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Home-based multidimensional survivorship programmes for breast cancer survivors (Review)

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[Intervention Review]

Home-based multidimensional survivorship programmes for breast cancer survivors

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ABSTRACT

Background

The prognosis and survival rate of women with breast cancer have significantly improved worldwide. Effective home-based multidimensional programmes for breast cancer survivors have gained an ever greater emphasis in survivorship care to maximise women's quality of life for their successful transition to rehabilitation and normal life. It is important to summarise the best available evidence to evaluate the effects of home-based multidimensional survivorship programmes on quality of life in women within 10 years of the completion of surgery or adjuvant cancer therapy for breast cancer, or both.

Objectives

To assess the effects of home-based, multidimensional survivorship (HBMS) programmes on maintaining or improving the quality of life in breast cancer survivors.

Search methods

In April 2016 we searched the Cochrane Breast Cancer Specialised Register, CENTRAL, PubMed, Embase, CINAHL Plus, PsycINFO, Web of Science, and the World Health Organization's International Clinical Trials Registry Platform (WHO ICTRP) and ClinicalTrials.gov. We also screened reference lists of all identified studies and contacted study authors.

Selection criteria

Randomised controlled trials (RCTs) and quasi-RCTs assessing the effects of HBMS programmes in maintaining or improving quality of life in women with stages 0 to 3 breast cancer who completed primary cancer treatment (surgery or adjuvant cancer therapy, or both) up to 10 years earlier. We considered studies where the interventions included more than one of the following listed components: educational (such as information provision and self-management advice), physical (such as exercise training and resistance training) and psychological (such as counselling and cognitive therapies), to constitute a multidimensional programme. Interventions had to be allowed to be carried out at home.

Data collection and analysis

Two authors independently assessed eligible studies for inclusion, and performed quality assessment and extracted relevant data of the included studies. Quality of life was the primary outcome of the review.

Main results

We included 22 RCTs and four quasi-RCTs on 2272 participants. We categorised the intervention components into four groups: educational and psychological; educational and physical; physical and psychological; and educational, physical and psychological. Most of the studies

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used usual care (routine medical follow-up services) as the comparator. A few studies used a lower level or different type of intervention (e.g. stress management or exercise) or attention control as the comparator.

We used the Functional Assessment of Cancer Therapy-Breast (FACT B), European Organisation for Research and Treatment of Cancer Quality of Life C30 (EORTC C30), Quality of Life (QoL) Breast Cancer, and SF36 questionnaires to assess quality of life. HBMS programmes may increase breast cancer-specific quality of life and global quality of life immediately after the intervention, as measured by FACT-B and EORTC C30 (FACT-B: mean difference (MD) 4.55, 95% confidence interval (CI) 2.33 to 6.78, 7 studies, 764 participants; EORTC: MD 4.38, 95% CI 0.11 to 8.64, 6 studies; 299 participants; moderate-quality evidence). There was no evidence of a difference in quality of life as measured by QoL-Breast Cancer or SF-36 (QoL-Breast Cancer: MD 0.42, 95% CI -0.02 to 0.85, 2 studies, 111 participants, very low-quality evidence; physical composite score SF36: MD 0.55, 95% CI -3.52 to 4.63, 2 studies, 308 participants, low-quality evidence).

We observed a similar pattern at one to three months after the intervention: FACT-B (MD 6.10, 95% CI 2.48 to 9.72, 2 studies, 426 participants), EORTC-C30 (MD 6.32, 95% CI 0.61 to 12.04, 2 studies; 172 participants) and QoL-Breast Cancer (MD 0.45, 95% CI -0.19 to 1.09, 1 study, 61 participants). At four to six months and 12 months, there was no evidence of a difference in quality of life between groups (four to six months: EORTC - MD 0.08, 95% CI -7.28 to 7.44, 2 studies; 117 participants; SF-36 - MD -1.05, 95% CI -5.60 to 3.51, 2 studies, 308 participants; 12 months: EORTC - MD 2.04, 95% CI -9.91 to 13.99, 1 study; 57 participants).

Functional status was incorporated into the quality of life subscale findings. HBMS programmes may decrease anxiety (MD of Hospital Anxiety and Depression Scale (HADS) -1.01, 95% CI -1.94 to -0.08, 5 studies, 253 participants, low-quality evidence) compared to control immediately after the intervention but the effect did not persist at four to six months. There was no evidence of improvements in depression immediately after HBMS (MD of HADS -1.36, 95% CI -2.94 to 0.22, 4 studies, 213 participants, low-quality evidence) or at follow-up. HBMS programmes may also decrease fatigue (MD -1.11, 95% CI -1.78 to -0.45, 3 studies, 127 participants; low-quality evidence) and insomnia (MD -1.81, 95% CI -3.34 to -0.27, 3 studies, 185 participants, low-quality evidence).

None of the included studies reported service needs and utilisation and cost of care, and therefore the effect of HBMS programmes on healthcare utilisation and cost is unknown. Due to the variations in assessment methods of adherence among the eight studies, we could not combine the results for meta-analysis. We synthesised the results narratively, with the reported adherence rates of 58% to 100%.

Authors' conclusions

The results of this systematic review and meta-analysis revealed that HBMS programmes in breast cancer survivors appear to have a short-term beneficial effect of improving breast cancer-specific quality of life and global quality of life as measured by FACT-B and EORTC-C30, respectively. In addition, HBMS programmes are associated with a reduction in anxiety, fatigue and insomnia immediately after the intervention. We assessed the quality of evidence across studies as moderate for some outcomes, meaning that we are fairly confident about the results, while we assessed other outcomes as being low-quality, meaning that we are uncertain about the result.

PLAIN LANGUAGE SUMMARY

Home-based multidimensional survivorship programmes for breast cancer survivors

Background

The demands are growing for effective multidimensional survivorship programmes in women who have had breast cancer. This review was conducted to evaluate the effects of home-based multidimensional survivorship programmes on the quality of life in women who had completed primary treatment (surgery and/or chemotherapy and/or radiotherapy) for breast cancer in the previous 10 years.

Study characteristics

We found 26 studies with 2272 participants receiving home-based multidimensional survivorship programmes compared with control. The content and delivery approach of the home-based multidimensional survivorship programmes were diverse among the included studies. The survivorship programme could incorporate any combination of at least two of the three identified components: educational (such as the provision of information and advice on how to self-manage); physical (such as exercise or resistance training); and psychological (such as counselling and cognitive therapies). Most of the studies used usual care (routine medical follow-up services) as a comparator. A few studies used a lower level or different type of intervention (e.g. stress management or exercise) or attention control as the comparator.

The results revealed that home-based multidimensional survivorship programmes in breast cancer survivors appear to have a short-term beneficial effect of improving quality of life. Several other studies examined the effects of home-based multidimensional survivorship programmes on symptoms and psychosocial outcomes. Those breast cancer survivors who received home-based multidimensional survivorship programmes showed a reduction in fatigue, insomnia and anxiety, but the effect was in the short term. There was no difference between groups with respect to symptoms of depression, flushes and night sweats. We found that a group-based approach may be more effective than an individual-based approach to deliver the home-based multidimensional survivorship programmes. However, we found no evidence for a difference in quality of life with educational, psychological or physical components of the survivorship programmes.

Quality of evidence

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The quality of evidence across studies for quality of life ranged from moderate to very low, meaning that in some cases we were fairly confident about the results (e.g. quality of life improvements) while in other cases we were uncertain about the results (e.g. reductions in fatigue, insomnia and anxiety).

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SUMMARY OF FINDINGS

Summary of findings for the main comparison. Home-based multidimensional survivorship programmes for breast cancer survivors

Home-based multidimensional survivorship programmes compared to control for quality of life of breast cancer survivors

Patient or population: breast cancer survivors
Settings: home-based
Intervention: home-based multidimensional survivorship programmes

Comparison: control (most of the studies used usual care (i.e. routine medical follow-up services) as the comparator. A few studies used a lower level or different type of intervention (e.g. stress management or exercise), or attention control as the comparator)

Outcomes	Anticipated absolute effects (95% CI)*		No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Control	Home-based multidimensional survivorship programmes			
Quality of Life **FACT-B** Functional Assessment of Cancer Therapy - Breast Cancer Specific Scale from: 0-144 Follow-up: 0 to 3 months[1]	The mean quality of life in the control group was **109.4**	The mean quality of life - FACT-B in the intervention group was **4.55 higher** (2.33 to 6.78 higher) Higher score ==> Better Quality of Life	764 (7 studies)	⊕⊕⊕⊖ **moderate** [2]	
Quality of Life **EORTC** European Organisation for Research and Treatment of Cancer - Global Scale from: 0-100 Follow-up: 0 to 10 months[1]	The mean quality of life in the control group was **67.95**	The mean quality of life - EORTC in the intervention group was **4.38 higher** (0.11 to 8.64 higher) Higher score ==> Better Quality of Life	299 (6 studies)	⊕⊕⊕⊖ **moderate** [3]	
Quality of Life **QoL Breast Cancer** Quality of Life - Breast Cancer Overall Follow-up: 0 to 3 months[1]	The mean quality of life in the control group was **4.07**	The mean quality of life - QOL Breast Cancer in the intervention group was **0.42 higher** (0.02 lower to 0.85 higher) Higher score ==> Better Quality of Life	111 (2 studies)	⊕⊖⊖⊖ **very low** [4,5]	
Quality of Life - SF-36 (Physical)	The mean quality of life (physical) in the control group was	The mean quality of life - SF-36 (Physical) in the intervention group was **0.55 higher**	308 (2 studies)	⊕⊕⊖⊖ **low** [3,5]	

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SF-36 Physical Function Scale from: 0-100 Follow-up: 0 to 3 months[1]	**79.7**	(3.52 lower to 4.63 higher) Higher score ==> Better Quality of Life		
Anxiety Hospital Anxiety and Depression Scale Follow-up: 0 to 12 months[1]	The mean anxiety in the control group was **6.71**	The mean anxiety in the intervention group was **1.01 lower** (1.94 to 0.08 lower) Lower score ==> Less anxious	253 (5 studies)	⊕⊕⊖⊖ **low** [3,5]
Depression Hospital Anxiety and Depression Scale Follow-up: median 0 to 12 months[1]	The mean depression in the control group was **3.53**	The mean depression in the intervention group was **1.36 lower** (2.94 lower to 0.22 higher) Lower score ==> Less depression	213 (4 studies)	⊕⊕⊖⊖ **low** [3,5]
Fatigue Brief Fatigue Inventory Follow-up: 0 months[1]	The mean fatigue in the control group was **3.3**	The mean fatigue in the intervention group was **1.11 lower** (1.78 to 0.45 lower) Lower score ==> Less fatigue	127 (3 studies)	⊕⊕⊖⊖ **low** [3,5]

*__CI:__ Confidence interval

GRADE Working Group grades of evidence
High quality: further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: we are very uncertain about the estimate.

[1]Length of follow-up counted from end of intervention, 0 month refers to the measurements conducted at the end of the intervention.
[2]We downgraded the quality of evidence (risk of bias) 1 point for QoL FACT-B because (i) blinding was not implemented in the studies, (ii) participants were recruited using non-probability sampling and (iii) the participation rates were low.
[3]We downgraded the quality of evidence (risk of bias) 1 point for EOTRC -General because (i) allocation concealment was not mentioned in the studies, (ii) blinding was not implemented in the studies, (iii) selective reporting was unclear, (iv) participants were recruited using non-probability sampling and (v) the participation rates were low.
[4]We downgraded the quality of evidence (risk of bias) 2 points for QoL Breast Cancer because (i) allocation concealment was not mentioned in the studies, (ii) blinding was not implemented in the studies, (iii) selective reporting was unclear, (iv) participants were recruited using non-probability sampling and (v) the participation rates were low. Overall, around 50% of components were rated high risk of bias.
[5]We downgraded the quality of evidence (imprecision) 1 point for QoL Breast Cancer because the overall sample size < 400.

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BACKGROUND

Description of the condition

Breast cancer is the most common cancer in women worldwide (IARC 2014; WHO 2013). Early detection, advancements in adjuvant chemotherapy, radiological techniques, hormonal therapy and targeted therapies have significantly improved the survival rate of women with breast cancer. Overall five-year survival rates are now approaching 100% for stage 0 and 1 breast cancer, and are about 93% and 72% for stage 2 and stage 3 breast cancers, respectively, in the USA (ACS 2016). Similarly, in the UK, five-year survival rates are at 99.1%, 87.6% and 55.1% for stage 1, stage 2 and stage 3 breast cancer, respectively (Cancer Research UK 2017). Survival rates for breast cancer are expected to continue to increase, resulting in a growing population of patients with long-term care needs: this poses a challenge both for patients themselves and their families, and for oncology services.

The concept of cancer survivorship has been discussed in the medical literature, but an exact definition is yet to be reached. Most medical and psycho-oncology literature suggests that a cancer survivor is someone who has completed primary cancer treatment and moved towards a return to normal life, with a diminished risk of cancer recurrence, or who is living with cancer but is not in the terminal phase of illness (Gosain 2013; Hodgkinson 2007; Mullan 1985). Clinically, the first five to 10 years after breast cancer treatment is a vulnerable period, during which some women may face a multitude of short-term and long-term health and psychosocial problems, including persistent or late-emerging symptoms (or both) following the cancer and its treatment, and psychosocial distress associated with the risk of cancer recurrence, chronic uncertainty and social disruption (Binkley 2012; Cheng 2014; Ewertz 2011; Gandhi 2010; Janz 2007; Kim 2012; Kuehn 2000; Levangie 2009; Mehnert 2009; Rosedale 2010).

For cancer survivors, the goal is to maximise their physical and psychosocial well-being, and thus quality of life, for a successful transition to normal life patterns. Nevertheless, the healthcare services provided to cancer survivors post-treatment may be insufficient when compared to those provided in the earlier phase of diagnosis and treatment. It has been indicated in the literature that the traditional medical follow-up and surveillance functions of monitoring for recurrent cancer frequently fail to meet the supportive care needs of survivors, often resulting in feelings of abandonment during the transition from patient to survivor (Jefford 2008). Breast cancer survivors have said that off-treatment symptoms were much worse and persisted longer than expected, mainly because they felt that they were not taught realistically what to expect and also not introduced to appropriate rehabilitation programmes after treatment (Binkley 2012; Cheville 2007; Collins 2004; Lee 2010a).

International studies on the supportive care needs of breast cancer survivors consistently indicate that about one in two survivors report one or more unmet needs, and these are mostly in the healthcare system/information and psychological domains (Armes 2009; Cheng 2014; Harrison 2011). A recent study has indicated that within six months of primary cancer treatment, more than 50% of women have some or strong care needs in physical functioning, psychological functioning, and self and body image (Pauwels 2013). Literature suggests that unmet needs are associated with poor quality of life (Akechi 2011; Cheng 2016; So 2014). The demands for evidence-based, post-treatment survivorship care programmes in the breast cancer population are enormous. The National Care Survivorship Initiative (NCSI) and the Institute of Medicine (IOM) recommend a shift towards best-structured care for post-treatment cancer survivors, with a greater emphasis on recovery, health and well-being (NCSI 2010). In the USA, the National Coalition for Cancer Survivorship has highlighted the importance of survivorship care plans (NCCS 2009).

