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Sexual health promotion interventions in Iranian postmenopausal women: A systematic review of randomized controlled trials

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Abstract:

This study aimed to systematically review published articles on sexual health promotion interventions in postmenopausal Iranian women. Five databases including PubMed, ProQuest, Web of Science, Science Direct, and Google Scholar, as well as three Iranian databases, including SID, IranDoc, and Magiran, were searched without a time limit for sexual health promotion interventions in Iranian postmenopausal women. The risk of bias was assessed using the Jadad scale. In total, 48 articles met our inclusion criteria and provided data for this review. The measured outcomes were different aspects of sexual function. Outcomes were measured using a specific questionnaire related to sexual function and its areas. The results obtained from the tools used have led to the classification of the results based on the type of interventions used to improve the sexual health of postmenopausal women. The main groups were drug interventions (chemical and herbal) and non-drug interventions (psychological and educational). Surveys showed that most interventions performed on sexual health in Iranian postmenopausal women were medicinal (herbal) interventions. Numerous studies obtained a good quality score. The results of this study can be used to improve the sexual health of postmenopausal women.

Keywords:

Intervention, Iranian, menopause, RCT, sexual health

Introduction

In women, sexual performance, hormones, and the aging process are inseparably linked.^[1] Middle age and menopause are some of the factors related to women's sexual dysfunction.^[2] The clinical effects of sexual dysfunction can be enhanced and augmented by menopausal symptoms.^[3] Sexual disorders may significantly affect the quality of life of middle-aged and older women.^[4] During this period, the loss or absence of a life partner,^[5] sexual problems of the partner,^[6] age of the partner, length of the relationship, feelings towards the life partner, level of education, stressors, negative attitude towards menopause, the

experience of physical illness or mental illness,^[7] medical treatment or drugs,^[5] menopausal status,^[8] may affect women's sexual activity. In postmenopausal Iranian women, sexual dysfunction is more related to sociocultural factors than hormonal problems.^[9]

As life expectancy increases, most women spend a third or more of their life in menopause. Therefore, as a parameter of health and quality of life, it is an important factor.^[10] The number of postmenopausal women worldwide will increase significantly in the coming decades. Surveys have shown that women expect to maintain a high level of health and quality of life during the postmenopausal years.^[11] The proportion

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of women who continue to be sexually active, in or out of their 70s, has increased. This trend highlights the importance of understanding the sexual health of older adults, as sexual problems have also been reported with increasing age.^[12]

Various methods are used to prevent and treat sexual dysfunctions during menopause, which are generally divided into two main groups: pharmaceutical treatments and complementary and alternative medicine.^[13] A review of studies has shown that public education, diagnosis of signs and symptoms, health promotion, attention to the sexual partner, and individual treatment are among the interventions used to reduce sexual problems.^[14] Considering the importance of maintaining sexual relationships in postmenopausal women and as regards that there was no general systematic study related to the interventions to improve the sexual health of postmenopausal women, this research was conducted to investigate the sexual health interventional studies on Iranian postmenopausal women. Also, another purpose of this study was to use the desired and classified results in practice.

Materials and Methods

The present study was approved by the Ethics Committee of the Shahroud University of Medical Sciences: IR.SHMU.REC.1400.083. This comprehensive review was performed in five stages:

Identify the research question

This study was conducted to answer the following research question: What are the interventions to improve sexual health in Iranian postmenopausal women?

Search strategies for identifying and selecting studies

This review study examined studies related to sexual health promotion interventions in postmenopausal women in the Google Scholar database as well as other electronic databases such as PubMed, ProQuest, Web of Science, Science Direct, Magiran, SID, and IranDoc with an out-time limit. The search was performed using both “text word” and “Medical Subject Heading (MeSH)” strategies. For example, we used the AND/OR operators to perform an advanced search of articles in the PubMed international database as follows:

“sexual behavior” OR “sexual”) AND (“sexual health” OR “sexual well-being”) AND (“menopause” OR “menopausal”) AND “women” AND (“methods” OR “intervention”) AND (“therapy” OR “treatment” OR “therapeutics”) AND “promotion.”

Study selection

Relevant studies published up to 2023 were screened. Also, the reference lists of the obtained articles were manually screened to get other related articles. Two authors then independently screened the articles against the eligibility criteria. Eligibility criteria of articles included publication in scientific and authoritative journals, in the Persian and English languages, evaluation of sexual health-promoting interventions, medicinal methods, non-medicinal methods, treatment, and answering the research question. Initially, 259 articles were selected from the databases. Then, during the screening, some articles were removed due to a lack of focus on the research question. Also, during the full-text review and evaluation, articles that did not mention aspects of sexual health in postmenopausal Iranian women or had goals other than the current review were excluded from the study. The number of final articles was determined. Finally, 48 studies were used for review, after excluding irrelevant studies by reading their titles and abstracts. All this process was reported in the PRISMA diagram [Figure 1].

