Evaluation and comparison of the effects of various cognitive-behavioral therapy methods on climacteric symptoms: A systematic review study

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Abstract

Objective: Climacteric syndrome, which is related to many symptoms, often causes discomfort in women. Non-pharmacologic treatment is one of the treatment options for affected individuals, and this syndrome can be cured with psychological treatments such as cognitive behavioral therapy (CBT). The present study aimed to compare the efficacy of various CBT methods on the improvement of climacteric symptoms.

Material and Methods: PubMed, Scopus, Cochrane, Medline, PsycINFO, and Google Scholar were searched for relevant articles published between January 1990 and August 2018. Data extraction and quality assessment were conducted by two authors.

Results: A total of 15 articles including 910 women were entered. We divided the CBT methods into two categories, face-to-face (individual and group CBT) and indirect (self-help CBT) methods. Among the three CBT approaches, three articles covered individual CBT, nine articles carried out group CBT, and in five articles, the self-help approach was used. The climacteric symptoms that improved with CBT were categorized into three groups as vasomotor symptoms, psychological symptoms, and organic disorders. Generally, the face-to-face method played a key positive effect on symptom improvement, and the group CBT approach was more effective on psychological symptoms.

Conclusion: Although the indirect method is more cost-effective, it has less impact than the face-to-face method; it is better to use face-to-face approaches to achieve better results, if possible. Further studies are required in this regard, particularly in the individual and self-help CBT approaches, to measure the impact of these approaches on more varied symptoms of menopause. (J Turk Ger Gynecol Assoc 2019; 20: 178-95)

Keywords: Climacteric, cognitive behavioral therapy, menopause, symptoms

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Introduction

Climacteric and menopause are closely related concepts; however, they do not denote to exactly the same thing. Climacteric is the process of aging in women, including three periods. The first stage is peri-menopause, occurring within one and eight years before the beginning of menopause. A series of gradual changes occur during this period. The second period is menopause, which is confirmed by having experienced a year of amenorrhea, and the postmenopausal stage, which is the third phase, begins when menopause is confirmed and lasts until old age (1). From a practical point of view, the term *menopause* globally refers to the aging process of the ovary and includes any period of peri-menopausal and postmenopausal in women (2).

The climacteric period can be associated with symptoms in four different classifications: 1- vasomotor vegetative symptoms (e.g. hot flashes, night sweats, palpitations); 2- psychological symptoms (e.g. anxiety, depression, nervousness, insomnia, decreased libido, memory loss, melancholy, fatigue); 3- organic disorders (e.g. osteoporosis, cutaneous atrophy, urogenital atrophy, arthralgia, myalgia); and 4- metabolic disorders (e.g. obesity, arterial hypertension) (Table 1). The pathogenesis is related to a decline in sex hormone concentration, particularly the decrease in estrogens (3,4). Moreover, some factors such as genetic and lifestyle factors, psychological disposition and personal attitudes as well as educational background (5), have a key impact in experiencing menopause in the climacteric period in women (6). The average age of menopause is 51 years (7), and the age of menopause remains constant in spite of the increased life expectancy in women, Therefore, with an increase in life expectancy, women spend about one-third of their lives after menopause and have problems caused by menopausal symptoms (8). As expressed by women, they consider menopause "the beginning of new phase of life", "dissatisfaction with sexual acts" and "change in physical and mental health" (9). Thus, performing therapeutic interventions is essential to reduce the negative effect of climacteric syndrome on lifestyle.

Hormone replacement therapy (HRT) is the most extensively used treatment for the main symptoms of menopause, causing a 70-90% reduction of the symptoms (10). Although HRT has been the treatment of choice for climacteric syndrome for many years, uncertainty about its benefits and costs has emerged since the publication of the Women's Health Initiative's results (11). Many women prefer non-medical treatments for menopausal symptoms (12) and they are always concerned about the adverse effects and possible long-term health risks of HRT (13). Strong and convincing evidence exists indicating that the long-term risk of using estrogen and progestin to avoid postmenopausal diseases is much greater than its benefits (11). These results have challenged health providers to find alternative treatments for menopausal women (14). The evidence base for non-medical treatments is being increasingly examined with mixed results (4,13-22.) In addition, there has been considerable interest in developing effective nonmedical interventions to help women manage menopausal symptoms (4,17,19,23).

Considering the physical and psychological problems that occur in this period, it seems that non-medical therapies that help women to deal with their problems, particularly psychological therapies will be useful. Cognitive behavioral therapy (CBT) is one of the effective methods (24,25). Nowadays, CBT is used in the management of many conditions such as anxiety, depression, phobia, and stress (26). CBT-based psychological treatments were developed as treatments for menopausal disorders (21). This therapy helps people to think differently and due to this new thinking, they can confront undesirable events with more acceptable behaviors (27,28). In recent studies, it was shown that cognitive behavioral treatment, including psychoeducation, paced breathing/relaxation, and CBT could help women to manage symptoms such as HF/NS, which was acceptable to women, showed promise in exploratory trials of individual and group CBT, and reduced the symptoms (14,17,29).

Various CBT methods (group, individual and self-help CBT) were implemented in the climacteric period in several trials on the health of women.

The present systematic review aimed to compare the efficacy of various methods of CBT on the improvement of the climacteric symptoms.

Material and Methods

Search strategy

The current systematic literature review was performed using electronic databases such as PubMed, Scopus, Cochrane, Medline, PsycINFO, and Google Scholar. The search was performed from January 1990 to August 2018 by using the following related keywords in titles and abstracts (women OR female) AND (menopause* OR peri-menopause OR "post menopause") AND (climacteric treatment OR therapy OR "cognitive behavioral therapy" OR CBT OR "psychological treatment symptom") AND ("hot flashes" OR sweat OR anxiety OR depression OR insomnia OR "menopausal symptoms" OR "climacteric syndrome").

