

Effect of counseling and educational interventions on sexual functioning of women with natural menopause: A systematic review and meta-analysis

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ABSTRACT

Background: Sexual dysfunction of postmenopausal women is an important health issue and calls for an effective treatment option. One of the most effective treatments is implementation of educational and counseling programs. The aim of this study is "to perform a meta-analysis examining the efficacy of counseling and educational interventions on sexual functioning of postmenopausal women". **Methods:** Google Scholar, PubMed, Scopus, ProQuest, Springer, Cochrane Library, SID, Science direct, Ovid and Web of Science databases were searched from March to June 2017 to retrieve articles published between 2003 and 2017. Clinical trials that examined counseling and education interventions among women with natural menopause and assessed their sexual function as primary or secondary outcomes were included. Point and pooled estimates of outcomes were estimated within a 95% confidence interval. **Results:** Of 1858 potentially relevant studies identified, twelve studies were meta-analyzed. The studies were different both in terms of intervention and outcome assessment tools, the subgroup analysis was performed. Based on the type of intervention, total mean difference between groups was estimated as of -0.66 (-1.05 , -0.27), and -0.11 (-0.28 , 0.06), in before and after comparison in the intervention group, -0.09 (-0.53 , 0.35), in post-comparisons between the intervention and control groups for counseling intervention. As well as, -1.05 (-1.51 , -0.59) in before and after comparison in the intervention group and -1.30 (-1.87 , -0.74) in post-comparisons between the intervention and control groups was estimated with 95% confidence intervals for educational intervention. **Conclusions:** Our meta-analysis shows that counseling was ineffective and education was effective in improving sexual functioning in menopause women.

Keywords: Postmenopausal, natural menopause, educational, counseling, intervention, sexual function.

Introduction

Menopause is defined as the permanent termination of menstruation for more than 12 months. It is a natural biological

event that occurs without any pathological reasons. Physical and psychological changes ^[1, 2] forms a complicated stage in women's life, which is significantly important from reproductive health aspect ^[3]. In 2030, the population of menopausal women will reach one billion two hundred thousand, with an annual increase of 47 million new cases a year ^[4]. This period is associated with physical, emotional, social and interpersonal problems, low self-esteem and self-image ^[5, 6]. Also, health-related and sexual functioning issues should be addressed during menopause ^[7, 8].

Sexual function as a set of psychosocial responses ^[9] is influenced by a complex interactions of biological, psychological, social and environmental factors ^[10, 11]. Sexual

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dysfunction is divided to sexual response disorders, genital-pelvic pain/penetration disorders and substance-drug-related dysfunction. The emergence of symptoms requires at least 6 months [12]. Different studies have reported that the prevalence of sexual dysfunction is 68-86.5% among menopausal women. The difference may be due to different methods adopted in different studies [13]. Various factors such as physical [14, 15], psycho-emotional [16] social, and interpersonal relationships influence the development of sexual dysfunction during menopause [9, 17]. Sexual dysfunction can cause sexual dissatisfaction [18]. Satisfaction with sexual relationships is one of the important factors related to marital life satisfaction [19, 20]. Health and sexual function and satisfaction have significant effects on the social-psychological well-being and physical health. Therefore, the quality of life of couples peri- and post-menopause is reduced [21]. In 2010, the World Health Organization (WHO) has also referred to the neglect of sexual health after reproductive ages [22]. Therefore, sexual dysfunction at these ages is an important health issue and needs appropriate treatment.

Menopause is considered a physiological event that does not require medication and hormone therapy [23]. Medical treatments are individual-based and may lead to anxiety [24]. As a result, non-pharmacological treatments are recommended as the first level of care [25]. For manipulating the mind, body, and communication issues, education and counseling are the initial steps of treatment [26]. Psychological and counseling interventions can be promising and proactive interventions for the treatment of sexual dysfunction. They have two main advantages over pharmacological treatment options. They have no negative physical consequences and can restore sexual function and sexual satisfaction [27].

Given the potential benefits of educational and counseling interventions, their effectiveness in providing patients with sufficient support needs further studies. Available studies have been inconclusive and their effectiveness has not been described [28, 29]. No review has been published to assess the effectiveness of such interventions on the sexual functioning of women with menopause. Therefore, it is necessary to examine evidence-based data to determine which type of intervention can be more effective in improving the sexual functioning of menopausal women. The finding of this study can also provide guidelines for further research in this aspect. The aim of this study was to investigate the effect of educational and counseling interventions on the sexual functioning of menopausal women using a systematic review and meta-analysis.

Methods

Search strategy

Initially the research question was identified and the PICO was designed to identify participants, interventions, comparison groups, outcomes, and types of studies. Two researchers independently conducted the electronic search in the databases. The Medical subject heading (MeSH) was used to find related

keywords such as 'menopause, postmenopausal, natural menopause, education, counseling, psychological, intervention, enhancement programs and sexual function. Relevant articles published between 2003 and 2017 were searched in the databases such as Google Scholar, PubMed [Medline], ProQuest, Springer, Cochrane Library, Scopus, SID, Science direct, Ovid and Web of Science. The search process was started from March 2017 and continued to the end of June. As a manual search, the list of references of review and clinical trial articles were searched to retrieve relevant articles. The articles were reviewed and the most relevant ones were selected based on inclusion criteria. In case of disagreements, a third researcher proceeded to reach conclusions.

Inclusion Criteria

Only published clinical trials that examined counseling and educational programs on women with natural menopause and assessed their sexual function as primary or secondary outcomes were entered into the study. The articles could be in Persian or in English.

