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Effectiveness of Cognitive Behavioral Therapies in Women with Breast Cancer: A Systematic Review

Meme Kanserli Kadınlarda Bilişsel Davranışçı Terapilerin Etkililiği: Sistematik Derleme

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Abstract

Cognitive Behavioral Therapy (CBT) has been proven by systematic review and meta-analysis studies that it is an effective psychotherapeutic approach for women with breast cancer (WBC) having biological, psychological, and social distress. However, CBT consists of different waves. In recent years, it is found that third wave approaches such as Acceptance and Commitment Therapy (ACT) and Mindfulness Based Cognitive Therapy (MBCT) are used as psychological interventions in breast cancer. In the present study, the aim is to assess the effects of randomized controlled studies based on second and third wave Cognitive Behavioral Therapies on the bio-psycho-social distress of WBC by a systematic review. Literature review was conducted on 3 electronic databases, Google Academic, PubMed, and Ulakbim, by using English and Turkish keywords. Studies executed with second- or third-wave Cognitive Behavioral Therapies in women with breast cancer and with randomized controlled research designs were included in the review. 21 studies complying with the eligibility criteria were found. Among these studies, 16 were categorized as the studies conducted based on Cognitive Behavioral Therapy, 3 based on ACT, and 2 based on MBCT. It is observed that Cognitive Behavioral Therapies are effective in depression, insomnia, cognitive impairment, menopausal symptoms, fatigue related by cancer, physical adaptation, pain, life quality, psycho-social adaptation, self-esteem, and sexual dysfunction.

Keywords: Breast cancer, cognitive behavioral therapy, randomized controlled trials, systematic review

Öz

Bilişsel Davranışçı Terapi (BDT) biyolojik, psikolojik ve sosyal sıkıntı yaşayan meme kanserli kadınlar (MKK) için etkili bir psikoterapötik yaklaşım olduğu sistematik derleme ve meta-analiz çalışmalarıyla kanıtlanmıştır. Bununla birlikte BDT farklı kuşaklardan oluşmaktadır. Son yıllarda Kabul ve Kararlılık Terapisi (KKT) ve Bilinçli Farkındalık Temelli Bilişsel Terapi (BFTBT) gibi üçüncü kuşak yaklaşımlar meme kanserinde psikolojik müdahaleler olarak kullanılmaya başlandığı görülmektedir. Bu çalışmada ikinci ve üçüncü kuşak Bilişsel Davranışçı Terapilere dayalı randomize kontrollü çalışmaların MKK'nin biyo-psiko-sosyal sıkıntıları üzerindeki etkileri sistematik olarak taranarak değerlendirilmesi amaçlanmıştır. Alan yazın taraması Google Akademik, PubMed ve Ulakbim olmak üzere 3 elektronik veri tabanında ve İngilizce ve Türkçe terimlerle yürütülmüştür. Taramaya meme kanserli kadınlarla, ikinci ya da üçüncü kuşak Bilişsel Davranışçı Terapilerle yürütülmüş ve araştırma desenleri randomize kontrollü olan çalışmalar dahil edilmiştir. Çalışmaya dahil edilme kriterlerine uyan 21 çalışmaya ulaşılmıştır. Bu çalışmalardan 16'sı Bilişsel Davranışçı Terapi, 3 tanesi KKT ve 2 tanesi de BFTBT temelinde uygulanan çalışmalar olarak kategorize edilmişlerdir. Bilişsel Davranışçı Terapilerin, depresyon, uykusuzluk, bilişsel bozulma, menopoz belirtileri, yorgunluk, fizyolojik uyum, ağrı, yaşam kalitesi, psiko-sosyal uyum, öz-saygı ve cinsel işlev bozukluğunda etkili olduğu gözlenmiştir.

Anahtar sözcükler: Meme kanseri, bilişsel davranışçı terapi, randomize kontrollü araştırmalar, sistematik derleme

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BREAST CANCER, which is both a life-threatening acute disease and a serious chronic disease, is the most common type of cancer among women. It is also one of the leading causes of death from cancer in women (Turner et al. 2005, Institute of Medicine [IOM] 2008, Ferlay et al. 2010, Ogden 2010, Gültekin and Boztaş 2014).

Breast cancer consists of the stages of diagnosis, primary treatment, systematic treatments, completion of treatment and re-involving in normal life, monitorization and recurrence of cancer, and mitigation or sedative treatment in advanced cancer (Hewitt et al. 2004). Women with breast cancer (WBC) experience a crisis period including anxiety and depression besides acute stress reactions at the stage of diagnosis (Andersen et al. 1989, Harcourt et al. 1999, Landmark et al. 2002, Bennett et al. 2005, Blow et al. 2011, Tunç-Aksan and Gizir 2017). Depressive and anxiety symptoms seem to continue in primary and systematic treatments (e.g., helplessness, anxiety etc.) (Yeo et al. 2004, Sütçü 2010). It is observed that thoughts about uncertainty and depressive symptoms were experienced during the cancer observation period, and anxiety and depression levels increased during the advanced cancer period (Hopwood et al. 1991, Turner et al. 2005, Shockney and Shapiro 2009, Gandubert et al. 2009, Moodley 2011).

Typically, every treatment stage starting from the diagnosis of breast cancer seems to cause high levels of distress, anxiety, and depression in women. In addition, women encounter various bio-psycho-social problems such as fear of recurrence of their illness, fatigue, decreased sleep quality, physical symptoms such as low body image, sexual dysfunction, anxieties related to treatment, distressed thoughts about the disease, changes in marriage/spouse communication, and existential issues related to death (Yeager et al. 2005, Ganz 2008).