Data extraction and management

The researchers carefully examined the full text of each selected article to extract appropriate and relevant information. A general agreement was reached before the final inclusion of the articles. The extracted variables included the following: first author, year of publication, type of study, number of samples, age, type of intervention, duration of intervention, instrument used, results, and risk of bias assessment score. Next, the data obtained from the articles were placed in the relevant

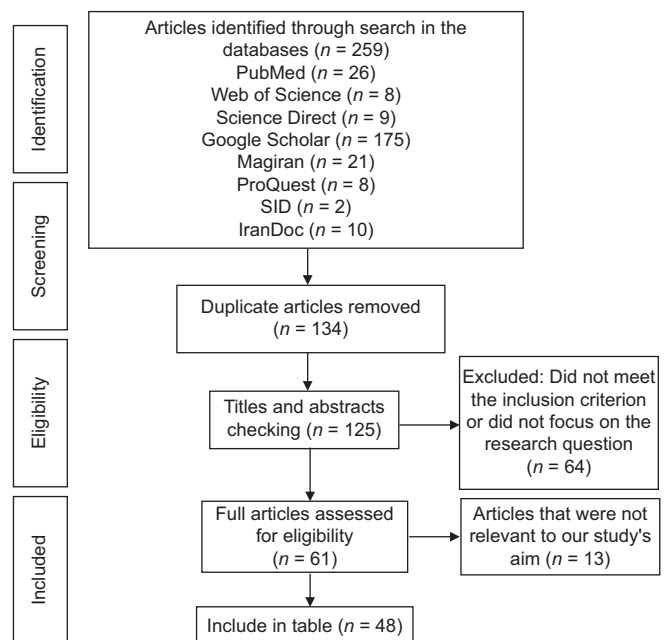


Figure 1: Search flowchart based on the PRISMA guidelines

categories (pharmacological and non-pharmacological interventions).

Assessment of risk of bias

To assess the risk of bias, we used the reliable risk of bias tool developed by Jadad *et al.*^[15] This tool evaluates the quality of clinical reports. This tool includes three items. The first term is related to the randomization of samples with the appropriate method (the score range is 0–2). The second term is related to the two-way blinding of the study (score range 2–0). The third term is related to the mention of the number and reasons for the drop in samples (score range 0–1).^[16] The overall score of the scale is 5 points according to all these statements. A Jadad score of less than 3 indicates poor study quality and a score greater than or equal to 3 indicates good study quality.^[17] Two reviewers reassessed the risk of bias results to ensure that risk of bias criteria was applied consistently for each included study.

Results

Search results

After removing irrelevant studies, 48 articles related to the research purpose were selected. The measured outcomes were defined as sexual performance, sexual satisfaction, sexual desire, quality of sexual life, sexual dysfunction beliefs, dyspareunia, and menopause-related quality of life. In total, 28 studies of sexual performance, 11 studies of sexual satisfaction, 5 studies of sexual desire, 1 study of the quality of sexual life, 1 study of sexual dysfunction beliefs, and 2 studies of the quality of life of menopausal women have been investigated. Outcomes were measured using questionnaires used as diagnostic tools. The tools used to evaluate the results included The Female Sexual Function Index (FSFI), the Standard Sexual Quality Questionnaire, the Menopause-Specific Quality of Life (MENQOL), the Sabbatsberg Sexual Rating Scale (SSRS), the Larson Sexual Satisfaction Questionnaire, the Halbert Index of Sexual Desire (HISD) Questionnaire, Women Sexual Self-Schema Scale, short form of Enrich's Sexual Satisfaction Questionnaire, Sexual Dysfunctional Beliefs' Questionnaire, the Brief Male Sexual Function Inventory (BMSFI) and Sexual Behaviors Assessment Questionnaire (SBAQ). The results obtained from the tools used have led to the classification of the results based on the type of interventions used to improve the sexual health of postmenopausal women. The information was divided into two categories. The main groups were drug interventions (chemical and herbal) and non-drug interventions (psychological and educational). In the group of pharmaceutical interventions, 8 articles, 25 articles in herbal interventions, and 15 articles in psychological educational interventions were included. In the included studies, the minimum age of menopausal women was 40 years and the maximum

age was 68 years. The results of the studies are described in Tables 1-3.

Assessment of risk of bias

In the general review of studies, 38 studies scored 3 or higher quality on the Jadad scale and had good quality, and 10 studies scored less than 3 and were evaluated as low quality. The classification of the risk of bias for each class of interventions was as follows: in pharmaceutical interventions, 6 good-quality and 2 low-quality studies; in herbal interventions, 23 good-quality and 2 low-quality studies; in psychological interventions, 9 studies were of good quality and 6 studies were of low quality. Finally, 10 studies with low quality were excluded from the results table.

