



## A clinical study of the effect of Glycyrrhiza glabra plant and exercise on the quality of life of menopausal women

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### Original Article

#### Abstract

**BACKGROUND:** Most women experience significant changes during and after menopause which causes various complications of menopause and the changes in quality of their life. The aim of this study was to evaluate the effect of Glycyrrhiza glabra plant and exercise on quality of life (QOL) of menopausal women.

**METHODS:** This clinical experiment was performed in Arak, Iran. The study subjects consisted of 120 menopausal women. The participants were selected through convenience method and randomly divided into 4 groups of 30 subjects. Group 1 participants were administered 3 Glycyrrhiza glabra tablets daily. Group 2 participants had a regular exercise program. Group 3 participants were simultaneously administered Glycyrrhiza glabra tablets like group 1 and had an exercise program like group 2. Group 4 received no intervention. The participants' QOL was investigated before and 1 month after the intervention using the Menopause-Specific Quality of Life (MENQOL) Questionnaire. Data analysis was performed in SPSS software using Mann-Whitney, Wilcoxon, Kruskal-Wallis, and chi-square tests, and variance analysis.

**RESULTS:** No significant difference between the four groups in terms of vasomotor, psychosocial, physical, and sexual health, and QOL based on the Kruskal-Wallis test before the intervention. However, a significant difference was observed between the groups in terms of vasomotor, psychosocial, physical, and sexual health and QOL after the intervention.

**CONCLUSION:** The results of this study showed the efficacy of Glycyrrhiza glabra and exercise programs in controlling the symptoms of menopause. It is recommended that postmenopausal women use exercise programs and Glycyrrhiza glabra to control menopausal symptoms.

**KEYWORDS:** Glycyrrhiza Glabra, Exercise, Quality of Life, Menopause

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### Introduction

Menopause is a natural and inevitable process

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in women's lives., In addition to the positive aspects (contraceptive care and menstruation) of menopause, women experience different symptoms such as urinary disorders, depression and isolation<sup>1</sup>, sexual dysfunction, hot flashes<sup>2</sup>, and osteoporosis.<sup>3</sup> These

symptoms affect women's occupational and social activities, mood, sexual activity, and quality of life (QOL).<sup>4</sup> Previous studies have indicated the negative impact of menopause on QOL of menopausal women.<sup>5,6</sup>

Thus, consideration of QOL during menopause is very important in terms of public health.<sup>7</sup> Factors such as education, medication, and regular exercise moderate menopausal symptoms and improve QOL.<sup>8</sup> Due to the side effects of hormone therapy such as endometrial and breast cancer, nausea, and headache in menopausal women,<sup>1,9</sup> researchers have applied aromatherapy<sup>4</sup> and behavioral approaches such as participation in aerobic and anaerobic sports to control the side effects of menopause treatment.<sup>10</sup>

In addition to its psychological effect due to increased fibrinolysis system activity, exercise improves menopausal symptoms such as hot flashes, fatigue, libido, and the treatment and prevention of diseases such as osteoporosis, arthritis, and cardiovascular diseases.<sup>11</sup> *Glycyrrhiza glabra* is a medicinal plant containing phytoestrogens.<sup>12</sup> This plant has varied benefits such as its effect on sleep disturbance, fatigue, depression, hot flashes, gastric intestinal disorders, and menopause.<sup>13</sup> Due to its advantages, its use leads to a reduction in menopausal symptoms and side effects, and thus, improvement in physical and mental health of menopausal women.<sup>14</sup>

Due to increased life expectancy, menopause comprises a long period of women's life (about one third).<sup>15</sup> Because of the importance of QOL in postmenopausal women and the lack of studies on the impact of interventions on the QOL in menopausal women, the present study was conducted. This study was conducted with the aim to evaluate the clinical efficacy of *Glycyrrhiza glabra* and regular aerobic exercise on QOL of menopausal women.

## Materials and Methods

Randomized controlled trials (RCT) were used to evaluate the effects of *Glycyrrhiza glabra*

plant and regular aerobic exercise on QOL of menopausal women. Figure 1 shows the conceptual framework of this study.

In the article by Yazdkhasti *et al.*,<sup>16</sup>  $S = 0.01$  and a 10% drop in the sample was predicted with 95% confidence and 80% test power = 85%,  $\alpha = 0.05$ ,  $\mu_1 = 113.30 \pm 34.45$ , and  $\mu_2 = 138.35 \pm 1$ . Written informed consent forms were completed by all study participants.