As is seen, the importance of psychological interventions appears in the bio-psycho-social problems encountered by WBC. The results of meta-analysis and systematic review studies show that psychological interventions, especially Cognitive Behavioral Therapy (CBT), are effective in dealing with medical side effects in patients with cancer, increasing the quality of life, and reducing emotional distress (Faller et al. 2013, Daniels 2015, Johnson et al. 2016, de la Torre-Luque Gambara and Cruzado 2016).

However, CBT does not consist of a single epoch, but rather consists of several different era, generations, and waves (Hayes and Hofmann 2017). While Behavioral Therapy takes place in the first generation, second generation includes classical CBT and Rational Emotive Behavioral Therapy. In the third generation, Acceptance and Commitment Therapy (ACT), Cognitive Behavioral System Analysis Therapy (CBSAT), Functional Analysis Psychotherapy (FAP), Integrative Behavioral Couple Therapy (IBCT), Dialectical Behavioral Therapy (DBT), Metacognitive Therapy (MCT), Schema Therapy and Mindfulness-based Cognitive Therapy (MBCT) take place (Özdel 2015, Vatan 2016, Hayes and Hofmann 2017, Ruggiero et al. 2018). As is seen, Cognitive Behavioral Therapies consist of a wide range of interventions.

CBT has two main factors that enable it to be effective in dealing with cancer-related psychological problems. First one is to adapt the current treatment protocols oriented to

psychological problems such as depression, insomnia, or anxiety to similar psychological problems experienced in cancer. The second one is that the general therapeutic approach and problem-solving theory of CBT such as normalization and cooperation, facilitates adaptation in the individuals with cancer. Interventions in CBT related to cancer include cognitive interventions such as conceptualizing the problem, interfering with dysfunctional thoughts and beliefs, and behavioral interventions such as behavioral experiments, problem-solving, or behavioral activation (Moorey and Watson 2015).

In the third-wave approaches, mindfulness, enabling both positive and negative experiences to be approached without judgment, comes into prominence. Instead of changing the thoughts, it is also aimed to accept that pain is a part of life. As an example, it is one of the third-wave approaches of ACT, which is a factor of mindfulness. In ACT, which is based on behavioral psychology, the context in which the problem occurs is important. In ACT, it is aimed to accept pain with its positive and negative aspects, to determine the personal values in the experience within the context, and to act pertinaciously in line with the values by rejecting the disease-health differentiation or pathological categorization. Thus, increasing psychological flexibility is intended (Hulbert-Williams et al. 2015). In the interventions in ACT related to cancer, prevention of avoiding unpleasant experiences related to cancer, encouragement of these experiences for acceptance, determination of personal values in the life with cancer, and activation towards these values pertinaciously take place. Therapeutic strategies include the experiential situations, using metaphors, and the determination and evaluation of inter-interview practices (González-Fernández and Fernández-Rodríguez 2019)

The efficacy of the psychological intervention approaches of Cognitive Behavioral Therapies for the patients with cancer is supported by the results of systematic review and meta-analysis studies that are conducted with women with breast cancer. It is highlighted that CBT is effective in pain (Tatrow and Montgomery 2006), insomnia (Aricò Raggi and Ferri 2016), and quality of life (Zhang et al. 2017, Ye et al. 2018). Besides, in a meta-analysis study of Guarino et al. (2020) in which they compared the effects of psychological interventions on women with breast cancer, they showed that Cognitive Behavioral Therapies were significantly superior on depression and quality of life than supportive-expressive therapies and psychoeducational studies. Based upon these results, the authors suggested to investigate the efficacies of other approaches within the framework of Cognitive Behavioral Therapies. Thus, it is also important to examine the effect of Cognitive Behavioral Therapies specific to breast cancer, which is the most common type of cancer among women. From this point of view, the general purpose of the present study is to examine the effect of Cognitive Behavioral Therapies on the bio-psycho-social problems related to cancer in WBC and to systematically review the randomized controlled studies (RCT) conducted with WBC, regardless of stage and age. The sub-purposes of the study are to determine the categories and subcategories of Cognitive Behavioral Therapies conducted with WBC, to compare the general characteristics of the interventions specified in the categories according to the

sample, frequency range, comparison groups, and the intervened variables and to compare Cognitive Behavioral Therapies based on the intervened variables.

Method

Research strategy and selection process

google Academic, PubMed, and Ulakbim electronic data review sites were used for the current systematic review study. The data were selected from RCTs that between September 2019 and all the date ranges available from the said electronic review sites. RCT is defined as a strong research pattern by assuring randomization in an experimental design, having high internal validity, and enabling generalization (Stanley, 2007, Bickman and Reich, 2015). In English review, "breast cancer" AND "randomized controlled trials" AND "cognitive behavioral therapy" terms were used and then, "acceptance and commitment therapy", "dialectical behavior therapy", "schema therapy", "cognitive behavioral system analysis", "metacognitive therapy", and "mindfulness-based cognitive therapy" terms were used instead of "cognitive behavioural therapy" and reviews were searched again. Similarly in the Turkish review, "meme kanseri" AND "randomize kontrollü çalışma" AND "bilişsel davranışçı terapi", then "bilişsel davranışçı terapi" terms were removed and "kabul ve kararlılık terapisi", "diyalektik davranış terapisi" ,"şema terapi", "bilişsel davranışçı sistem analizi" "metakognitif terapi", "bilinçli farkındalık temelli bilişsel terapi" terms were used separately.