Pharmacological (chemical) interventions

Medical interventions in menopausal women in Iran have been less compared to herbal and psychological interventions, which have been performed on tibolone,^[56,57] conjugated estrogen,^[18,19] melatonin,^[20] royal jelly, oxytocin gel,^[21] zinc supplement,^[22] and comparison of premarin with CO₂ laser therapy.^[23] The minimum duration of the intervention was 8 weeks and the maximum was 6 months. Most studies were conducted on the general index of sexual performance of postmenopausal women, and only two studies investigated sexual quality^[18] and the quality of life of postmenopausal women.^[19]

Pharmaceutical (herbal) interventions

In Iran, 25 studies investigated the effect of using herbal medicines on the sexual life of postmenopausal women, and most interventions used in Iran on postmenopausal women were with this method. Herbal interventions were used with different goals such as improving sexual function, quality of sexual life, sexual satisfaction, desire and stimulation, sexual arousal and orgasm, vaginal lubricant, dyspareunia, and menopausal symptoms. Most studies focused on the general performance of postmenopausal women using the standard FSFI questionnaire and assessing the sexual satisfaction of this group. Herbal medicines used in interventions included Ginkgo biloba,^[13,24-26] fennel,^[33,34,39,58] ginseng,^[44] date palm pollen capsule,^[28-30] red clover,^[27] Alcea,^[35] chamomile,^[42] saffron,^[36] fenugreek seeds,^[37] *Tribulus terrestris*,^[38] squill oil,^[45] Aphrodite,^[31,32] combined herbal capsule,^[40,41] Jazar supplement,^[43] *Citrus aurantium* essential oil.^[46] These interventions have been studied more in the south of the country (Ahvaz) and Tehran. The minimum duration of the intervention was 28 days and the maximum was 12 weeks.

Psychological and educational interventions

Regarding psychological and educational interventions, 15 studies were included. Most studies investigated the sexual performance of postmenopausal women using the

Table 1: Studies that included pharmaceutical (chemical) interventions promoting sexual health in postmenopausal Iranian women

Author/year	Type of Study	Number of samples	Age group	Type of interventions			Assessment of risk of bias Jadad score	
				Type of intervention	Duration of intervention	Tools of a sexual function measurement		
Eftekhar et al., T 2009 ^[18] Tehran	Single-blinded clinical trial	40 healthy postmenopausal women	-	Vaginal estrogen (Premarin placebo): lubricant vaginally	4 months	A sexual quality standard questionnaire	The level of sexual satisfaction was significantly higher in the Premarin group than in the placebo group. A decrease in sexual disorders was observed to the extent of 3% ($P<0.01$).	3
Fatemeh Seyyedi et al. 2016 ^[19] Shahreکرد	Randomized clinical trial	90 postmenopausal women with symptoms of vaginal atrophy	50-65	Three groups: 15% royal gel vaginal cream, lubricant, and conjugated estrogens	3 months	Menopause-specific Quality of Life (MENQOL)	The royal vaginal gel is significantly more effective than conjugated estrogens and lubricants in improving the quality of life, and sexual and urinary functions in postmenopausal women ($P<0.05$).	5
Nehle Parandavar et al. 2018 ^[20] Shiraz	A randomized clinical trial with a placebo	240 postmenopausal women with complaints of sexual dysfunction	40-60	Melatonin (3 mg tablet) placebo	3 months	Female Sexual Function Index (FSFI)	Melatonin significantly improves sexual performance in postmenopausal women ($P<0.001$).	5
Parvin Abedi et al. 2020 ^[21] Ahvaz	Randomized controlled clinical trial	96 postmenopausal women with symptoms of vaginal atrophy and sexual dysfunction	40-50	Oxytocin vaginal gel 400 IU placebo	eight weeks	Female Sexual Function Index (FSFI)	All areas of sexual function including desire, arousal, lubrication, pain, sexual satisfaction, and the total score of sexual function in oxytocin gel was significantly improved compared to the control group ($P<0.0001$).	5
Leila Mazaheri et al. Nia 2021 ^[22] Ahvaz	Randomized clinical trial	116 postmenopausal women with serum zinc levels below 26 and low sexual performance	Menopause women over 49 years old	Zinc sulfate 110 mg capsule placebo	6 weeks	Female Sexual Function Index (FSFI)	The use of zinc supplements in the intervention group has significantly improved the overall score of sexual function compared to the control group ($P<0.001$).	5
Tahereh Eftekhar et al. 2020 ^[23] Tehran	Randomized controlled clinical trial	50 postmenopausal women with symptoms of vaginal atrophy	45-65	CO ₂ laser therapy every month for three months Premarin vaginal cream (0.625 mg, 3 nights a week for 3 months)	3 months	Female Sexual Function Index (FSFI)	The effects of laser therapy in terms of improving libido, orgasm, sexual satisfaction, less pain during intercourse, and overall sexual performance were higher than the Premarin group ($P<0.05$).	5

Table 2: Studies that included pharmaceutical (herbal) interventions promoting sexual health in postmenopausal Iranian women

