

Original Paper

# Comparison of the Effects of Licorice and Aerobic Exercise on the Quality of Life of Postmenopausal Women



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## ABSTRACT

**Introduction:** Menopause is accompanied by many physical and psychological symptoms that can affect the Quality of Life (QoL) of women. Nowadays, behavioral approaches, such as exercise programs, and herbal therapies are recommended to control menopause complications.

**Objective:** This study aimed to compare the effects of exercise and licorice on the QoL of postmenopausal women.

**Materials and Methods:** This quasi-experimental study was conducted in Arak City, Iran, in 2014. Sixty postmenopausal women were selected as study participants using the convenience sampling method and were divided into two equal groups (exercise and licorice) using a random number table. The licorice group received three tablets of licorice daily at three times, i.e., in the morning, noon, and night before meals, for 4 weeks; the exercise group adopted a regular walking program comprising 30-45 min of walking three times a week for 1 month. The QoL of the participants before and 1 month after the intervention was evaluated using the Menopause-Specific Quality of Life questionnaire. The obtained data were analyzed using the independent t-test, Wilcoxon signed-rank test, one-way analysis of variance, and Mann-Whitney U test.

**Results:** The two groups were matched in term of demographic characteristics. The Mann-Whitney U test revealed no significant difference in the QoL between the two groups before and after the intervention. However, the mean and standard deviation of the QoL in both groups was higher after the intervention than the values before the intervention.

**Conclusion:** Licorice and aerobic exercise are effective in controlling menopause complications and improving the QoL. Therefore, these interventions should be adopted to improve the QoL of postmenopausal women.

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## Introduction

# M

enopause is one of the most important stages of women's lives and occurs between 45 and 60 years of age; thus, depending on the life expectancy of women, they spend approximately 30 years of their lives in this stage. In this stage, due to a reduction in the levels of ovarian hormones and pituitary gonadotropins, abnormalities occur in the reproductive system, and eventually, menstruation stops [1]. Following menopause, a woman experiences various symptoms, such as reproductive, mental, and psychological problems, sexual dysfunction, anxiety, depression, and isolation [2]. These symptoms may be severe, thus affecting the normal functioning and the Quality of Life (QoL) of the woman [3]. Various studies have reported the negative effect of menopause on the QoL of postmenopausal women and the need for special attention to their QoL [4, 5]. Given that in the next 50 years, demographic change will lead to a dramatic increase in the number of elderly people, an increase in problems related to menopause is expected [6].

Various interventions, such as education, medication, hormone therapy, and traditional medicine, can alleviate the menopausal symptoms and help improve the QoL [7], but all of them have some limitations. For example, hormone therapy, in addition to controlling menopausal symptoms and preventing osteoporosis, causes some complications, such as increased risk of endometrial and breast cancer, nausea, headache, and hot flashes [8, 9]. In this regard, the use of complementary therapies, such as cupping, aromatherapy, acupuncture, and herbal therapy, has now increased. Organs of some herbal plants, or medicinal plants, may contain substances with curative and palliative properties that can be used to treat or relieve human ailments and their symptoms [10]. Geranium leaf, anise extract, red clover, and licorice are among the plant products widely used to control menopausal symptoms. Among these, licorice, the root of *Glycyrrhiza glabra*, is a phytoestrogenic plant that contains a large amount of estrogen-like compounds that are effective in treating sleep disorders, fatigue, depression, hot flashes, and gastrointestinal disorders observed in menopausal women [11]. It also increases the mental and physical health of postmenopausal women [12]. Although the pseudo-estrogenic property of this plant has been proven in vitro, further clinical research is warranted [13].

Menopausal symptoms can also be alleviated by behavioral approaches, such as participation in aerobic and anaerobic exercises [14], which can treat hot flashes, night sweats, fatigue, and depression [15] and improve sexual desire and physical strength [16]. Performing regular aerobic exercises can improve blood pressure and thus reduce hot flashes in postmenopausal women, in addition to controlling weight and reducing osteoporosis [17]. However, not all postmenopausal women can perform aerobic and anaerobic exercises as some may have cardiovascular diseases or may be in the early stages of osteoporosis [18, 19]. Stojanovska et al. and Ju YH et al. believe that exercise alone can only help postpone menopausal age and not prevent or control menopausal symptoms [20, 21].

Because of increased life expectancy, women spend a large part of their lives (approximately one-third) in menopause [22]. Given the importance of the QoL of postmenopausal women, the many complications of medications used for treating menopausal symptoms, and the lack of any study comparing the effects of these interventions on the QoL of these women, we conducted this study to compare the effects of licorice and physical activity on the QoL of these women.