Regarding the review, the criteria determined within the scope of PICOS (P: Participants; I: Interventions; C: Comparisons; O: Outcomes; S: Study designs) are as follows (Liberati et al. 2009): Diagnosis of breast cancer of the participants without any restrictions based on stage, age and disease stages; the presence of intervention included in the range of Cognitive Behavioral Therapies; the comparison groups consisting passive (waiting list) or active (other treatment areas) treatment groups; research pattern of randomized controlled studies, and English or Turkish research language.

Within the scope of specified criteria and terms, 458 (Google Academic: 183, Ulakbim: 199, Pubmed; 76) studies were found. According to the inclusion criteria, it was found that 21 studies complied with the research criteria. Figure 1 shows the research process of the systematic review via the PRISMA (Liberati et al. 2009) diagram.

Data extraction

During data extraction, a data extraction form was created by the author. This form included information such as the authors, the year of study, types of intervention, intervention groups, duration of study, follow-up, dependent variables, and the outcome of the study. In case the information given in the form was not included in the reviewed database, they were considered as lost data. Table 1 provides information regarding the categories and sub-categories obtained as a result of data extraction and the general characteristics of the studies and Table 2 shows the comparisons between the groups within the scope of categories and sub-categories, and the results of the studies.

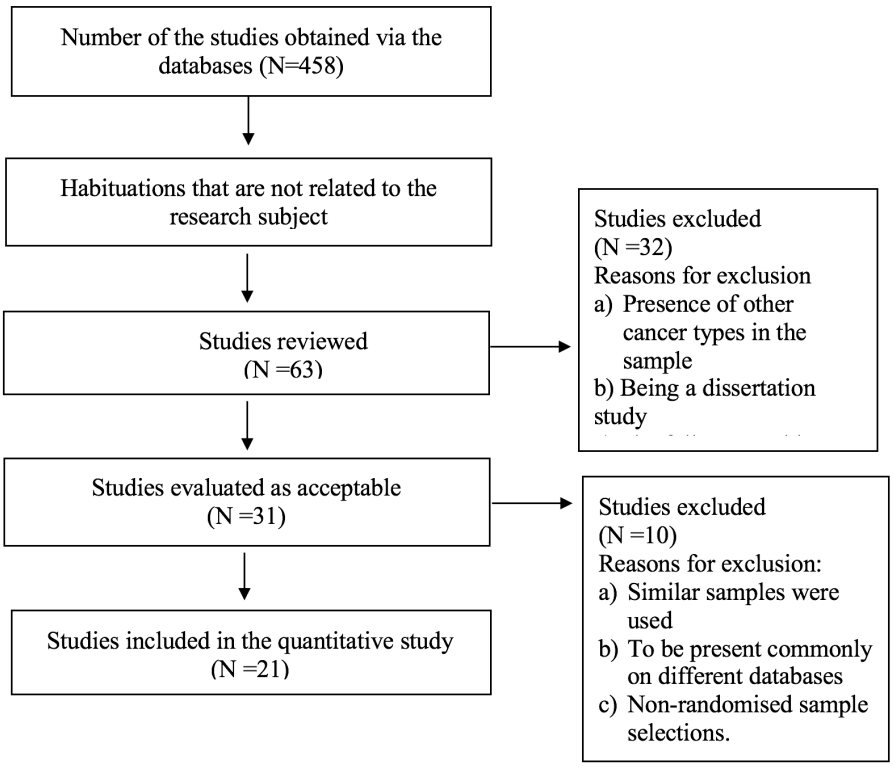

Figure 1. Flow chart of the studies included in the systematic review according to the PRISMA Control List

Results

Categories and general features of the studies

categories and Sub-categories: In the present review study, Cognitive Behavioral Therapies conducted with WBC were examined. As a result of the examination, 21 studies complying with the review criteria were found. In the said studies, the definitions of the intervention groups were examined by the researchers conducting the studies and it was observed that 16 studies were named as CBT-based, 3 as ACT, and 2 as Mindfulness-based. Thus, the results of the studies compiled under the roof of Cognitive Behavioral Therapies were divided into three categories. These categories were named as Cognitive Behavioral Therapy (CBT), Acceptance and Commitment Therapy (ACT), and Mindfulness-Based Cognitive Therapy (MBCT).

Studies naming the intervention groups as CBT-based were considered in the CBT category. When the intervention groups and intervention contents of 16 studies in CBT category were examined, it was observed that 6 studies included technology-based CBT intervention programs (Savard et al. 2014, 2016, Ferguson et al. 2016, Hummel et

Table 1. Categories, sub-categories and general characteristics of the studies regarding the review