Author/year	Type of study	Pharmaceutical (herbal) interventions			
		Number of samples	Age group	Type of intervention	Duration of intervention
Mina Amiri Pebdani et al. 2012 ^[24] Tehran	Randomized controlled clinical trial	80 postmenopausal women	50-60	120–240 mg Ginkgo biloba Placebo	One Month
Mina Amiri Pebdani et al. 2012 ^[25] Tehran	Triple-blind placebo controlled trial	80 postmenopausal women	50-60	120–240 mg Ginkgo biloba Placebo	One Month
Jamileh Malakouti et al. 2017 ^[26] Ardabil	Double-blind randomized clinical trial	180 healthy postmenopausal women	45-55	Ginkgo biloba tablet aroma solution placebo aroma solution	6 weeks
Jamileh Khayatan 2019 et al. ^[27] Ahvaz	Randomized controlled clinical trial	76 healthy postmenopausal women	45-65	Red clover vaginal cream placebo	8 weeks
Somayeh Sadeghi, 2019 et al. ^[28] Mashhad	Triple-blinded, placebo controlled clinical trial	60 menopausal women with low libido	40-65	Date palm pollen placebo capsules	35 days
Sedigheh Yosefzadeh, 2017 et al. ^[29] Mashhad	Double-blind controlled clinical trial	60 postmenopausal women without sexual dysfunction	40-65	Date palm pollen placebo	35 days
Loripoor, Marzeyeh 2022 et al. ^[30] Rafsanjan	Three-blind randomized clinical trial	110 menopausal women	50-65	300 mg capsule of palm extract placebo	4 weeks
Simin Taavoni et al. 2014 ^[31] Tehran	Triple-blind clinical trial	80 menopausal women	50-60	Afroditi capsule placebo	1 month
Simin Taavoni 2016 et al. ^[32] Tehran	Triple-blind clinical trial	80 menopausal women	50-60	Afroditi capsule placebo	1 month
Shahnaz Najjar, 2015 et al. ^[33] Ahvaz	A double-blind randomized controlled trial	60 postmenopausal women with vaginal atrophy	45-65	5% Fennel vaginal cream placebo	
Parvin Abedi 2018 et al. ^[34] Ahvaz	Double-blind randomized controlled trial	60 postmenopausal women with sexual dysfunction	45-65	Fennel vaginal cream placebo	8 weeks
Alieh Kianitalaei, 2021 et al. ^[35] Mashhad	Double-blind clinical trial	60 postmenopausal women with sexual dysfunction	40-65	Alcea vaginal suppository 5% placebo	8 weeks
Mahbubeh Tabatabaeichehr, 2020 et al. ^[36] Bojnurd	Double-blind clinical trial	67 healthy postmenopausal women	45-60	Saffron capsule placebo	28 days
Fakhriyeh Mazalzadeh, 2018 et al. ^[37] Ahvaz	Randomized Clinical Trial	60 postmenopausal women with dyspareunia and sexual dissatisfaction	Mean age in the fenugreek group is 54 years and the placebo is 55 years	Fenugreek vaginal cream 5% placebo	8 weeks
Mitra Tadayon 2018 et al. ^[38] Ahvaz	Double-blind randomized placebo controlled trial	60 postmenopausal women	Mean age in the intervention group is 52 and in the placebo group is 51	Syrup containing <i>Tribulus terrestris</i> placebo	8 weeks
Parvin Ghaffari 2020 et al. ^[39] Yasuj	Three-blinded randomized clinical trial	80 postmenopausal women	45-60	Capsules of Fennel seed powder (2 g) starch-containing capsules (2 gr)	8 weeks
Shima Afshar 2020 et al. ^[40] Gorgan	Randomized Clinical Trial	48 postmenopausal women with sexual dysfunction	41-54	Capsules (Melissa officinalis, fennel extract, and Nigella sativa powder) placebo (starch capsules)	8 weeks

Contd...

Table 2: Contd...

Pharmaceutical (herbal) interventions					
Author/year	Type of study	Number of samples	Age group	Type of intervention	Duration of intervention
Paria Eliasvandi 2018 et al. ^[41] Kermanshah	Triple-blinded, randomized placebo controlled trial	64 postmenopausal women	40-60	The herbal capsule included cloves, Anise and Anison, violet flowers, <i>Terminalia chebula</i> and fresh green raisins, senna leaves, <i>Alhagi maurorum</i> , and Golqand placebo	4 weeks
Zahra Bosak 2020 et al. ^[42] Gotvand	Double-blind clinical trial	96 postmenopausal women with dyspareunia and sexual dissatisfaction	45-65	5% chamomile vaginal gel conjugated estrogen vaginal cream placebo gel	12 weeks
Sousan Hafizi 2021 et al. ^[43] Tehran	Double Blind Randomized, Placebo Controlled Trial	90 postmenopausal women with sexual dysfunction	45-60	Jazar capsules (500 mg each) placebo	8 weeks
Zahra Ghorbani 2019 et al. ^[44] Tabriz	Double-blind, randomized, controlled trial	62 postmenopausal women with sexual dysfunction	45-60	500 mg of Panax Ginseng placebo	4 weeks
Farzane Karimi 2021 et al. ^[45] Mashhad	Triple-blind randomized controlled trial	60 postmenopausal women with dyspareunia	45-65	Intervention: squill oil Placebo: olive oil	4 weeks
Zahra Abbaspoor 2022 et al. ^[46] Ahvaz	A randomized controlled trial with a single-blind design	80 postmenopausal women with a FSFI score of less than 28	45-60	<i>Citrus aurantium</i> essential oil placebo	4 weeks