Moreover, the reference section of relevant trials, systematic reviews and meta-analyses were manually checked to recognize the related trials missed by electronic database searches.

Two authors independently conducted the search and screened studies against the inclusion criteria; first, the authors independently extracted data and then checked the extracted data. Any discrepancies were resolved via discussion and consensus.

The following data were extracted with the use of PICOS criteria: population (e.g. sample size, women with natural menopause), intervention (e.g. various CBT methods: group, individual and self-help CBT, duration, length of program), comparison (e.g. non-CBT therapy group or no treatment control), outcomes (e.g. reported in the form of the improvement scores of climacteric symptoms), study design (e.g. RCT, clinical trial, quasi-experimental). Thus, the data were extracted and classified under the following headings in systematic tables (Table 1-4): author, country, year (to establish a historical timeline), study design, sample size, specifications of population, comparison condition, scale, intervention, and the main findings of the studies, which can be reported in the form of scores and changes.

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Inclusion and exclusion criteria

The inclusion criteria for entering evidence in the current systematic review included original and quantitative interventional studies in English or at least with an English abstract, which could offer adequate information regarding the impact of any kind of CBT methods on the improvement of menopausal symptoms, which were published in peer-reviewed journals. Studies with randomized-control trial, clinical trial, experimental, semi-experimental, and pilot designs were entered and the subjects of the studies were healthy women in the climacteric period with normal menopause (not because of surgery) and receiving CBT for the treatment of the symptoms.

The exclusion criteria included the qualitative and quantitative interventional studies without numerical outcome data, and observational, cohort, case-control, cross-sectional, retrospective, and prospective studies were also excluded.

Screening

A total number of 1628 articles were identified and imported to Endnote X8, and after removal of duplicates (n=415), we screened titles and abstracts of the remaining articles (n=1213). After evaluating the inclusion criteria in remaining papers, the texts of 59 potentially relevant articles were fully assessed for more screening. These articles were evaluated for eligibility, and finally, 15 studies were entered in the current systematic review.

Based on the type of CBT interventions, the entered studies were classified into two groups based on the type of CBT interventions; the first classification was face-to-face CBT, including individual and group CBT, and the second was indirect CBT, containing self-help CBT. In the indirect method, the support is provided by a professional therapist by telephone, email, or any other communication tools.

Quality assessment

The quality of the studies was evaluated using the Cochrane Collaboration's tool to assess the risk of bias in randomized trials by two authors independently (27). In addition, the tool has six criteria assessed in the entered studies, which are random sequence generation, allocation concealment, description of drop-outs, blinding of participants and personnel, power analysis, and intention-to-treat analysis or no drop-outs. One point was given for each criterion observed in each study. Based on this assessment tool, the quality of a study was evaluated as "high" when five or six criteria were observed, "moderate" when three or four criteria were observed, and "low" when fewer than three criteria were observed. Any disagreements between the two authors were discussed until consensus was reached and if any variation remained, it was settled through discussions with a third researcher.

Results

From all the related papers, based on the title and abstract screening, we can observe the inclusion criteria in 15 studies. Figure 1 represents a flow diagram of PRISMA.

Characteristics of the included studies

A total of 15 articles were published between 1996 and 2018. Among all the final articles, the designs of most studies (n=8) were randomized controlled trials (RCTs) (17,19-21,31-35), three were pilot studies (4,14,34), one of the remaining articles had a randomized clinical trial design (36), and two studies were clinical trials (33,35), we also have a quasi-experimental design in all the articles (23). Among the articles, two articles of Hassan (31) and Khoshbooii (32) were obtained from the findings of one study and had similar results.

Demographic characteristics of subjects

According to the total number of subjects in all entered studies, 910 women were entered in the current systematic review. The sample size of the study population per study varied from 8 to 140 women, and the age range of the participants in the articles was assessed from 35 to 71 years.

The women involved in these studies were fairly healthy, mostly married or cohabiting, and had at least one child. Educational level was divided between those educated up to lower than primary school education, and the majority had at least elementary education and housekeeping (4,17,19,21,34,35,37). All of the participants were employed in one study (36). In two studies, the demographic variables were not described completely (14,33).

Methods of recruitment

Six studies recruited participants from health centers (17,21,31-33,35), three through Women's Health Clinics (4,23,34), and five studies through general practices, breast screening clinics, menopause websites, and local newspaper advertisements (14,19,20,37,38), and finally, one study recruited participants from public and private sectors (36).

The following scales were used in the entered studies to assess the symptoms changes: Insomnia Severity index, BDI-II Questionnaire, Women's Health Questionnaire, the Depression, Anxiety, and Stress Scale-21, Blatt's Kupperman Menopausal index, Hospital Anxiety and Depression scale, HF/NS problem-rating, Center for Epidemiologic Studies Depression scale, the Greene Climacteric scale, the Montgomery-Asberg Depression Rating scale, the Hamilton Anxiety scale, Menopause Rating scale, and the Hot Flashes Related Daily Interference scale.

The number of studies based on their countries included five studies from the United Kingdom, four from the United States, three from Iran, two from Spain, and one study from Switzerland.