After receiving permission from the Ethics Committee of the Arak University of Medical Sciences with the code IRCT2015031117873N4.NO and introducing themselves and explaining the purpose and methodology of this research, the researchers collected data from October to March 2013. The participants consisted of 120 menopausal women. The subjects were selected using convenience method and randomly divided into 4 groups of 30 subjects. After determining the target population, the samples were randomly divided into two groups.

The first group received 3 *Glycyrrhiza glabra* tablets (manufactured by Razak Pharmaceutical, containing 380 mg *Glycyrrhiza glabra* extract) three times daily; in the morning, afternoon, and evening. The tablets were administered before meals, due to favorable side effects, such as elimination of gastrointestinal dyspepsia, flatulence, heartburn, and constipation, according to the manufacturer's instructions<sup>4</sup> for 4 weeks. Group 2 participants took part in a regular aerobic exercise program like regular walking 3 sessions (even days) per week at 9 am for 4 weeks. This means that each session included a 5 minute warm up, 30 minute walking, or 5 minute cool-down routine.<sup>17</sup> Group 3 took *Glycyrrhiza glabra* like group 1 and took part in an exercise program like group 2. Group 4 did not receive any intervention and only completed the questionnaires. After the study, the control group participants were informed that they could use other methods if they wished. The

inclusion criteria consisted of women aged 48-52 years with a minimum of 1 year and a maximum of 3 years since their last menstrual cycle, the lack of chronic diseases such as diabetes, hypertension, hypothyroidism and hyperthyroidism, lack of surgical removal of the ovaries and uterus, having a spouse, no history of depression and psychiatric disorders, non-smokers, lack of use of hormone replacements therapy (HRT). Patients who reported physical and mental illnesses, the incidence of adverse events, and accidents or illness during the study, were prescribed and administered a new drug, or were at risk of musculoskeletal disorders (fractures, and etc.), and thus were

unable to perform the exercise program, were excluded. Before the end of the 4<sup>th</sup> week after the intervention, the questionnaires were distributed among the subjects and completed through self-report. In this study, blinding method was not applied.

The questionnaire included a demographic questionnaire and the Menopause-Specific Quality of Life (MENQOL) Questionnaire. The MENQOL questionnaire contains 26 questions and its validity and reliability have been confirmed by Arian ( $r = 0.92$ ).<sup>18</sup> The MENQOL questionnaire consists of 4 vasomotor, psychomotor, physical, and sexual aspects and the questions are scored based on 4-point scale ranging from 0 to 3 (0: lack of presence

