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Original Article

The effect of saffron on sexual dysfunction in women of reproductive age

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ABSTRACT

Background & Aim: Sexual dysfunction is a common matter among women which has a significant effect on human's life. Various methods have been evaluated for encountering and treatment of sexual dysfunction. Considering the effects of saffron and shortage of conducted studies in this field, the aim of the present study was to evaluate the effect of saffron on sexual dysfunction in women of reproductive age.

Methods & Materials: The present clinical trial was conducted on 69 women of 18 to 39 years old who referred to the health centers of the Arak University of Medical Sciences in 2013. Participants were selected using continuous sampling method and were randomly allocated into two groups of intervention and control. The intervention was performed as using saffron extract capsule for 8 weeks and comparing it to consumption of placebo capsules. The status of participants' sexual performance was evaluated using Female Sexual Function Index before the intervention and four and eight weeks after the start of the intervention. Data were analyzed through SPSS software using chi square test, independent t-test and Cochrane test.

Results: Results showed no significant difference between both groups regarding their sexual dysfunction at the beginning of the study. Comparing the two groups of intervention and control four weeks after the start of the intervention showed a significant difference between their excitement and desire. However, eight weeks after the start of the intervention, the difference between both groups regarding their total sexual dysfunction and all of its aspects except for lubrication and dyspareunia was statistically significant.

Conclusion: Considering the effect of saffron on improvement of women's sexual performance and also considering the safety of this herbal drug, saffron could be used for improvement of sexual performance in women of reproductive age.

Introduction

Sexual performance is a special part of human's life and behavior (1) and has an important role in the health of individuals and the society (2, 3). Healthy sexual function is a complicated factor in women's health quality of life (4-6) and could be affected by different interpersonal, psychological, biological and environmental factors (7, 8). Sexual dysfunction is a common matter among women and lead to serious complications (9-12). Sexual dysfunction is defined as a series of disorders in desire, excitement, orgasm, and dyspareunia (13-15). The prevalence of sexual dysfunction varies in different parts of the world. In a meta-analysis that was conducted on descriptive studies, the prevalence of sexual dysfunction in the world was reported as 9.4% (16), and

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specifically, it was reported as 40 to 50% in Italy (17), 8.52% in Egypt (18), and 5.55% in India (19). Also, a meta-analysis that was conducted on Iranian women reported the prevalence of sexual dysfunction to be 9.43% (confidence interval of 8.52-35) (20). In Iran the prevalence of desire disorder is 33%, excitement disorder is 16.5%, orgasm disorder is 25% and dyspareunia is 45.5% (21). Women with different ages, socioeconomic conditions, cultures and educational levels might suffer from these disorders (22, 23). Sexual dysfunction might affect different aspects individuals' health and quality of life and lead to various personal and social problems (3, 5, 17, 24, 25). Therefore, prevention, diagnosis and appropriate treatment of this disorder are of essential importance and might improve the health of women and the society (26, 27).

Currently, various surgical, medicinal and non-medicinal methods are used for treatment of sexual dysfunction (26, 28, 29). Non-medicinal methods include psychological counseling, modification of lifestyle, body image enhancement and using lubricators and moisturizers. Medicinal treatments include hormonal drugs, phosphodiesterase inhibitors, and psychotropic drugs (30). Since surgical and medicinal methods always have side effects (26), using simpler and safer methods as initial solutions could be beneficial (31). Using herbal supplements is one of these methods which are widely used for treatment of various diseases and problems (32, 33). Saffron is an herbal medicine which has been the subject of interest in many countries, from a long time age (34). Saffron has a warm and dry nature and has been presented as an astringent, resolvent, and concoctive drug in most of the references. Some of the most important chemical elements of saffron are carbohydrates, minerals, vitamins (riboflavin and thiamine) and pigments including crocin, anthocyanin, carotene, mucilage lycopene, and zigzantin. The aromatic element of saffron is turpenic (Safranal) and picrocrocin is responsible for the taste of saffron (35, 36). Gastrointestinal and cardiac protective, antidepressant, aphrodisiac, anticancer, anti-inflammatory, absorption enhancer and oxytocic properties of saffron has made it to be used for treatment of different problems such as digestive, ocular, psychological and urogenital (premenstrual syndrome, dysmenorrhea, and irregular menstruation) disorders (37, 38). In laboratory studies the oxytocic and aphrodisiac effects of saffron on sexual performance have been approved (36, 39-41). Increased libido (33, 42, 43) and increased production and quality of semen (44) are some of the effects of saffron. Saffron, by facilitating the supply of oxygen for tissues and increasing the number of basophils responsible for the increment gonadotropins, would eventually lead to the increased production of testosterone (36). Although various studies have been conducted to evaluate the effect of saffron on treatment of sexual dysfunction in men (44-46), few studies with similar aims have been conducted on women (47). Kashani et al (2012) in a study evaluated the effect of saffron on treatment of fluoxetine-related sexual disorders in women with depression. The researcher prescribed 40 mg of saffron per day for the participants and assessed their sexual performance for two and four weeks; results indicated significant improvement of sexual performance in the participants.