Quality assessment

In total, the six quality criteria were assessed for 15 studies. The lowest score was 1 (four studies), and the highest score was 5 (three studies). The overall study quality was low, one study (6%) was rated with a high quality, six (40%) with a moderate quality, and eight (54%) with a low quality. The descriptions of the method were as follows: generation of the allocation sequence (sequence generation) was reported in zero studies; concealment of the allocation sequence (allocation concealment) was reported in 10 studies; blinding of the main outcome assessment was described in only five studies; in 10 studies, description of drop-outs was observed; a power-analysis was conducted in nine studies, and four studies had no drop-outs.

Features of CBT sessions

Generally, in these articles, the CBT sessions were held to improve the following climacteric symptoms, which from the highest to the lowest level, were as follows: hot flashes and night sweats (HF/NS), depression, anxiety, insomnia, nervousness, melancholy, myalgia, vertigo, fatigue, irritability, headaches, palpitations, paresthesia, dysesthesia, sleeping problems, cardiac symptoms, sexual problems, urinary symptoms, vaginal dryness, and joint and muscle pain. Table 1 presents the classification of these symptoms.

As mentioned earlier, in general, we divided the studies into two general classifications in terms of the CBT method used (face-to-face and indirect), where the face-to-face method includes individual CBT and group CBT. Based on the studies reporting the individual CBT, this approach was conducted in the form of 4-6 sessions of one hour per 6-8 weeks. In general, group CBT sessions consisted of 4 to 16 sessions of 60 to 160 minutes, usually held weekly, and women were in groups of 4 to 12 people. All studies considering the self-help CBT as a subset of indirect CBT used a booklet and participants had to complete this protocol during a 4-week period, and two studies, in addition to the booklet, had 2-week telephone guide sessions.

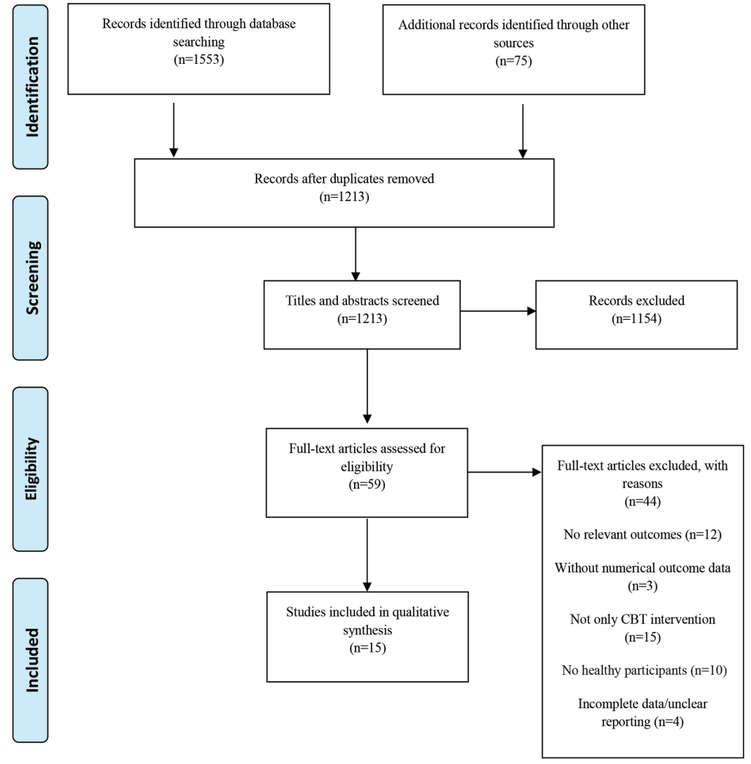

Figure 1. PRISMA flow diagram

Table 1. The classification of the climacteric symptoms improved by CBT

Vasomotor symptoms	Psychological symptoms	Organic disorder
Hot flash	Depression	Myalgia
Night sweat	Anxiety	Urinary complaints
Vertigo	Insomnia (sleeping problems)	Vaginal dryness
Headache	Nervous	Joint and muscle pain
Palpitation	Melancholy	
Paresthesia	Fatigue	
Cardiac complaints	Irritability	
	Sexual problems	

Statistical analysis

To assess the effect of CBT methods on climacteric symptoms and to assess clinically meaningful individual change in symptoms, symptom changes scores were calculated as follows (mean difference):

MD= Pre-treatment symptom score – Last post treatment symptom score

For better a comparison between all the main results, and so as to not equalize the score before the treatment in the studies, we converted the MD score to a percentage.

Accordingly, the number in the table in percentage form represents the decrease or increase in the severity of the symptoms after the treatment (compared with the initial score).

$$Percentage = \frac{MD}{Pre\text{-}treatment\ symptom\ score}$$

The Effect of CBT Methods on Climacteric Symptoms

a. The effect of evaluating each CBT approach on symptoms reviewed in studies (Table 2-4)

HF/NS frequency

According to the findings;

Individual CBT was able to decrease the pre-test score of HF/NS frequency up to 59% (Table 2).

Group CBT was successful in decreasing the initial score of HF/NS frequency by 3.9-40% (Table 3).

Self-help CBT made a decline in the baseline score of HF/NS frequency by 3.9-48% (Table 4).

HF/NS problem rating

Individual CBT caused a 33% reduction from the baseline score of HF/NS problem rating (Table 2).

Group CBT was able to make a 22-52% reduction in the pre-test score of HF/NS problem rating (Table 3).

Self-help CBT was successful in decreasing the initial score of HF/NS problem-rating by 20-52% (Table 4).

Hot flashes

Group CBT reduced baseline score of hot flashes by 11-57%.

Night sweats

Group CBT was not able to significantly reduce night sweats. In the study by Kefeer and Blanchard (14), group CBT reduced night sweats up to 41% in the immediate group, but the score was nearly doubled in the delay group (Table 3).