Exclusion Criteria

Studies conducted only on women of reproductive ages, studies which used merely pharmacological interventions, hormone therapies or traditional herbal medicine, studies the full texts of which were not available to the researchers and studies which were not clinical trials were excluded from the study.

Types of participants

Women with natural menopause.

Types of interventions

There are two types of interventions for enhancing the sexual function in menopausal women with a natural cause as educational and counseling interventions. The distinction between these two types of intervention has been based on the title, structure and content of the intervention sessions and method.

The comparison group

A group of women with natural menopause who did not receive intervention.

Types of measured outcome

The desired outcome in this study was sexual function among natural menopausal women. Only clinical trials that showed this result in their primary or secondary outcome were included in this review study. Mean and standard deviation of the score of sexual function in the intervention and control groups, before and after the intervention were measurement criteria.

Types of study design

Only clinical trials studies, before - after designs with or without control group included in this review.

Types of tools used for evaluating sexual function in the studies

Various tools were used to assess sexual functioning in various studies as follow:

FSFI: It was a 19 item questionnaire that assessed six domains of sexual functioning (desire, arousal, lubrication, orgasm,

satisfaction, and pain). This tool measured sexual functioning over the past month. A score less than 26.5 indicated sexual dysfunction^[30].

McCoy Female Sexuality Questionnaire: This questionnaire measured sexual functioning over a recent month and included two sections and 19 questions. Five domains of sexual function (desire, satisfaction, lubrication, orgasms and spouse problems) were assessed using this tool. The score ranged from zero to one hundred. A higher score indicated better sexual functioning^[31].

Menopause Specific Quality of Life Questionnaire (MENQOL): This questionnaire contained 29 Likert type items about the symptoms and complications of menopause in four domains: vasomotor (3 items), psychosocial (7 items), physical (16 items) and sexual (3 items). For each item, score of 1 was for minimum intensity and score of 6 was for maximum intensity. A higher score indicated a worse quality of life and symptoms of menopause^[32].

Greene Climacteric Scale

This scale measured menopause symptoms i.e., psychological, physical, vasomotor, and sexual symptoms (1 item). It included 21 items on a four point Likert scale. The score for each item ranged from 0 to 3. Zero was the absence of the symptom, 1 was low, 2 was moderate and 3 was the existence of severe symptoms. A lower score indicated improved sexual functioning and lower sexual complications^[33].

Quality assessment of the studies

Two researchers evaluated the quality of studies based on the Jadad score^[34-36]. This checklist contained three general (direct) items, which assessed random assignment, blindness, and drop-out rate and eight indirect statements. Most articles used these three items. In this study, all articles were examined using both direct and indirect items, but for assessing the final quality and in announcing the score, as with most studies, three direct items were taken into account. Scoring of the three direct terms was on a three-point scale including zero, one and two, and of the eight indirect items were on a two-point scale of zero and one. Finally, the score for the items was calculated, and scores of three or more, from the direct statements indicated a good quality of study. In this systematic review, only five study received scores of three or more (Table II).

Data extraction

Information needed for each study, such as the name of the author, the date and place of the study, the sample size, the age of the participants, the design of the study, the instrument, the type of intervention, and the impact of the intervention (mean and standard deviation) were extracted. All the extracted data were entered into Microsoft Excel (Table I).

Statistical analysis

The Stata software ver. 11 was used to analyze data. The heterogeneity index between the studies was determined using the Cochrane (Q) and I^2 tests. The Random Effect Model was used to estimate the standardized difference of sexual functioning's mean score. It should be noted that the estimating

method was inverse variance and Cohen statistics. Standardized difference spot of the mean sexual functioning score was estimated with a 95% confidence interval in the forest plots, in which the square plot represented the weight of each study and the lines on both sides indicated a 95% confidence interval. Moreover, the Egger's test was conducted to verify the publication bias, and the significance level of less than 0.01 was used as the judgment criterion.

Results

Study selection and descriptions

In the initial search for articles, screening of titles was performed and 1845 studies were searched based on the study questions. After removing duplicates, 1625 articles remained. In the second stage, consideration of inclusion criteria, no access to the full text of the articles and publication in other languages led to the removal of 1557 articles. During manual search, thirteen articles were included into the search process. Next, the full texts of all 68 remaining articles were examined and 55 studies were excluded from the study, because they did not fulfill the inclusion criteria. Lastly, 13 articles entered this systematic review and were qualitatively assessed (**Figure 1**). Of them, four studies had before and after designs and had no control groups and nine studies had RCT designs. Except three studies, subjects were randomly assigned to groups. All thirteen studies assessed sexual function. Five studies directly evaluated sexual function as a primary outcome, and eight ones indirectly evaluated it as a secondary outcome. Four intervention studies used counseling and nine used educational methods. One study used the McCoy Female Sexual Questionnaire, six studies used the MENQOL, four studies used the FSFI and two studies used the Greene Climacteric Scale. The total sample size of the studies was 714 in the intervention group and 401 in the control group. Some studies were quasi-experimental and had no control groups. The age range of the participants in the studies was 40-65 years, except for one study that had the age range of 28-70 years. Also, 72.7% of the subjects were in the post-menopausal period^[37]. Of these 13 studies, 12 studies were included to meta-analysis and one study was excluded, because the results were not clear^[38]. The Anderson's study (2015) was evaluated as three separate studies in meta-analysis as three different methods of counseling were used (Table I).