Considering the few negligible complications of saffron (headache, nausea, dizziness, hypomania and loss of appetite) (37, 48) and the importance of sexual dysfunction and the necessity of finding safe methods to treat and deal with it; also considering that despite the potential of saffron for treating this problem, sufficient

studies have not been conducted in this field, therefore the present study was conducted to evaluate the effect of saffron on sexual dysfunction.

Methods

The present study was a double-blind placebo-controlled clinical trial which was approved by the ethics committee of the Tehran University of Medical Sciences by No. 90181-99021934-01-92 and registered at the Iranian Registry for Clinical Trials under the code IRCT201206265912N5. Study population included all the women of reproductive ages who referred to the health centers affiliated with Arak University of Medical Sciences in 2013. Based on the study of Ramezani et al (2012) which reported the prevalence of sexual dysfunction as 50%, and with a confidence interval of 95% and test power of 90%, the sample size for each group was calculated to be 34. Considering a 20% sample loss, 40 participants were considered for each group. To perform sampling, seven health centers affiliated with Arak University of Medical Sciences were selected randomly. After visiting the health centers, the researcher selected eligible women who referred to the centers and were willing to participate in the study. Participants were selected using continuous sampling method and then randomly allocated into two groups of control and intervention.

The inclusion criteria were being Iranian, being married, not being pregnant, not breastfeeding, being 18 to 39 years old, and having sexual dysfunction defined by gaining a score of less than 28 from the Female Sexual Function Index (FSFI). The exclusion criteria were unwillingness to continue the study, becoming pregnant during the study, occurrence of side effects and allergic symptoms to the drug and occurrence of stressful events during the study.

Data gathering tools were demographic characteristics questionnaire and FSFI. Demographic characteristics contained age, husband's age, duration of marriage, number of pregnancies, type of deliveries, number of children, history of infertility, history of abortion, women's and their husbands' educational level and occupational status and economic status. FSFI contains 6 dimensions and 19 items. Each item is scored with a 5-point Likert scale (from never to almost always). Its dimensions are desire (coefficient of 0.6 and cut-off point of 3.3), excitement (coefficient of 0.3, cut-off point of 4.3), lubrication (coefficient of 0.3, cut-off point of 4.3), orgasm (coefficient of 0.4, cut-off point of 4.3), sexual satisfaction (coefficient of 0.4, cut-off point of 8.3), dyspareunia (coefficient of 0.4, cut-off point of 8.3) and the total score (cut-off point of 28) (49). The validity and reliability of this questionnaire has been approved in previous studies (50, 51).

The intervention group received a 15 mg saffron extract capsule and the control group received its placebo capsule twice a day. Both capsules were produced at the laboratory of the Pharmacy Faculty of the Tehran University of Medical Sciences as 15 mg identical (in appearance) capsules. To perform the blinding, both drugs were put in similar pockets which were numbered consecutively. The method of drug consumption was explained for the participants.

Since the researchers were intended to evaluate both the mid-duration (after 4 weeks of consumption) and long term (after 8 weeks of consumption) effect, the required drug supply for 4 weeks was given to the participants. Four weeks after receiving the drugs, through phone calls, participants were invited to visit the center for filling the questionnaire and taking the drug supply for

the next 4 weeks. At the end of the eighth week participants were again called in for completing the questionnaire.

After explaining the aims of the study, procedures and the right of withdrawal at any time, written informed consent was obtained from all the participants. Also to main the confidentiality of the data, questionnaires were anonymous. In case of occurrence of any side effects or complications, the participant would be referred to a physician.

After evaluating the normality of the data using Kolmogorov-Smirnoff test, chi square test, Fisher's exact test and independent t-test were used to assess the homogeneity of the demographic data between both groups. To compare the sexual performance status, chi square and Cochrane's tests were used. The significant level for all the statistical tests was set at 0.05. Analysis was conducted using SPSS 16.