Depression

Individual CBT was able to make a 50-63% reduction in the pre-test score of depression (Table 2).

Group CBT was successful in decreasing the initial score of depression by 27-72% (Table 3).

Anxiety

Group CBT was able to reduce baseline scores of anxiety by 18-71% (Table 3).

Insomnia

Individual CBT caused a 73% reduction from the baseline score of insomnia (Table 2).

Group CBT could not only make a considerable failure in the baseline score of insomnia, but also caused a 19% increase in the pre-test score (Table 3).

Self-help CBT was successful in decreasing the initial score of insomnia by 71% (Table 4).

Nervousness

Group CBT was able to make an approximately 18% reduction in the pre-test score of nervousness in women (Table 3).

Melancholy

Group CBT was successful in decreasing the initial score of melancholy up to 41%.

Cardiac symptoms

Group CBT could cause a 42% reduction from the baseline score of cardiac symptoms.

Sexual problems

Group CBT was able to make a 29% reduction in the pre-test score of sexual problems.

Vaginal dryness

Group CBT was able to reduce the pre-test score of vaginal dryness up to 29%.

Urinary symptoms

Group CBT was not successful in decreasing the initial score of urinary symptoms and the score in the follow-up period had a 10% increase of baseline (Table 3).

Joint and muscle pain

Group CBT was successful in decreasing the initial score of joint and muscle pain up to 16%.

Myalgia, vertigo, fatigue, irritability, headaches, palpitations, paresthesia, and dysesthesia

Group CBT was unable to create a considerable decline in the follow-up score of each of them, separately (Table 3).

b. The effectiveness of the face-to-face CBT method

To evaluate this method, first of all, we will determine the impact of individual and group CBT approach according to Table 2 and Table 3 and our main findings mentioned above.

Individual CBT

Only three studies referred to this method, and if we determine which symptoms can be improved by this approach, HF/NS, the frequency in the vasomotor cluster can be indicated. Individual CBT can have excellent effects on insomnia, which is classified in the category of psychological symptoms. The overall findings of this approach cannot be regarded because few studies have evaluated the effects of individual CBT (Table 2).

Group CBT

Since only group therapy was conducted on each of the vasomotor symptoms separately, we can conclude that group CBT could not be successful in treating most of the vasomotor symptoms, and it just improved hot flashes and cardiac symptoms among the seven symptoms of this classification. However, it can make the HF/NS rate better than with the other approaches.

Most of the psychological symptoms (except insomnia) had a greater improvement in the group CBT approach, and only vaginal dryness in the organic disorder category could be under the effect of group CBT, and most of them did not have significantly positive changes. Generally, group CBT was more effective on psychological symptoms (Table 3).

c. The efficiency of indirect CBT method

In this part, we examine the self-help CBT approach.

Self-help CBT

Self-help CBT approach has improved symptoms such as HF/NS frequency and problem rating, but the individual approach is more effective. Also this approach had the same positive effect as individual therapy on insomnia (Table 4).

Discussion

Considering the many studies conducted to improve the menopause symptoms using group CBT, we can show that in general, the treatment group has more favorable effects on psychological symptoms. However, considering the fact that apart from group therapy, other approaches have not been applied to psychological symptoms and owing to the good effect of individual and self-help CBT in depression and insomnia, group CBT cannot be absolutely chosen as the best approach (31,32). Moreover, limited studies were conducted on individual and self-help CBT and most of them focused on HF/NS frequency and problem rating in each approach. Among these, individual CBT played a further role on HF/NS frequency, which due to the limited number of studies conducted using this approach, this part of our findings obtained from the results of one study cannot be generalized (17). Obviously, it is worth mentioning that group and self-help CBT also played a positive and similar role on HF/NS frequency, which resulted from more studies (33-38).

According to three articles comparing the different approaches (19,20,32), two studies compared the effects of group and self-help CBT on HF/NS frequency and problem rating. The group CBT treatment consists of psycho-education, stress management, paced breathing, and self-help CBT includes a self-help book that is learned during a four-week course and two phone calls made by a psychologist. Both of them, as already mentioned, indicated an almost equal effect of the two approaches; however, group CBT was somewhat more successful than self-help CBT (19,20), consistent with our findings.

In the study of Khoshbooii (32), the impacts of individual and group CBT on depression were compared with each other. The individual sessions are tailored to the needs of women and are flexible, but the general format of CBT sessions covered the main components such as psycho-education, cognitive interventions, behavioral interventions, assigning homework, and relapse prevention. According to their findings, both approaches had the same effect on depression, and the effect of individual CBT was negligibly greater than group CBT (32). In addition, as mentioned earlier, both group and individual CBT had a positive and significant impact on depression but the findings from group therapy were more widespread (32,34,35), which could be a result of the alterations in the conditions of the samples, the number of treatment sessions, the content or the kind of follow-up in studies; therefore, group CBT cannot be considered a guaranteed approach, but if properly implemented, it can reduce up to 72% of the initial depression score; otherwise, it can only be up to 27% effective. Thus, the preliminary treatment approach for depression can be group CBT sessions held in good conditions.