Description of the intervention

A home-based programme is defined as interventions that an individual can carry out at home over any duration of follow-up. The interventions should be easy to perform and facilitate long-term adherence.

Home-based, multidimensional survivorship programmes often take the form of multimodal interventions, including education, physical and psychological interventions, exercise training or dietary advice. An education intervention includes information about self-management strategies for physical symptoms and recovery, including topics such as fatigue, arm pain, numbness/tingling, lymphoedema, problems with sleeping, and regaining and rebuilding lives. A key support for cancer survivors is the provision of information (Van de Poll-Franse 2011). Beneficial effects of educational interventions on quality of life have been reported in breast cancer survivors (Fillion 2008; Meneses 2007). Dietary advice, including weight loss strategies, meal plans and caloric goal setting, is commonly present in breast cancer survivorship programmes. Positive effects of dietary advice on weight control, physical functioning and anxiety levels have been reported in breast cancer survivors (Kim 2011; Thompson 2012). Exercise programmes include muscle stretching, core stability exercises, physiotherapy and aquatic exercises. Physical activity and muscle strength have been shown to reduce fatigue and improve quality of life in breast cancer survivors (Cantereri-Villanueva 2012; Cuesta-Vargas 2014; Rogers 2009a). Psychological interventions, including psychotherapy and counselling, are important for assisting women in making the transition from treatment to recovery. Previous studies have shown that mindfulness-based psychotherapy may reduce depression and anxiety, fatigue and disturbed sleep in breast cancer survivors (Lengacher 2011; Lengacher 2012).

A home-based, multidimensional survivorship programme will contain training session(s) by a trained person or healthcare professional, with interventions delivered either individually or through group sessions in a healthcare or home-based setting, with any mode of delivery (such as in person, over the telephone or internet, or through multimedia). Supplementary training materials (including videos, booklets, self-help workbooks, internet-based resources, etc.) may be provided to reinforce practice at home (Gautam 2011; Morey 2009; Pinto 2005; Spector 2014). This provides breast cancer survivors with the knowledge and self-management skills necessary to manage their own care and to enhance their recovery, health and well-being (Bodenheimer 2002; Gautam 2011; Morey 2009; Pinto 2005; Spector 2014). The feasibility of and level of adherence to programmes are often assessed through the use of logbooks, self-monitoring diaries and motivational telephone calls (Cheville 2013; Gautam 2011; Jeffs 2013a; Lee 2013).

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How the intervention might work

Given the multifaceted nature of the transition process of a cancer survivor from treatment to recovery, multimodal interventions are required to address its full impact. Since breast cancer survivors normally have infrequent clinical follow-up (Grunfeld 2010), a home-based programme may offer a viable option in providing a more feasible and sustainable post-treatment survivorship programme. Previous studies have revealed that survivors need rehabilitation programmes that can assist them in the self-management of their health and psychosocial problems, which can include persistent or late-emerging symptoms (or both) following the cancer and its treatment, upper extremity dysfunction and psychosocial distress associated with the risk of cancer recurrence, chronic uncertainty and social disruption (Binkley 2012; Lattanzi 2010). Patient-training to increase active participation and self-care skills, which survivors can use for identifying and managing emerging symptoms and problems, and training to regain health, are essential elements for maximising quality of life and thus effective care transitions (Garrett 2013; Howell 2012). Positive correlations between levels of empowerment and self-care, symptom control, psychological adjustment and quality of life in cancer survivors have been documented (Ganz 2004; Loh 2011).

Why it is important to do this review

Several studies encompassing multidimensional and home-based programmes for breast cancer survivors have been conducted (Meneses 2007; Spector 2014). These programmes have varied in their intervention components and delivery structures. To date, a systematic review on the effectiveness of home-based, multidimensional programmes in maintaining or improving the quality of life of breast cancer survivors is not available. The aim of this review was therefore to assess the effectiveness of home-based, multidimensional survivorship programmes for breast cancer survivors, in order to guide evidence-based healthcare decision-making and policy in post-treatment survivorship planning and services.

OBJECTIVES

To assess the effects of home-based, multidimensional survivorship programmes (HBMS) on maintaining or improving quality of life in breast cancer survivors.

The review will evaluate the extent to which:
• survivorship programmes exert a different impact on different domains of quality of life (physical, functional, psychological and social well-being);
• survivorship programmes exert a different impact on different patient-reported and healthcare outcomes, including functional status, anxiety and depression, symptom severity and distress, and the need for and utilisation of services;
• different components and delivery structures influence outcomes;
• different survivorship periods influence outcomes; and
• different levels of adherence influence outcomes.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) and quasi-RCTs with or without blinding, assessing the effects of home-based, multidimensional survivorship programmes (HBMS) in maintaining or improving quality of life in women with breast cancer who had completed primary cancer treatment (surgery, adjuvant chemotherapy and radiotherapy) up to 10 years earlier.

Types of participants

Women (18 years and over) with a breast cancer diagnosis between stages 0 to 3 and within 10 years of the completion of primary cancer treatment (surgery, adjuvant chemotherapy and radiotherapy). Women with stage 4 or recurrent breast cancer were excluded.

Types of interventions

We considered studies where the interventions included more than one of the following listed components to constitute a multidimensional programme and included those that were allowed to be carried out at home over any duration of follow-up. The components are:

- educational (such as information provision, symptom management advice, dietary advice and self-management advice);
- physical (such as exercise training and resistance training); and
- psychological (such as mindfulness-based psychotherapy, counselling and cognitive therapies).

The interventions are often combined as multidimensional survivorship programmes for evaluation in RCTs and quasi-RCTs. This review sets out the evidence for the full range of survivorship programmes in an effort to identify the best components and delivery structures for breast cancer survivors.

The interventions must contain training session(s) by a trained person or healthcare professional. The interventions may be delivered individually or through group sessions in a healthcare or home-based setting, with any mode of delivery (such as in person, over the telephone or internet, or through multimedia). An intervention programme can be considered home-based if the interventions are allowed to be carried out at home and participants are advised to practise the intervention at home over any duration of follow-up after the delivery of the programme. Supplementary training materials (including videos, booklets, self-help workbooks, internet-based resources, etc.) must also be provided to reinforce practice at home. Examples of home-based interventions include, but are not limited to:

- exercise programmes that are taught to participants individually at the study site; participants are then asked to practise the programme at home and materials, such as videos and booklets, are provided to them (Cheville 2013);
- booklets consisting of information and demonstrations of self-management techniques are taught and provided to participants and they are instructed to practise the techniques at home (Jacobsen 2013; Morey 2009);

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- interventions implemented in a group-based setting, with booklets to reinforce learning given to participants; participants are advised to practise the intervention at home (Cadmus-Bertram 2013; Cho 2006).

The comparison group can include:

- those who have received a lower level or different type of intervention, such as routine services available or standard care;
- an active control, which provides the same amount of attention to the participants without the actual intervention;
- waiting list controls or no treatment;
- interventions given in different settings.

Types of outcome measures

Primary outcomes

- Health-related quality of life, measured using generic or disease-specific, validated instruments such as the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (QLQ-C30) (EORTC Quality of Life Department 2017), Functional Assessment of Cancer Therapy-Breast Cancer (FACT-B) (Cella 1993), Quality of Life Index - Cancer Version (QOLI-CV) (Ferrans 1990), Quality of Life – Cancer Survivor Tool (QOL-CS) (Ferrell 1995) or Cancer Rehabilitation Evaluation System (CARES) (Schag 1989).

Secondary outcomes

- Functional status (incorporated into measurements from functional subscales of quality of life instruments), symptom severity and distress (fatigue, insomnia, endocrine symptoms, symptom distress, and joint pain, stiffness and physical function), and psychosocial outcomes including anxiety and depression.
- Service needs and utilisation, including psychosocial and supportive care needs, unplanned re-admission and hospitalisation, and cost of care
- Participants' adherence to the programme interventions.

Search methods for identification of studies

Electronic searches

The electronic search for literature focused on retrieving published manuscripts in academic journals through systematic searching of the following databases.

- Cochrane Breast Cancer's Specialised Register (21 April 2016). Details of the search strategies used by Cochrane Breast Cancer for the identification of studies and the procedures used to code references are outlined in the Group's module (www.onlinelibrary.wiley.com/o/cochrane/clabout/articles/BREASTCA/frame.html). We planned to extract trials coded with the key words 'breast cancer survivor', 'survivorship', 'transitional care', 'home based', 'self care', 'self help', 'self management', 'self managed', 'survivorship surveillance', 'continuum of care', 'home-based multidimensional survivorship program' and 'post treatment care' for consideration.
- Cochrane Central Register of Controlled Trials (CENTRAL; 2016, Issue 3; www.cochranelibrary.com/about/central-landing-page.html) (refer to Appendix 1)
- Embase via OvidSP (1980 to 21 April 2016; www.ovid.com/site/catalog/databases/903.jsp) (refer to Appendix 2)
- PubMed (1976 to 28 March 2016; www.ncbi.nlm.nih.gov/pubmed/) (refer to Appendix 3)
- Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus via EBSCO (1966 to 28 March 2016; https://health.ebsco.com/products/the-cinahl-database) (refer to Appendix 4)
- PsycINFO via OvidSP (1987 to 21 April 2016; www.ovid.com/site/catalog/databases/139.jsp) (refer to Appendix 5)
- Web of Science via Web of Knowledge (1991 to 28 March 2016; www.webofknowledge.com/) (refer to Appendix 6).

We retrieved all peer-reviewed journal articles published in English from all time periods. We performed a pilot search on CINAHL to identify relevant keywords contained in the title, abstract and subject descriptors. We used the following terms, with wildcards and modifications where necessary, when performing searches on electronic databases.

The basic search terms used were:

- "Breast Neoplasm*" OR "Breast Cancer*" OR "Breast Carcinoma" OR "Breast Malignanc*" OR "Breast Tumor*" OR "Breast Lump*"
- survivor*
- survivorship OR therap* OR interven* OR program* OR evaluat* OR educat* OR rehabilit* OR effect* OR train* OR "post treatment care" OR "survivorship surveillance" OR "continuum of care" OR "transitional care" OR "home based" OR "home-based" OR "self care" OR "self-care" OR "self help" OR "self-help" OR "self manag*" OR "self-manag*" OR "multidimension*" OR "multi-dimension*"
- 1 AND 2 AND 3

In addition, we used the search strategy recommended in the *Cochrane Handbook for Systematic Reviews of Interventions* to optimise the sensitivity of randomised controlled trial identification (Lefebvre 2011).

Searching other resources

- We screened the bibliographies of all identified studies and reviews for any relevant publications.
- We contacted the first authors of identified studies and experts in the area of interest to enquire whether they were aware of any other relevant unpublished literature in the area or any initial results.
- We contacted the associations relevant to the field of oncology to identify any other relevant unpublished literature in the area. They included the American Cancer Society (ACS), Singapore Cancer Society (SCS), American Association for Cancer Research (AACR), Cancer Research UK (CRUK), Macmillan Cancer Support, the World Cancer Research Fund (WCRF), the Association for International Cancer Research (AICR) and the American Society of Clinical Oncology (ASCO).
- We identified grey literature and unpublished studies through searching the OpenGrey database (www.opengrey.eu) (Appendix 7) and Web of Science.
- We screened ongoing clinical trials for all prospectively registered trials. These included the World Health Organization's

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International Clinical Trials Registry Platform (WHO ICTRP) (21 April 2016) (Appendix 8) and www.clinicaltrials.gov (21 April 2016) (Appendix 9).

- We screened databases for theses and dissertations, including Digital Dissertation Consortium, ProQuest Dissertation and Theses Global (Appendix 10).

Data collection and analysis

Selection of studies

Two review authors (EL and ZMK) independently searched the electronic databases and stored all articles obtained in EndNote version X6 (www.endnote.com). We screened articles obtained from keyword searching for duplicates electronically with EndNote X6 and then manually. After duplicate removal, we assessed the remaining articles for eligibility based on titles and abstracts. We included studies in the next round of full-text screening if they met the following fundamental criteria:

- RCTs including quasi-RCTs;
- female breast cancer survivors (aged 18 and over) with a breast cancer diagnosis between stages 0 to 3;
- interventions were delivered to survivors who were within 10 years of the completion of primary cancer treatment (surgery, adjuvant chemotherapy and radiotherapy);
- interventions included both home-based and multidimensional components;
- health-related quality of life was reported as an outcome of the study, measured using a generic or disease-specific validated instrument.

We retrieved full-text articles if we considered the trials relevant and if there was insufficient information to determine inclusion or exclusion. We then examined each article against the established inclusion and exclusion criteria. We linked together multiple reports of the same study. We screened the bibliography of included trials and relevant reviews to identify additional relevant articles missed during the electronic search. We contacted the first authors of the eligible trials to seek further information about the methodology if necessary. The two review authors resolved any discrepancies in the inclusion or exclusion of the trials by discussion. Disagreements between review authors were resolved by consultation with a third review author (KC). We recorded a list of excluded trials and reasons for exclusion in the 'Characteristics of excluded studies' table.

Data extraction and management

Two review authors (EL and ZMK) independently reviewed and extracted the data from each eligible study. We extracted the following information and input this into a data extraction form.

- Publication information: authors, year of publication, title of study, journal published, country of study, recruitment source, language of publication and aim of study.
- Study characteristics: study design, total study duration, inclusion/exclusion criteria for participation in study, sample size and evidence of power calculation, sampling method, response rate, drop-out and withdrawal rate, sequence generation, allocation sequence concealment, blinding and method, quality of delivery (e.g. training of implementers) and presence of safeguard checks against diffusion of treatments.
- Participant information: age (range, mean, standard deviation), gender (only for trials performed on both men and women), tumour stage, cancer treatment modality, and distribution of participants to each group of the trial.
- Intervention group characteristics: number of intervention arms in the study, types of intervention (e.g. symptom management, exercise training, dietary interventions, problem-solving training, cognitive behavioural interventions, psycho-educational interventions, complementary interventions, spiritually focused psychotherapy), delivery structure (e.g. individual, group-based, telephone, internet, multimedia), delivery setting (e.g. hospital, home, community), frequency of intervention delivery (e.g. duration of intervention, number of sessions, duration of each session) and providers of the intervention (e.g. a trained person or healthcare professional).
- Comparison group characteristics: description of comparison group, e.g. those who received lower levels or different types of intervention (e.g. routine available services or standard care, active control, waiting list control, no treatment and interventions given in different settings).
- Outcome measures (quality of life, functional status, symptoms, psychosocial outcomes, services need and utilisation, cancer recurrence, participants' adherence and satisfaction): measurement tool used for each outcome, upper and lower limits and whether a high or low score is favourable, follow-up timing, frequency and duration for each outcome, and any missing data.

The two review authors resolved disagreements in data extraction through discussion and consulted a third, independent review author (KC) if disagreements could not be resolved.