## Materials and Methods

This quasi-experimental, single-blinded research was conducted at a clinic in Arak City, Iran, in 2014. The research population comprised all postmenopausal women referred to the clinic. Minimum sample size was estimated to be 60 postmenopausal women based on the study of Yazdkhasti et al. [23], with a 95% confidence interval, 80% test power, 0.01 Standard Deviation (SD), and 10% margin of error ( $\mu_1=113.30\pm 34.45$ ,  $\mu_2=138.35\pm 17$ ). Inclusion criteria were as follows: 48-52 years of age and 1-3 years since last menstruation [24]; literate; using cell phone; no chronic disorders, such as diabetes, hypertension, hyperhidrosis, and hypothyroidism; no overectomy/hysterectomy; no history of depression or psychiatric disorders; and no use of hormonal drugs and cigarettes during the past 6 months and until the end of the study. The exclusion criteria were as follows: experiencing any adverse event during the study, having any musculoskeletal disorder (fractures) that prevents one from performing exercise, and having a disease that requires a new medical prescription.

Study participants were selected using the convenience sampling method when they visited the clinic for monthly or annual examinations or accompanied by one of their relatives. They were then randomly divided into

two groups (licorice and exercise) using a random number table. All participants were explained the aims and procedure of the study, and signed informed consent was obtained from them. The licorice group received three tablets of licorice (containing 380 mg of licorice extract; Razak Pharmaceutical Co., Tehran, Iran) daily at three times, i.e. in the morning, noon, and night before the meal (due to the favorable gastrointestinal effects of the plant in treating indigestion, flatulence, heartburn, and constipation), for 4 weeks [25].

Participants were texted by the researcher every day ensure that they were taking the pills. The exercise group performed regular exercises three times a week for 4 weeks. The exercise duration was 40-45 min and comprised 5 min of warm-up, 30 min of continuous walking or jogging, and 5 min of cooling down [26]. The researcher gathered the participants in the park at 10:00 am - 12:00 am to ensure that the exercises were properly performed. The transportation costs of participants were paid by the researcher. Before the intervention and at the end of the fourth week after the intervention, self-reported personal information inventory and the Menopause-Specific Quality of Life (MENQOL) questionnaire were distributed among participants. The MENQOL questionnaire has 26 items, although its original version designed by Hilditch et al. [27] at the University of Toronto, Canada, had 29 items. The validity of the questionnaire was verified, and its reliability was obtained as 0.84 using the Cronbach's  $\alpha$  coefficient. The questionnaire covers vasomotor, psychomotor, physical, and sexual domains. The answers to questionnaire items are rated based on a 3-point scale (1: Mild; 2: Moderate; and 3: Severe).

Based on the responses, participants were further divided into three groups in terms of their QoL; the "poor QoL" group, comprising participants with a total score of 52-78; the "moderate QoL" group, comprising those

with a total score of 26-52; and the "good QoL" group, comprising those with a total score of 0-26. Therefore, low scores were indicative of a high QoL. The obtained data were analyzed in SPSS V. 16 using the Chi-square test, Wilcoxon signed-rank test, ANOVA, and Mann-Whitney U test.

## Results

The mean age of women in the licorice and exercise groups were  $51.9 \pm 2.02$  and  $51.8 \pm 1.76$  years, respectively. Most women in the licorice (90%) and exercise (83.34%) groups were housewives. The educational level of most women in the licorice (43.34%) and exercise (46.66%) groups was high school diploma. Further, most women in the licorice (53.34%) and exercise (63.33%) groups reported their income level as fair. No significant difference was observed between the two groups in terms of socio-demographic characteristics (Table 1).

The Mann-Whitney U test results showed no significant difference between the two groups in terms of vasomotor ( $P=0.095$ ), psychomotor ( $P=0.572$ ), physical ( $P=0.847$ ), sexual ( $P=0.051$ ), and overall ( $P=0.065$ ) QoL before the intervention (Table 2). The results 1 month after the intervention also showed no significant difference between the two groups in terms of vasomotor ( $P=0.15$ ), psychomotor ( $P=0.899$ ), physical ( $P=0.716$ ), sexual ( $P=0.209$ ), and overall ( $P=0.698$ ) QoL.