Evaluation of publication bias and heterogeneity

In the meta-analysis, the results of heterogeneity tests showed that there was heterogeneity between the results of initial studies. The random effects model was used to estimate the mean standardized difference in the sexual function score. Since the studies were different both in terms of intervention and outcome assessment tools, the subgroup analysis was performed and the studies were subdivided based on the probable factors, which led to the heterogeneity and in each group statistical analysis was conducted independently. The summary and classification of the submitted studies in terms of the type of

intervention led to the creation of two categories and each category was made up of a number of sub-categories as described below:

Category 1: Counseling interventions affecting sexual function

Four studies used counseling techniques as an intervention that included: 1. Cognitive-behavioral group interventions [39], 2. Group psycho-educational intervention [37], 3. Web-based multidisciplinary intervention to reduce menopausal and sexual symptoms [28], 4. Group counseling using the GATHER method [40].

Category 2. Educational interventions affecting sexual function with subcategories

Eight studies used education as an intervention which included:

1. Health education including: a) education based on an individual empowerment model [41], b) structured training program in the form of a supportive group [42, 43], c) group health education on women's attitudes and awareness [44, 45], and d) educational program based on life skill training [46]. 2. Sex education and sexual enhancement program that promoted sexual behaviors and functions [29, 47].

Based on the results of the meta-regression, the type of intervention had a significant effect on the heterogeneity in the results of the primary studies ($\beta = 1.8$, $P = 0.025$). In subgroup analysis based on the type of outcome measurement tools, the type of the tool for measuring sexual functioning outcome had a significant effect on the heterogeneity between the results of primary studies ($\beta = -1.6$, $P = 0.05$).

For the pre- and post- comparison in the intervention group, the studies used tools with reverse scoring, based on the type of intervention were divided to two groups of counseling interventions as four studies (Anderson (2015) evaluated three separate studies) [28, 40], and six studies as educational interventions [41-46]. According to the results of meta-analysis and comparison of the mean score in the intervention group, the intervention in five studies was significantly effective. The mean difference of sexual function scores between before and after education within the intervention group was reported as -1.05 , $CI_{95\%} (-1.51, -0.59)$. Education improved sexual function 1.05 times more than counseling. The pooled mean difference was reported as -0.11 , $CI_{95\%} (-0.28, 0.06)$ (Figure 2A).

For the pre- and post- comparisons in the control group, six studies were included. The meta-analysis and comparison of mean score of sexual function in the control group showed that the change in five studies was not significant. The mean difference of sexual function scores between before and after education in the control group was reported as 0.15 , $CI_{95\%} (-0.10, 0.39)$, and for counseling was reported as 0.31 , $CI_{95\%} (-0.13, 0.75)$. Meta-analysis showed no significant differences in the sexual function score within the control group before and after the intervention (education and counseling) (Figure 3A).

For the comparison of the intervention and control groups after the intervention, sub-group analysis of the type of the intervention showed that two types of intervention (counseling and education) had a significant difference [-1.10 , $CI_{95\%} (-1.71$,

$-0.49]$. Education improved sexual function 1.1 times more than counseling (Figure 4A).

The pre and post comparison of the intervention group, subgroup analysis based on the outcome measurement tool, the mean difference was compared in 10 studies. The difference was significant in five studies. The overall results of the intervention in those studies that used the MENQOL was significantly different, and the total mean difference of sexual function scores between the groups was reported as -0.78 $CI_{95\%} (-1.24, -0.32)$. However, in the studies that used the Greene Scale, no significant differences were reported for the intervention, and total mean difference between the groups was reported as -0.50 $CI_{95\%} (-1.20, 0.21)$. (Figure 2B).

For comparing the before and after intervention within the control group, six studies were included. According to meta-analysis and comparison of the mean score of sexual function in the control group, the change in five studies was not significant different. The pooled mean difference of sexual function scores in the studies that used the MENQOL was reported as 0.20 $CI_{95\%} (-0.06, 0.46)$, and for the Greene scale was reported as 0.08 $CI_{95\%} (-0.28, 0.44)$. The meta-analysis showed that there were no significant differences in the sexual function score within the control group before and after the intervention for these tools (Figure 3B).

For comparing the groups (intervention and control) after the intervention, the subgroup analysis of the outcome measurement tool showed that two types of outcome measurement tools had a significant difference [-1.10 , $CI_{95\%} (-1.71, -0.49)$]. In the studies that used the MENQOL, the sexual function score was improved 1.10 times more than those studies that used the Greene scale (Figure 4B).

For comparing the before and after intervention within the intervention group, in the subgroup analysis of outcome measurement tools with a direct scoring (FSFI, McCoy FSQ), four studies [29, 37, 39, 47] were included. One study reported the significant effect of the intervention, but the overall effect of the intervention was reported as insignificant. The total mean difference of sexual function scores between the before and after intervention within the intervention group was reported as 0.29 $CI_{95\%} (-0.10, 0.69)$, (Figure 2C).

For comparing the groups (intervention and control) after the intervention, subgroup analysis based on the type of outcome measurement tools with direct scoring, two studies used the control group [29, 47]. A significant effect of the intervention was reported. The total mean difference between the groups was reported as 3.41 $CI_{95\%} (2.97, 3.85)$. (Figure 3C).