Assessment of risk of bias in included studies

Two review authors (EL and ZMK) independently assessed the risk of bias of the included studies using The Cochrane 'Risk of bias' tool (Higgins 2011).

The tool consists of seven domains:

1. sequence generation;
2. allocation concealment;
3. blinding of participants and personnel;
4. blinding of outcome assessors;
5. incomplete outcome data;
6. selective outcome reporting;
7. other sources of bias.

A judgement of 'yes' indicated a low risk of bias, 'no' indicated a high risk of bias and 'unclear' indicated either unclear or unknown risk of bias. We recorded the assessment results in the 'Risk of bias' tables using Review Manager 5.3 (RevMan 5.3) software (RevMan 2014). We compared the judgements of the two independent review authors and resolved any disagreements through discussion. We consulted a third review author (KC) if disagreements could not be resolved.

Measures of treatment effect

Data reported in studies were dichotomous (e.g. satisfied or not satisfied), ordinal (e.g. different categories in quality of life scales) or continuous (e.g. changes in quality of life scores).

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Dichotomous outcomes

We extracted the number of participants in each treatment arm who experienced the outcome of interest and the number of participants assessed at endpoint using a 2 x 2 table and computed risk ratio (RR) with 95% confidence interval (CI) for each study.

Ordinal outcomes

If odds ratios (OR), say from proportional odds models, were reported for the ordinal outcome, we extracted the OR and its 95% CI.

Continuous outcomes

We computed the mean difference (MD) with a 95% CI for each study when the outcome was measured with the same scale for all studies; otherwise we computed standardised mean difference (SMD) and its 95% CI. If standard deviations were not reported, we planned to compute them using the methods described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Deeks 2011), given sufficient information was available or authors of the included papers provided additional information (e.g. mean, standard deviation or sample size of their studies).

Unit of analysis issues

The unit of analysis was the individual study and therefore we did not anticipate any unit of analysis issues.

Dealing with missing data

We reported the number of participants included in the final analysis of each included study as a proportion of all participants in the study and we recorded the reasons for exclusion from analysis for each study. We contacted the primary authors of the study to request any missing data, if possible.

Assessment of heterogeneity

We assessed heterogeneity quantitatively using the Chi^2 test (Deeks 2011) and I^2 statistic (Higgins 2003). We used a P value of less than 0.10 and the I^2 value (less than 30% as a low level, 30% to 50% as a moderate level and more than 50% as a substantial level of heterogeneity) to determine the heterogeneity (Deeks 2011).

Assessment of reporting biases

We searched grey literature to identify any unpublished studies that would be relevant. We used funnel plots to identify reporting bias where there were at least 10 studies included in the meta-analysis, to ensure that the power was sufficient (Sterne 2011). Asymmetry in the plots could indicate reporting bias. We also used the trim and fill method to examine the bias and to compute the adjusted estimate due to the potential bias (Duval 2000).

Data synthesis

For the effect measure for continuous outcomes we used MD or SMD and for dichotomous outcomes we used RR (Borenstein 2009). We used a fixed-effect model with an inverse variance approach when the level of heterogeneity was low, defined as I^2 less than 30% (Normand 1999), and a DerSimonian and Laird (DH) random-effects model when the heterogeneity was moderate, defined as I^2 between 30% and 70% (DerSimonian 2000). We presented pooled and individual results using forest plots with the results presented according to the follow-up period in chronological order (e.g. post intervention, one to three months after intervention, four to six months after intervention, etc.). Results from individual studies were not pooled when there was a substantial level of heterogeneity (i.e. I^2 more than 70%). We planned to use meta-regression to explore the source of heterogeneity only if there were enough studies (Borenstein 2009). Where there were insufficient studies for conducting meta-analysis, we summarised the results in a narrative format.

Summary of Findings table:

The GRADE approach was used to assess the quality of evidence for the following main outcomes:

- Fact-B Breast Cancer Specific
- EORTC - Global
- QoL Breast Cancer
- QoL SF-36 (Physical)
- Anxiety
- Depression
- Fatigue

We used GRADEproGDT software (GRADEproGDT) to develop the Summary of Findings table and followed GRADE guidance (Schünemann 2011). Two authors (EL and WWST) graded the quality of the evidence. We selected to report the quality of evidence for Fact-B Breast Cancer Specific because it is the overall score, computed by the sum of the general score and breast cancer sub-scale, specifically designed for capturing the QoL for women with breast cancer.

Subgroup analysis and investigation of heterogeneity

We planned to conduct subgroup analyses based on pre-defined subgroups, namely the type of cancer treatment modality, survivorship period (less than five years versus five years or more) and components of the multidimensional interventions (physical plus psychological, physical plus educational, psychological plus educational, physical plus psychological plus educational) to attempt to explore heterogeneity across the subgroups. Since none of the included studies provided stratified analysis according to cancer treatment modality and survivorship period, we were unable to perform subgroup analyses as per the review protocol.

In future review updates, if sufficient data are available, potential covariates for meta-regression will include the mean age of the participants and the mean time from first diagnosis. We may decide on additional covariates after data extraction from the included studies.

Sensitivity analysis

We performed sensitivity analysis for the primary outcome, quality of life, where meta-analysis was possible, by repeating the analysis with the exclusion of the following studies:

- studies with a high risk of bias, based on the Cochrane 'Risk of bias' tool;
- studies that were unpublished (grey literature).

We used a fixed-effect model for all outcomes regardless of the degree of heterogeneity so as to compare the sensitivity analyses with the results from the Data synthesis section. We identified

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further issues that threatened the robustness of the results in the meta-analysis during the review process and performed sensitivity analysis accordingly, to ensure that the identified issues would not interfere with the quality of the meta-analysis. We presented the results from the sensitivity analysis in a summary table. We computed the relative differences between the estimates from the main analysis and the sensitivity analysis for examination.

RESULTS

Description of studies

Results of the search

The electronic search retrieved 29,198 studies, of which 25,907 were left after duplication removal. We retrieved another seven studies from other sources, including bibliography lists of included articles, and screened the titles and abstracts of 25,914 records in total, subsequently excluding 25,740 studies, leaving 174 articles for full-text assessment. We retrieved each article and judged it against the inclusion and exclusion criteria. Following full-text screening we excluded 140 articles for various reasons (see Excluded studies). We included 26 studies in this review, of which 25 were journal articles (Cho 2006; Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Fillion 2008; Galantino 2010; Heidrich 2009; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Sherman 2010; Spahn 2013; Swisher 2015; Wonghongkul 2008), and 1 was a dissertation (Fiorentino 2008). Eight abstracts or ongoing trials (Abrahams 2015; Befort 2014; Hummel 2015; Marcus 1998; Matthews 2002; McDonald 2014; Rock 2013; NCT01515124) were not included in the synthesis as no data were available. See Figure 1.

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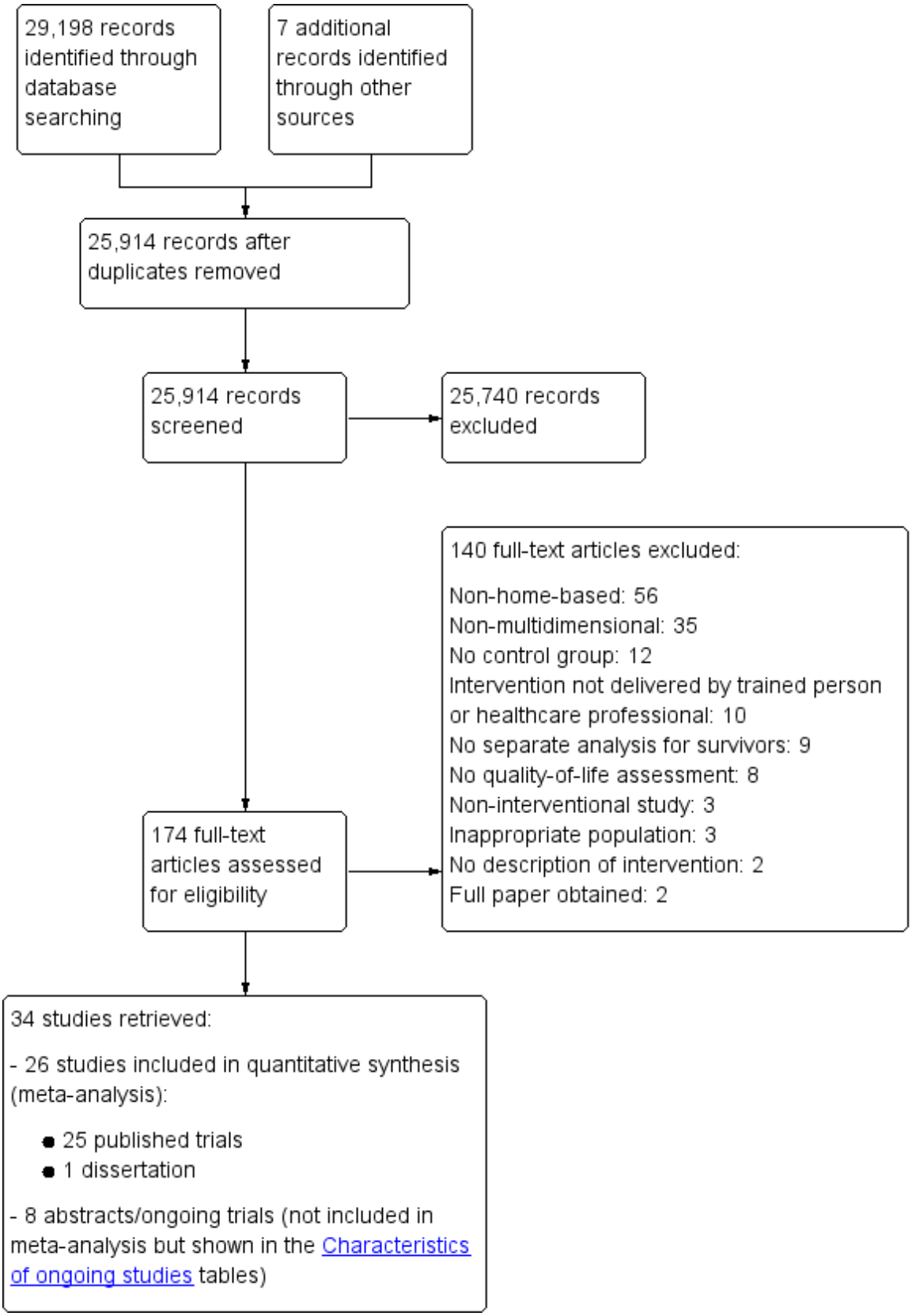
Figure 1. Study flow diagram



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Included studies

We identified 26 included studies (25 journal articles and 1 dissertation) and 8 ongoing studies for this review. (See Characteristics of included studies and Characteristics of ongoing studies tables).

Type of studies

Of the 26 full studies, 21 were RCTs (Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Fillion 2008; Fiorentino 2008; Heidrich 2009; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Mann 2012; Matthews 2014; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Spahn 2013; Swisher 2015) and four were quasi-RCTs (Cho 2006; Galantino 2010; Sherman 2010; Wonghongkul 2008). The last study (Loerzel 2008) was a secondary analysis of a RCT by Meneses 2007, which was also included in this review. Rogers 2009b and Rogers 2009c were multiple reports of the same study using the same study sample. Rogers 2009c reported the study outcomes at baseline and immediately post intervention, while Rogers 2009b reported the study outcomes at baseline, immediately post intervention and at three months post intervention.

Type of participants

All participants were diagnosed with stages 0 to 3 breast cancer and had completed primary cancer treatment. Due to the unavailability of data in the included studies, we could not ascertain if local recurrence and metastatic disease occurred in participants. Sample sizes in the studies ranged from 14 to 422 participants. Fifteen studies (Cho 2006; Dirksen 2008; Fillion 2008; Fiorentino 2008; Hoffman 2012; Kim 2011; Lengacher 2009; Loerzel 2008; Matthews 2014; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Sherman 2010; Spahn 2013) provided information on the tumour stage at diagnosis while 11 studies did not (Duijts 2012; Ergun 2013; Eyigor 2010; Galantino 2010; Heidrich 2009; Lahart 2016; Mann 2012; McClure 2010; Meneses 2007; Swisher 2015; Wonghongkul 2008). Among the studies that reported the tumour stage at diagnosis, 36 women had stage 0, 231 women had stage 1, 215 women had stage 2 and 87 women had stage 3 tumours at diagnosis in the HBMS group. In the comparison group, 35 women had stage 0, 225 women had stage 1, 194 women had stage 2 and 71 women had stage 3 tumours at diagnosis. Forty-one participants in the HBMS group and 15 participants from the comparison group did not report their tumour stage at diagnosis (Sherman 2010). Fiorentino 2008 and Loerzel 2008 did not provide information on the breakdown of the tumour stage at diagnosis by study group and overall 42 women had stage 1, 18 women had stage 2 and 4 women had stage 3 tumours at diagnosis.

Twenty-three studies (Cho 2006; Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Fillion 2008; Fiorentino 2008; Heidrich 2009; Hoffman 2012; Kim 2011; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Spahn 2013; Swisher 2015; Wonghongkul 2008) provided information on the treatment modality, while three studies did not (Galantino 2010; Lahart 2016; Sherman 2010). In the studies that provided information on the treatment modalities, 634 participants had surgery, 640 participants had chemotherapy, 395 participants had radiation therapy and 546 participants had hormonal therapy in the HBMS group. In the comparison group, 423 participants had surgery, 430 participants had chemotherapy, 381 participants had radiation therapy and 369 participants had hormonal therapy. Dirksen 2008 and Eyigor 2010 did not indicate the type of adjuvant therapy given to the participants. Dirksen 2008 stated that 26 and 27 participants had surgery and adjuvant therapy in the HBMS and control group, respectively. Eyigor 2010 indicated that 11 and three participants underwent adjuvant therapy in the two intervention groups respectively. Heidrich 2009, Fiorentino 2008 and Loerzel 2008 did not report separately the treatment modality by study group. In these three studies, 124 participants underwent surgery, 29 participants underwent chemotherapy, 84 participants underwent radiation therapy and 79 participants underwent hormonal treatment. Lengacher 2009 and Meneses 2007 provided percentages reflecting the treatment modalities that participants underwent. In Lengacher 2009, 61% of participants in the HBMS group underwent radiotherapy only, while 39% of the participants in the HBMS group underwent chemotherapy and radiotherapy. In the comparison group, 60.5% of participants underwent radiotherapy only, while 39.5% of participants underwent both radiotherapy and chemotherapy Lengacher 2009. In Meneses 2007, more than 60% of participants underwent breast-conserving surgery and 40% underwent single or bilateral mastectomy. In addition, more than 69% of participants underwent radiotherapy, 54% of participants underwent combination chemotherapy and more than 76% of participants were given tamoxifen or aromatase inhibitors.