## Discussion

The present study compared the effects of licorice and physical activity on the QoL of postmenopausal women. The results showed no significant difference between the regular exercise program and the consumption of licorice in terms of improvement in the QoL of postmenopausal women in different domains. In addition, the mean scores of the vasomotor, physical, and sycho-

Table 1. Demographic characteristics of the exercise and licorice groups

Variable	Mean $\pm$ SD		Sig.*
	Licorice	Exercise	
Age, y	51.9 $\pm$ 2.02	51.8 $\pm$ 1.76	0.993
Menopause age, y	50.6 $\pm$ 1.09	50.4 $\pm$ 1.43	0.059
Body mass index, kg/m <sup>2</sup>	24.91 $\pm$ 20.06	25.02 $\pm$ 2.55	0.953
Number of live children	4.23 $\pm$ 1.73	3.46 $\pm$ 1.63	0.079
Number of dead children	0.33 $\pm$ 0.546	0.4 $\pm$ 0.563	0.256

\*Independent t-test

**Table 2.** Mean scores of the various domains of the quality of life before and 1 month after the exercise and licorice interventions

Domains		Licorice Group		Exercise Group		Sig.*	
		Before	After	Before	After	Before	After
Vasomotor	Mean(SD)	3.33(1.88)	1.23(1.07)	2.53(1.81)	1.63(1.21)	0.095	0.15
Psychomotor	Mean(SD)	8.93(3.56)	3.8(1.9)	8.36(3.01)	3.76(2.29)	0.572	0.899
Physical	Mean(SD)	13.96(3.31)	7.6(3.91)	13.96(4.39)	7.16(3.09)	0.847	0.716
Sexual	Mean(SD)	3.46(2.16)	7.29(6.15)	2.83(1.82)	1.13(1.19)	0.051	0.209
Quality of Life	Mean(SD)	29.7(6.15)	14.76(5.43)	27.7(4.85)	13.7(5.38)	0.065	0.689

\*Mann-Whitney U test

motor domains of the QoL in both the exercise and licorice groups were indicative of improvement.

Asterand et al. [28] showed that physical exercises are effective in reducing vasomotor symptoms in postmenopausal women. Tartibian et al. [26] also reported that regular aerobic exercise program reduces vasomotor symptoms (hot flashes). According to Daley et al. [19], regular physical exercises, such as aerobic and resistance exercises, can prevent and reduce the physical symptoms of menopause, such as muscle weakness and osteoporosis. Elavsky and McAuley [29] also reported that physical activity increases the QoL of postmenopausal women. Moriyama et al. [30] suggested physical activity as an independent factor in reducing menopausal symptoms and improving the QoL. The results of the present study support these findings. However, Aiello et al. [31] reported that the exercise program in their study was not effective in reducing menopausal symptoms. This discrepancy in findings is probably due to the differences in the type and time of exercise.

Further, the mean scores of the physical, sychomotor, and vasomotor domains of the QoL were significantly different before and after the intervention in the licorice group, but these scores were not significantly different from the corresponding ones in the exercise group. Nahidi et al. [32] showed that licorice decreases the frequency and severity of hot flashes in postmenopausal women. Similar findings have also been reported by other studies [24, 25]. Jeffrey et al. [33] reported positive effects of licorice on the QoL, including the QoL in the sexual domain, of postmenopausal women. By contrast, the findings of the present study showed that the mean score of the QoL in the sexual domain increased after consuming licorice, indicating a decrease in the QoL in this domain. This discrepancy may be related to cultural differences as

most Middle Eastern people, especially women, are reluctant to talk about sex and respond properly to related questions; another reason may be that they did not have sexual intercourse in the month after the intervention to report any changes in the sexual domain. An in-depth research in this field can provide a more accurate answer.

Because the interventions in our study were limited to 1 month (due to time constraints), we suggest that further studies be conducted with a longer study period and larger sample size, involving with the measurement of the QoL before and after the interventions. In addition, the effects of the interventions on long-term complications of menopause, such as osteoporosis and cardiovascular diseases, should be investigated. Considering the high incidence of disorders, such as hypertension and depression, in this age group, it is recommended that in collaboration with other medical groups, the effects of licorice be assessed in women with such disorders and the risk of side effects be compared with the healthy groups. In addition, because the main limitation of the study was the absence of a control group for comparisons with the licorice and exercise groups, further study should be conducted with a control group. Nonetheless, the findings of this study suggest that the health and QoL of postmenopausal women can be improved by adopting interventions involving physical activities and/or herbal medicines.

## Ethical Considerations

### Compliance with ethical guidelines

This research was approved by the Research Center of Arak Medical University, No. 1098 with Ethics Code of 93-163-8 and was registered by the Iranian Registry of Clinical Trials No.IRCT2015031117873N4.

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## Conflict of interest

No conflict of interest has been declared by the authors.

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