Evaluation of publication bias

The Egger's test showed that the bias in reporting the results was not statistically significant ($\beta = 0.21$, $P = 0.06$)

Discussion

Menopause is the most critical and sensitive stage in women's health [48]. This era is associated with physical, psychological, social and interpersonal problems, each of which affects the

health and sexual function during menopause^[9]. Therefore, interventions in different domains are required to reduce these problems^[9, 49]. Hormone replacement therapy has been suggested as the elective treatment for menopause. Insufficient data on the benefits and disadvantages of such therapies are present; however, it has led to the emergence of other interventional studies^[50]. The lack of knowledge of physiological changes during menopause and sexual disorders, and negative attitudes toward post-menopausal sexual issues require the implementation of educational and counseling programs to raise women's knowledge and improve their attitudes of menopause and to eliminate false beliefs about sexual issues^[29, 42, 47]. The aim of this study was to investigate the effectiveness of structured and evidence-based educational and counseling efforts to find the most effective intervention for improving the sexual function of menopausal women. A few studies with contradictory results have been conducted on the effectiveness of educational and counseling interventions in the sexual functioning of menopausal women.

Health education interventions are alternative strategies for improving health and confrontation with menopausal symptoms^[51]. Forouhari et al. assessed the effect of education and awareness on the quality of life of postmenopausal women^[44]. This meta-analysis indicated that in the subgroup analysis of the type of intervention, before and after the intervention, education was effective in the sexual functioning of menopausal women. However, in the Moridi's study (2006), it was ineffective^[45]. In the Forouhari's study, 71.95% of subjects had elementary school education, the age range of subjects was higher and the severity of sexual symptoms was higher before the intervention. Also, six education sessions each lasting for 60 minutes were held. In the Moridi's study, 47.5% of the subjects had no or elementary school education and intervention included two educational sessions without a control group. The more appropriate effect of the Forouhari's study could be due to such reasons^[44, 45].

The individual empowerment model that improves self-esteem, ability to achieve goal, a sense of control over life, and hope for the future is another education method. In 2013, Zeidi et al. showed that the intervention with a focus on awareness raising and changing attitudes significantly changed quality of life in menopausal women and improved their sexual symptoms^[41]. Health education in the form of a supportive group and the exchange of experiences between individuals promoted critical thinking and verbal skills^[42]. Yazdkhasti et al. showed that this method improved quality of life and reduced sexual symptoms and improved sexual function. The meta-analysis showed that Yazdkhasti's study in the subgroup of the type of intervention and the outcome measurement tool analysis was consistent with the Mirghafourvand's study (2014)^[43]. In the subgroup analysis of the type of outcome measurement tools, the Mirghafourvand's study showed inconsistencies in comparison to the study of Anderson (2015)^[28] that used three different counseling methods. None of the three types of the intervention in the Anderson's study had any effect on the sexual outcome.

One reason for this difference could be the short follow-up of the Mirghafourvand's study.

Life skills are defined as the ability to have positive and adaptable behaviors that prepares individuals to cope effectively with everyday challenges, so that one can cope with the challenges of life. Life skills education can improve quality of life and sexual function^[46]. The result of the current study was in line with that of the Forouhari's study (2010), Yazdkhasti (2012), Mirghafourvand (2014) and Zeidi (2013)^[41-44]. Sex education is essential for improving sexual function of individuals, effective communication between couples, increasing self-confidence and self-esteem, sexual relationships, and informed decision making at individual and interpersonal levels. In the subgroup analysis based on the outcome measurement tools with direct scoring, a comparison between the intervention and control groups showed that the Nazarpour's intervention (2016, 2017) was effective^[29, 47]. However, it was ineffective in the pre- and post- intervention in the intervention group. This was also in line with the Alder's study (2006), which used the C.B.T group methodology. The Nazarpour's study was inconsistent with the Smith's study^[37], as psycho-education influenced sexual function in the intervention group. One of the reasons might be the small sample size of the Smith's study, different types of interventions.

In the subgroup analysis of the type of the intervention and outcome measurement tools, this meta-analysis showed that educational interventions were effective, but counseling interventions were rather ineffective.

The limitation of this study was the heterogeneity of included studies. Also, the sample size in some studies was low, they used different designs, some of which had pre-post control group designs. In some studies, different tools evaluated the sexual functioning index, some of which assessed one part of sexual function and did not include all dimensions. Some studies did not merely focus on sexual function, but rather studied the effect of counseling and education on quality of life and menopausal symptoms. For some studies, symptoms and sexual problems were only a secondary outcome of these studies. A number of studies relatively assessed the effectiveness of counseling programs. Despite these shortcomings, similarities in inclusion criteria and the measured outcome of these studies helped compare the studies and perform analyses.

Conclusion

The findings of this study indicated that counseling interventions were ineffective and the educational intervention was effective in improving sexual functioning among menopause women. However, some limitations of the studies hindered a decisive conclusion on these interventions. Major trials and more appropriate methodologies are required in future studies to determine the effectiveness of such interventions.

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Availability of data and materials

All data generated or analyzed during the study were included in this published article.

Authors' contributions

E. N. was responsible for formulating the research question, collecting the data, screening articles, quality assessment and producing the initial draft of the manuscript. M.M. was responsible for designing the study, collecting the data and statistical analysis. A.F. was responsible for quality assessment. S.B. was the second searcher. The final version was revised by the third author. All authors agreed that the final version of the article to be published.

Conflict of Interests

The authors declare that they have no Conflict of interests.