Pharmaceutical (herbal) interventions			
Author/year	Tools of a sexual function measurement	Results of the intervention	Assessment of risk of bias Jadad score
Mina Amiri Pebdani et al. 2012 ^[24] Tehran	Sabbatsberg Sexual Rating Scale (SSRS)	Despite the effectiveness of the Ginkgo biloba herbal supplement on women's sexual desire, the results show its lack of effect on their sexual activity ($P=0.44$).	5
Mina Amiri Pebdani et al. 2012 ^[25] Tehran	Sabbatsberg Sexual Rating Scale (SSRS)	After the intervention, there was no statistically significant difference between Ginkgo biloba and placebo groups in terms of sexual satisfaction ($P=0.31$).	5
Jamileh Malakouti et al. 2017 ^[26] Ardabil	Female Sexual Function Index (FSFI)	Combinations of aromatherapy inhalation and ginkgo biloba tablets improved sexual function in postmenopausal women ($P<0.001$).	5
Jamileh Khayatan 2019 et al. ^[27] Ahvaz	Female Sexual Function Index (FSFI)	The average score of all areas of sexual function increased significantly after 8 weeks of intervention in both groups and these changes in the red clover group compared to the placebo were significantly higher ($P<0.001$).	5
Somayeh Sadeghi, 2019 et al. ^[28] Mashhad	Female Sexual Function Index (FSFI)	A significant difference was observed in the mean change in sexual desire ($P=0.021$) and sexual stimulation ($P=0.002$) between the two groups.	5
Sedigheh Yosefzadeh, 2017 et al. ^[29] Mashhad	Female Sexual Function Index (FSFI)	Taking date pollen capsules improves the orgasm of menopausal women ($P=0.004$). However, it does not affect sexual satisfaction ($P=0.122$).	5
Loripoor, Marzeyeh 2022 et al. ^[30] Rafsanjan	Standard questionnaire of 6 questions FSFI (Female Sexual Performance Index)	According to the results, daily consumption of 300 mg of date pollen extract does not significantly improve the sexual performance of postmenopausal women ($P=0.908$).	5
Simin Taavoni et al. 2014 ^[31] Tehran	Sabbatsberg Sexual Rating Scale (SSRS)	There was a significant difference between the average score of sexual satisfaction in the two groups ($P=0.01$).	5
Simin Taavoni 2016 et al. ^[32] Tehran	Sabbatsberg Sexual Rating Scale (SSRS)	Consumption of Aphrodite can improve the state of orgasm in postmenopausal women ($P=0.02$). Also, after the intervention, a significant difference was seen between the Aphrodite and placebo groups in the sexual desire score ($P=0.008$).	5

Contd...

Table 2: Contd...