Results

From all the 80 primary participants, 11 were excluded for unwillingness to continue participation, physician's recommendation for withdrawal from the study, inaccessibility during the follow-up periods and becoming pregnant (Figure 1). So the rate of sample loss was 13.75%.

The mean ages of the participants were 29.5 ± 4.19 years and 29.57 ± 5.18 years in the control and the intervention group, respectively. Also the mean ages of the husbands in the control and the intervention group were 33.32 ± 4.3 years and 33.32 ± 4.3 years, respectively. The mean duration of marriage in the control group was 9.5 ± 5.45 years and in the intervention group was 8.17 ± 5.75 years. Results of independent t-test showed no significant difference between both groups regarding their age, their husband's age and the duration of their marriage ($p < 0.05$). Also both groups were homogenous regarding their demographic characteristics (Table 1). Sexual performance status of the participants in both groups of intervention and control at three measurement stages of before the intervention, four weeks and eight weeks after the start of the intervention are shown in table 2.

Discussion

The present study was conducted to evaluate the effect of daily consumption of 15 mg of saffron extract for eight weeks on sexual dysfunction in women of reproductive age. Results showed that the sexual performance status was significantly improved in the intervention group at three measurement stages but the difference in the control group was not statistically significant. Also, four weeks after the start of the intervention the level of disorder in excitement and desire in the intervention group was significantly decreased compared to the control group; but no significant changes were observed in the level of disorder in lubrication, orgasm, satisfaction, dyspareunia, and the total score of sexual dysfunction. However after eight weeks of consuming saffron extract capsules, the difference between the intervention and the control groups regarding the total score of sexual dysfunction and all of its aspects, except for lubrication and dyspareunia, was statistically significant. In fact these results would indicate that consumption of saffron would improve women's sexual performance and the improvement would increase over time.

This result would confirm the results of previous studies that were conducted on the effect of saffron on sexual dysfunction in men (46) and women (47) and fluoxetine-related sexual dysfunction (45) and also would confirm the results of animal studies (43, 52).