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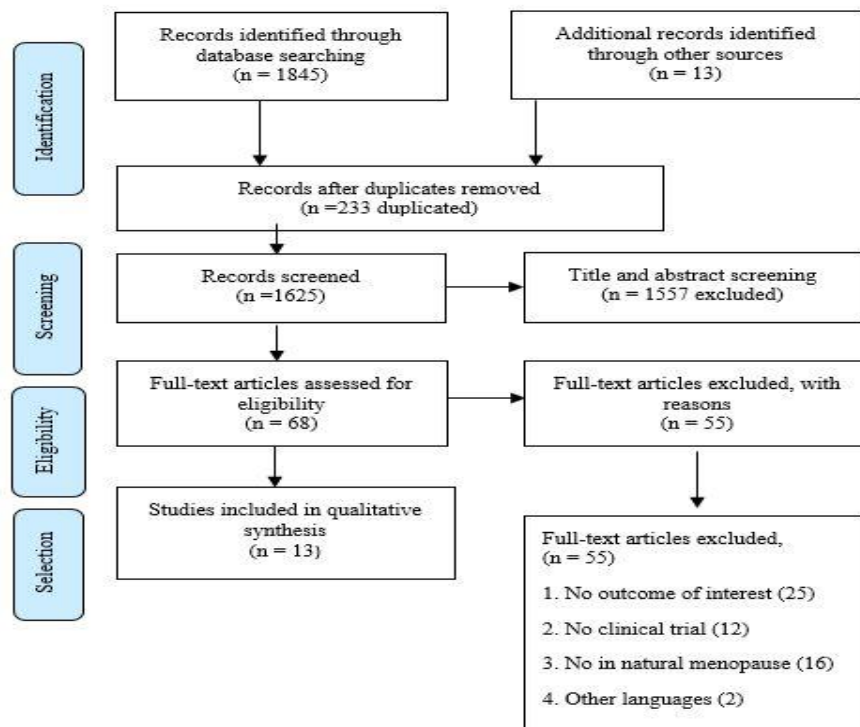


Figure 1: PRISMA Flow Diagram

Table 1: Description of studies entered into the structured Study - Characteristics of studies entered into the regular review and meta-Analysis

Author /year	Age of participant	Study design	Number of participant	Intervention	Duration of intervention	Mean (SD) intervention group before/ after intervention	Mean (SD) control group before / after intervention	Sexual function outcome measures	Number of items/ sex item	Quality grading
Alder J et al. (39)	German postmenopausal women, aged from 42 to 65 years	Before and after	30	Counseling, group meetings	7 weekly lasting 1.5 h	Before= 4.05(1.05) After= 4.4(1)	-	McCoy FSQ	19 / 19	1
Anderson D et al. (28)	Australian women, aged between 40 and 65 years	Before and after	Group A= 138	Counseling, on-line independent	with a 12-week Program	Before= 1.36(1.08) After= 1.22(1.1)	-	Greene Climacteric Scale	21 / 1	1
Anderson D et al.(28)	Australian women, aged between 40 and 65 years	Before and after	Group B= 41	Counseling, face-to-face with nurse consultations,	with a 12-week Program	Before= 1.07(0.93) After= 0.81(0.86)	-	Greene Climacteric Scale	21 / 1	1
Anderson D et al. (28)	Australian women, aged between 40 and 65 years	Before and after	Group C= 46	Counseling, on-line with virtual nurse consultations	with a 12-week Program	Before= 1.22 (1.13) After= 1.29 (1.04)	-	Greene Climacteric Scale	21 / 1	1
Mirghafour vand M et al. (43)	Iranian postmenopausal women, aged from 45 to 59 years	RCT	120(case= 60 control=60)	Educational / group	Three weekly 60-minutes educational sessions into 6 group	Before= 1.3(1.1) After= 0.01(0.09)	Before= 1.7(1.3) After= 1.8(1.2)	Greene Climacteric Scale	21 / 1	3
Parsa P et al. (40)	Iranian postmenopausal women, aged from 45 to 60 years	RCT	80(case= 40control= 40)	Counseling / GROUP	four sessions in weekly for 45 to 60 minutes	Before= 12.7 (7.2) After= 12.1(6.5)	Before= 10.4(7.6) After= 12.7(7.2)	MENQOL	29 / 3	1
Farokhi F et al. (46) (Persian)	Iranian postmenopausal women, aged from 48 to 60 years	RCT	40(case=20 control=20)	Educational / Group discussion	8 training sessions, twice a week for 45-60 minutes	Before= 5.35(2.87) After=3.5(1.93)	Before= 6.3(4.16) After=6.3(3.89)	MENQOL	29 / 3	2
Zeidi E et al. (41) (Persian)	Iranian postmenopausal women, with mean aged 51/33 ± 4/43	RCT	100(case=50 control=50)	Educational / Group discussions	five sessions in five group discussions for 60-45 minutes	Before=7.2(2.4) After=4.8(1.2)	Before=6.9(3.1) After=7.1(2.4)	MENQOL	26/3	1

