadeh H. The role of health beliefs in preventive behaviors in people with type 2 diabetes at risk. *J ShaheedSadoughiUniv Med Sci* 2010;18(1):24-31.
  28. Shoaakazemi M. Relation between family social support & coping strategies in recovery breast cancer. *Iran J Breast Dis* 2014;6(4):35-40.
  29. Lee LT, Bowen PG, Mosley MK, Turner CC. Theory of planned behavior: social support and diabetes self-management. *J NursPract* 2017;13(4):265-70.
  30. Gąsiorowski J, Rudowicz E. Functional social support for hypertensive patients in primary care setting in Poland: what is expected and what is received? *Value Health Reg Issues* 2017;13:39-43.
  31. Giena VP, Thongpat S, Nitirat P. Predictors of health-promoting behavior among older adults with hypertension in Indonesia. *Int J NursSci* 2018;5(2):201-5.
  32. Webster EK, Logan SW, Gray WN, Robinson LE. A cross-sectional study on the relationship between the risk of hypertension and obesity status among pre-adolescent girls from rural areas of Southeastern region of the United States. *Prev Med Rep* 2018;12:135-9.
  33. Xu RY, Zhou YQ, Zhang XM, Wan YP, Gao X. Body mass index, waist circumference, body fat mass, and risk of developing hypertension in normal-weight children and adolescents. *NutrMetabCardiovasc Dis* 2018;28(10):1061-6.
  34. Kalanei Z, Shahbazei L, Salimei T, Amineipur MR. The status of hypertension in Yazd city. *Payesh* 2011;10(1):70-101.
  35. Fattahi F, Behrouzi MK, Zarrati M. Relation of body mass index, abdominal obesity, some nutritional habits and hypertension in 25-65 year old population of Tehran. *Koomeh* 2011;12(3):229-35.