Types of interventions

The interventions examined in the included studies were multidimensional and encompassed a combination of at least two of the three identified components: educational, physical and psychological. A home-based component was also present in all the interventions. Five studies (Duijts 2012; Rogers 2009b; Rogers 2009c; Rogers 2015; Swisher 2015) explored the effects of interventions comprising physical and psychological components, six studies (Ergun 2013; Eyigor 2010; Kim 2011; McClure 2010; Sherman 2010; Wonghongkul 2008) explored the effects of interventions comprising physical and educational components, while 12 studies (Dirksen 2008; Fiorentino 2008; Galantino 2010; Heidrich 2009; Hoffman 2012; Lahart 2016; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; Meneses 2007; Savard 2005) explored the effects of interventions comprising psychological and educational components. The remaining three studies (Cho 2006; Fillion 2008; Spahn 2013) examined the effects of interventions comprising physical, psychological and educational components.

The duration of the delivered interventions ranged from four weeks to six months. Four studies had interventions that lasted between four to six weeks (Fillion 2008; Lengacher 2009; Mann 2012; Fiorentino 2008) while 13 studies had interventions that lasted between 7 to 12 weeks (Cho 2006; Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Hoffman 2012; Kim 2011; Rogers 2009b; Rogers 2009c; Rogers 2015; Sherman 2010; Spahn 2013; Swisher 2015). Amongst the remaining nine studies, the intervention lasted more than 12 weeks for five studies (Galantino 2010; Lahart 2016; Loerzel 2008; McClure 2010; Meneses 2007) and the duration was not reported in four studies (Heidrich 2009; Matthews 2014; Savard 2005; Wonghongkul 2008).

Thirteen studies delivered the HBMS programme using group-based methods (Cho 2006; Dirksen 2008; Ergun 2013; Eyigor 2010; Hoffman 2012; Lengacher 2009; Mann 2012; McClure 2010; Rogers 2015; Savard 2005; Sherman 2010; Spahn 2013; Wonghongkul

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2008), ten studies delivered the interventions on an individual basis (Fillion 2008; Galantino 2010; Heidrich 2009; Kim 2011; Lahart 2016; Loerzel 2008; Matthews 2014; Meneses 2007; Swisher 2015; Fiorentino 2008) while three studies used a combination of group- and individual-based delivery methods (Duijts 2012; Rogers 2009b; Rogers 2009c).

Types of outcome

Baseline measurements were taken before the introduction of the study interventions in all studies. The period of follow-up in the included studies ranged between immediately after the intervention to 12 months after the end of intervention delivery. Six studies had longer follow-up periods of six months and above after the end of intervention delivery (Duijts 2012; Loerzel 2008; Mann 2012; Matthews 2014; Meneses 2007; Savard 2005).

Primary outcome

The included studies used a variety of instruments to assess quality of life, including the Functional Assessment of Cancer Therapy (FACT-B, FACT-G, FACT-ES) instrument (Dirksen 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2009c; Rogers 2015; Sherman 2010; Swisher 2015), European Organisation for Research and Treatment of Cancer Quality of Life C30 (EORTC QLQ-C30, EORTC BR23) (Ergun 2013; Eyigor 2010; Kim 2011; Matthews 2014; Savard 2005; Spahn 2013), Short Form Health Survey (SF-12) (Fillion 2008; Heidrich 2009), Short Form Health Survey (SF-36) (Duijts 2012; Fiorentino 2008; Heidrich 2009; Lengacher 2009; Mann 2012; McClure 2010), the Quality of Life Patient/Cancer Survivor (QOLP/CS) scale (Galantino 2010), the Quality of Life-Breast Cancer (QOL-BC) scale (Loerzel 2008; Meneses 2007; Wonghongkul 2008), the WHO 5-item well-being questionnaire (WHO-5) (Hoffman 2012) and a study-specific instrument that was designed by the author (Cho 2006). Amongst the studies using the FACT instrument, four studies used only breast cancer-specific versions including the FACT-B and FACT-ES, (Dirksen 2008; Hoffman 2012; Sherman 2010; Swisher 2015) and four studies used both generic and cancer-specific versions (Lahart 2016; Rogers 2009b; Rogers 2009c; Rogers 2015). In the studies using the EORTC instrument, five (Ergun 2013; Kim 2011; Matthews 2014; Savard 2005; Spahn 2013) used only the generic EORTC QLQ-C30 instrument while one study (Eyigor 2010) used both the generic (EORTC QLQ-C30) and disease-specific (EORTC BR23) versions of the instrument.

Secondary outcomes

Symptom Severity and Distress

Ten studies assessed anxiety using the State-Trait Anxiety Inventory (STAI) (Dirksen 2008; Heidrich 2009), Profile of Mood States (POMS) (Fillion 2008), Brief Symptom Inventory (BSI-18) (Fiorentino 2008) and Hospital Anxiety and Depression Scale (HADS) (Duijts 2012; Galantino 2010; Kim 2011; Matthews 2014; Savard 2005; Spahn 2013).

Fourteen studies assessed depression using the Center for Epidemiologic Studies-Depression Scale (CES-D) (Dirksen 2008; Fiorentino 2008; Heidrich 2009; Lengacher 2009), Beck Depression Inventory (BDI) (Ergun 2013; Eyigor 2010; McClure 2010), Profile of Mood States (Fillion 2008) and Hospital Anxiety and Depression Scale (HADS) (Duijts 2012; Galantino 2010; Kim 2011; Matthews 2014; Savard 2005; Spahn 2013).

Two studies (Dirksen 2008; Lengacher 2009) reported participants' depressive symptoms measured by Center for Epidemiological Studies Depression Scale (CES-D)

Ten studies assessed fatigue using the Profile of Mood States Fatigue/Inertia Subscale (PONSF/I) (Dirksen 2008), the Brief Fatigue Inventory (BFI) (Ergun 2013; Eyigor 2010; Kim 2011), Multidimensional Fatigue Inventory (MFI) (Fiorentino 2008; Fillion 2008; Savard 2005; Spahn 2013), Piper Fatigue Scale (PFS) (Matthews 2014) and the German Fatigue Assessment Questionnaire (GEAQ) (Spahn 2013).

Seven studies assessed sleep-related outcomes: four studies assessed insomnia, using the Insomnia Severity Index (ISI) (Dirksen 2008; Fiorentino 2008; Matthews 2014; Savard 2005) and three studies assessed sleep dysfunction using the Pittsburgh Sleep Quality Index (PSQI) (Fiorentino 2008; Rogers 2009b; Rogers 2009c).

Four studies assessed endocrine symptoms: two studies used the endocrine subscale of the Functional Assessment of Cancer Therapy (FACT-ES) (Duijts 2012) and the Greene Climacteric Scale (GCS) (Fiorentino 2008). Two studies assessed hot flushes and night sweats using the Hot Flush Rating Scale (HFRS) (Duijts 2012; Mann 2012).

Two studies assessed symptom distress using the Symptom Bother-Revised Scale (SB-R) (Heidrich 2009) and M.D. Anderson Symptom Inventory (MDASI) (Lengacher 2009). However, Heidrich 2009 only reported the Symptom Distress score for the intervention group and not the control group, therefore we could not determine the combined MD.

Two studies assessed joint pain, stiffness and physical function using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (Rogers 2009b; Rogers 2009c). As these two studies were multiple reports of the same study, we did not combine the results in a meta-analysis.

Adherence

Eight studies assessed adherence (Duijts 2012; Kim 2011; Lengacher 2009; Mann 2012; McClure 2010; Rogers 2009c; Sherman 2010; Spahn 2013), which they measured using a variety of methods such as attendance records (Duijts 2012; Lengacher 2009; Mann 2012; Sherman 2010), number or intensity of training sessions (Duijts 2012; Lengacher 2009; Mann 2012; McClure 2010; Spahn 2013) and level of goal achievement (Kim 2011). Rogers 2009c did not describe the method of adherence assessment. Due to the variations in assessment methods of adherence across the various studies, we could not combine the results. Sherman 2010 and Spahn 2013 measured the level of participation in the intervention, while Kim 2011 measured the level of achievement of goals for the prescribed intervention at the end of the study. Duijts 2012, Lengacher 2009 and Mann 2012 measured attendance at intervention sessions and completion of homework assigned. McClure 2010 utilised an internally generated questionnaire, which asked the number of times each participant practised and used the intervention. Due to the limited data reporting and variations in data reporting, we did not perform meta-analyses.

Excluded studies

During the screening of full-text articles, we excluded 140 studies for various reasons. We excluded 56 studies as there was no home-

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based component in the intervention and 35 studies because the intervention was not multi-dimensional. Twelve studies did not have a control group; ten studies did not use a trained person or healthcare professional to deliver the intervention; nine studies did not perform a separate analysis for breast cancer survivors; eight studies did not perform quality-of-life assessments; three studies did not have an interventional component; three studies were not performed on breast cancer survivors; and two studies did not describe the intervention administered. We also excluded two abstracts as we were able to retrieve the full, published papers. See Characteristics of excluded studies table and Figure 1.

Risk of bias in included studies

Refer to Figure 2.

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Figure 2. Risk of bias summary

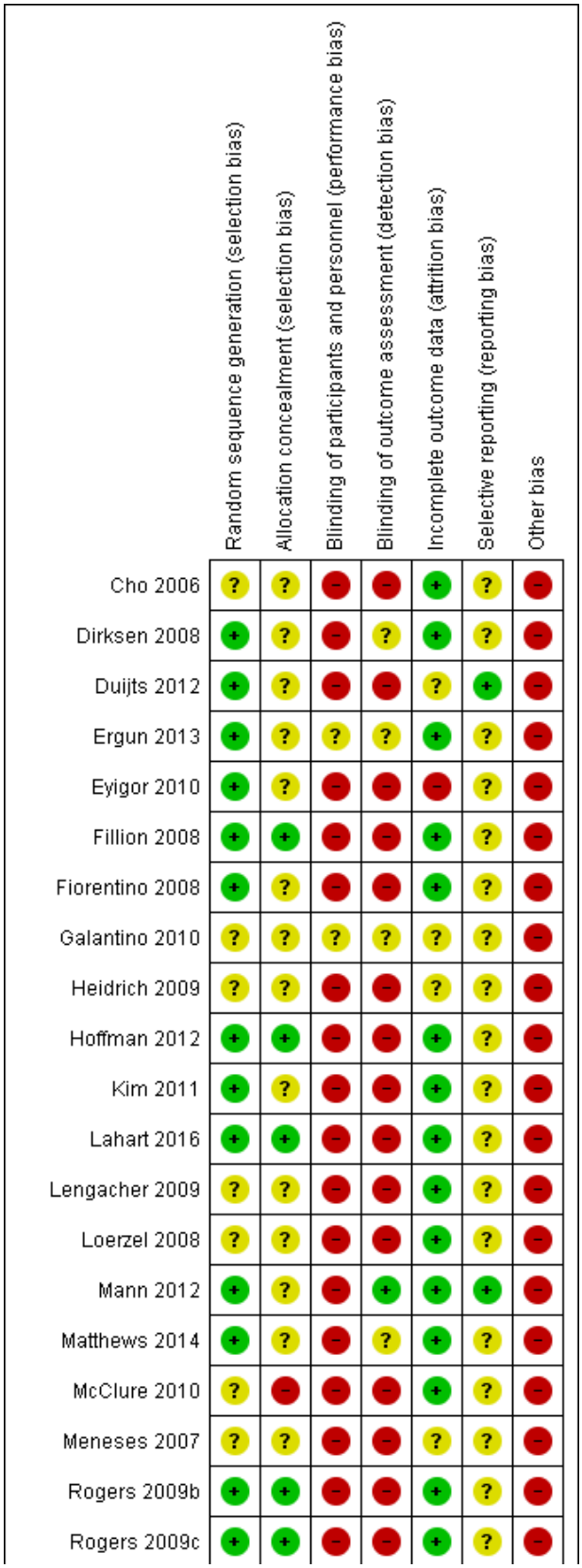

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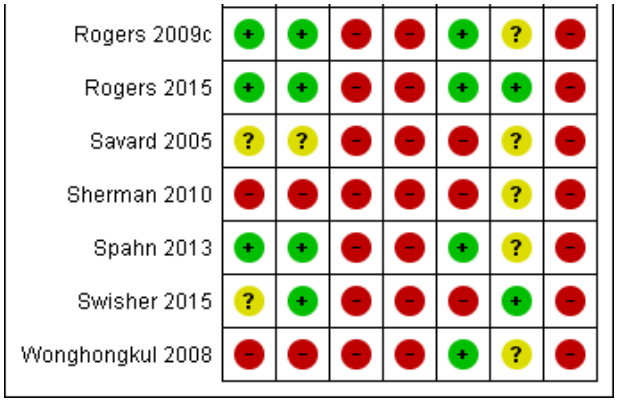
Figure 2. (Continued)



Allocation

Random sequence generation

Fifteen studies stated clearly the methods used for random sequence generation (Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Fillion 2008; Fiorentino 2008; Hoffman 2012; Kim 2011; Lahart 2016; Mann 2012; Matthews 2014; Rogers 2009b; Rogers 2009c; Rogers 2015; Spahn 2013) therefore we judged the risk for selection bias as being low. We could not make a judgment of bias for nine studies due to the lack of information provided, and we gave them an unclear risk of bias rating (Cho 2006; Galantino 2010; Heidrich 2009; Lengacher 2009; Loerzel 2008; McClure 2010; Meneses 2007; Savard 2005; Swisher 2015). We allocated Sherman 2010 and Wonghongkul 2008 a high risk of selection bias due to the lack of random sequence generation of intervention and comparison groups.

Allocation concealment

We judged eight studies to have a low risk of selection bias resulting from allocation concealment (Fillion 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2009c; Rogers 2015; Spahn 2013; Swisher 2015). However, this risk was elevated in Sherman 2010 and Wonghongkul 2008 due to the lack of randomisation. McClure 2010 performed randomisation in groups of eight with four participants allocated to the HBMS group and four to the comparison group. As a result, the same personnel who performed screening on the participants and informed them of group status could have guessed the group allocation for the next participants, so we judged the risk of selection bias to be high. We could not judge the presence of selection bias resulting from allocation concealment in 15 studies (Cho 2006; Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Fiorentino 2008; Galantino 2010; Heidrich 2009; Kim 2011; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; Meneses 2007; Savard 2005) and so rated them 'unclear'.

Blinding

Blinding of participants and personnel

Blinding of participants and personnel was not achievable in 24 of the included studies due to the nature of the intervention, which made it difficult to blind the participants and personnel from the allocated groups (Cho 2006; Dirksen 2008; Duijts 2012; Eyigor 2010; Fillion 2008; Fiorentino 2008; Heidrich 2009; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Sherman 2010; Spahn 2013; Swisher 2015; Wonghongkul 2008). None of the included studies achieved a low risk of bias due to proper blinding of participants and personnel. The remaining two studies we judged as having an unclear risk of bias due to providing inadequate information (Ergun 2013; Galantino 2010).

Blinding of outcome assessors

One study blinded outcome assessors (Mann 2012) and so corresponded to a low risk of detection bias. Twenty-one studies did not blind outcome assessors (Cho 2006; Duijts 2012; Eyigor 2010; Fillion 2008; Fiorentino 2008; Heidrich 2009; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Loerzel 2008; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Sherman 2010; Spahn 2013; Swisher 2015; Wonghongkul 2008), and we could not make a judgment based on the information available in the remaining four studies (Dirksen 2008; Ergun 2013; Galantino 2010; Matthews 2014).