Based on the findings of the present study, it can be concluded that if an individual has an insomnia problem, group CBT cannot produce a good result, but individual and self-help

Face-to-Face CBT methods

Table 2. The efficiency of individual CBT on Climacteric symptoms

Author/year/ country	Study design	Sample size	Specifications of population	Comparison condition	Scale	Intervention	Main findings						
Nowakowski et al. (33)	Clinical trial	n total: 40	Mean age= 55±6.2 Reported ≥ 1 nocturnal hot flash	MEC Pre and post treatment	1. ISI 2.CES-D	MEC and CBTMI 4 sessions 50 minute over 8 weeks (Psycho-education cognitive interventions)	**SX***		**Pre-treatment**	**Post-treatment**	**MD (%)**		**p value**
							Insomnia severity	**CBTMI**	15±3.5	4±3.7	-11 (73%↓)		=0.003
								MEC	16±4.2	10±5.0	-6 (37%↓)		
							Depression	**CBTMI**	16±9.0	8±7.4	-6 (37%↓)		=0.019
								MEC	15±11.1	13±9.2	-2 (13%↓)		
Khoshbooii (32)	RCT	n total: 42 n intervention: 20 n control: 22	Age range: 41-55 With a depression score between 21- 56	Control group Follow up periods	BDI-II Questionnaire	(I-CBT) 8 sessions 60 minute over 8 weeks Skills group information based on cognitive behavioral assumptions	**SX***		**Pre- test**	**Post test**	**4 weeks**	**MD (%)**	**p value**
							Depression	**I**	32.30±8.73	10.85±6.17	11.75±6.59	-20.55 (63%↓)	=0.001
								C	34.09±8.34	32.77±6.92	33.77±7.17	-0.32 (0.9%↓)	
Hunter et al. (29)	RCT	n total: 61 n CBT: 27 n HRT: 19 n control: 15	Age range 45-71 Women who reported hot flashes (or night sweats) once a week or more frequently	CBT compare with HRT and no treatment control group (NT) Follow up periods	1.Women's Health Questionnaire 2. A checklist for assessment of hot flashes	4 sessions 60 minute over 6-8 weeks Relaxation, rhythmic breathing Cognitive-behavioural to cope with hot flushes	**SX**		**Baseline**	**Monitor**	**Post-treatment**	**Follow-up**	**MD (%)**	**p value**
							HF/NS frequency	**CBT**	28.08±21.06	28.87±25.41	14.37±16.47	11.41±17.52	-16.67 (59%↓)	<0.01
								HRT	42.92±33.46	37.25±35.43	11.75±14.63	9.50±14.06	-33.42 (77%↓)	<0.01
								Control	24.19±19.65	22.19±18.14	23.19±16.26	20.07±17.87	-4.12 (17%↓)	>0.05
							HF/NS problem	**CBT**	5.49±2.58	5.28±2.37	3.13±1.77	3.65±2.39	-1.84 (33%↓)	<0.01
								HRT	5.36±1.98	5.33±2.47	5.13±1.39	5.23±2.04	-0.13 (2.4%↓)	>0.05
								Control	4.21±1.83	3.32±1.63	3.82±1.71	3.82±2.23	-0.39 (9.2%↓)	>0.05

*SX: The abbreviation of symptoms, MEC: Menopause education control, ISI: Insomnia Severity index, CES-D: Center for epidemiologic studies depression scale, CBTMI: Cognitive behavioral therapy for menopausal insomnia, RCT: Randomized controlled trial, BDI: Beck's depression inventory, I-CBT: Internet-based cognitive behavioral therapy, CBT: Cognitive-behavioral therapy, HRT: Hormone therapy