Category	Sub-category	Study	Sample size and characteristics	Measurement frequency	Intervened variables
CBT	TBCBT	Savard et al. (2014)	239 Radiotherapy areas	Pre-Post 3, 6 and 12-month follow-up	Insomnia
		Savard et al. (2016)	239 Chemotherapy and radiotherapy areas	Pre-Post 3, 6 and 12-month follow-up	Insomnia
		Ferguson et al. (2016)	44 Individuals in cancer follow-up period	Pre-Post 2-month follow-up	Cognitive dysfunction related to chemotherapy
		Atema et al. (2019)	245 Individuals in cancer follow-up period	Pre-Post 2 and 6-month follow-up	Menopouse symptoms
		Hummel et al. (2017)	169 Individuals in cancer follow-up period	Pre-Post 3 and 9-month follow-up	Sexual dysfunction Closeness in relationship
		(Zachariae et al. (2018)	255 Individuals in cancer follow-up period	Pre-Post 9 and 15-month follow-up	Insomnia
	Standard CBT	(Savard et al. (2005)	57 Individuals in cancer follow-up period	Pre-Post 3, 6 and 12-month follow-up	Insomnia
		Qiu et al. (2013)	62 Individuals completed chemotherapy and radiotherapy	Pre-Post 6-month follow-up	Depression Quality of life Self-esteem
		Irwin et al. (2017)	95 Individuals in cancer follow-up period	Pre-Post 6 and 15-month follow-up	Insomnia
	CBTH	Montgomery et al. (2009)	39 Radiotherapy areas	Pre-Post 1-month follow-up	Fatigue related to radiotherapy
	DA	(Hopko et al. (2011)	80 Unspecified	Pre-Post 12-month follow-up	Depression
	CBSM	Antoni et al. (2009)	128 Receiving therapy without metastasis	Pre-Post 6 and 12-month follow-up	Psycho-social and Physiological adaptation
		Stagl et al. (2015a)	237 Stage 0-III without metastasis and operated individuals	Pre-Post 5-year follow-up	Depression
		Stagl et al. (2015b)	100 Stage 0-III without metastasis	Pre-Post 8-15 years follow-up	Depression Quality of Life

Table 1 continued

	Gudenkauf et al. (2015)	183 Stage 0-III without metastasis	Pre-Post	Psychological adaptation
	Nápoles et al. (2015)	151 1 year passed over the diagnosis	Pre-Post 6-month follow-up	Quality of life related to health
ACT	Najvani et al. (2015)	20 Without metastasis	Pre-Post 1-month follow-up	Depression Psychological flexibility
	Mosher et al. (2018)	47 With metastasis	Pre-Post 12-week follow-up	Pain Fatigue Sleep disorders Depressive symptoms
	Montazer et al. (2018)	29 Stage 0-II with completed operation process	Pre-Post	Psychological adaptation
MBCT	Johannsen et al. (2016)	129 Individuals completed treatments	Pre-Post 1, 3 and 6-month follow-up	Post-treatment pain
	Javadi et al. (2018)	36 Between 30 and 55 years old	Pre-Post Follow-up period is not specified	Depression Anxiety Stress symptoms

ACT: Acceptance and Commitment Therapy, BA: Behavioral Activation, CBSM: Cognitive Behavioral Stress Management, CBT: Cognitive Behavioral Therapy, CBTH: CBT- Hypnosis, CBTVI: CBT via Internet, GCBT: Group BDT, IBCBT: Internet-based CBT, , MBCT: Mindfulness-based CBT, Pre-Post: Pre-test Post-test practice, PCBT: Professional CBT group, TBCBT: Technology-based CBT, VCBT: Video-based CBT, VMAT: Video-Conference CBT-based Memory and Attention Training.

al. 2017, Zachariae et al. 2018, Atema et al. 2019). These studies were examined under the Technology-based CBT (TBCBT) sub-category. When TBCBT was examined, it was found that video-based group was used in 2 studies (Savard et al. 2014, 2016), video conference in 1 study (Ferguson et al. 2016), and internet-based CBT was used in 3 studies (Hummel et al. 2017, Zachariae et al. 2018, Atema et al. 2019). In CBT category, it was seen that 3 studies were identified as CBT by the intervention groups and the said studies were considered in the Standard CBT subcategory (Savard et al. 2005, Qiu et al. 2013, Irwin et al. 2017). When other two studies in CBT category were examined, it was observed that CBT and hypnosis were used together in one of them (Montromery et al. 2009) and the said study was handled in the CBT Hypnosis (CBTH) sub-category. Although there are two comparative intervention groups in the other study, the sub-category of the study was called as Behavioral Activation (BA) because the priority of the study was to test the efficacy of behavioral activation (Hopko et al. 2011).

However, it was observed that the intervention groups of 5 of 16 studies in the CBT category consisted of standardized Cognitive Behavioral Stress Management (CBSM) program. Five studies that were applied as randomized were examined in CBSM sub-category (Antoni et al. 2009, Gudenkauf et al. 2015, Nápoles et al. 2015, Stagl et al. 2015a, 2015b). In addition, of 21 studies, Acceptance and Commitment Therapy (ACT) was used in 1 (Najvani Neshatdoost Abedi and Mokarian 2015), ACT via telephone interview in

1 (Mosher et al. 2018), and ACT integrated with forgiveness in the remaining studies (Montazer Salehzadeh and Nasirian 2018) were used and such studies were taken to the ACT category. From the remaining 2 studies, the study conducted by Johannsen et al. (2016) used the MBCT approach in the intervention group. In the other study, it was observed that MBCT and Meta-cognitive therapy models were compared (Javadi et al. 2018). As a result, these studies were considered in MBCT category.