Incomplete outcome data

Incomplete outcome data contributed to a low risk of bias in 18 studies because withdrawals from the study groups appeared to be well-balanced and unlikely to lead to attrition bias (Cho 2006; Dirksen 2008; Ergun 2013; Fillion 2008; Fiorentino 2008; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; McClure 2010; Rogers 2009b; Rogers 2009c; Rogers 2015; Spahn 2013; Wonghongkul 2008). However, we judged four studies as having a high risk of attrition bias as a result of imbalanced attrition between the study groups (Eyigor 2010; Savard 2005; Sherman 2010; Swisher 2015). Four studies did not report enough information to allow a judgement (Duijts 2012; Galantino 2010; Heidrich 2009;).

Selective reporting

The study protocols were available for four studies (Duijts 2012; Mann 2012; Rogers 2015; Swisher 2015) so we allocated low risk of reporting bias to these four studies that reported their outcomes as planned. Protocols were not available for the remaining 22 studies and so we could not make a judgment (Cho 2006; Dirksen 2008; Ergun 2013; Eyigor 2010; Fillion 2008; Fiorentino 2008; Galantino 2010; Heidrich 2009; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Loerzel 2008; Matthews 2014; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Savard 2005; Sherman 2010; Spahn 2013; Wonghongkul 2008).

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Other potential sources of bias

We judged all the included studies as having a high risk of other biases due to the use of convenience sampling, where the study participants were recruited because of their convenient accessibility to the researcher. Bias might exist in the selection of the study sample (Cho 2006; Dirksen 2008; Duijts 2012; Ergun 2013; Eyigor 2010; Fillion 2008; Fiorentino 2008; Galantino 2010; Heidrich 2009; Hoffman 2012; Kim 2011; Lahart 2016; Lengacher 2009; Loerzel 2008; Mann 2012; Matthews 2014; McClure 2010; Meneses 2007; Rogers 2009b; Rogers 2009c; Rogers 2015; Savard 2005; Sherman 2010; Spahn 2013; Swisher 2015; Wonghongkul 2008).

Effects of interventions

See: **Summary of findings for the main comparison** Home-based multidimensional survivorship programmes for breast cancer survivors

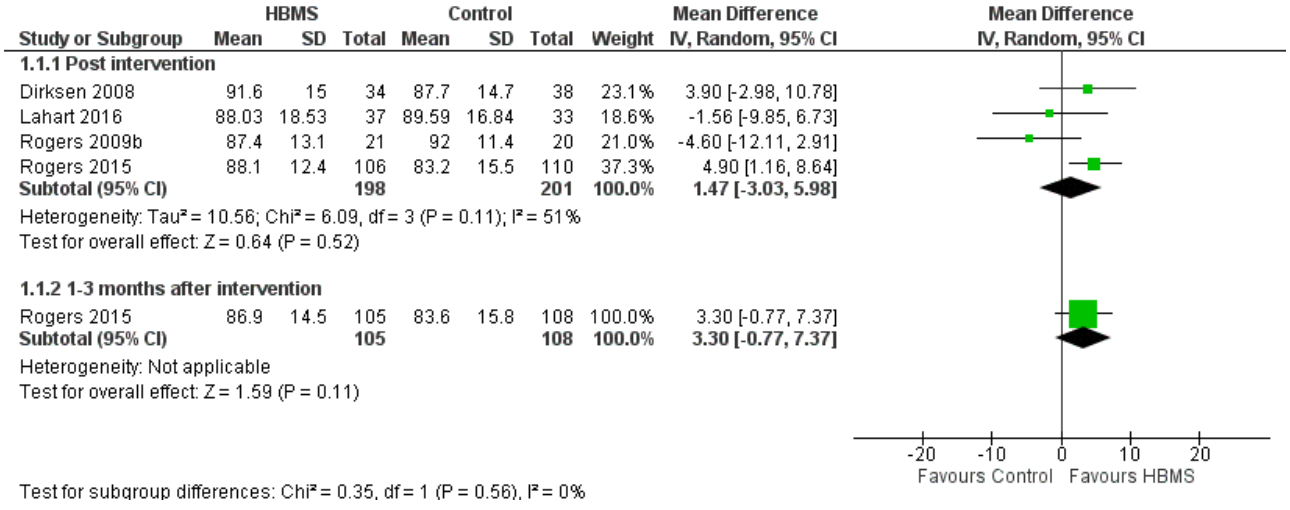
Primary outcome

Quality of life

Functional Assessment of Cancer Therapy - Breast (FACT-B)

Four studies (Dirksen 2008; Rogers 2009b; Rogers 2015; Lahart 2016) reported general scores post intervention. The pooled MD between the HBMS and control groups was 1.47 (95% CI -3.03 to 5.98; 399 participants; I^2 = 51%) (Figure 3), indicating that there was no significant difference in general scores between the two groups. Rogers 2015 reported general scores at three months after the intervention but the difference was not significant (MD 3.30, 95% CI -0.77 to 7.37) (Analysis 1.1).

Figure 3. Forest plot of comparison 1, quality of life by Functional Assessment of Cancer Therapy-Breast (FACT-B), outcome: 1.1 General



Seven studies (Dirksen 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2015; Sherman 2010; Swisher 2015) reported breast cancer scores post intervention. A significant pooled MD between HBMS and the control group was observed (MD 4.55, 95% CI 2.33 to 6.78; 764 participants; I^2 = 17%; moderate-quality evidence), demonstrating a significantly higher breast cancer score in the HBMS group (Analysis 1.2; Figure 4; Figure 5). Two studies (Hoffman 2012; Rogers 2015) reported the scores at one to three months post intervention and the pooled MD was also statistically significant (MD 6.10, 95% CI 2.48 to 9.72; 426 participants; I^2 = 0%).

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Figure 4. Forest plot of comparison 1, quality of life by Functional Assessment of Cancer Therapy-Breast (FACT-B), outcome: 1.2 Breast cancer

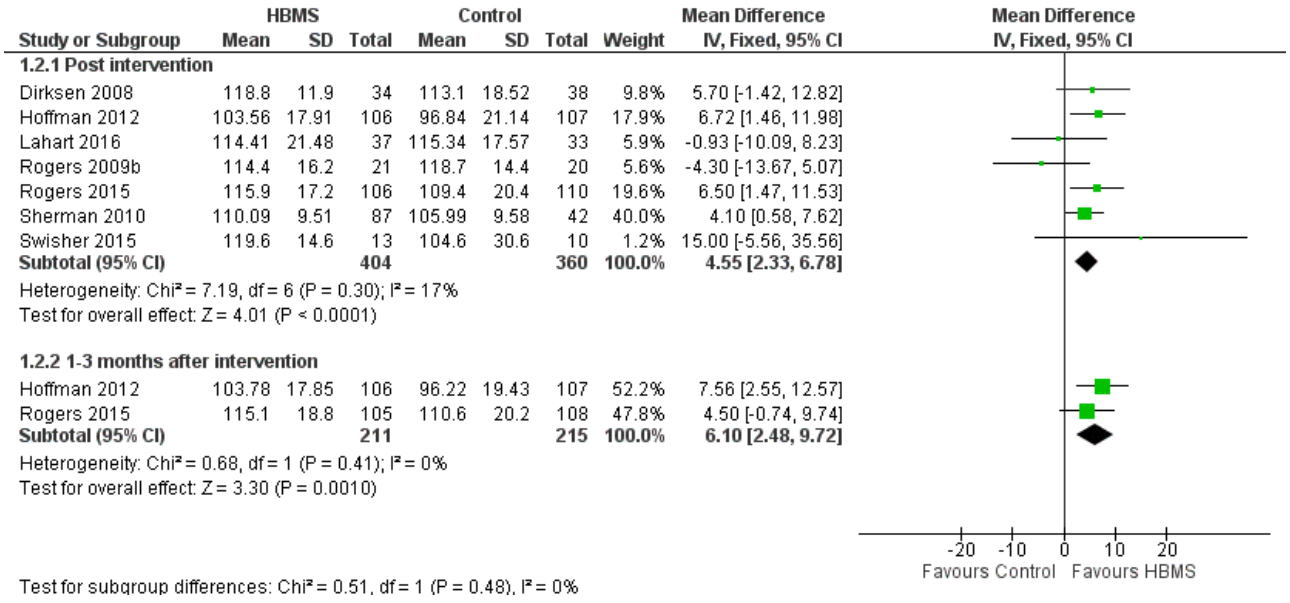
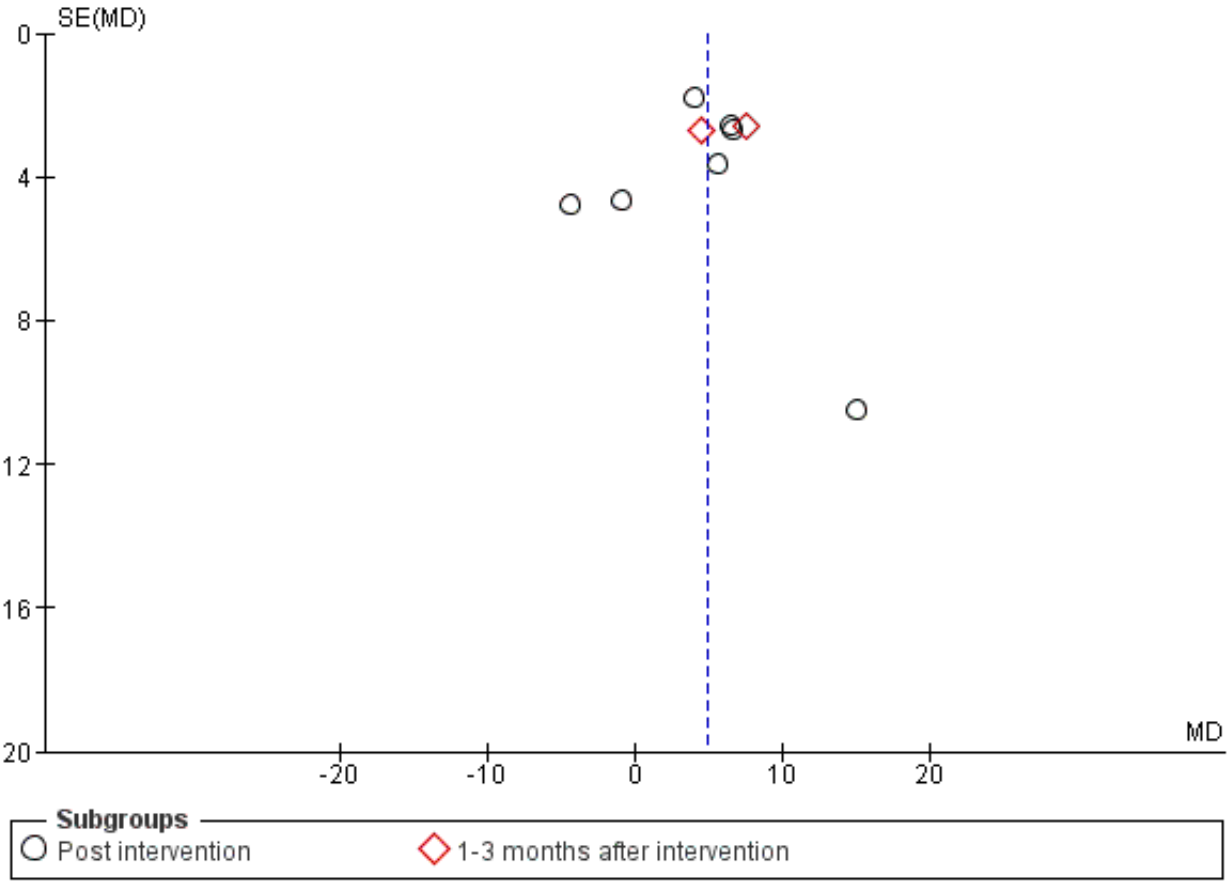


Figure 5. Funnel plot of comparison 1, quality of life by Functional Assessment of Cancer Therapy-Breast (FACT-B), outcome: 1.2 Breast cancer



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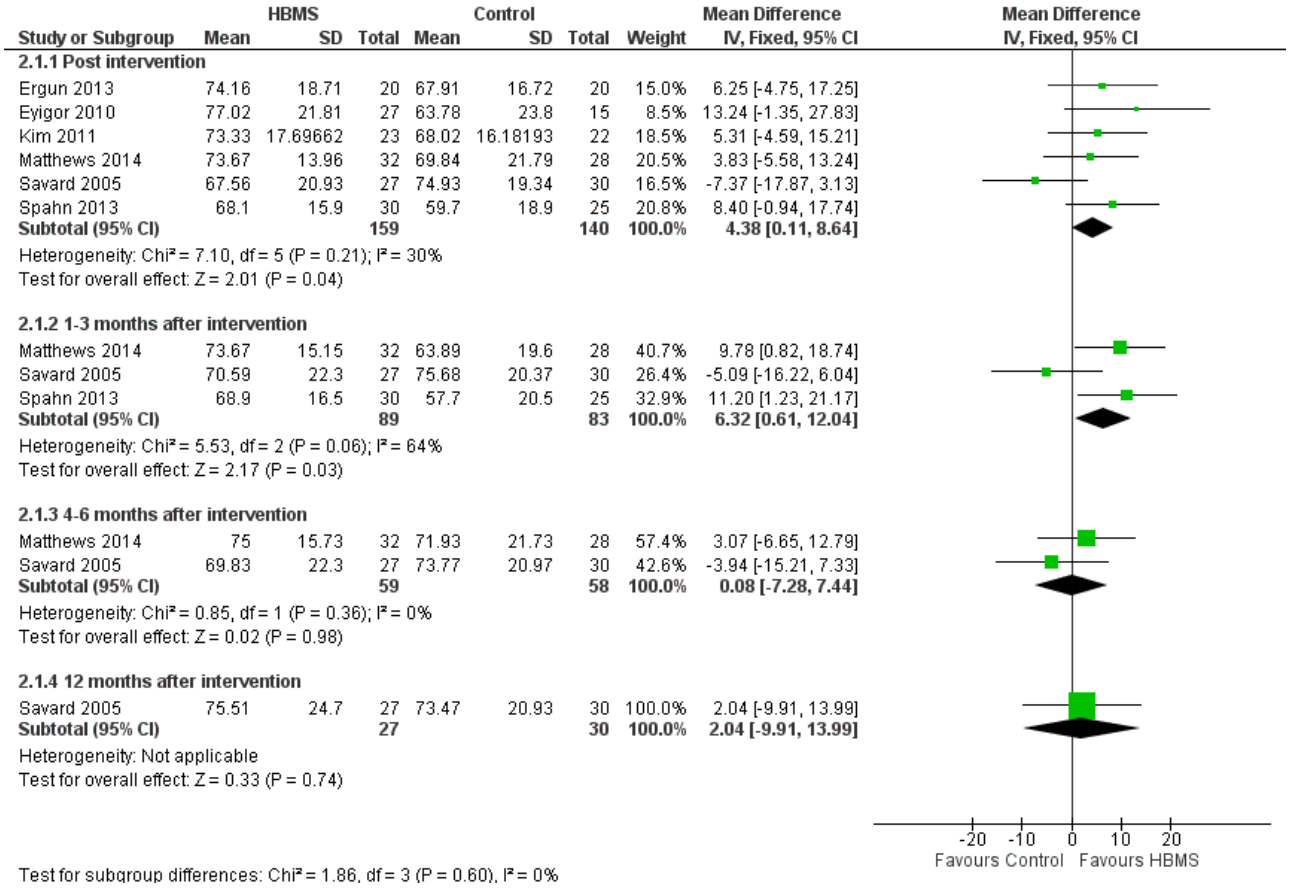
The subscale results for physical well-being, social well-being, emotional well-being, functional well-being, endocrine subscale and Trial Outcome Index are provided in Table 1.