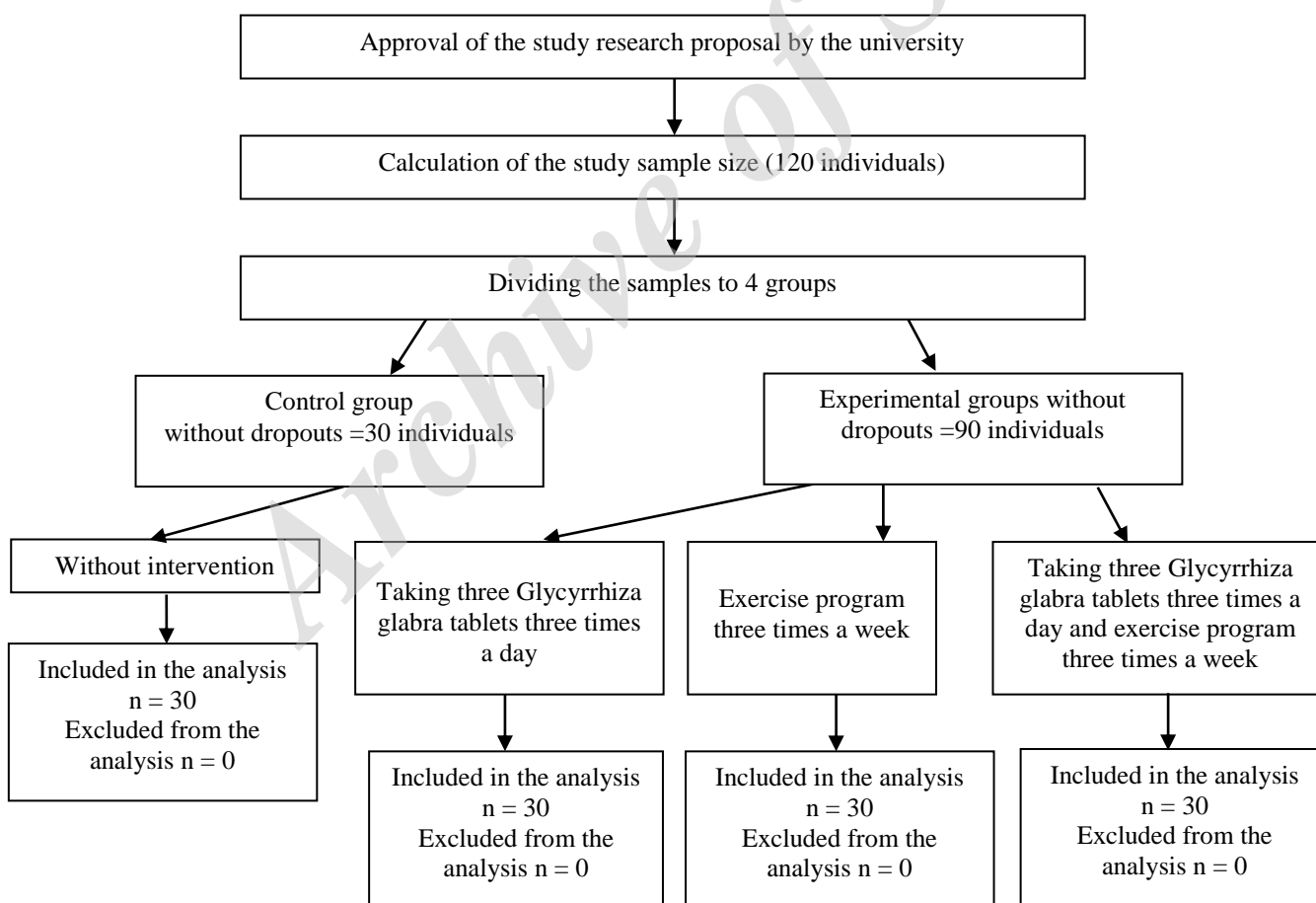


Figure 1. Diagram plan

of that aspect, 1: low presence, 2: average presence, and 3: extreme presence. Then, subjects were classified into 3 groups on the basis of their response to the questionnaire. Scores in the range of 0-26, 26-52, and 52-78 illustrate poor, moderate, and favorable QOL, respectively (higher scores indicate lower QOL). Data was analyzed in SPSS software (version 16, SPSS Inc., Chicago, IL, USA) using chi-square, Wilcoxon, Kruskal-Wallis, and Mann-Whitney tests.

## Results

### Demographic characteristic

In the present study, 30 menopausal women in each of the 4 groups were studied, and none were excluded. The groups were similar in terms of mean age, age at menopause, body mass index (BMI), number of deceased and living children, education, occupation, and income levels before and after the intervention and were not significantly different (Table 1).

### Baseline analyses

QOL and its aspects are presented in table 2 before and after the intervention in the four groups. Due to the lack of difference in the groups' interventions using the Kruskal-Wallis test, Mann-Whitney test was applied to compare the mean scores of the groups. To reduce the Type I error, the amount of alpha was determined ( $0.05 \div 4 = 0.0125$ ) according to the Bonferroni correction. According to Mann-Whitney test results, the comparison of the mean and standard deviation of QOL showed no significant difference between groups 1 and 2 in terms of vasomotor ( $P = 0.15$ ), emotional, social, physical, and sexual aspects, and total QOL. Significant differences were observed between groups 1 and 3 after the intervention in terms of the sexual dimension ( $P = 0.004$ ) and QOL ( $P = 0.001$ ). The results showed a significant difference between *Glycyrrhiza glabra* and controls after the intervention in terms of vasomotor ( $P = 0.001$ ), emotional-social ( $P = 0.001$ ), and physical dimensions ( $P = 0.001$ ),

and QOL ( $P = 0.001$ ). Moreover, the results showed a significant difference between groups 2 and 3 after the intervention in terms of vasomotor dimension ( $P = 0.001$ ), and QOL ( $P = 0.001$ ). A significant difference was observed between group 2 and the control group in exercise and vasomotor control ( $P = 0.005$ ), psychosocial ( $P = 0.001$ ), physical ( $P = 0.001$ ), and QOL ( $P = 0.001$ ) scores. Furthermore, in group 2 and the control group, a significant difference was observed in vasomotor ( $P = 0.001$ ), psychosocial ( $P = 0.001$ ), physical ( $P = 0.001$ ), and QOL ( $P = 0.001$ ) scores.