Sample size and characteristics

when the sample sizes of the studies were analyzed, they varied between 20 and 255. It was found that the highesy sample size was 255 in the study of Zachariae et al. (2015) and the lowest one was 20 in the study of Najvani et al. (2015). When the characteristics of the samples in the studies were examined, it was found that the samples were defined as the treatment subjects in 4 studies (Antoni et al. 2009, Montgomery et al. 2009, Savard et al. 2014, Savard et al. 2016). It was seen that individuals at cancer follow-up period were present in six studies (Savard et al. 2005, Ferguson et al. 2016, Hummel et al. 2017, Irwin et al. 2017, Zachariae et al. 2018), individuals completed their treatment in 2 studies (Qiu et al. 2013, Johannsen et al. 2016), and the sample was not defined in 1 study (Hopko et al. 2011). Despite it was defined as a sample without metastasis in four studies, the stages of the sample were given in three of these studies (Gudenkauf et al. 2015, Stagl et al. 2015a, Stagl et al. 2015b, Montazer et al. 2018), while it was defined as "without metastasis" in another study (Najvani et al. 2015). When the remaining 3 studies were analyzed, it was observed that in one study, there were only one year after diagnosis (Nápoles et al. 2015), the other with metastases (Mosher et al. 2018) and finally only the individuals identified by age ranges (Javadi et al. 2018).

Measurement frequency of the studies

when the models of the studies were examined, it was seen that the follow-up period was not specified in 1 study (Montazer et al. 2018). It was observed that the shortest follow-up period was 1 month (Montgomery et al. 2009; Najvani et al. 2015) and the longest was 15 years (Stagl et al. 2015b).

Intervened variables

when the intervened variables were examined in the studies, it was seen that the most intervened variable was depression (Hopko et al. 2011, Qiu et al. 2013, Najvani et al. 2015, Stagl et al. 2015a, Stagl et al. 2015b, Javadi et al. 2018, Mosher et al. 2018). Insomnia was used in 5 (Savard et al. 2005, Savard et al. 2014, Savard et al. 2016, Mosher et al. 2018, Zachariae et al. 2018) and quality of life was used in 3 studies (Qiu et al. 2013, Nápoles et al. 2015, Stagl et al. 2015b). Psychological and physical adaptation were considered in 3 studies (Antoni et al. 2009, Gudenkauf et al. 2015, Montazer et al. 2018). Also, fatigue was handled in 2 studies (Montgomery et al. 2009, Mosher et al. 2018). Anxiety was discussed in two studies (Javadi et al. 2018, Mosher et al. 2018). Cognitive dysfunction (Ferguson et al.

2016), menopause symptoms (Atema et al. 2019), sexual dysfunction, and sexual satisfaction (Hummel et al. 2017), self-esteem (Qiu et al. 2013), psychological flexibility (Najvani et al. 2015), stress (Javadi et al. 2018), and pain (Johannsen et al. 2016) were handled as intervention variables in one study each.

Categories, ıntergroup comparisons and results

Study groups

when the characteristics of the groups of twenty one studies were examined, it was seen that 12 studies included an intervention group and a control group or a waiting list (Savard et al. 2005, Irwin et al. 2008, Antoni et al. 2009, Qiu et al. 2013, Najvani et al. 2015, Nápoles et al. 2015, Ferguson et al. 2016, Johannsen et al. 2016, Hummel et al. 2017, Mosher et al. 2018, Montazer et al. 2018, Zachariae et al. 2018, Atema et al. 2019). It was observed that 2 intervention groups were created, and a comparison was made for the intervened variables in two studies. One of them is the CBT group and Tai Chi Chih (TCC) group, which were conducted for insomnia (Irwin et al. 2017). Another study is the behavioral activation and problem-solving group applied for depression (Hopko et al. 2011). In two studies, psycho-education groups were developed in order to compare the intervention group (Stagl et al. 2015a, Stagl et al.2015b). In five studies, it was seen that comparisons were made by developing two intervention groups and a control group (Montgomery et al. 2009, Savard et al. 2014, Gudenkauf et al. 2015, Savard et al. 2016, Javadi et al. 2018).

Comparison groups

when the results of the review studies in Table 2 are evaluated, it is seen that cognitive behavioral therapies are effective in the studies consisting of an intervention group and a control and a support group or a waiting list. As an example, technology-based Video-Conference CBT-based Memory and Attention Training (VMAT) (Ferguson et al. 2016) and Internet-based CBT (IBCBT) (Hummel et al. 2017, Zachariae et al. 2018, Atema et al. 2019), standard BDT (Savard et al. 2005, Qiu et al. 2013) and CBSM (Antoni 2003, Nápoles et al. 2015), ACT (Najvani et al. 2015, Montazer et al. 2018, Mosher et al. 2018), MCBT (Irwin et al. 2017) groups take place within these interventions. At the same time, it is also observed in the comparisons made both in intervention and psycho-education groups that CBT is more effective than reducing the symptoms of depression and improving the quality of life when compared to the psycho-education group (Stagl et al. 2015a, Stagl et al. 2015b). In addition, it is observed that CBT-based intervention practices carried out by professionals are more effective than the intervention practices including technology, and the control groups. For example, the results of the Professional CBT (PCBT) intervention show that it is more effective on insomnia when compared to the results of the VCBT and the control group (Savard et al. 2014, Savard et al. 2016). The results of the studies including two intervention groups and a control/waiting list show that the intervention programs are effective. The results of CBSM and the relaxation group approve that they are effective

Table 2. Study-related categories, sub-categories, and comparisons between groups and their effects on the variables