EORTC-QLQ

Six studies (Ergun 2013; Eyigor 2010; Kim 2011; Matthews 2014; Savard 2005; Spahn 2013) reported the global scores post intervention. The pooled MD was statistically significant (MD 4.38, 95% CI 0.11 to 8.64; 299 participants; I^2 = 30%; moderate-quality evidence) implying that the EORTC-QLQ global scores for women in the HBMS group were significantly higher than women in the control group by 4.38 units on average (Analysis 2.1; Figure 6). Three studies (Matthews 2014; Savard 2005; Spahn 2013) reported the global scores at one to three months post intervention and the pooled MD was significant (MD 6.32, 95% CI 0.61 to 12.04; 172 participants; I^2 = 64%). Two studies (Matthews 2014; Savard 2005) reported scores at four to six months post intervention and the pooled MD was insignificant (MD 0.08, 95% CI -7.28 to 7.44; 117 participants; I^2 = 0%).

Figure 6. Forest plot of comparison 2, quality of life measured by European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC-QLQ), outcome: 2.1 General



The subscale results for the functional, symptom, role, emotional, cognitive, social and physical function scores are provided in Table 1.

Quality of Life - Breast Cancer

Three studies (Loerzel 2008; Meneses 2007; Wonghongkul 2008) reported the overall scores post intervention but the data were incomplete in one study (Meneses 2007). The pooled MD post intervention was 0.42 (MD 0.42, 95% CI -0.02 to 0.85; 111 participants; I^2 = 74%; 2 studies; very low-quality evidence) (Analysis 3.1). Two studies (Meneses 2007; Wonghongkul 2008) reported the overall scores at one to three months post intervention but the data for Meneses 2007 were incomplete; the MD of Wonghongkul 2008 was 0.45 (MD 0.45, 95% CI -0.19 to 1.09).

The subscale results for the physical scores are provided in Table 1.

SF-36

Three studies (Duijts 2012; Mann 2012; McClure 2010) reported SF-36 physical component scores post intervention but complete data were not available for one study (McClure 2010). The pooled effect was statistically significant with a MD of 0.55 (95% CI -3.52 to 4.63; 308 participants; 2 studies; I^2 = 7%; low-quality evidence) (Analysis 4.1). Two studies reported the scores at four to six months post intervention and the pooled effect was MD -1.05 (95% CI -5.60 to 3.51; 308 participants; I^2 = 0%).

Secondary outcomes

Anxiety

Seven studies (Dirksen 2008; Lengacher 2009; Galantino 2010; Kim 2011; Matthews 2014; Savard 2005; Spahn 2013) reported

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anxiety post intervention: two studies used the State-Trait Anxiety Inventory (STAI) and five studies used Hospital Anxiety and Depression Scale (HADS). The pooled MD for STAI was -4.70 (95% CI -7.88 to -1.52; 154 participants; 2 studies) and HADS was -1.01 (95% CI -1.94 to -0.08; 253 participants; 5 studies; I^2 = 53%; low-quality evidence) (Analysis 5.1). The anxiety score in the HBMS group was significantly lower regardless of the instrument used. If we used the SMD to combine the results from the seven studies, the pooled SMD would be -0.34 (95% CI -0.55 to -0.14; 7 studies; I^2 = 34%). Two studies (Matthews 2014; Savard 2005) reported scores on HADS at one to three months post intervention and the pooled MD was -0.68 (95% CI -2.04 to 0.68; 113 participants; I^2 = 25%).

Depression

Nine studies (Dirksen 2008; Ergun 2013; Eyigor 2010; Kim 2011; Lengacher 2009; Matthews 2014; McClure 2010; Savard 2005; Spahn 2013) reported participants' depression post intervention, where three of them used the Beck Depression Inventory (BDI) (Ergun 2013; Eyigor 2010; McClure 2010), two used the STAI (Dirksen 2008; Lengacher 2009), and four used the HADS (Kim 2011; Matthews 2014; Savard 2005; Spahn 2013). The pooled MD of BDI, STAI and HADS were -0.61 (95% CI -3.16 to 1.94), -3.29 (95% CI -5.82 to -0.77) and -1.36 (95% CI -2.94 to 0.22; 213 participants; low-quality evidence). Matthews 2014, Savard 2005 and Spahn 2013 also reported the anxiety score at one to three months post intervention but the pooled MD was not statistically significant (MD -0.74, 95% CI -2.71 to 1.22) (Analysis 6.1).

Depressive symptoms

Two studies (Dirksen 2008; Lengacher 2009) reported participants' depressive symptoms post intervention. Both studies showed lower symptom scores in the HBMS group but only one study (Lengacher 2009) was significant. The pooled MD was statistically significant (MD -2.61, 95% CI -4.93 to -0.29; 154 participants; I^2 = 0%) (Analysis 10.1).

Fatigue

Five studies (Ergun 2013; Eyigor 2010; Fillion 2008; Kim 2011; Savard 2005) reported fatigue post intervention: two studies used the Multidimensional Fatigue Inventory (MFI) (Fillion 2008; Savard 2005) and three studies used the used the Brief Fatigue Inventory (BFI) (Ergun 2013; Eyigor 2010; Kim 2011). The pooled MD of BFI was -1.11 (95% CI -1.78 to -0.45; 127 participants; I^2 = 0%; low-quality evidence) while the pooled MD of MFI was -0.04 (95% CI -0.69 to 0.62; 144 participants; I^2 = 32%). Savard 2005 reported the MD of MFI scores at one to three and four to six months post intervention but none of them were statistically significant (Analysis 7.1).

Insomnia

Three studies (Dirksen 2008; Matthews 2014; Savard 2005) reported the severity of insomnia measured by the Insomnia Severity Index (ISI) post intervention. The pooled MD was -1.18 (95% CI -3.34 to -0.27; 185 participants; I^2 = 0%) (Analysis 8.1). Matthews 2014 and Savard 2005 reported the MD of ISI scores at one to three months post intervention and the pooled MD was significant (MD -2.27, 95% CI -4.22 to -0.33; 113 participants; I^2 = 46%).

Night Flushes and night sweats

Two studies (Duijts 2012; Mann 2012) reported flushes and night-sweat symptoms post intervention. The pooled MD was -1.50 (95% CI -3.75 to 0.75; 216 participants; I^2 = 0%) (Analysis 9.1). Both studies presented the long-term follow-up results but none was significant.

Service needs and utilisation

None of the included studies reported data on these outcomes.

Participants' adherence to the programme interventions

Eight studies assessed participants' adherence to the programme interventions (Duijts 2012; Kim 2011; Lengacher 2009; Mann 2012; McClure 2010; Rogers 2009c; Sherman 2010; Spahn 2013). Due to the variations in assessment methods of adherence among the eight studies, we could not combine the results for meta-analysis. We report the results narratively here. Adherence rates varied across all eight studies and ranged from 58% to 100%. Six studies (Kim 2011; Lengacher 2009; Mann 2012; Rogers 2009c; Sherman 2010; Spahn 2013) reported adherence rates for programme interventions of more than 80%. Of these, four studies (Kim 2011; Mann 2012; Rogers 2009c; Spahn 2013) reported adherence rates of more than 90%. McClure 2010 reported adherence for programme interventions as good to excellent. Duijts 2012 reported adherence rates of 58% to 70% for the three programme intervention groups.

Subgroup analysis

We conducted two sets of subgroup analyses, the first one by the component of the intervention and the second by the mode (delivery structure) of the intervention. Since none of the included studies provided stratified analysis according to cancer treatment modality and survivorship period, we were unable to perform subgroup analyses as per the review protocol.

Components of the intervention

We divided the components of the intervention into four groups: educational and psychological components; educational and physical components; physical and psychological components; and educational, physical and psychological components. We performed subgroup analyses only for those meta-analyses with four or more studies, and on quality of life outcomes.

FACT-Breast Cancer

Educational and psychological components

There was a higher mean FACT-B Breast Cancer Specific score in the HBMS group than in the control group (MD 5.08, 95% CI 1.24 to 8.92; 355 participants; 3 studies; I^2 = 3%) (Analysis 11.1).

Educational and physical components

There was a higher score in the HBMS group than in the control group (MD 4.10, 95% CI 0.58 to 7.62; 129 participants; 1 study) (Analysis 11.1).

Physical and psychological components

There was a higher score in the HBMS group than in the control group (MD 4.57, 95% CI 0.24 to 8.90; 280 participants; 3 studies; I^2 = 60%) (Analysis 11.1).

We detected no significant difference in quality of life among the three groups (Chi^2 = 0.14, P = 0.93) (Analysis 11.1). Refer to Table

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2 for subgroup analysis results for physical, social, emotional and functional well-being.

EORTC-QLQ

Educational and psychological components

There was a lower score in the HBMS group than in the control group (MD -1.16, 95% CI -8.17 to 5.85; 117 participants; 2 studies; I^2 = 59%) (Analysis 12.1).

Educational and physical components

There was a higher mean EORTC-QLQ global score in the HBMS group than in the control group (MD 7.25, 95% CI 0.68 to 13.82; 127 participants; 3 studies; I^2 = 0%) (Analysis 12.1).

Educational, physical and psychological components

There was an insignificantly higher score in the HBMS group than in the control group (MD 8.40, 95% CI -0.94 to 17.74; 55 participants; 1 study) (Analysis 12.1).

No significant difference in global quality of life was revealed among the three groups (Chi^2 = 3.85, P = 0.15) (Analysis 12.1).

Mode of the intervention

We divided the mode (delivery structure) of intervention into three groups: group-based interventions; individual-based interventions; and both group- and individual-based interventions. The mode of intervention was included as a subgroup analysis as it was one of the objectives of the review.

FACT-Breast Cancer

Group-based interventions

The pooled MD for group-based interventions was 5.36 (95% CI 2.97 to 7.74; 630 participants; 4 studies) (Analysis 13.1).

Individual-based interventions

The pooled MD for individual-based interventions was 1.71 (95% CI -6.66 to 10.07; 93 participants; 2 studies; I^2 = 48%) (Analysis 13.1).

Group- and individual-based interventions

The MD for combined group- and individual-based interventions was -4.30 (95% CI -13.67 to 5.07; 41 participants; 1 study) (Analysis 13.1).

No significant difference in quality of life was revealed among the three subgroups (Chi^2 = 4.31, P = 0.12) (Analysis 13.1). Refer to Table 3 for subgroup analysis results for physical, social, emotional and functional well-being.

EORTC-QLQ

Group-based interventions

The pooled MD of the four studies with group-based interventions was 4.28 (95% CI -1.19 to 9.74; 194 participants; 4 studies; I^2 = 57%) (Analysis 14.1).

Individual-based interventions

The pooled MD for the individual-based interventions was 4.53 (95% CI -2.29 to 11.35; 105 participants; 2 studies; I^2 = 0%) (Analysis 14.1).

No significant difference was revealed between the two groups (P = 0.95).

As Chapter 20 of Borenstein 2009 suggests at least 10 studies for each covariate in meta-regression, and our meta-analyses contained a smaller number than recommended, we did not conduct such analyses. We did not conduct sensitivity analyses because most studies had high risk of bias and none of the studies in the meta-analyses were from grey literature.

DISCUSSION

Summary of main results

This systematic review included 26 studies involving women who had been diagnosed with stage 0 to 3 breast cancer and had completed surgery, adjuvant chemotherapy or radiotherapy (or a combination or all of these) within the last 10 years. The aims of the home-based multidimensional survivorship (HBMS) programmes in the included studies were mixed: some focused on reducing a multitude of long-term or late symptoms associated with breast cancer and its treatment (e.g. fatigue, sleep problems, lymphoedema, hot flushes and night sweats, psychological distress) while some focused on improving health or psychosocial well-being, or both. The HBMS programmes included symptom management, cognitive behavioural therapy, counselling, exercise, and/or wellness activities. All programmes were directed towards improving quality of life for women within their first 10 years after breast cancer treatment.

The results of this review showed beneficial effects of HBMS programmes for some measures of quality of life. For quality of life measured by FACT-B, there was a significant improvement in breast cancer-specific, physical and endocrine domains of quality of life post intervention and at one to three months post intervention. Similarly, for quality of life measured by the EORTC-C30, there was a beneficial effect of HBMS programmes in global, functional and emotional domains of quality of life immediately and at one to three months post intervention. The quality of evidence across studies was moderate. However, no improvement in quality of life was shown either at four to six months nor at 12 months post intervention. The results suggested that HBMS programmes for women with breast cancer post treatment with surgery and/or adjuvant chemotherapy and/or radiotherapy are effective for improving quality of life and their effect persists for three months. As for the effects of HBMS programmes on quality of life subscales, physical and endocrine domains of quality of life (using FACT-B), and functional and emotional domains of quality of life (using EORTC-C30) showed an improvement compared to control.

QoL-Breast Cancer and SF-36 were relatively uncommon tools to measure quality of life in the included studies. The effect of HBMS programmes on overall quality of life or physical composite score was not demonstrated immediately post intervention or at follow-up and we assessed the quality of evidence as very low. A possible explanation for the non-significant finding could be due to the focus of the intervention targeted towards menopausal symptoms or lymphoedema in the studies of Duijts 2012, Mann 2012 and McClure 2010, and SF-36 is a generic quality-of-life measure (Ware 2005) and thus it may lack sensitivity to detect differences in cancer populations.

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Some of the included studies were designed to decrease psychological distress, fatigue and insomnia severity, that in turn lead to an increase in quality of life. Insomnia significantly reduced immediately and after one to three months after the intervention in women assigned to the HBMS programmes. We also observed a beneficial effect of HBMS programmes on anxiety immediately post intervention regardless of the measurement tools being used, and depression and fatigue immediately post intervention as measured by STAI and BFI, respectively. However, the effects could not be sustained at follow-up.

Subgroup analysis on the different components of the survivorship programme did not show any difference in quality-of-life measures. In contrast, the mode of delivering HBMS programmes to women revealed a statistically significant effect on quality of life, in which group-based HBMS interventions were effective in increasing the physical, emotional, and functional aspects of quality of life (using FACT-B).