## Discussion

The present study aimed to evaluate the effect of *Glycyrrhiza glabra* plant and a regular exercise program on improvement of QOL and its aspects such as vasomotor, psychosocial, physical, and sexual aspects in menopausal women. The results indicated the positive impact of *Glycyrrhiza glabra* on improvement of QOL and its aspects. The present study confirms the findings of Nahidi et al.<sup>19</sup> They concluded that the *Glycyrrhiza glabra* plant can reduce hot flashes at night and improve the level of physical and mental health in menopausal women.<sup>19</sup> The researchers believed that this herb may cause a reduction in hot flashes, especially at night, and thus, improve sleep and as a result QOL. Hajirahimkhan et al. conducted a study on the effects of estrogenic activity of licorice species as compared to hops on symptoms and side effects of menopause.<sup>20</sup> They recommended this plant for the controlling of menopausal symptoms due to having higher estrogenic activity, yet being safer than other plants.<sup>20</sup> The present study has explained the positive impact and effectiveness of *Glycyrrhiza glabra*. A study was conducted by Abdollahi et al. to investigate the effect of the aqueous extract of *Glycyrrhiza glabra* on menopausal symptoms.<sup>21</sup> The results showed a significant and meaningful difference in the average number of hot flashes (vasomotor aspect) at the end of the treatment compared to

**Table 1. Demographic characteristics of menopausal women in four groups (n = 120)**

Characteristics	Group	Group 1	Group 2	Group 3	Group 4	Total	Result	
Age at time of study (mean ± SD)		51.90 ± 2.02	51.8 ± 1.76	51.90 ± 1.98	51.9 ± 1.65	51.9 ± 1.84	F = 0.02	P = 0.993
Age at menopause (mean ± SD)		49.60 ± 1.09	50.4 ± 1.43	50.50 ± 1.16	50.2 ± 1.16	50.2 ± 1.33	F = 2.88	P = 0.039
Body mass index (BMI) (mean ± SD)		24.91 ± 20.06	25.02 ± 2.55	25.06 ± 2.20	25.26 ± 2.53	25.06 ± 2.32	F = 0.11	P = 0.953
Number of living children (mean ± SD)		4.23 ± 1.73	3.46 ± 1.63	0.64 ± 1.52	4.56 ± 1.51	4.08 ± 1.68	F = 2.32	P = 0.079
Number of deceased children (mean ± SD)		0.33 ± 0.55	0.40 ± 0.56	0.20 ± 0.48	0.166 ± 0.46	0.517 ± 0.27	F = 1.36	P = 0.256
Educational level [n (%)]	Illiterate	4 (13.4)	2 (6.6)	4 (13.3)	5 (16.6)	15 (12.5)	X <sup>2</sup> = 10.5	
	Under Diploma	13 (43.3)	9 (30.0)	14 (46.6)	17 (56.6)	53 (44.9)	df = 1	
	Diploma	10 (33.3)	14 (46.6)	9 (30.0)	7 (23.3)	40 (33.3)	P = 0.572	
	University Degree	3 (10.0)	5 (16.6)	3 (10.0)	1 (3.3)	12 (10.0)		
Occupation [n (%)]	House keeper	27 (90.0)	25 (83.3)	27 (90.0)	29 (96.6)	108 (90.0)	X <sup>2</sup> = 2.96	
	Retired	3 (10.0)	5 (16.6)	3 (10.0)	1 (3.3)	12 (10.0)	df = 1	
							P = 0.397	
Income Rate [n (%)]	Sufficient	3 (10.0)	3 (10.0)	2 (6.7)	1 (3.3)	9 (7.5)	X <sup>2</sup> = 6.92	
	Partially Sufficient	11 (36.6)	19 (63.3)	13 (43.3)	17 (56.6)	60 (50.0)	df = 1	
	Insufficient	16 (53.3)	8 (26.6)	15 (50.0)	12 (40.0)	51 (42.5)	P = 0.328	

SD: Standard deviation

**Table 2. Comparison of the mean and standard deviation of quality of life and its dimensions before and 1 month after the intervention in four groups (n = 120)**