Author/year	Pharmaceutical (herbal) interventions		Assessment of risk of bias Jadad score
	Tools of a sexual function measurement	Results of the intervention	
Shahnaz Najar, 2015 et al. ^[33] Ahvaz	Larson Questionnaire	After the intervention, the average level of sexual satisfaction in the group using fennel vaginal cream was significantly better than the placebo group ($P<0.001$).	4
Parvin Abedi 2018 et al. ^[34] Ahvaz	Female Sexual Function Index (FSFI)	The total FSFI score in the fennel group was significantly higher than the control group ($P<0.001$).	5
Alieh Kianitalaei, 2021 et al. ^[35] Mashhad	Female Sexual Function Index (FSFI)	All areas of sexual function increased after 8 weeks of intervention in the treatment group, and these changes were statistically significant compared to placebo ($P=0.001$).	5
Mahbubeh Tabatabaiechehr, 2020 et al. ^[36] Bojnurd	Female Sexual Function Index (FSFI)	The average scores of sexual performance in the saffron group improved ($P<0.001$).	5
Fakhriyeh Mazalzadeh, 2018 et al. ^[37] Ahvaz	Larson sexual satisfaction questionnaire	After the intervention, a significant difference was observed in the average sexual satisfaction between the drug and placebo groups ($P<0.001$).	4
Mitra Tadayon 2018 et al. ^[38] Ahvaz	Larson sexual satisfaction questionnaire	A significant increase in sexual satisfaction was observed in the tetanus syrup group ($P<0.005$).	4
Parvin Ghaffari 2020 et al. ^[39] Yasuj	Menopausal Kupperman index and Hurlbert index of sexual desire	Daily use of fennel seeds significantly improved menopausal symptoms in postmenopausal women for more than 8 weeks, although the effect on estradiol levels and libido was not significant ($P>0.05$).	5
Shima Afshar 2020 et al. ^[40] Gorgan	Female Sexual Function Index (FSFI)	A combination of <i>Foeniculum vulgare</i> , <i>Melissa officinalis</i> extract, and <i>Nigella sativa</i> seed powder does not improve the sexual function of postmenopausal women with sexual dysfunction, and it might be the synergism effect of this combination.	5
Paria Eliasvandi 2018 et al. ^[41] Kermanshah	Female Sexual Function Index (FSFI)	4 weeks after the intervention, the average total score of sexual performance was significantly higher in the combined herbal capsule group ($P<0.001$).	5
Zahra Bosak 2020 et al. ^[42] Gotvand	Larsson a four-degree pain self-assessment questionnaire	After the end of the intervention period, a significant difference was observed between the intervention and placebo groups in the average sexual satisfaction ($P<0.001$). Also, a significant decrease in painful sexual intercourse was observed ($P<0.001$).	5
Sousan Hafizi 2021 et al. ^[43] Tehran	Female Sexual Function Index (FSFI) the Menopause-Specific Quality of Life (MENQOL)	Jazar supplementation significantly improved quality of life and sexual function and prevented or delayed vaginal atrophy ($P<0.001$).	5
Zahra Ghorbani 2019 et al. ^[44] Tabriz	Female Sexual Function Index (FSFI) the Menopause-Specific Quality of Life (MENQOL)	After the intervention, the mean total FSFI score in the intervention group was significantly higher than the control group ($P<0.001$).	5
Farzane Karimi 2021 et al. ^[45] Mashhad	Sabbatsberg Sexual Self-Rating Scale Marinoff dyspareunia scale	There was a statistically significant difference in dyspareunia score and sexual satisfaction before and after the intervention ($P<0.001$).	4
Zahra Abbaspoor 2022 et al. ^[46] Ahvaz	(FSFI)	The results of this study showed that in the intervention group, the total score of FSFI and all its dimensions improved significantly compared to the control group ($P<0.0001$).	4

standard FSFI questionnaire. Applied programs included the following: cognitive-behavioral therapy,^[59] individual and group education,^[47-50] educational intervention by health volunteers,^[60] midwife-based group discussion education,^[52,61] counseling interventions,^[62] education based on the theory of planned behavior,^[63] relationship enhancement education and counseling (REEC),^[51] sexual enhancement program,^[54] counseling with emotional regulation,^[53] sports exercises,^[64,65] Kegel exercise,^[55] concurrent training, simultaneous endurance, and resistance training.^[66] Different aspects of sexual function,

such as sexual schema, sexual satisfaction, frequency of sexual intercourse, desire, arousal, vaginal lubrication, marital satisfaction, dyspareunia, sexual beliefs, sexual awareness, and attitude, were examined. The minimum duration of the intervention during the training sessions was a few hours and the maximum was 12 weeks.

Discussion

We systematically reviewed previous studies on sexual health promotion interventions in Iranian

Table 3: Studies that included psychological/educational interventions promoting sexual health in postmenopausal Iranian women