Table 3. The efficiency of group CBT on menopausal symptoms

Author/year/ country	Study design	Sample size	Specifications of population	Comparison condition	Scale	Intervention	Main findings
Soori et al. (21)	RCT	n total: 76 n intervention: 38 n control: 38	Rage age: 47-57 Rage of time passed from menopause: 1 to 4 years	Control group Pre and post treatment	DASS-21	6 sessions 60 to 90 minutes Groups of 11 to 12 women Relaxation, respiration, familiar with negative thoughts. To talk about the stress and discussing about them	**SX*** / **Pre-treatment** / **Post-treatment** / **1 month later** / **MD (%)** / **p value** **Depression** **I**: 9.63±3.72 / 2.63±1.97 / 2.35±1.66 / -7.01 (72%↓) / <0.001 **C**: 8.50±3.42 / 7.81±3.97 / 7.44±2.66 / -1.06 (12%↓) / >0.05
Larroy et al. (23)	Quasi-experimental	n total: 53 n intervention: 28 n control: 25	Age range: 42 to 55	Control group Follow up periods	1. BKMI 2. HADS	8 sessions 120 minutes weekly Groups of 8 -10 women Psycho education, relaxation, exercise and nutrition, Kegel exercises. Sexual re-education, problem-solving	**SX*** / **Pre- test** / **Post test** / **MD (%)** / **p value** **Hot flashes** **I**: 8.29±3.91 / 4.29±3.76 / -4 (48%↓) / <0.001 **C**: 10.4±2.58 / 10.8±2.86 / 0.40 (3.8%↑) / >0.05 **Nervous** **I**: 4.46±1.64 / 3.64±2.04 / -0.82 (18%↓) / <0.05 **C**: 3.40±1.91 / 3.60±2.00 / 0.20 (5.8%↑) / >0.05 **Melancholia** **I**: 2.14±0.93 / 1.25±0.84 / -0.89 (41%↓) / <0.001 **C**: 1.68±1.18 / 1.60±1.19 / 0.80 (47%↑) / >0.05 **Anxiety** **I**: 11.79±3.05 / 8.14±3.19 / -3.58 (30%↓) / <0.001 **C**: 10.60±1.98 / 10.28±1.43 / -0.32 (3%↓) / >0.05 **Depression** **I**: 6.71±3.71 / 4.79±2.63 / -1.92 (28%↓) / <0.001 **C**: 4.65±3.69 / 4.88±3.39 / 0.23 (4.9%↑) / >0.05 **Intensity of symptom** **I**: 28.75±5.75 / 19.36±8.62 / -9.39 (32%↓) / <0.001 **C**: 28.88±6.63 / 28.48±5.97 / -0.40 (1.3%↓) / >0.05
Norton et al. (20)	RCT	n total: 93 n intervention: 48 n control: 45	Mean age: 53.09±5.4 18 years or older Having problematic HFNS	Control group Follow up periods	HFNS problem rating (HFRS)	4 session Weekly 160 minutes Groups of 6-8 women Received a relaxation/ paced breathing CD	**SX** / **Baseline** / **6 weeks** / **26 weeks** / **MD (%)** / **p value** **HF/NS problem rating** **I**: 5.87±2.28 / 3.75±0.76 / 4.54±0.8 / -1.33 (22%↓) / =0.001 **C**: 5.87±2.28 / Not significant difference / Not significant difference **HF/NS frequency** **I**: 63.15±49.24 / 60.67±1.61 Small significant reduction / -2.48 (3.9%↓) / <0.05 **C**: 63.15±49.24 / Not significant difference / Not significant difference
Green et al. (34)	A pilot study	n total: 8	Age range: 40-60	Pre and post treatment	1. HFRDIS 2. GCS 3. MADRS 4. The Hamilton Anxiety Scale	10 session Weekly 160 minutes Groups of 4 women Psychoeducation, cognitive, restructuring, relaxation, Behavioral modification for urogenital complaints	**SX** / **Pre-treatment** / **Post-treatment** / **MD (%)** / **p value** **Hot flash daily interference** 39.8±12.4 / 16.9±9.5 / -22.90 (57%↓) / =0.01 **Anxiety** 19.8±6.0 / 12.8±6.7 / -7 (35%↓) / =0.00 **Depression** 6.9±3.6 / 4.6±4.1 / -2.3 (33%↓) / =0.04 **Variety of menopausal symptoms** 23.1±10.7 / 19.0±13.7 / -4.1 (17%↓) / =0.19
Ayers et al. (19)	RCT	n total: 93 n intervention: 48 n control: 45	Average age: 53.09 years Women having 10 or more problematic hot flaflashshes and night sweats (HF/NS) a week for at least a month	Control group Follow up period	Subscale of the HFRS	4 session Weekly 160 minutes Groups of 4 women Using PowerPoint presentations, a relaxation/paced breathing CD, and handouts	**SX** / **Baseline** / **6 weeks** / **26 weeks** / **MD (%)** / **p value** **HF/NS problem rating** **I**: 6.00±2.15 / 3.01±2.11 / 2.86±2.11 / -3.14 (52%↓) / =0.001 **C**: 5.79±2.76 / 4.97±2.44 / 4.18±2.45 / -1.61 (27%↓) **HF/NS frequency** **I**: 61.83±38.17 / 43.85±42.16 / 36.77±50.71 / -25.06 (40%↓) / =0.004 **C**: 56.69±50.43 / 49.67±48.55 / 44.05±45.18 / -12.64 (22%↓)

Table 3. Continued

Author/year/ country	Study design	Sample size	Specifications of population	Comparison condition	Scale	Intervention	Main findings					
Khoshbooii (32)	RCT	n total: 44 n intervention: 22 n control: 22	Aged range: 41- 55 With a depression score between 21 and 56	Control group Pre and post treatment + follow up	BDI-II Questionnaire	16 sessions twice weekly 160 minutes Psycho-education Cognitive Interventions Behavioral Intervention	**SX**		**Pre-test**	**Post test**	**4 weeks**	**MD (%)**	**p value**
							Depression	**I**	33.95±9.64	12.04±5.89	12.63±6.41	-21.32 (62%↓)	=0.001
								C	34.09±8.34	32.77±6.92	33.77±7.17	-1.13 (3.3%↓)	
Larroy García and Gómez-Calcerrada (4)	A pilot study	n total: 49 n intervention: 21 n control: 28	Range age: 43-56	Control group Pre and post treatment	1. HADS 2.Kupperman and Blatt Menopausal Index	8 sessions weekly 160 minutes Psycho education, relaxation, Kegel exercises, and problem-solving techniques	**SX**		**Pre-treatment**	**Post-treatment**	**MD (%)**	**p value**	
							Anxiety	**I**	6.43±4.3	5.24±3.40	-1.19 (18%↓)	<0.010	
								C	10.60±1.98	10.28±1.43	-0.32 (3%↓)	>0.05	
							Depression	**I**	4.05±3.19	2.76±2.98	-1.29 (31%↓)	<0.025	
								C	4.72±3.69	4.88±3.39	0.16 (3.3%↑)	>0.05	
							Intensity of symptoms	**I**	14.14±7.03	11.24±6.47	-2.9 (20%↓)	<0.030	
								C	28.88±6.66	28.48±5.97	-0.40 (1.3%↓)	>0.05	
							Hot flashes	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Paresthesia	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Insomnia	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Nervousness	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Melancholy	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Vertigo	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Fatigue	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Myalgia	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Headaches	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Palpitations	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	
							Dysaesthesia	**I**	Not significant difference			>0.05	
								C	Not significant difference			>0.05	

Table 3. Continued

Author/year/ country	Study design	Sample size	Specifications of population	Comparison condition	Scale
Alder 2006 Switzerland (35)	Clinical trial	n total: 30	Ages ranged: 42-65 Twelve (40%) were on HRT during the study period	Follow up periods	1. MRS 2.HADS (German version)
Keefer 2005 New York (14)	Pilot study	n total: 19 n immediate: 11 n delayed: 8	Mean age: 51.0±4.7	Follow up periods	1.The Women's Health Questionnaire 2. Daily vasomotor symptom diary