Category	Sub-category	Study	Study groups	Result
CBT	TBCBT	Savard et al. (2014)	1. PCBT, 2. VCBT 3. Control group	PCBT and VCBT have a significant effect on the decrease of the strength of insomnia compared to the control group. PCBT has a significant effect on the decrease of the strength of insomnia compared to the VCBT.
		Savard et al. (2016)	1. PCBT, 2. VCBT 3. Control group	PCBT and VCBT have a significant effect on the decrease of the strength of insomnia in 3, 6, and 12-month follow-up compared to the control group. PCBT has a significant effect on the decrease of the strength of insomnia 3, 6, and 12-month follow-up compared to the VCBT.
		Ferguson et al. (2016)	1. VMAT 2. Support group	VMAT has a significant contribution in cognitive dysfunction and a significant positive contribution in a 2-month follow up when compared to the support group.
	TBCBT	Atema et al. (2019)	1. IBCBT 2. Control group	IBCBT has a significant effect on the decrease of the menopouse symptoms in 2 and 6-month follow-up compared to the control group.
		Hummel et al. (2017)	1. IBCBT 2. Control group	IBCBT has a positive and significant effect on sexual dysfunction and closeness in relationship.
		Zachariae et al. (2018)	1. CBTVI 2. Control group	CBTVI has a significant positive effect on insomnia in 9 and 15-month follow-up when compared to the control group.
	Standard CBT	Savard et al. (2005)	1. CBT 2. Control group	CBT has a significant effect on the strength of insomnia and a significant positive effect in 3, 6 and 12-month follow-up.
		(Qiu et al. (2013)	1. GCBT 2. Control group	GBDT has a significant effect on 6-month follow-up in decreasing the depression symptoms, increasing quality of life and self-esteem when compared to the control group.
		Irwin et al. (2017)	1. CBT 2. Tai Chi Chih group (TCC)	CBT and TCC groups have a significant effect on increasing the quality of sleep in 2, 3 and 15-month follow-up.
	CBTH	Montgomery et al. (2009)[	1. CBTH 2. Standard medical care group 3. Control group	CBTH has a significant effect on decreasing the strength of fatigue when compared to other two groups.
	BA	Hopko et al. (2011)	1. BA group 2. Problem-solving Therapy Group	BA and Problem-solving Therapy Group have a significant effect on decreasing the depression symptoms in a 12-month follow-up.
	CBSM	Antoni et al. (2009)	1. CBSM group 2. Control group	CBSM has a significant effect on increasing psycho-social adaptation and physiological adaptation in 6 and 12-month follow-up when compared to the control group.
		Stagl et al. (2015a)	1.CBSM 2. Psycho-education group	CBSM group has a significant effect on decreasing the depression symptoms in a 5-year follow-up when compared to the psycho-education group.

	Stagl et al. (2015b)	1. CBSM 2. Psycho-education group	CBSM group has a significant effect on decreasing the depression symptoms and increasing the quality of life in a 8 and 15-year follow-up when compared to the psycho-education group.
	Gudenkauf et al. (2015)	1. CBSM 2. Relaxation training group 3. Health education group	CBSM and Relaxation Training have a significant effect on increasing the psychological adaptation.
	Nápoles et al. (2015)	1. CBSM 2. Control group	CBSM group has a significant effect on increasing the quality of life related to health in a 1-year follow-up when compared to the control group.
ACT	Najvani et al. (2015)	1. ACT group 2. Control group	ACT has a significant effect on decreasing the depression symptoms and increasing the psychological flexibility in a 6-month follow-up when compared to the control group.
	Mosher et al. (2018)	1. ACT telephone interview 2. Support/ education telephone interview	ACT has a significant effect on decreasing fatigue and sleep disorder continuing for 12 months when compared to the support training. ACT and support training group have a significant effect on decreasing the depression symptoms in a 12-month follow-up.
	Montazer et al. (2018)	1. ACT integrated with forgiveness 2. Control group	ACT has a significant effect on increasing the psychological adaptation when compared to the control group.
MBCT	Johannsen et al. (2016)	1. MBCT 2. Waiting list	MBCT has a significant effect on the decrease of the pain in 1, 3, and 6-month follow-up according to the waiting list.
	Javadi et al. (2018)	1. MBCT 2. Metacognitive Therapy 3. Control group	MBCT and Metacognitive therapy have a significant and continuous effect on reducing depression, anxiety, and stress symptoms when compared to the control group. MBCT has a significant and continuous effect on reducing depression, anxiety, and stress symptoms when compared to metacognitive therapy.

ACT: Acceptance and Commitment Therapy, BA: Behavioral Activation, CBSM: Cognitive Behavioral Stress Management, CBT: Cognitive Behavioral Therapy, CBTH: CBT- Hypnosis, CBTVI: CBT via Internet, GCBT: Group BDT, IBCBT: Internet-based CBT, , MBCT: Mindfulness-based CBT, Pre-Post: Pre-test Post-test practice, PCBT: Professional CBT group, TBCBT: Technology-based CBT, VCBT: Video-based CBT, VMAT: Video-Conference CBT-based Memory and Attention Training.

programs according to the results of the control group (Gudenkauf et al. 2015). However, it is observed that both intervention groups are also effective in the studies comparing only two intervention groups. For example, CBT and Tai Chi Chih (TCC) interventions have the same positive effect on the insomnia variable (Irwin et al. 2017). Finally, it is seen that behavioral activation and problem-solving interventions seem to have the same positive effect on depression (Hopko et al. 2011). In the comparison between MBCT and Metacognitive therapy under the roof of cognitive behavioral therapies, it can be observed that MBCT is more effective in reducing depression and anxiety symptoms than Metacognitive therapy, but both intervention methods have efficient intervention approaches in reducing stress responses when compared to the control group (Javadi et al. 2018).