Author/year	Type of Study	Number of samples	Age group	Psychological/educational interventions			Results of the intervention	Assessment of risk of bias Jadad score
				Type of intervention	Duration of intervention	Tools of a sexual function measurement		
Parvin Abedi 2017 et al. ^[47] Andimeshk	Randomized clinical trial	60 postmenopausal women	45-60	Individual education program Group education program	4 weeks	Larson sexual satisfaction questionnaire	The mean score of sexual satisfaction in women receiving group education was higher than individual education ($P<0.05$). The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3
Mandana Mir Mohammad Aliei 2016 et al. ^[48] Tehran	Randomized clinical trial	100 postmenopausal women with sexual dysfunction	47-55	Sex education program	4 weeks	FSFI	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	5
Narges Alavipour 2020 et al. ^[49] Hamedan	Randomized controlled trial	90 postmenopausal women with sexual dysfunction	40-65	Four group education sessions of 45-60 min	1 month	FSFI	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3
Zahra Vakili 2019 et al. ^[50] Isfahan	randomized controlled trial	108 postmenopausal women with sexual dysfunction	Age <65 years	Group education peer education control group	2 weeks	FSFI	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3
Zeinab Javadivala 2019 et al. ^[51] Tabriz	Randomized controlled trial	Thirty-two married couples (64 individuals)	40-60	Relationship enhancement education and counseling (REEC)	4 weeks	FSFI, Brief Male Sexual Function Inventory (BMSFI) Sexual Behaviors Assessment Questionnaire (SBAQ), PAIR (Personal Assessment of Intimacy in relationships)	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3
Ehtram Naeji 2019 et al. ^[52] Mahmudabad	Randomized controlled trial	52 postmenopausal women with sexual dysfunction	44-55	A midwife-based counseling education program control group: routine care	1 Month	FSFI	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	5
Nahid Ansari 2020 et al. ^[53] Khomeyn	Randomized controlled trial	40 menopausal women with a low score on the sexual satisfaction questionnaire	Mean age, 54 years in the control group and 57 years in the intervention group	Intervention group: emotional regulation counseling, control group: routine care	8 weeks	Larson sexual satisfaction questionnaire Bar-On's emotional quotient questionnaire	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3
S. Nazarpour 2016 et al. ^[54] Chalus and Nowshahr	Randomized controlled trial	104 postmenopausal women	40-60	Intervention: sexual enhancement program Controls: general educational material	Two hours of training sessions in groups of 10 to 15 people	FSFI	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3
Atefeh Khosravi 2022 et al. ^[55] Dezful	Randomized controlled trial	150 postmenopausal women	Without age limit	Kegel exercise Lubricant gel control	12 weeks	FSFI	The results showed that the mean score of sexual function improved after the intervention in all dimensions except orgasm ($P<0.001$). The total mean of sexual function and standard deviation after the intervention in the intervention group was significantly higher than the control group ($P<0.001$). The average total score of sexual function and its areas in the peer education group and group education was significantly higher than the control group after the intervention ($P<0.001$). After the intervention, there were statistically significant improvements in women's sexual function- as well as in arousal, erection, male ejaculation, and satisfaction ($P<0.05$).	3

postmenopausal women. The results obtained based on the tools used led to the classification of the results into two main groups of pharmaceutical and non-pharmacological interventions. Pharmaceutical (chemical) interventions in postmenopausal women in Iran have been less than pharmaceutical (herbal) and psychological interventions. Most studies were related to herbal interventions.

Regarding the use of hormones, to reduce the symptoms of vulvovaginal atrophy (VVA), initial treatments such as non-hormonal vaginal lubricants, moisturizers, and regular sexual activity were suggested. For women who did not improve with lubricants and moisturizers, estrogen therapy was recommended as a standard of care.^[19] With estrogen use, women reported less burning, pain, vaginal dryness, or burning during intercourse, which often resulted in increased libido and arousal.^[5] In Iran, four studies investigated the effect of estrogen on sexual function, quality of life of postmenopausal women, and sexual quality, with positive results.^[18,19,56,57]

Regarding the effect of vitamin D, there is evidence that hormones such as vitamin D and sex hormones modulate the functional relationship between bone and muscle tissues.^[67] Recent research has also shown that vitamin D3 may help prevent vaginal atrophy and help relieve vaginal discomfort after menopause.^[68] A study (2018) showed that oral vitamin D supplements in combination with isoflavones, calcium, and inulin significantly improve the sexual performance of postmenopausal women.^[69] In Iran, a study protocol for a randomized controlled trial has been published to investigate the effect of vaginal vitamin D suppositories on the sexual performance of postmenopausal women. In the discussion section of the study, it is stated that vaginal vitamin D suppositories improve sexual function in postmenopausal women with long-term effects and minimal side effects, suppositories are a safe alternative and complementary choice to reduce sexual dysfunction in this group.^[68]

Melatonin is effective in significantly improving various aspects of sexual function in postmenopausal women. In Iran, only one study investigated the effect of melatonin. More research is still needed to determine the exact mechanisms by which melatonin improves sexual performance in postmenopausal women.^[20] Melatonin probably improves sexual performance in mammals by lowering the arousal threshold through modulation of the sensitivity of central 5-hydroxytryptamine receptors.^[70] Also, in 2008, the results of a study aimed at investigating the effect of melatonin on the sexual behavior of male rats with diabetes showed that melatonin prevented sexual impotence in these animals by modifying the function of the central serotonergic system.^[71]

In recent years, the role of oxytocin in reducing or treating vaginal atrophy has been the focus of researchers. For example, in a study on postmenopausal women, Al-Saqi *et al.*^[72] found that treatment of vaginal atrophy using oxytocin vaginal gel could significantly improve vaginal atrophy, decrease vaginal pH, and increase surface cells. In the study conducted in Iran by Abedi *et al.*^[21] in 2020, oxytocin gel also affected the areas of sexual performance.

A variety of treatment strategies are available for FSD.^[73] Various herbs are available for Iranian postmenopausal women with sexual dysfunction. However, a few studies have been conducted on each plant; thus, more studies are recommended. Phytoestrogens have various effects on sexual function. Published reports of a review study and meta-analysis on the effect of phytoestrogens on the sexual performance of postmenopausal women showed that maritime pine bark, *Trigonella foenum-graecum* L., and *Foeniculum vulgare* can be considered agents to overcome sexual disorders, whereas soy, red clover, genistein, and flaxseed did not have a promising effect on these conditions.^[74] In Khayatan *et al.*'s^[27] study in 2018, red clover vaginal cream was effective on the sexual performance of postmenopausal women.