Groups	Group 1		Group 2		Group 3		Group 4		Kruskal-Wallis test Result	
	Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD		between the four group	
Dimensions	Before	After	Before	After	Before	After	Before	After	Before	After
Vasomotor	3.33 ± 1.88 Z = -3.797 P = 0.001	1.23 ± 1.07	2.53 ± 1.81 Z = -2.178 P = 0.290	1.63 ± 1.21	2.63 ± 1.77 Z = -4.200 P = 0.0001	0.70 ± 1.05	2.70 ± 1.82 Z = -0.130 P = 0.897	2.80 ± 1.82	P = 0.317	P = 0.0001
Psychosocial	8.93 ± 3.56 Z = -4.513 P = 0.0001	3.80 ± 1.90	8.36 ± 3.01 Z = -4/390 P = 0.0001	3.76 ± 2.29	9.20 ± 2.99 Z = -4.720 P = 0.0001	2.90 ± 1.42	7.60 ± 2.72 Z = -0.487 P = 0.629	8.52 ± 3.11	P = 0.160	P = 0.0001
Physical	13.96 ± 3.31 Z = -4.344 P = 0.0001	7.60 ± 3.91	13.96 ± 4.39 Z = -4.670 P = 0.0001	7.16 ± 3.09	14.86 ± 5.7 Z = -4.446 P = 0.0001	14.8 ± 4.7	14.40 ± 4.71 Z = -0.108 P = 0.014	8.80 ± 5.03	P = 0.953	P = 0.0001
Sexual	3.46 ± 2.16 Z = -2.350 P = 0.0001	7.29 ± 6.15	2.83 ± 1.82 Z = -3.237 P = 0.001	1.13 ± 1.19	2.43 ± 1.9 Z = -3.051 P = 0.001	0.87 ± 1.04	2.26 ± 1.92 Z = -0.170 P = 0.300	1.36 ± 1.21	P = 0.153	P = 0.0001
Overall QOL	29.70 ± 6.15 Z = -4.733 P = 0.0001	14.76 ± 5.43	27.70 ± 4.85 Z = -4.789 P < 0.001	13.70 ± 5.38	29.10 ± 6.66 Z = -4.786 P = 0.0001	10.13 ± 2.94	27.43 ± 7.23 Z = -0.788 P = 0.431	26.30 ± 6.02	P = 0.215	P = 0.0001

SD: Standard deviation; QOL: Quality of life

the beginning. In this case the symptoms improved and the number of hot flashes was reduced.<sup>21</sup>

In the present study, we examined the *Glycyrrhiza glabra* plant with the difference that *Glycyrrhiza glabra* tablets were used instead of its aqueous extract and its impact was measured on other aspects of QOL in addition to the vasomotor aspect. Menati *et al.* conducted a study on the effect of *Glycyrrhiza glabra* plant on hot flashes of menopausal women and its comparison with hormone therapy.<sup>4</sup> They concluded that *Glycyrrhiza glabra* effective in the treatment of menopausal symptoms such as a hormone and can be used as a replacement treatment without the side effects of hormone therapy.<sup>4</sup> Considering the results of the abovementioned studies and the present research for the prevention of hormone replacement therapy, it seems that consumption of the *Glycyrrhiza glabra* plant can control inappropriate symptoms and improve QOL in menopausal women. The results also showed that a regular aerobic exercise program improves QOL in menopausal women. These results are in line with the study by Tartibian *et al.* on the effect of regular aerobic exercise on vasomotor symptoms in menopausal women, which indicated a reduction in vasomotor symptoms (hot flashes) through a regular aerobic exercise.<sup>17</sup> Thus, they recommend the modification of a sedentary lifestyle to an active lifestyle with regular exercise to improve health and physical fitness. Lee *et al.*<sup>22</sup> in a cross-sectional study titled "relationships between menopausal symptoms, depression, and exercise in middle-aged women" found that more symptoms and side effects of menopause were observed in depressed women than non-depressed women. Women who exercise regularly have fewer depression and menopause symptoms than women who do not exercise. These results are in line with the current research, with the only difference