Yazdkhasti M et al. (42)	Iranian postmenopausal women with mean aged 53 years	RCT	105(case=52 control=53)	Educational / Group	10 consecutive sessions, 120 minutes, for six group	Before=16.44(5.07) After=12.54(5.45)	Before=16.19(5.14) After=16.03(5.74)	MENQOL	26/3	3
Forouhari S et al. (44)	Iranian postmenopausal women, aged 44–55	RCT	62(case=31 control=31)	Educational / Group	weekly, for six weeks, each session 45-60 min	Before=7.5(1.7) After=4.7(1.7)	Before=6.3(1.1) After=7.1(1.1)	MENQOL	26/2	2
Moridi G et al. (45) Persian)	Iranian postmenopausal women with mean aged 45.5 ± 2.15	experimental study	40	Educational / Group	Two lecture sessions for 30 to 45 minutes	Before=1.8(.64) After=1.58(1.04)	-	MENQOL	29/3	0
Nazarpour S et al. (29)	Iranian postmenopausal women, aged 40–60 years	RCT	98(case=48 control=50)	Educational	Two hours of training sessions	Before=24.41(3.39) After=24.41(.52)	Before=22.88(6.65) After=22.7(.51)	FSFI	19/19	3
Author /year	Age of participant	Study design	Number of participant	Intervention	Duration of intervention and follow up	Mean and SD intervention group before/ after intervention	Mean and SD control group before / after intervention	Sexual function outcome measures	Number of items/ sex item	Quality grading
Smith WJ et al. (37)	women with an age range from 28-70 years, %72.7 was postmenopausal	Before and after	25	Counseling / group	monthly held 2-hour evening session, 60-minute open format lecture	Before=12.1(5.13) After=17.1(5.13)	-	FSFI	19/19	0
Aliei M et al. (38) (Persian)	Iranian postmenopausal women, aged 47–55 years	RCT	92((case=45 control=47)	Educational / group	a training program in 4 sequential weekly sessions, lasting 2 h	Before=Unreported After=2.471(4.505) Increase score	Before=Unreported After=.59(4.028) Decrease score	FSFI	19/19	3
Nazarpour S et al. (47)	Iranian postmenopausal women, aged 40–60 years	RCT	98(case=48 control=50)	Educational / group	with 10- to 15-member groups for 2 hours	Before=24.4(3.4) After=24.5(.5)	Before=22.9(6.6) After=22.75(.5)	FSFI	19/19	3

Table 2: Quality assessment of studies

Row	Items of Jaded Scale	Farokh i F. 2016	Nazarpour S. 2017	Mirghafour vand M. 2014	Aliei M. 2016	Nazarpour S. 2016	G. Moridi 2006	Forouhari S. 2010	Yazdkhasti M. 2012	Zeidi E. 2013	Parsa P. 2017	Anders on D. 2015	Smith W. 2088	Alder J. 2006
1	1. Was the study described as randomized?	2	2	2	2	2	0	2	1	1	1	1	0	0
2	2. Was the study described as double-blind?	0	0	0	1	0	0	0	1	0	0	0	0	0
3	3. Was a description of withdrawals and drop outs?	0	1	1	0	1	0	0	1	0	0	0	0	1
Other Markers Not Related Directly														
4	4. Were the objectives of the study defined?	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5. Were the outcome measures defined clearly?	1	1	1	0	1	0	0	1	1	1	1	1	1
6	6. Was there a clear description of the inclusion and exclusion criteria?	1	1	1	1	1	0	1	1	1	1	1	0	1
7	7. Was the sample size justified?	1	1	1	1	1	0	1	1	1	1	1	1	1
8	8. Was there a clear description of the interventions?	1	0	1	1	0	0	1	1	1	1	1	1	1
9	9. Was there at least one control (comparison) group?	1	1	1	1	1	0	1	1	1	1	0	0	0
10	10. Was the method used to assess adverse effects described?	0	0	0	0	0	0	0	0	0	0	0	0	0
11	11. Were the methods of statistical analysis described?	1	1	1	1	1	1	1	1	1	1	1	1	1
Total score		9	9	10	9	9	2	8	11	8	8	7	5	7

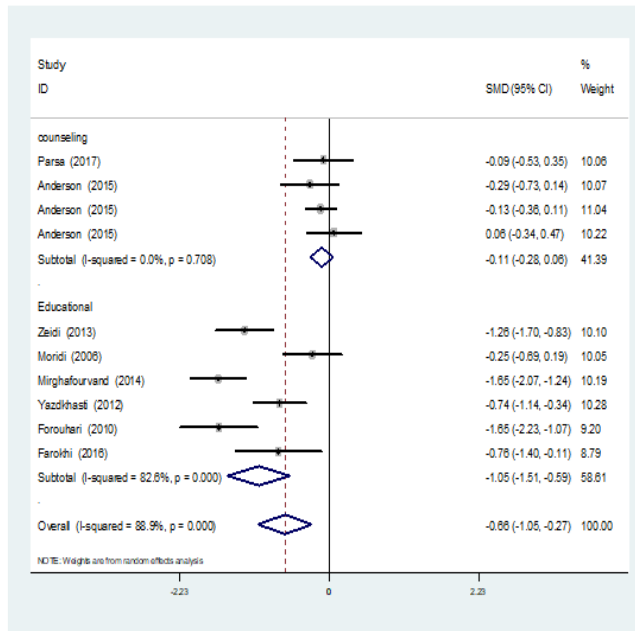


Figure 2A. Pre and post comparisons in the intervention group, subgroup analysis based on the type of intervention is displayed in Figure 2A, (Ten studies included). The random-effects approach was used due to significant heterogeneity (Overall, $I^2 = 88.9\%$, $p = 0.000$).