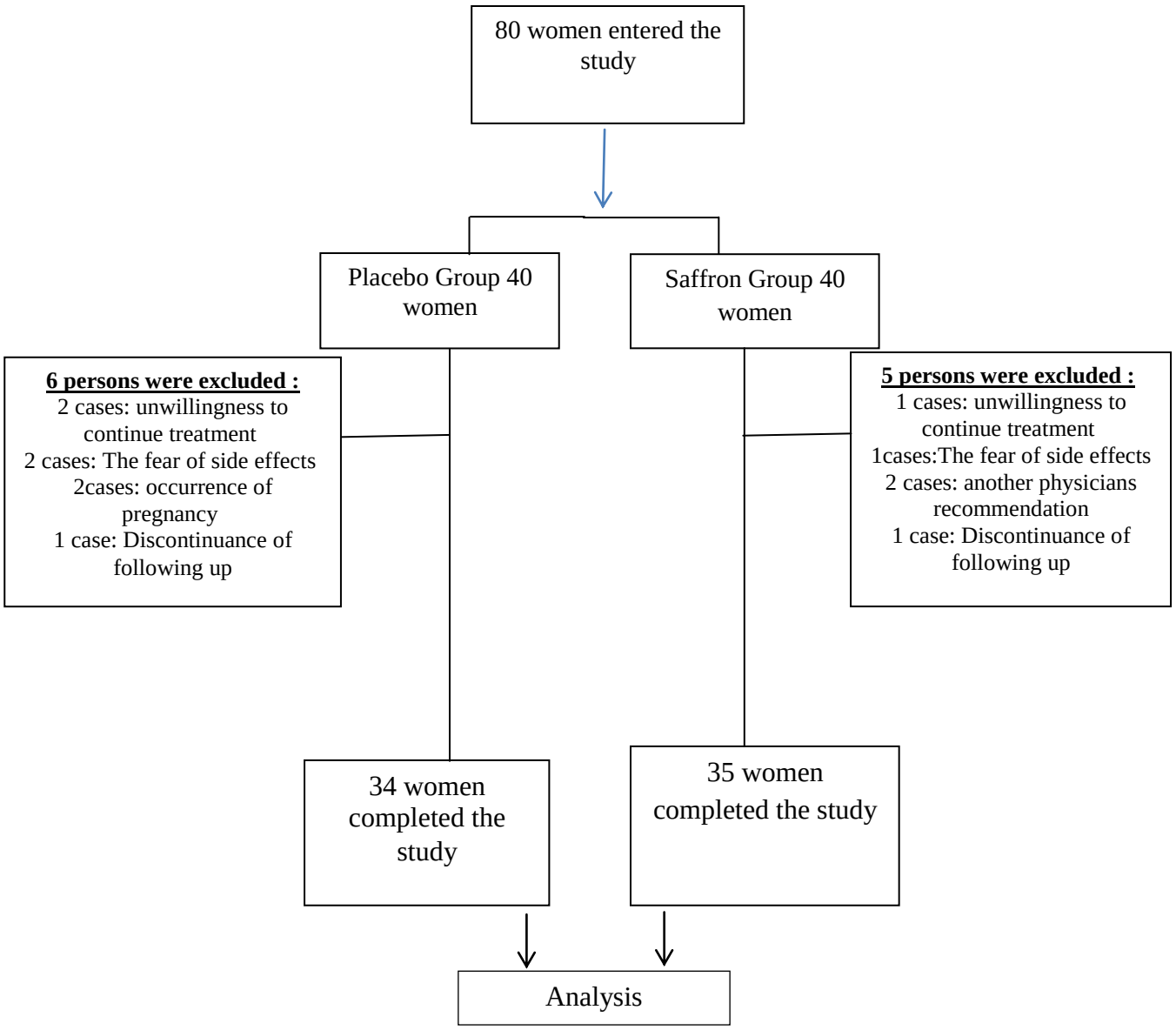

Figure 1. Flowchart of sampling

Table 1. The relationship of quality of life and its dimensions to disease severity in patients with psoriasis, 2015 (N = 99)

Variables		Placebo(N=34) N (%)	Saffron(N=35) N (%)	P-value*
Number of pregnancy	0	5 (14.7%)	9 (25.7%)	*0.34
	1	12 (35.3%)	12 (34.3%)	
	2	12 (35.3%)	9 (25.7%)	
	3≤	5 (14.7%)	5 (14.3%)	
Number of children	0	5 (14.7%)	11 (31.4%)	*0.18
	1	15 (44.1%)	14 (40%)	
	2	12 (35.3%)	6 (17.1%)	
	3≤	2 (5.9%)	5 (14.7%)	

Variables		Placebo(N=34) N (%)	Saffron(N=35) N (%)	P-value*
Type of delivery	Natural	16 (47.1%)	17 (48.6%	** 0.14
	Cesarean section	13 (38.2%)	7 (20%)	
	No one	5 (14.7%)	11 (31.4%)	
Infertility history	Has	1 (2.9%)	2 (5.8%)	***0.98
	Has not	33 (97.1%)	33 (97.2%)	
Abortion history	Has	6 (17.6%)	7 (20%)	** 1
	Has not	28 (82.4%)	28 (80%)	
Education	Primary school	3 (8.8%)	5 (14.3%)	***0.68
	High school/Middle	11 (32.4%)	8 (22.9%)	
	Diploma	15 (44.1%	14 (40%)	
	Collegiate	5 (14.7%)	8 (22.9%)	
Husband`s education	Primary school	4 (11.8%)	9 (25.7%)	** 0.09
	High school/Middle	12 (35.3%)	4 (11.4%)	
	Diploma	13 (38.2%	15 (42.9%)	
	Collegiate	5 (14.7%)	7 (20%)	
Employment status	Housewife	33 (97.1%)	32 (91.4%)	***0.61
	Employed	1 (2.9%)	3 (8.6%)	
Husband`s employment status	Unemployed	1 (2.9%)	1 (2.9%)	***1
	Worker	18 (52.9%)	17 (48.6%)	
	Employee	4 (11.8%)	5 (14.3%)	
	Self-employed	11 (32.4%)	12 (34.3%)	
Sexual function	Weak	3 (8.8%)	6 (17.1%)	***0.65
	Intermediate	28 (82.4%)	25 (71.4%)	
	Good	3 (8.8%)	4 (11.4%)	

***** Maan-Whitney U, ****** Chi-square test, *******Fisher`s Exact Test

Table 2. Distribution of absolute and relative frequency of sexual dysfunction and its dimensions in the control and intervention groups before, 4 and 8 weeks later