GCS: The Greene Climacteric Scale, MADRS: Montgomery–Asberg Depression Rating Scale, HADS: Hospital Anxiety and Depression Scale, BKMI: Blat's Kupperman Menopausal Index, HFNS: Hot flashes and night sweats, HFRDIS: The Hot Flash related Daily Interference Scale

Intervention	Main findings					
7 sessions weekly 90 minutes Groups of 4-8 women Relaxation techniques, breathing, Exercise for coping with sexual problem one follow-up group session 3 months after the intervention	**SX**		**T1 10 weeks before**	**T2 before beginning**	**T3 after last session**	**MD (%)**	**p value**
	Hot flashes		4.3±2.2	3.4±2.0	2.6±1.7	-1.7 (39%↓)	<0.01
	Cardiac complaints		1.4±1.7	1.7±2.1	0.8±0.6	-0.6 (42%↓)	<0.01
	Sleeping problems		3.1±2.5	3.3±1.9	3.7±4.8	0.6 (19%↑)	N.S**
	Depressive mood		3.6±2.5	3.8±2.8	2.6±2.2	-1 (27%↓)	<0.02
	Irritability		3.4±2.2	4.1±2.5	3.2±2.4	-0.2 (5.8%↓)	N.S
	Reduced effectiveness		3.8±2.3	4.2±2.7	3.2±2.3	-0.6 (15%↓)	<0.04
	Sexual problems		4.8±3.1	4.3±3.2	3.4±2.7	-1.4 (29%↓)	0.06
	Urinary complaints		1.0±1.3	1.4±1.4	1.1±1.2	0.1 (10%↑)	N.S
	Vaginal dryness		4.1±3.5	4.0±3.0	2.9±2.5	-1.2 (29%↓)	<0.03
	Joint and muscle pain		3.1±2.6	2.7±2.1	2.6±2.0	-0.5 (16%↓)	N.S
	Anxiety		7.7±4.5	8.2±4.8	6.2±4.2	-1.5 (19%↓)	<0.01
	Depression		5.8±4.4	6.7±5.4	4.7±3.9	-1.1 (18%↓)	<0.02
Participants were randomized into either immediate treatment or delayed treatment Immediate group treatment 8 sessions weekly 90 minutes Groups of 4-6 women. Psychoeducation, cognitive restructuring and paced respiration education	**SX**			**Pre-treatment**	**Post-treatment**	**MD (%)**	**p value**
	Hot flashes	**Immediate**		65.63±71.06	37.81±58.44	-27.82 (42%↓)	=0.21
		Delayed		66.54±60.63	58.75±95.13	-7.79 (11%↓)	
	Night sweats	**Immediate**		11.73±8.76	6.91±8.25	-4.82 (41%↓)	=0.09
		Delayed		32.89±23.47	68.00±88.12	35.11 (>100%↑)	
	Distress rating	**Immediate**		3.78±2.22	2.59±2.71	-1.19 (31%↓)	=0.06
		Delayed		4.86±1.48	5.15±1.60	0.29 (6.3%↑)	
	Problem rating	**Immediate**		4.42±1.97	2.72±2.79	-1.7 (38%↓)	=0.18
		Delayed		9.17±12.97	3.83±1.78	-5.34 (58%↓)	
	Total vasomotor	**Immediate**		78.27±44.73	44.73±62.43	-33.54 (42%↓)	=0.01
		Delayed		98.50±64.98	126.75±121.85	28.25 (28%↑)	

MRS: Menopause Rating Scale, *SX: The abbreviation of symptoms, **N.S: Not significant, DASS-21: The Depression Anxiety and Stress Scale,

Indirect CBT methods

Table 4. The efficiency of self-help CBT on menopausal symptoms

Author/year/country	Study design	Sample size	Specifications of population	Comparison condition	Scale
Hardy et al. (36)	Multicenter randomized controlled trial	n total: 124 n intervention: 60 n control: 64	Range age: 45-60 Working women Having problematic HF/NS for at least 2 months	Control group Follow-up period	Hot flash rating scale as used in the MENOS2 trial
McCurry et al. (37)	A single-site, randomized clinical trial	n total: 106 n CBT: 53 n MEC: 53	Range age: 40-65 With moderate insomnia symptoms [(ISI) score, ≥12] and 2 or more daily hot flashes	MEC Follow-up periods	ISI score
Stefanopoulou and Hunter (38)	RCT	n total: 92 n intervention: 47 n control: 45	Range age: 44-77 age from 18 years or older With problematic hot flashes and night sweats (HF/NS score >2) for at least 1 month and minimum frequency of 10 flashes per week	Control group Follow-up periods	HFRS
Norton et al. (20)	RCT	n total: 92 n intervention: 47 n control: 45	Mean age: 53.09±5.4 18 years or older Having problematic HFNS (score >2)	Control group Follow-up periods	HFNS problem rating (HFRS)
Ayers et al. (19)	RCT	n total: 92 n intervention: 47 n control: 45	Average age: 53.09 years Women having 10 or more problematic hot flashes and night sweats a week for at least a month	Control group Follow-up periods	Subscale of the HFRS

GCS: The Greene Climacteric Scale, MADRS: Montgomery–Asberg Depression Rating Scale, HADS: Hospital Anxiety and Depression Scale, BKMI: Blat's Kupperman Menopausal Index, HFNS: Hot flashes and night sweats, HFRDIS: The Hot Flash related Daily Interference Scale