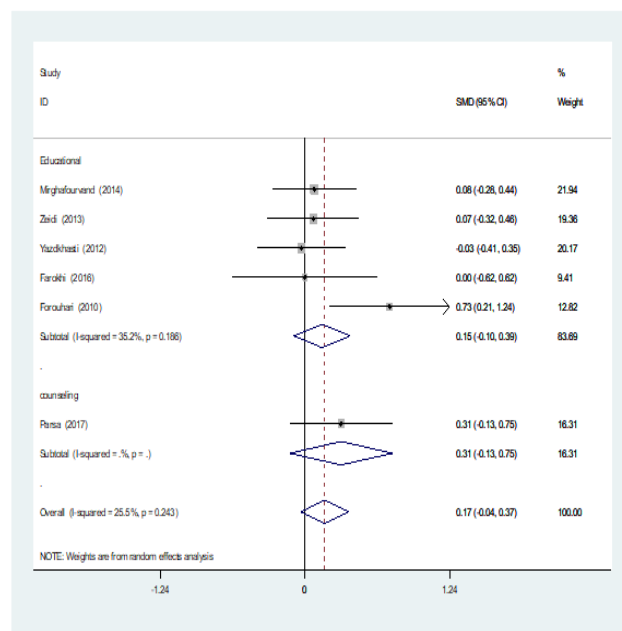


Figure 3A. Pre and post comparisons in the control group, subgroup analysis based on the type of intervention is displayed in Figure 3A, (Six studies included). The fixed effect model was used due to no significant heterogeneity between the results ($I^2 = 25.5\%$, $p = 0.2$).

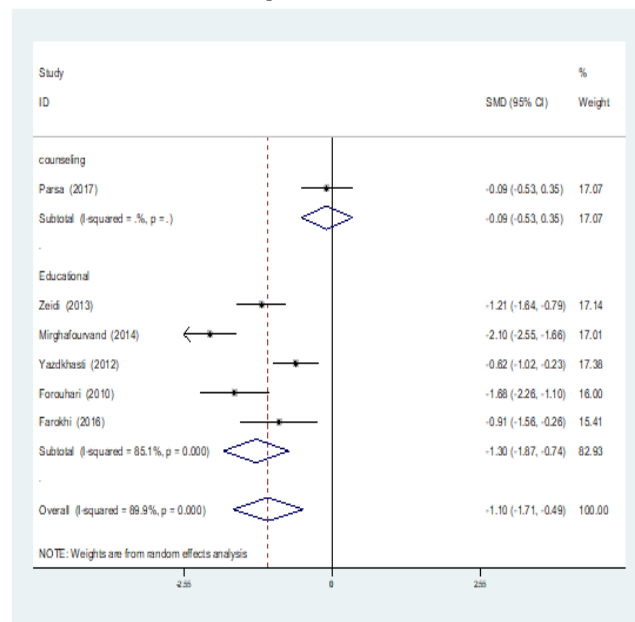


Figure 4A. Post comparisons between intervention and control groups, subgroup analysis of type of intervention is displayed in figure 4A (Six studies included). The random-effects approach was used due to significant heterogeneity (Overall, $I^2 = 89.9\%$, $p = 0.000$).

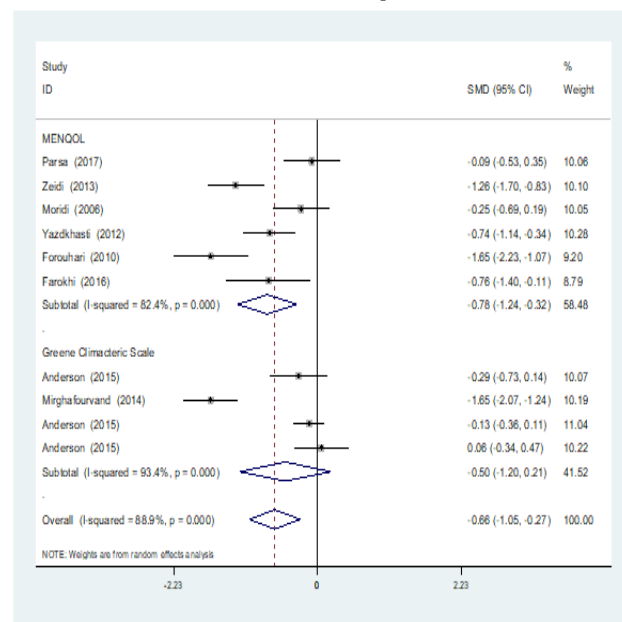


Figure 2B. Pre and post comparisons in the intervention group, subgroup analysis based on the type of outcome measurement tools is displayed in figure 2B. (Ten studies included). The random-effects approach was used due to significant heterogeneity (Overall, $I^2 = 88.9\%$, $p = 0.000$).

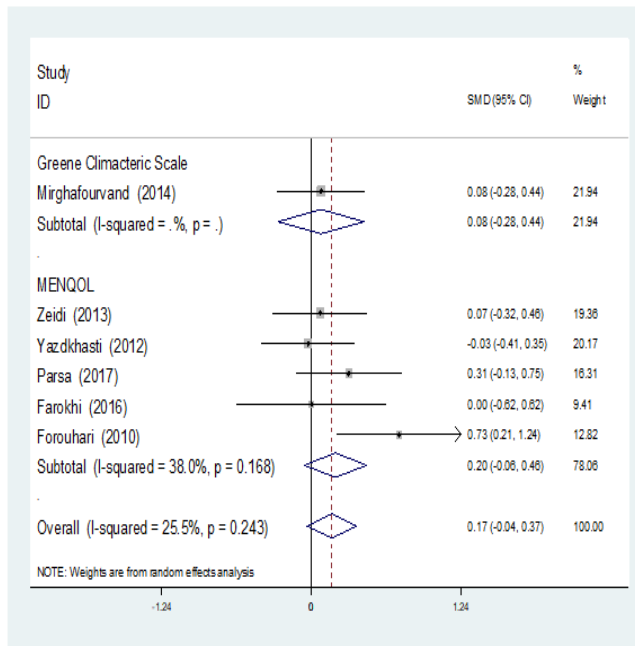


Figure 3B. Pre and post comparisons in the control group, subgroup analysis based on the type of outcome measures tool is displayed in Figure 3B, (Six studies included). The fixed effect model was used due to no significant heterogeneity between the results (I^2 : 25.5%, $p = 0.2$),