Dimensions	Time	Control				Intervention				Test
		Yes		No		Yes		No		
		N	%	N	%	N	%	N	%	X^2
Desire	Before	17	50	17	50	17	48/6	18	51/4	0/5
	4 weeks	14	41/2	20	58/8	4	11/4	31	88/6	**0.006**
	8 weeks	13	38/2	21	61/8	1	2/9	34	97/1	**<0.001**
	Cochrane		0.3				**<0.001**			
Excitement	Before	18	52/9	16	47/1	24	68/6	11	31/4	0.2
	4 weeks	22	64/7	12	53/3	12	34/3	23	65/7	**0.01**
	8 weeks	18	52/9	16	47/1	4	11/4	31	88/6	**<0.001**
	Cochrane		0.2				**<0.001**			
Lubrication	Before	13	38/2	21	61/8	18	51/4	17	48/6	0.3
	4 weeks	13	38/2	21	61/8	9	25/7	26	74/3	0.3
	8 weeks	9	26/5	25	73/5	3	8/6	32	91/4	0.6
	Cochrane		0.06				**<0.001**			
Orgasm	Before	15	44/1	19	55/9	19	54/3	16	45/7	0.4
	4 weeks	12	35/3	22	64/7	9	25/7	26	74/3	0.4
	8 weeks	15	44/1	19	55/9	3	8/6	32	91/4	**0.001**
	Cochrane		0.3				**<0.001**			
Satisfaction	Before	17	50	17	50	24	68/6	11	31/4	0.1
	4 weeks	19	55/9	15	44/1	16	45/7	19	54/3	0.4
	8 weeks	18	52/9	16	47/1	3	8/6	32	91/4	**<0.001**
	Cochrane		0.6				**<0.001**			
Dyspareunia	Before	14	41/2	20	58/8	17	48/6	18	51/4	0.6
	4 weeks	15	44/1	19	55/9	12	34/3	23	65/7	0.4
	8 weeks	11	32/4	23	67/6	9	25/7	26	74/3	0.6
	Cochrane		0.2				**0.01**			
Total	Before	34	100	0	0	35	100	0	0	1
	4 weeks	34	100	0	0	32	91/4	3	8/6	0.2
	8 weeks	34	100	0	0	23	65/7	12	34/3	**<0.001**
	Cochrane		1				**<0.001**			

Kashani et al (2013) after evaluating the effect of saffron on SSRIs-related sexual dysfunction in depressed women revealed that daily consumption of 30 mg of saffron extract for four weeks would significantly improve the total score of sexual performance and its excitement, lubrication and pain dimensions; however no significant difference was observed in the dimensions of desire, sexual satisfaction and orgasm (47). The differences in the effect of saffron on different dimensions of sexual performance might between the present study and the study by Kashani et al might be due to the difference between their study populations. In the study by Kashani et al samples were depressed women with sexual dysfunction while the present study evaluated healthy women with sexual dysfunction. Reviewing the articles in different databases did not lead to any other studies that have evaluated the effect of saffron on sexual performance in women; but some studies have been conducted on men's sexual performance. Modaberian et al (2012) in their study evaluated the effect of saffron on sexual dysfunction in depressed men who were consuming fluoxetine and resulted that daily consumption of 30 mg of saffron extract for four weeks would significantly improve erectile function and intercourse satisfaction. But its effect on orgasm and sexual satisfaction was negligibly insignificant (45). Shamsa et al (2009) also showed that consumption of 200 mg capsules of saffron extract for 10 days would significantly increase the number and duration of erection and in general, would improve the sexual performance in men with erectile disorders (46). In contrast, Safari Nejad et al (2010) in their study that evaluated the effect of saffron on men's erectile disorders found no significant effect (53).

Saffron is a native plant of Iran and has been considered for treatment of many problems in Persian traditional medicine for a long time; but it is not widely considered for therapeutic uses in the world. Although some studies have assessed the effect of saffron on psychological problems such as depression (54-57), no studies were found in other countries for evaluating the effect of this plant on sexual dysfunction.

Since various internal and external factors could be effective on individual's sexual experiences, the observed responses and effects might be affected by these factors. To resolve this problem, by random allocation and homogenization of the two groups in terms of some of their characteristics, the effort was to reduce these effects. Also considering that sexual issues are some of the most private matters of life, embarrassment, shame and fear would prevent the participants to provide correct answers. The researcher tried to resolve this problem by creating a proper connection with the participants and ensuring them of the confidentiality of their information. It is recommended that future studies would be conducted to compare the effects of different drugs and also different dosages of saffron extract on the treatment of sexual dysfunction in different groups.

The present study showed that saffron extract can improve and enhance sexual performance and its different domains. Given that one of the goals of Midwifery services is to enhance the quality of life of women in all its aspects, this method that is less complicated and more affordable and accessible to women can be used for treating sexual dysfunction.

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Conflict of Interest

The authors of this study declare no conflicts of interest.

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