None of the included studies reported service needs and utilisation or cost of care, and therefore the effect of HBMS programmes on healthcare utilisation and cost is unknown. Due to the variations in assessment methods of adherence among the eight studies, we could not combine the results for meta-analysis. The results were synthesised narratively, with the reported adherence rates of 58% to 100%.

Overall completeness and applicability of evidence

The evidence in this review is current to April 2016. Although the included studies were diverse in terms of the intervention components, delivery approach and duration of HBMS programmes and quality-of-life measures, it was possible to pool the results of seven studies that used FACT-B, six studies that used EORTC-C30, three studies that used QoL-Breast Cancer, and three studies that used SF-36. We included 17 out of 26 studies, involving 1482 participants, in the meta-analyses but we were unable to include nine studies due to the unavailability of data and wide range of quality-of-life measures being used. Three of these studies measured quality of life with the SF-36: Fiorentino 2008 reported mean change scores within an intervention group rather than mean score of each group; Lengacher 2009 presented the adjusted mean physical and mental composite scores of each group based on the population norm; and Heidrich 2009 did not present the mean score for quality of life. The authors of these studies concluded that there was no statistically significant difference in quality of life between groups, which was in line with the other three studies using SF-36, whose data we were able to include in meta-analysis. It was not possible to include Cho 2006 and Fillion 2008 in meta-analysis since the former was the only study to use the authors' own validated tool, while the latter was the only study to measure quality of life with SF-12. We were unable to include Galantino 2010 in meta-analysis since this was the only study to measure quality of life using QoL Patient/Cancer Survivors Scale and they did not report standard deviations for data pooling. In future, studies should standardise outcome measures and reporting parameters so as to reduce heterogeneity across studies and to permit robust meta-analysis. Rogers 2009c was not used in the meta-analyses because it used the same data as reported in Rogers 2009b but focused mainly on the change in physical activity–related outcomes. In addition, due to the unavailability of data, despite contacting the authors, Meneses 2007 and McClure 2010 were not included in the meta-analysis.

Complex interventions have increasingly been recognised as an essential approach to address the complex needs of patients in oncology settings but they pose challenges in head-to-head comparisons and thus data synthesis across studies. In this review, the included studies were multi-focused, targeting a multitude of common health problems and issues in women who were in transition from the primary cancer treatment phase into the rehabilitation and survivorship phase, which makes the survivorship programmes vary somewhat. In view of the diversity of individual survivorship programmes within the included studies, it was not possible to perform analysis of individual programmes (content and duration) that could contribute to the knowledge of exact components influencing or explaining quality of life. This limits our ability to provide evidence regarding the relative effects of different content and duration of survivorship programmes. Future studies addressing the specific content and duration of survivorship programmes in quality of life are needed to allow the possibility of data synthesis and conclusions.

The majority of the included studies had a short follow-up, with only nine studies measuring quality of life at one to three months post intervention. The long-term effects of HBMS programmes are unknown. In addition, the included studies did not provide data about service needs and utilisation or cost of care that could be used for data synthesis and meta-analysis.

Quality of the evidence

We used the GRADE approach to assess the quality of evidence of the included studies (refer to Summary of findings for the main comparison). The quality of the evidence for the primary outcome of quality of life in 13 studies that used FACT-B and EORTC-C30 we judged as moderate, while quality of life in four studies that used QoL-Breast Cancer and SF-36 was low to very low. The quality of evidence for secondary outcomes of anxiety and depression, fatigue, and insomnia included in this review was low. The major contributors to the grading of moderate to very low quality of evidence include the high (92%) or unclear (8%) risk of performance bias and high (81%) or unclear (15%) risk of detection bias. Only one study (Mann 2012) used blinding of the trial statistician and researchers who collected outcome measures. Nevertheless, blinding is difficult to execute in such studies of survivorship programmes given the nature of interventions being delivered. There is also a possibility that the subjective nature of quality-of-life measurement would incur the 'Hawthorne' or social desirability effect in response to the participants' own awareness of their intervention group assignments when blinding was impossible. Therefore, the limitation of this review might be the robustness of findings of included studies being compromised as a result of performance and detection bias, as well as the subjective nature of quality-of-life reporting.

Many of the included studies provided limited information pertaining to the criteria required to make a judgment of the risk of bias, which might also affect quality of evidence. Domains where the unclear risks of bias were common included selective outcome reporting (92%), allocation concealment (58%) and random sequence generation (35%). The majority of included studies were free of incomplete outcome data bias (69%). The withdrawals from the HBMS programme and control group seemed to be distributed evenly.

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The variations in pooled estimates of the primary outcome of quality of life and secondary outcomes of fatigue and insomnia of the included studies were small (I^2 = 30% or less). However, the studies that used QoL-Breast Cancer (I^2 = 74%) and HADS for anxiety (I^2 = 53%) and depression (I^2 = 73%) had high heterogeneity, which also contributed to the very low and low quality of evidence, respectively. In addition, data were not extractable for the planned subgroup analyses of type of cancer treatment modality and survivorship period (less than five years versus five years or more). As shown in the funnel plot, the publication bias affecting the overall quality of evidence was considered low.

There is a possibility of sampling bias associated with non-probability sampling being employed by all of the included studies.

Taken together, this review resulted in our rating the evidence as moderate to very low quality for all primary and secondary outcomes.

Potential biases in the review process

We included 26 studies, of which 22 were RCTs and four were quasi-RCTs (Cho 2006; Galantino 2010; Sherman 2010; Wonghongkul 2008). The selection bias associated with these four quasi-RCTs could reduce the quality of the evidence, and increase heterogeneity in overall quality of life as measured by QoL-Breast Cancer (Wonghongkul 2008). Nevertheless, the results of the review were robust when we excluded those quasi-RCTs in a sensitivity analysis. We also identified eight abstracts/ongoing trials using the RCT design, however, at the time of writing, none of these studies had reported data.

The included studies used different quality-of-life measures and approaches to report data (e.g. group mean across each study time point versus mean change in certain time point within group), which hampered pooling of data of all included studies for a single meta-analysis. Instead, we performed separate meta-analyses by individual quality-of-life measures. This may have biased the estimation of the effect in this review.

Agreements and disagreements with other studies or reviews

We identified a systematic review of multidimensional rehabilitation programmes for adult cancer survivors (Scott 2013b). The review by Scott 2013b included 12 RCTs to examine the effectiveness of professional-led multi- or uni-dimensional rehabilitation interventions on physical and psychosocial well-being of survivors with a broad range of cancer diagnosis (breast caner accounted for 41% of the total population of participants). The risk of bias ranged from moderate to high, and the level of heterogeneity across studies was high. The authors were only able to pool data on the SF-36 in five studies. They found that SF-36 physical composite score was significantly higher in participants who received multidimensional rehabilitation programmes compared to control participants (MD 2.2, 95% CI 0.12 to 4.31, P = 0.04). On the contrary, our meta-analysis showed no effect of home-based multidimensional survivorship programme on SF-36 physical composite score of quality of life, neither immediately post intervention nor in follow-up measurement (Duijts 2012; Mann 2012; McClure 2010). This discrepancy is likely to be related to the differences in the level of heterogeneity across studies between the two reviews, and mixed cancer populations in the review by Scott 2013b.

AUTHORS' CONCLUSIONS

Implications for practice

Multimodal interventions have been recognised as an important approach in addressing the multifaceted nature of the transition process of a breast cancer survivor from treatment completion to long-term survival. The results of this systematic review and meta-analysis showed that home-based, multidimensional survivorship (HBMS) programmes provide a short-term beneficial effect by improving quality of life, and some domains of quality of life as measured by FACT-B and EORTC-C30 questionnaires. This review also suggested that home-based multidimensional survivorship programmes may reduce anxiety, fatigue, and insomnia as measured by HADS, BFI and ISI, respectively. The result of this review revealed no difference in improving quality of life with educational, psychological or physical components of interventions in survivorship programmes. Group-based intervention may be the most effective mode of intervention delivery in improving physical, emotional and functional quality of life. Nevertheless, there did not appear to be a beneficial effect of HBMS programmes three months after the intervention. The effect of HBMS programmes on healthcare service and utilisation, and cost of care is unknown. There were insufficient data to examine the variations in content or duration of the HBMS programmes.

Implications for research

It is essential for future studies to improve the standards and rigours of conducting studies and reporting data in this field of research. Blinding is difficult to implement given the nature of interventions being delivered in HBMS programmes. Nevertheless, Mann 2012 involved blinding of the trial statistician and researchers who collected outcome measures, suggesting that at least single blinding is possible in such studies to reduce the risk of detection bias.

Because of the low number of included studies stratified by the type of cancer treatment modality and survivorship period (less than five years versus five years or more), it was not possible to perform subgroup analysis. There is a need for future studies to stratify and take account of these clinical parameters. Further high-quality studies are also required to evaluate the long-term effect (i.e. longer than three months) of HBMS programmes and compare different content and duration of the survivorship programmes. Additional studies are needed to evaluate the effects of HBMS programmes on unmet needs, healthcare cost, and clinical and patient outcomes. Future studies examining the mediating role of self-efficacy, empowerment, self-management skills and social support on behavioural change, and thus quality of life, would also help to shed some light on the path of HBMS programmes in improving quality of life of breast cancer survivors. Adverse effects or harms of HBMS programmes should also be addressed in future studies.

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Cho 2006

Methods	Design: single centre, quasi-RCT. Follow-up: 10 weeks from baseline.
Participants	Major inclusion criteria: stage 1-2 breast cancer; within 2 years after mastectomy; completion of chemotherapy and/or radiotherapy with or without current hormone therapy use N = 55 (E: 28, C: 27) Mean age: E: 48.7 ± 9.1 years, C: 49.6 ± 6.2 years Stage of breast cancer: E: stage 1 (12, 42.9%), stage 2 (16, 57.1%); C: stage 1 (13, 48.2%), stage 2 (14, 51.8%)
Interventions	E: Psycho- educational (psychological-based education) + physical (exercise) + psychological (peer support group activity)

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Cho 2006 *(Continued)*

	Psychological-based education: group format, conducted by specialists (oncology, nurse, surgeon, dietician, and image consultant), 1 session per week of 90 minutes for ten weeks, topics included understanding breast cancer, treatment and complications of breast cancer, and advice about lymphedema prevention and management, nutrition and diet, sexual and daily life, and effective ways to manage relationships and communication. Exercise: group format, 2 sessions per week of 90 minutes for ten weeks, sessions included a warm up, main exercise and cool-down; home-based practice, at least twice per week for ten weeks, practiced basic stretching and stretching each part of the body. Peer support group activity: group format, 1 session per week of 60 minutes for ten weeks, involved participants sharing their feelings, conflicts and experiences. C: waiting-list control.
Outcomes	QOL scale developed by the study authors
Notes	E: experimental, C: comparison, RCT: randomised control trial. Dropouts or missing data where reported: Of the 65 participants entered into the study, 6 participants from experimental group and 4 from control were excluded from data analysis due to metastasis or did not complete the post-test. Meta-analysis was not possible as the QOL scale used was the study authors' own scale.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Participants were randomly assigned into experimental and waiting-list control group but method of randomisation was not described
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants were aware of allocated interventions since they had to go through the interventions. The researcher was involved in intervention administration
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants were aware of allocated interventions since they had to go through the interventions. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition from intervention and control group described with reasons, and attrition balanced between groups (6 from intervention group, 4 from control group). Reasons for attrition: metastasis for 3 participants and refusal to be involved before completing post-test for 7 participants
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Study design was quasi-experimental with a non-equivalent control group. Sampling method not described. Participation rate not provided

Dirksen 2008

Methods	Design: single centre, RCT. Follow-up: after experimental interventions.

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Dirksen 2008 *(Continued)*

Participants	Major inclusion criteria: stage 1-3 breast cancer; at least 3 months post-completion of primary cancer treatment; has concerns about sleep N = 72 (E: 34, C: 38) Mean age: E: 57.2 ± 9.9 years, C: 59.2 ± 10.7 years Stage of breast cancer: E: stage 1 (19, 55.9%), stage 2 (9, 26.5%), stage 3 (4, 11.8%); C: stage 1 (17, 46.3%), stage 2 (12, 31.7%), stage 3 (5,12.2%)
Interventions	E: Psychological (cognitive behavioural therapy for insomnia) + Educational Cognitive behavioural therapy for insomnia: individual format, conducted by a master's level registered nurse therapist, a face-to-face session of 2 hours at session 1 and of about 1 hour at sessions 2-4, plus 2 phone sessions of about 15 minutes at sessions 5-6, primary foci were stimulus control instructions, sleep restriction therapy, sleep education and hygiene, reviewing daily sleep diaries, discussing progress to data, encouraging adherence to treatment recommendation; home assignment, daily sleep diaries. Educational: integrated into cognitive behavioural therapy for insomnia; stimulus control instructions, sleep restriction therapy, sleep education and hygiene. C: received the same attention and number of contact hours as experimental group.
Outcomes	Quality of life: FACT-B Others: STAI, CES-D, POMSF/I, ISI
Notes	C: comparison, E: experimental, CES-D: Center for Epidemiologic Studies-Depression Scale, C: control, FACT-B: Functional Assessment of Cancer Therapy-Breast, ISI: Insomnia Severity Index, POMSF/I: Profile of Mood States Fatigue/Inertia Subscale, RCT: randomised control trial, STAI: State-Trait Anxiety Inventory. Dropouts or missing data where reported: Of the 81 participants entered into the study, 6 from experimental group and 3 from control withdrew the study and were excluded from data analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants were randomly assigned to treatment groups by the use of a random numbers table
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Research assistant was not blinded to group assignment. Participants were aware of allocated interventions since they had to go through the intervention
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Participants could be aware of allocated interventions, although control group received the same attention and number of contact hours as the intervention group
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition from intervention and control group described with reasons, and attrition was quite balanced between groups (6 from intervention group, 3 from control group). Reasons for withdrawal from intervention group included treatment was not helping, did not like treatment, no longer interested, sched-

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Dirksen 2008 *(Continued)*

		uling problems and a family death. Reasons for withdrawal from control group included not interested, scheduling problems and not able to contact
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Non-probability sampling was performed and could lead to problems with external validity. Participation rate was about 26.2%