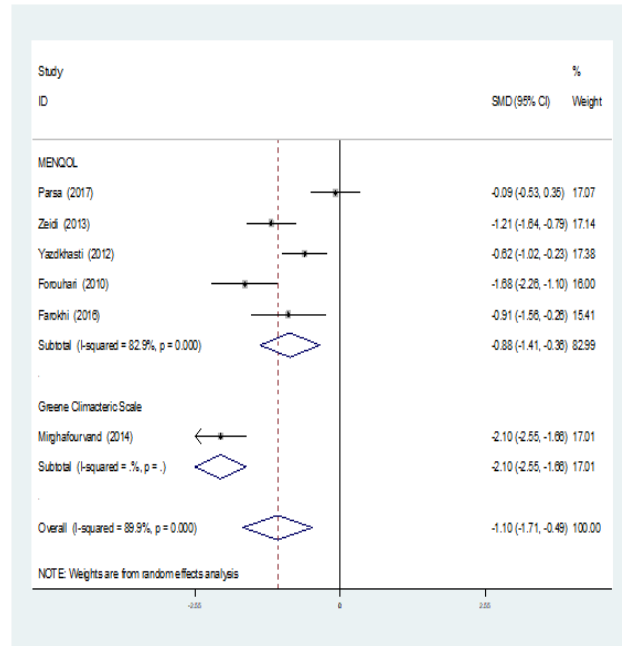


Figure 4B. Post comparisons between intervention and control groups, subgroup analysis based on the type of outcome measurement tools six studies included. The random-effects approach was used due to significant heterogeneity (Overall, $I^2 = 89.9\%$, $p = 0.000$).

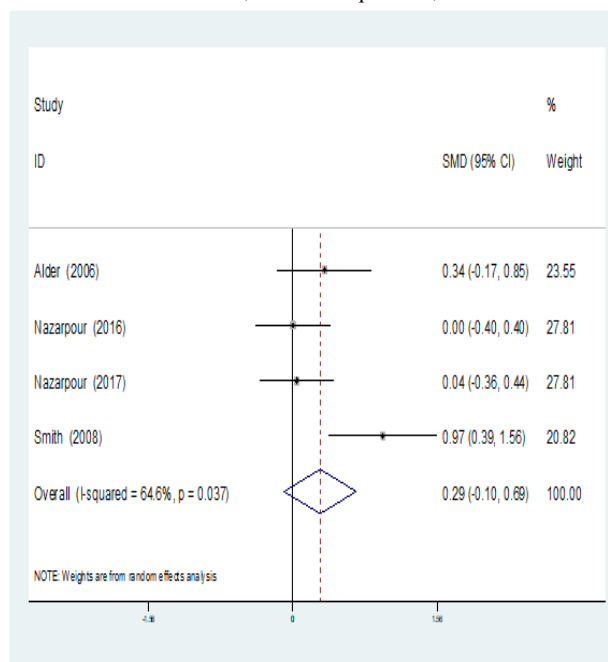


Figure 2C. Pre and post comparisons in the intervention group, subgroup analysis based on the type of outcome measurement tools with direct scoring is shown in figure 2C. (Four studies included). The random-effects approach was used due to significant heterogeneity (Overall, $I^2 = 64.6\%$, $p = 0.037$).

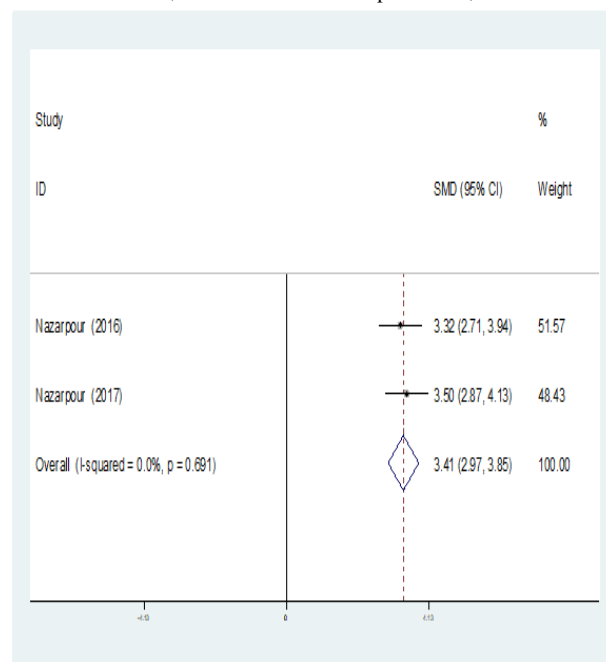


Figure 3C. Post comparisons between intervention and control groups, subgroup analysis based on the type of outcome measurement tools with direct scoring is shown in figure 3C (Two studies included). The random-effects approach was used due to significant heterogeneity (Overall, $I^2 = 0.0\%$, $p = 0.691$).