Effects of the studies on variables

when the studies were conducted in terms of the effect of interventions on variables,

cognitive impairment (Ferguson et al. 2016), menopause symptoms (Atema et al. 2019), fatigue related to radiotherapy (Montgomery et al. 2009), physiological adaptation (Antoni et al. 2009), and cognitive behavioral therapies seemed to be effective on the biological side effects of breast cancer treatments such as post-treatment pain (Johannsen et al. 2016). In addition, it is observed that cognitive behavioral therapies are effective in reducing the negative psycho-social symptoms in WBC such as depression (Hopko et al. 2011, Qiu et al. 2013, Najvani et al. 2015, Stagl et al. 2015a, Stagl et al. 2015b Javadi et al. 2018), insomnia (Savard et al. 2005, Savard et al. 2014, Savard et al. 2016, Mosher et al. 2018, Zachariae et al. 2018), quality of life (Qiu et al. 2013, Nápoles et al. 2015, Stagl et al. 2015b), psycho-social adaptation (Antoni et al. 2009, Gudenkauf et al. 2015, Montazer et al. 2018), self-esteem (Qiu et al. 2013), anxiety and stress (Javadi et al. 2018), and sexual dysfunction (Hummel et al. 2017).

Discussion

The aim of the present study is to make a systematic review of randomized controlled Cognitive Behavioral Therapies conducted with WBC. The CBT approaches used by 21 studies that complied with the review criteria when developing the intervention groups were categorized depending on the therapies in different generations or periods mentioned in the literature (Vatan 2016, Hayes and Hofmann 2017, Ruggiero et al. 2018). These categories were divided into 3 as CBT, ACT, and MBCT.

Six of the studies in CBT category consisted of technology-based CBT programs. Advancing technology and internet use have expanded the quality that can be reached by clinic-based cognitive behavioral therapies. Technology-based programs using personal computers, smart phones, and tablets enabled the intervention studies with or without therapists (Cornacchio Sanchez Chou and Comer 2017). Computer games or programs, websites containing information and CDs, mood or behavior monitoring programs via smart phones can be specified examples for such applications (Donovan 2013). As a result, it can be stated that cancer in WBC can be effective on the bio-psycho-social negative effects, regardless of whether it takes place in technology-based interventions, video conferencing, or over the internet. Similar results are also valid for the comparisons between the intervention group and the control or waiting list and the support groups (Savard et al. 2014, Ferguson et al. 2016, Savard et al. 2016, Hummel et al. 2017, Zachariae et al. 2018, Atema et al. 2019). However, the results show that vis-à-vis PCBT groups are more effective than the VCBT group conducted via video (Savard et al. 2014, Savard et al. 2016). Several factors can be mentioned regarding the effectiveness of the studies providing professional guidance. The immediate feedback by the therapist to the participants during the practice can help the participants develop their learning strategies. In addition, supportive attitude of the therapist may positively affect the therapeutic attitudes by increasing the self-efficacy perceived by the participants (Savard et al. 2014). Such results show that more comparative studies are required in CBT practices that are conducted via technology in terms of WBC.

On the other hand, the findings are such as to prove the efficacy of the studies carried out with CBT given in the standard CBT subcategory (Savard et al. 2005, Montgomery et al. 2009, Qiu et al. 2013,). This result complies with the literature (Matthews Grunfeld and Turner 2016). However, in the study comparing the effect of the CBT and TCC groups on insomnia, it was observed that both interventions had positive effects on insomnia (Irwin et al. 2017). As a standardized form of Tai Chi, TCC can be defined as the mind-body intervention involving slow physical activities and meditation (Irwin Olmstead and Motivala 2008). The results of the study show that mindfulness-based studies can also be important in WBC (Irwin et al. 2017). There are similarities between mindfulness and Tai Chi. Mindfulness is to focus on a single direction, purpose and moment, and attention without judgment (Kabat-Zinn, 1994). However, mindfulness consists of two components. The first one is to stay in the mental events and experiences focusing on the moment. The second component is to adapt to an experience specialized with curiosity, openness, and acceptance (Bishop et al. 2004). Similarly in TCC, it is important to intentionally direct the focus and maintain a curious and open attitude (Burschka Keune Oy Oschmann and Kuhn 2014). The results of the present study also show that mindfulness-based studies may be important in the studies to be conducted with insomnia and WBC (Irwin et al. 2017). The results of the meta-analysis also verify that mindfulness-based studies are effective on insomnia (Wang et al. 2018).

In the present study that has been conducted, ACT and mindfulness-based intervention programs have been obtained in terms of WBC. In WBC, it was observed that ACT was effective on depression, cancer adaptation, fatigue, and insomnia (Najvani et al. 2015, Montazer et al. 2018, Mosher et al. 2018). The essential aim of ACT is to increase psychological flexibility. Psychological flexibility consists of six dimensions including mindfulness, differentiation, acceptance, contextual self, values, and commitment according to the values (Stoddard and Afari 2014). Intervention studies conducted with MBCT are also seem to be effective in reducing the symptoms of pain, depression, and anxiety in WBC (Johannsen et al. 2016, Javadi et al. 2018). As Beatty et al. stated (2018), the studies based on mindfulness should be considered as a significant factor in decreasing psychological distress in WBC.