that the effectiveness of regular exercise was analyzed on other aspects of QOL beside the emotional aspect. Results of the study by Madureira *et al.*, on the effect of exercise on QOL in postmenopausal women with osteoporosis is also in line with that of the current research.<sup>7</sup> They demonstrated that regular exercise caused a considerable and significant increase in QOL in menopausal women.<sup>7</sup> A review by Daley *et al.* on the effect of exercise on reducing vasomotor symptoms and other symptoms of menopause confirmed the effectiveness of exercise in improving vasomotor symptoms, psychological status, and QOL in menopausal women.<sup>23</sup> Agil *et al.* in a study on short-term effects of exercise on symptoms of menopause, mental health, and QOL in menopausal women have compared the two types of aerobic and resistance exercise.<sup>24</sup> They concluded that both types of exercise had positive effects on menopausal symptoms, depression, and QOL.<sup>24</sup> The researcher believes that exercise may reduce the risk of heart disease and osteoporosis. This leads to improved physical symptoms and QOL in menopausal women. Regular exercise leads to the release of endorphins, which relax individuals, and thus, improve their QOL in the emotional aspect and consequently increase QOL. Sunsern have examined the effect of exercise on psychological stress factors in menopausal women in their study and concluded that exercise leads to a significant reduction in stress in menopausal women.<sup>25</sup> They also found that regular physical exercise can improve QOL in menopausal women.<sup>25</sup> However, the results of the study by Aiello *et al.* on the long-term effects of exercise interventions on the severity of menopause symptoms indicated no reduction in menopausal symptoms due to exercise.<sup>26</sup> In this study, the type of exercise performed in these women is not mentioned, the researcher believes that this finding may be the result of the type of exercise used or the

time of day the exercise was performed in this study. These findings indicate that aerobic exercise in combination with *Glycyrrhiza glabra* tablets can improve QOL in postmenopausal women. An extensive review of literature by the researcher showed that no study had been performed to evaluate the effect of exercise and herbal methods to control menopausal symptoms and improve QOL in menopausal women. The researcher believes that the simultaneous use of *Glycyrrhiza glabra* tablets and aerobic exercise may lead to the strengthening of the effect of each, and thus, improvement of QOL. It should also be noted that further research is required in this regard.

It seems that through methods such as changing a sedentary lifestyle to an active lifestyle and eliminating the side effects of hormone therapy by means of aromatherapy, we can promote health and subsequently improve QOL in menopausal women. Due to time limitation, the intervention was performed in a month. Thus, it is recommended that future studies be conducted with a larger sample size and for a longer time period and its impact be studied on the long-term side effects of menopause, such as osteoporosis, cardiovascular problems, and other cases. Furthermore, since the incidence of diseases such as hypertension and depression is higher in this age group, many women did not participate in the study. Therefore, it is recommended that the effect of herbal medicine be measured in women with the abovementioned diseases through collaboration with other expert groups and the incidence of side effects be compared with healthy subjects.

### Conflict of Interests

Authors have no conflict of interests.

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### References

1. Williams RE, Levine KB, Kalilani L, Lewis J, Clark RV. Menopause-specific questionnaire assessment in US population-based study shows negative impact on health-related quality of life. *Maturitas* 2009; 62(2): 153-9.
2. Asgari P, Zand S, Bahramnezhad F, Mahmoudi M. The effect of *Glycyrrhiza glabra* on quality of life in postmenopausal women. *Complement Med J Fac Nurs Midwifery* 2015; 2(5): 1146-54.
3. Asgari P, Bahramnezhad F, Mehrdad N, Asadi Noughabi AA, Hekmatpour D, Mahmoudi M. Depression, functionality and adaptability of elderly patients after open heart surgery off- or on-pump. *Jundishapur Sci Med J* 2015; 4(4): 30-4. [In Persian].
4. Menati L, Siahpoosh A, Tadayon M. A randomized double blind clinical trial of licorice on hot flash in post-menopausal women and comparison with hormone replacement therapy. *Sci Med J* 2010; 9(2): 157-67.
5. Forouhari S, Safari Rad M, Moattari M, Mohit M, Ghaem H. The effect of education on quality of life in menopausal women referring to Shiraz Motahhari clinic in 2004. *J Birjand Univ Med Sci* 2009; 16(1): 39-44.
6. Chapman JS, Jacoby V, Chen LM. Managing symptoms and maximizing quality of life after preventive interventions for cancer risk reduction. *Curr Opin Obstet Gynecol* 2015; 27(1): 40-4.
7. Madureira MM, Bonfa E, Takayama L, Pereira RM. A 12-month randomized controlled trial of balance training in elderly women with osteoporosis: improvement of quality of life. *Maturitas* 2010; 66(2): 206-11.
8. Kumari M, Stafford M, Marmot M. The menopausal transition was associated in a prospective study with decreased health functioning in women who report menopausal symptoms. *J Clin Epidemiol* 2005; 58(7): 719-27.
9. Falahi A, Nadrian H, Mohammadi S, Baghiyani Moghadam M. Utilizing the PRECEDE Model to predict quality of life related factors in patients with Ulcer Peptic Disease in Sanandaj, Kurdistan, Iran. *Payavard Salamat* 2009; 3(1-2): 30-43. [In Persian].
10. Blumel JE, Castelo-Branco C, Cancelo MJ, Cordova AT, Binfa LE, Bonilla HG, et al. Relationship between psychological complaints and vasomotor symptoms during climacteric. *Maturitas* 2004; 49(3): 205-10.