Intervention	Improvement score						
Self-help cognitive behavior therapy The final SH-CBT intervention was an A5 sized, color booklet with instructions and four chapters (with information, exercises and homework tasks) to be completed over 4 weeks	**SX***		**Baseline**	**6 weeks**	**20 weeks**	**MD (%)**	**p value**
	HF/NS problem rating	**I**	6.25±1.97	4.38±2.21	4.36±2.29	-1.89 (30%↓)	6w: p<0.001 20w: p=0.01
		C	6.80±1.90	6.16±2.31	5.80±2.30	-1 (14%↓)	
	HF/NS frequency	**I**	53.13±34.34	40.59±26.03	34.28±27.62	18.85 (35%↓)	6w: p=0.01 20w: p=0.05
		C	54.28±38.11	54.02±43.00	46.03±37.92	-8.25 (15%↓)	
Telephone-based cognitive behavioral therapy Six CBT-I or MEC telephone sessions in 8 weeks Behavioral sleep plan Stimulus control instructions, behavioral sleep plan	**SX**		**Baseline**	**8 weeks**	**24 weeks**	**MD (%)**	**p value**
	Insomnia	**CBT-I**	15.6±0.8	5.7±1.3	4.9±1.2	-10.7 (71%↓)	<0.001
		MEC	16.8±1	12.1±1.4	9.4±1.7	-7.4 (46%↓)	<0.001
	Hot flashes	**CBT-I**	-	Baseline -15.7±4.7	Baseline -22.8±5.9	-22.8	=0.03
		MEC	-	Baseline -7.1±7.5	Baseline -11.6±7.8	-11.6	=0.003
Telephone-guided self-help cognitive behavioral therapy Women completed a Self-Help CBT intervention (booklet and relaxation/paced breathing CD) during a 4-week period. women also received one 'guiding' telephone call from a clinical psychologist two weeks into treatment	**SX**		**Baseline**	**6 weeks**	**3 month**	**MD (%)**	**p value**
	HF/NS frequency	**I**	55.52±38.34	37.85±30.33	28.54±27.55	-26.98 (48%↓)	=0.001
		C	56.69±50.43	49.67±48.55	44.05±45.18	-12.64 (22%↓)	
	HF/NS problem rating	**I**	6.23±2.16	3.74±1.87	2.98±1.36	-3.25 (52%↓)	<0.0001
		C	5.79±2.76	4.97±2.44	4.18±2.45	-1.54 (26%↓)	
Self-help cognitive behavior therapy The material in booklet form; and received a relaxation/paced breathing CD during a 4-week period	**SX**		**Baseline**	**6 weeks**	**26 weeks**	**MD (%)**	**p value**
	HF/NS problem rating	**I**	5.87±2.28	3.79±0.58	4.68±0.83	-1.19 (20%↓)	6w: p<0.001 26w: p=0.001
		C	5.87±2.28	-	-		
	HF/NS frequency	**I**	63.15±49.24	60.67± 0.21 Small significant reduction		-2.48 (3.9%↓)	Small significant
		C	63.15±49.24	-	-		
Self-help cognitive behavior therapy Self-help CBT includes a self-help book completed during a 4-week period and two contacts with a clinical psychologist (one introductory session and a guiding telephone call 2 week into treatment)	**SX**		**Baseline**	**6 weeks**	**26 weeks**	**MD (%)**	**p value**
	HF/NS problem rating	**I**	5.84±1.93	2.96±1.76	3.07±1.93	-2.77 (47%↓)	6w: p<0.001 26w: p=0.005
		C	5.79±2.76	4.97±2.44	4.18±2.45	-1.61 (27%↓)	
	HF/NS frequency	**I**	70.68±57.49	49.20±39.24	44.94±42.70	-25.74 (36%↓)	6w: p=0.668 26w: p<0.05
		C	56.69±50.43	49.67±48.55	44.05±45.18	-12.64 (22%↓)	

MRS: Menopause Rating Scale, *SX: The abbreviation of symptoms, **N.S: Not significant, DASS-21: The Depression Anxiety and Stress Scale,

approaches can reduce over 70% of the initial insomnia score. Furthermore, in a study by Keefer and Blanchard (14) the intervention group was classified into two immediate and delayed treatment groups in the case of assessing night sweats, depression, and total vasomotor symptoms. Treatment sessions were designed weekly and consist of education, relaxation training, and cognitive restructuring. In this regard, they reported a positive effect in the group with immediate treatment, but in the group whose treatment was delayed, the result was the opposite, and all of these three scores were increased. For example, the score for night sweats was more than twice the initial score. According to this finding, the start time of group therapy is noticeable, and if the treatment begins at a later stage, the result can be obtained in the opposite way (14).

Although in the study of Larroy García and Gómez-Calcerrada (4), the symptoms measured by the Kupperman and Blatt Menopausal index questionnaire separately did not have a significant alteration after group CBT, the total score represents a 20% decrease from the initial score, indicating the effectiveness of the group approach.

Study limitation

We were not able to perform a meta-analysis in the present study due to the alteration in the questionnaires used to measure the symptoms, and the difference in the implementation method, including the number of treatment sessions or the number of participants in the group meetings. Moreover, as a result of the low and moderate quality of most studies involved in this systematic review, more studies with high quality should be conducted in individual and self-help CBT approaches to measure the impact of these approaches on more varied symptoms of menopause.

It can be concluded that although the indirect method is more cost-effective, it has less impact than the face-to-face method, and if there are possibilities, it is better to use face-to-face approaches to achieve a better result. However, in countries with less facilities, self-help CBT (indirect methods) can be beneficial.

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