Almost most herbal interventions have improved the sexual performance of postmenopausal women. Regarding effectiveness, a study by Ghaffari *et al.* was conducted in 2020 to investigate the effect of fennel seed powder on estradiol levels, menopausal symptoms, and libido in postmenopausal women. Treatment with fennel seeds did not significantly increase the sexual desire of the participants ($P > 0.05$),^[39] whereas other fennel interventions were effective.^[33,34,58]

Ginseng is one of the most famous and best-selling medicinal plants in the world. Ginseng has been used both as medicine and as a health food by healthy and sick people around the world, especially in Asian countries.^[44] A study by Oh *et al.* in 2010 aimed at the "Effect of Korean red ginseng on sexual arousal in postmenopausal women." Ginseng extract significantly improved FSFI scores in the sexual arousal domain ($P = 0.006$).^[75] Also, two other interventions were implemented on women's sexual performance, which were on pre-menopausal age groups. These studies reported improvement in sexual performance, without being statistically significant compared to the placebo group.^[76]

The presence of antioxidant compounds, such as quercetin, saponin, vitamin E, and manganese, which play an important role in reducing oxidative stress (which causes reproductive disorders), has been proven in date pollen. Also, the presence of sexual stimulation hormones in date pollen has been proven.^[77]

In a study examining the effect of date pollen extract on the serum concentration of estrogen, progesterone, and gonadotropin in adult female rats, the results showed that date pollen extract significantly increased the concentration of estrogen and progesterone.^[78] In Iran, a study was conducted to investigate the effect of date pollen capsules on the dimensions of sexual performance of postmenopausal women. The findings of the study showed that the consumption of date pollen can improve desire, sexual arousal, and orgasm in menopausal women.^[28,29] A 2022 study on postmenopausal women found that a daily intake of 300 mg of date pollen extract did not significantly improve sexual performance in postmenopausal women.^[30]

Alcea plant is not only phytoestrogens; however, it seems to reduce the pain during intercourse and vaginal dryness with the mechanism of softening and moisturizing the vaginal mucosa, and then increasing desire, orgasm, and satisfaction. Also, according to Iranian medical texts, Alcea, having a mild and moist temperament, causes healing and hydration to dry mucus, which confirms the above-mentioned favorable effects.^[35] Concerning the clinical trial aimed at investigating the effect of combined herbal capsules on improving sexual performance, all interventions were effective except for one case.^[40]

Because psychological factors are important in the development and especially the maintenance of sexual disorders, psychological interventions are promising treatments for sexual dysfunction. Compared to pharmacological treatment options, psychological interventions have two main advantages. That is, they do not have negative physical effects and their goal is to restore sexual function and increase sexual satisfaction.^[79] Sex education provides an opportunity to learn about sexual issues. According to the World Health Organization, sex education programs are considered a need that can prevent sexual disorders, and create safe sexual behavior and mental health.^[80] In the semi-experimental study of Shams *et al.*,^[81] cognitive-behavioral training on married women aged 20 to 40 years has been associated with an increase in sexual awareness, attitude, and self-confidence ($P = 0.001$), which is similar to the results of other interventions conducted in this field in postmenopausal women is consistent.

Given that, the WHO (2019) indicated that there is an urgent need for more research on the real needs of women and communities and the identification of self-care interventions for sexual and reproductive health. Unfortunately, a non-pharmacological study has not been conducted to investigate self-care in improving the sexual performance of postmenopausal women.

Based on the WHO, conducting research in this field is recommended.

One of the study strengths is that both English and Persian language studies were included in this review, which limited the potential for publication bias. Including only the studies conducted in the field of sexual health of Iranian postmenopausal women can be one of the limitations of the study. The researchers of the study intended to help postmenopausal women to improve their sexual health by reviewing the interventions performed in Iran (pharmaceutical and non-pharmacological treatments available) and classifying the effective interventions.

Conclusion

This systematic review showed that most studies about sexual health intervention in postmenopausal women in Iran focused on pharmaceutical (herbal) interventions. Among the herbal interventions, most interventions were performed on Ginkgo biloba, fennel, and palm pollen. About pharmaceutical (chemical) interventions, limited studies were conducted and among them, vaginal estrogen has been the most used. Individual and group education has been the most used method in non-pharmacological interventions. All studies were of high quality. Considering the effectiveness of non-pharmacological interventions or herbal medicines on the sexual performance of postmenopausal women, these methods can be used as the first step to treat postmenopausal women or patients who are prohibited from using hormone therapy. Considering the importance of self-care in sexual matters and the lack of these interventions in postmenopausal women, the study of this issue is required.

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Conflicts of interest

There are no conflicts of interest.

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