11. Schneider M, Dunton GF, Cooper DM. Physical activity and physical self-concept among sedentary adolescent females; An intervention study. *Psychol Sport Exerc* 2008; 9(1): 1-14.
12. Karacam Z, Seker SE. Factors associated with menopausal symptoms and their relationship with the quality of life among Turkish women. *Maturitas* 2007; 58(1): 75-82.
13. Karlsson I, Berglin E, Larsson PA. Sense of coherence: quality of life before and after coronary artery bypass surgery--a longitudinal study. *J Adv Nurs* 2000; 31(6): 1383-92.
14. Berra K. The effect of lifestyle interventions on quality of life and patient satisfaction with health and health care. *J Cardiovasc Nurs* 2003; 18(4): 319-25.
15. Sierra B, Hidalgo LA, Chedraui PA. Measuring climacteric symptoms in an Ecuadorian population with the Greene Climacteric Scale. *Maturitas* 2005; 51(3): 236-45.
16. Yazdkhasti M, Keshavarz M, Merghati Khoei E, Hosseini AF. The Effect of Structured Educational Program by Support Group on Menopause Women's Quality of Life. *Iran J Med Sci* 2012; 11(8): 986-94. [In Persian].
17. Tartibian B, Sharabiyani S, Abbasi A. Effect of regular aerobic exercise on vasomotor symptoms (hot flashes) in postmenopausal women. *J Babol Univ Med Sci* 2009; 11(4): 36-41. [In Persian].
18. Arian S. The effect of educational program on menopausal women [Thesis]. Tehran, Iran: Tarbiat Modares University; 2001. [In Persian].
19. Nahidi F, Zare E, Mojab F, AllaviMajd H. The effect of *Glycyrrhiza glabra* on the number of night hot flashes postmenopausal women. *Journal of Shahid Beheshti University of Medical Sciences* 2010; 19(67): 21-5. [In Persian].
20. Hajirahimkhan A, Simmler C, Yuan Y, Anderson JR, Chen SN, Nikolic D, et al. Evaluation of estrogenic activity of licorice species in comparison with hops used in botanicals for menopausal symptoms. *PLoS One* 2013; 8(7): e67947.
21. Abdollahi F, Azadbakht M, Shabankhahi B, Rezaei Abhari F, Mosleminezhad M. Effect of *Glycyrrhiza glabra* on menopausal complications. *J Mazandaran Univ Med Sci* 2006; 16(56): 75-82. [In Persian].
22. Lee Y, Kim H. Relationships between menopausal symptoms, depression, and exercise in middle-aged women: a cross-sectional survey. *Int J Nurs Stud* 2008; 45(12): 1816-22.
23. Daley AJ, Stokes-Lampard HJ, Macarthur C. Exercise to reduce vasomotor and other menopausal symptoms: A review. *Maturitas* 2009; 63(3): 176-80.
24. Agil A, Abike F, Daskapan A, Alaca R, Tuzun H. Short-term exercise approaches on menopausal symptoms, psychological health, and quality of life in postmenopausal women. *Obstet Gynecol Int* 2010; 2010.
25. Sunsern R. Effects of exercise on stress in thai postmenopausal women. *Health Care for Women International* 2002; 23(8): 924-32.
26. Aiello EJ, Yasui Y, Tworoger SS, Ulrich CM, Irwin ML, Bowen D, et al. Effect of a yearlong, moderate-intensity exercise intervention on the occurrence and severity of menopause symptoms in postmenopausal women. *Menopause* 2004; 11(4): 382-8.