On the other hand, it has been observed that behavioral activation and problem-solving groups have the same positive impact on depression (Hopko et al. 2011). Behavioral activation is considered as one of the effective interventions in the treatment of depression (Dimidjian et al. 2006, Gawrysiak Nicholas and Hopko 2009). Similarly, the results of meta-analysis studies show that problem-solving therapy is also effective in reducing the depressive symptoms (Bell and D'Zurilla 2009). Despite the methods used to decrease depressive symptoms are different in both approaches, they have functional similarities. In both interventions, it is aimed to reduce repulsive environmental coincidences and to increase responses oriented to randomized positive reinforcers, in other words, the avoidance behaviors are reduced (Hopko et al. 2011, Hopko et al. 2013). Although the specified functional similarities, more studies are required for determining which factors of behavioral activation or problem-solving interventions in WBC are effective in depression.

In addition, it can be seen that the studies examined in the CBSM subcategory in CBT category are also effective in WBC (Antoni et al. 2009, Gudenkauf et al. 2015, Nápoles et al. 2015, Stagl et al. 2015a, Stagl et al. 2015b). CBSM is an intervention program configured with 2-hour sessions over a 10-week period. Sessions consist of stress management, cognitive structuring, social support, assertiveness training, anger management, and coping skills training and, relaxation training (meditation, breathing exercises, guided imagery, progressive muscle relaxation) (Antoni 2003). It can be specified that as CBSM, which is configured within the scope of the present study, decreases the depression levels of WBC, it also increases the psychological and physiological adaptation, and the quality of life.

Within the scope of the review study, it was seen that the most intervened variable, in other words, the dependent variable was depression and took place in both second and third-wave studies. Depression is quite common in women with breast cancer, and prevalence doubles in low-income countries (Pilevarzadeh et al. 2019). Meta-analysis studies comparing the effective intervention approaches for depression in WBC show that CBT is outstanding (Matthews Grunfeld and Turner 2017, Xiao 2019). As specified by Moorey and Watson (2015), the contribution of CBT to the interventions conducted with individuals with cancer was the adaptation of the treatment protocols to cancer. It has been proven by randomized controlled studies and meta-analysis studies that CBT is an effective approach for depression with both theoretical and evidence-based intervention packages (David Cristea and Beck 2018). The second most intervened variable in the present study is insomnia. In non-pharmacological interventions against insomnia, it has been verified that cognitive interventions such as behavioral interventions including psychological training, relaxation, stimulus control, and intervention towards non-functional thoughts are effective and treatments involving such interventions have been defined as Cognitive Behavioral Therapies for Insomnia (CBTI) (Morgenthaler 2006). CBTI is presented as the first therapy option for insomnia (van Straten et al. 2018). Thus, it can be stated that the treatment packages in the CBT and the theory underlying the change are effective in psychological interventions towards WBC.

The present study has specific limitations. The heterogeneity of the studies limits the generalizability of the present review study. The presence of different intervention and comparison groups in the studies prevented absolute judgments regarding the effectiveness of the studies. Also, the samples constitute of women WBC in different stages of cancer and in different steps (for example, those with primary treatment or in cancer follow-up) or having different cancer therapies. Such differences have a possibility to cause various psychological results. This heterogeneity could be caused by the fact that the inclusion criteria specified for the review study are not explicitly specified. The decision in the inclusion criteria was caused by the purpose of compiling the second and third-wave Cognitive Behavioral Therapies in women WBC within one study. In the studies included in the review, the effect sizes on the dependent variables could not be presented since they were not reported in most studies. In conclusion, as the follow-up periods in the review studies submitted in the present review study are very different and the results are not submitted in some studies, the differences of the effects in the time periods have not been stated.

Conclusion

In the context of cognitive behavioral therapies conducted with WBC, it can be expressed that randomized controlled studies are generally effective in breast cancer in women. Studies in the CBT, ACT, and MBCT show that the second and third generations are effective in the bio-psycho-social distress experienced by women with breast cancer. However, although 12 of the 21 studies included in the study were CBT-based, 3 took place in ACT, and 2 in MBCT categories. The reason regarding the number of third-wave studies are lower than CBT may be caused by the fact that the third-wave studies are new than the second-wave and that they have just started to provide initial findings in health-related areas. As specified by David et al. (2018), the results of the third-wave studies can be specified as the primary results. When the studies within the scope of the present review study are examined, relaxation, meditation, and mindfulness take place in the interventions in studies conducted with WBC. In addition, it has been observed that the studies conducted in recent years have increased via technology, especially the studies carried out over the internet. One of the novel results of the review study is that the randomized studies including CBT programs conducted with WBC in Turkish literature were not available. It is seen that such studies are also needed in Turkey.

In conclusion, in the studies in the present review study conducted with women with breast cancer, the development of cognitive behavioral therapies shown as the golden standard was examined (Beatty et al. 2018). Within the scope of the review study, no limitations were done in terms of the dependent variables in which the effects of the studies were examined. Examination of the effects of the second- and third-wave CBT approaches on specific dependent variables will contribute to the literature. In addition, verification of the common effects of the results with meta-analysis method statistically will be a guiding factor for the intervention studies to be conducted with WBC.

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