Duijts 2012

Methods	Design: RCT. Follow-up: 12 weeks and six months after study entry.
Participants	Major inclusion criteria: stages 0-3 breast cancer; within 4-5 months of completion of chemotherapy; reported at least a minimal level of menopausal symptoms N = 422 (4 arms: E1: 109, E2: 104, E3: 106, C: 103) Mean age: E1: 48.2 ± 5.7 years, E2: 47.7 ± 5.6 years, E3: 49.0 ± 4.9 years, C: 47.8 ± 6.0 years Stage of breast cancer: not reported
Interventions	E1: psychological (cognitive behavioural therapy) E2: physical (exercise) E3: psychological (cognitive behavioural therapy) + physical (exercise) Cognitive behavioural therapy: group format, no information about who conducted the therapy, 1 session per week of 90 minutes for six weeks plus a booster session held 6 weeks after programme completion, primary foci were hot flushes and night sweats, and relaxation exercises. Exercise: individual format, one session per week of 2.5 to 3 hours for 12 weeks, physiotherapist-guided exercise and level of physical activity. C: waiting-list control.
Outcomes	Quality of life: SF 36, EORTC QLQ-BR23 Others: FACT-ES, HADS, HFRS, SAQ, BFLUTS
Notes	BFLUTS: Incontinence scale of the Bristol Female Lower Urinary Tract Symptoms Questionnaire, C: comparison, E1: experimental 1, E2: experimental 2, E3: experimental 3, FACT-ES: Endocrine subscale of the Functional Assessment of Cancer Therapy, HADS: Hospital Anxiety and Depression Scale, HFRS: Hot Flush Rating Scale, NS: not specified, EORTC QLQ-BR23: European Organisation for Research and Treatment of Cancer-Breast Cancer-Specific Quality of Life Questionnaire, RCT: randomised controlled trial, SAQ: Sexual Activity Questionnaire, SF-36: Short Form Health Survey.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants were randomly assigned using computerised block randomisation
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias)	High risk	Participants were aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded

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Duijts 2012 *(Continued)*

All outcomes		
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants were aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Percentage available follow-up data did not differ significantly between groups, but reason for missing outcome data not provided
Selective reporting (reporting bias)	Low risk	Study protocol was available and pre-specified outcomes were reported in pre-specified way
Other bias	High risk	Participation rate was about 23.4%. Sampling bias likely present as non-probability sampling was used

Ergun 2013

Methods	Design: single centre, RCT. Follow-up: after experimental interventions.
Participants	Major inclusion criteria: breast cancer with no recurrent or progressive breast cancer; completion of surgery, radiotherapy and chemotherapy, being post-menopausal N = 60 (E1: 20, E2: 20, C: 20) Mean age: E1: 49.7 ± 8.3 years, E2: 55.1 ± 6.9 years, C: 50.3 ± 10.4 years Stage of breast cancer: not reported
Interventions	E1: educational + physical (supervised exercise) E2: educational + physical (home exercise) E3: educational Educational: no information about individual or group format, one session of 30 minutes, topics included adverse effects of breast cancer, prevention of lymphoedema and related activities, together with a booklet about lymphoedema-specific exercises Physical (supervised exercise): no information about individual or group format, conducted by a specialist doctor of physical therapy and rehabilitation, supervised aerobic exercise and resistive exercise of 45 minutes per session with 3 sessions per week for 12 weeks, and brisk walking of 30 minutes per session with 3 sessions per week for 12 weeks. Physical (home exercise): home aerobic exercise for 12 weeks, and brisk walking of 30 minutes per session with 3 sessions per week for 12 weeks. C: educational only.
Outcomes	Quality of life: EORTC QLQ-C30 Others: BDI, BFI
Notes	BDI: Beck Depression Inventory, BFI: Brief Fatigue Inventory, C: comparison, E1: experimental 1, E2: experimental 2, EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life C30, RCT: randomised control trial. Dropouts or missing data where reported: 2 participants from home exercise group dropped out due to development of metastasis and lack of time to do the exercises but were included in data analysis.

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Ergun 2013 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random number tables used for randomisation
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Participants could be aware of allocated interventions but as all three groups received programme, blinding could be possible too, but study did not provide enough information to allow judgment. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Participants could be aware of allocated interventions but as all three groups received programme, blinding could be possible too, but study did not provide enough information to allow judgment. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition described with reasons and quantity was small, 1 case for development of metastasis and 1 case for lack of time to do exercises. These participants were still included in analysis
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias was present as participants were volunteers

Eyigor 2010

Methods	Design: single centre, RCT. Follow-up: eight weeks after the experiment.
Participants	Major inclusion criteria: breast cancer with no evidence of recurrent or progressive disease; completion of surgery, radiotherapy and/or chemotherapy with or without current hormone treatment N = 42 (E: 27, C: 15) Mean age: E: 48.5 ± 7.6 years, C: 49.7 ± 8.7 years Stage of breast cancer: not reported
Interventions	E: educational + physical (hospital pilates exercise + home exercise) Educational: no information about individual or group format, one session of 30 minutes, topics included the information of breast cancer, lymphoedema, and prevention of lymphoedema and related activities, together with a booklet about range-of-motion, stretching and respiratory exercises. Physical (hospital pilates exercise): no information about individual or group format, conducted by a specialist physiotherapist, supervised pilates exercise of 60 minutes per session with 3 sessions per week for 8 weeks. Physical (home exercise): home exercise in accordance with the booklet 1 session per day and walking exercise of 20 to 30 minutes per session with 3 sessions per week for 8 weeks. C: educational + physical (home exercise)
Outcomes	Quality of life: EORTC QLQ-C30, EORTC BR23

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Eyigor 2010 *(Continued)*

	Others: BDI, BFI
Notes	BDI: Beck Depression Inventory, BFI: Brief Fatigue Inventory, C: comparison, E: experimental, EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life C30, EORTC QLQ-BR23: European Organisation for Research and Treatment of Cancer-Breast Cancer-Specific Quality of Life Questionnaire, RCT: randomised controlled trial.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomised using a random numbers table
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded but the same physio made assessments before and after interventions
Incomplete outcome data (attrition bias) All outcomes	High risk	Attrition imbalanced across groups. 10 participants in group 2 failed to complete the programme due to loss of interest (2), difficulty in commuting to the hospital (6) and medical problems (2). No loss in group 1. Participants lost excluded from analysis
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely present due to non-probability sampling. Participation rate was about 96.3%

Fillion 2008

Methods	Design: single centre, RCT. Follow-up: post-experiment and at 3-months post-experiment.
Participants	Major inclusion criteria non-metastatic breast cancer; within 2 years after breast cancer treatment N = 87 (E: 44, C: 43) Mean age: E: 53.1 ± 9.7 years, C: 51.8 ± 10.3 years Stage of breast cancer: E: stage 0 (2, 4.5%), stage1 (21, 47.7%), stage 2 (18, 40.9%), stage 3 (3, 6.8%); C: stage 0 (4, 9.3%), stage 1 (17, 39.5%), stage 2 (12, 27.9%), stage 3 (10, 23.3%)
Interventions	E: psycho- educational + physical (exercise) Psycho-educational + physical (exercise): group meeting format, one session per week of 2.5 hours for four weeks (1 hour was supervised walking training, 1.5 hours was psycho-educative fatigue management session), with daily home-based practice of relaxation and exercise, plus one booster telephone

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Fillion 2008 *(Continued)*

	session of 5-15 minutes between 7th and 8th week after completion of psycho-educational and exercise interventions. C: usual care.
Outcomes	Quality of life: SF-12 Others: POMS, MFI
Notes	C: comparison, E: experimental, MFI: Multidimensional Fatigue Inventory, POMS: Profile of Mood States, SF-12: Short Form (12) Health Survey.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants randomly assigned to study groups through a sequence of randomisation which was computer-generated, after a preliminary stratification, according to the adjuvant treatments received
Allocation concealment (selection bias)	Low risk	A kinesiologist randomly assigned each participant to groups using sealed envelopes, which were concealed to both kinesiologist and patient till then
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition from both groups balanced (4 from intervention, 3 from control) with reasons provided. Reasons for withdrawal in intervention group were disease recurrence (2), withdrawal (1) and metastatic disease (1) and withdrawal in control group was due to withdrawal (2) and disease recurrence (1). participants who did not receive allocated intervention were not included in analysis
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported.
Other bias	High risk	Participation rate was 18.9%. Sampling bias likely present as non-probability sampling was used

Fiorentino 2008

Methods	Design: crossover-experimental. Follow-up: 6 and 12 weeks from baseline.
Participants	Major inclusion criteria: Survivors of breast cancer who had finished their breast cancer treatment and met the DSM IV criteria for insomnia N = 14 (E: 11, C: 10) Mean age: 61 ± 11.6 years Stage of breast cancer: Stage 1 (7), Stage 2 (3), stage 3 (2) and advanced stage 3 (2)
Interventions	E: educational + psychology (behavioural)

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Fiorentino 2008 *(Continued)*

	Education + Psychology (behavioural): 1-hour session per week for 6 week; educational component covered sleep stages, processes regulating sleep , sleep throughout life, sleep in cancer patients, Spielman et al.'s (1987) insomnia 3-P model and cognitive behavioral therapy basics; psychological (behavioural) component included entailed sleep restriction, stimulus control, adhering to the sleep hygiene rules, and training in progressive muscle relaxation techniques; conducted by a graduate level therapist trained in CBT-I, and supervised by a licensed clinical psychologist C: usual care
Outcomes	Quality of life: SF-36 Others: actigraphy, PSQI, ISI, Sleep Diaries, MFSI-SF, FOSQ, CESD,BSI-18, GCS
Notes	C: comparison, E: experimental, SF-36: Short Form (36) Health Survey ISI: Insomnia, PSQI: Pittsburgh Sleep Quality Index, ISI: Insomnia Severity Index, Severity Index, MFSI-SF: Multidimensional Fatigue Symptom Inventory, FOSQ: Functional Outcomes of Sleep Questionnaire, BSI-18: Brief Symptom Inventory, GCS: Greene Climacteric Scale. Dropouts or missing data where reported: 5 in experimental and 2 in comparison lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants randomly assigned through a computer-generated random list
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	2 women dropped out, 1 reported study was too much and another realised in therapy that the root of her insomnia would be addressed with a more comprehensive psychotherapy addressing psychological events and traumas experienced in childhood
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely present as non-probability sampling method used. Participation rate was about 58.3%

Galantino 2010

Methods	Design: single centre, quasi-RCT. Follow-up: 3 months from baseline.
Participants	Major inclusion criteria: not reported

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Galantino 2010 *(Continued)*

	N = 30 (E: 20, C: 10) Mean age: not reported Stage of breast cancer: not reported
Interventions	E: psychological (coaching) + educational Psychological (coaching): no information about individual or group format, conducted by a certified professional Health Fitness Instructor, an initial session of 90 minutes about a wellness vision and behavioural plan development, followed by five sessions of 30-40 minutes each over a 3-month period, topics included goal review and goal attainment, and discussion of obstacles and strategies. Educational: Web site information of health and fitness, and wellness vision and goals. (Web site information served as additional resources and was optional) C: long standing traditional social support
Outcomes	Quality of life: QOL P/CS Others: HADS
Notes	C: comparison, E: experimental, HADS: HADS: Hospital Anxiety and Depression Scale, QOL P/CS: Quality of Life Patient/Cancer Survivor, CESD: Center of Epidemiological Studies-Depression.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Information about allocation to intervention and control groups was not stated clearly
Allocation concealment (selection bias)	Unclear risk	No information provided about allocation concealment
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Participants could be aware of allocated interventions since they had to go through the intervention but it could also be possible that they were not aware as coaching and social support group appear similar. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Participants could be aware of allocated interventions since they had to go through the intervention but it could also be possible that they were not aware as coaching and social support group appear similar. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No information provided about attrition
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sample sizes in both groups seemed imbalanced (20 in coaching group, 10 in social support group). Sampling bias likely present as non-probability sampling was used. No information provided about participation rate

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Heidrich 2009

Methods	This paper reports 3 pilot studies; 2 RCTs and 1 single group study. We included 2 RCTs in this review. P1: Design: single centre, RCT. Follow-up: at 6 and 10 weeks post-experiment. P2: Design: single centre, RCT. Follow-up: at 2, 4, 6, 8 and 16 weeks post-experiment.
Participants	The 2 pilot studies have the same major inclusion criteria: aged 65 years or older, at least 1 year post diagnosis of non-metastatic breast cancer; at least 1 month post-treatment for breast cancer except hormonal therapies P1: N = 41 (E: not reported, C: not reported) Mean age: overall 72 years, range 65-86 years (E: not reported, C: not reported) Stage of breast cancer: not reported P2: N = 20 (E: not reported, C: not reported) Mean age: overall 69.7 years, range 65-82 years (E: not reported, C: not reported) Stage of breast cancer: not reported
Interventions	P1: Psychological (counselling interview) + Educational (symptom-management strategies and information) Psychological (counselling interview): individual format, conducted by an advanced practice nurses, Individualised Representational Intervention to Improve Symptom Management (IRIS), 1 face-to-face session of 35-70 minutes, involved participants describing their beliefs about most troublesome or serious symptoms and coping of symptoms, and developing a symptom management plan; and 1 phone session to review the progress of the symptom management plan. Educational: concurrent with the counselling interview, symptom-management strategies and information. C: usual care P2: Psychological (counselling interview) + Educational (symptom-management strategies and information) Psychological (counselling interview): same as P1 except for the addition of 4 bi-weekly telephone reinforcement sessions beginning 2 weeks after the baseline interview, content included symptom distress assessment and symptom management review. Educational: same as PI C: waiting-list control
Outcomes	PI*: Quality of life: SF-36 Others: SB-R, TSD, CES-D, STAI P2*: Quality of life: SF-12 Others: SB-R, TSD, CES-D, STAI, BPI
Notes	BPI: Brief Pain Inventory, CES-D: Center for Epidemiologic Studies-Depression Scale, SF-36: Short Form (36) Health Survey, SF-12: Short Form (12) Health Survey, P1: pilot study 1, P2: pilot study 2, RCT: randomised controlled trial SB-R: Symptom Bother-Revised Scale, STAI: State Anxiety Scale, TSD: Target Symptom Distress.

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Heidrich 2009 *(Continued)*

Dropouts or missing where reported:

P1*: 2 participants dropped out but were included in data analysis.

P2*: 1 participant dropped out but were included in data analysis.

*: Since Heidrich 2009 reported three pilot studies and two RCTs fulfilled our inclusion criteria; therefore, both pilot RCTs were included (labelled as P1 and P2 above)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Study 1 & 2: randomisation performed but method not described
Allocation concealment (selection bias)	Unclear risk	Study 1 & 2: study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Study 1 & 2: participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Study 1 & 2: participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Study 1 & 2: reasons for attrition not described but drop out rate not substantial
Selective reporting (reporting bias)	Unclear risk	Study 1 & 2: study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Study 1 & 2: sampling bias likely present as participants were volunteers. Participation rate was 73% and 81% for study 1 and 2 respectively

Hoffman 2012

Methods	Design: single centre, RCT. Follow-up: 8-12 weeks and 12-14 weeks from baseline.
Participants	Major inclusion criteria: stage 0-3 breast cancer; within 2 months to 2 years after the completion of surgery, chemotherapy and/or radiotherapy N = 229 (E: 114, C: 115) Mean age: E: 49.0 ± 9.3 years, C: 50.1 ± 9.14years Stage of breast cancer: E: stage 0 (11, 10%), stage 1 (34, 30%), stage 2 (47, 41%); stage 3 (22, 20%); C: stage 0 (6, 5%), stage 1 (45, 39%), stage 2 (47, 41%); stage 3 (17, 15%)
Interventions	E: Psychological (mindfulness-based stress reduction) + Education (didactic teaching) Psychological (mindfulness-based stress reduction): group format, conducted by a qualified mindfulness-based stress reduction instructor, 1 session per week of 2 hours for 8 weeks (except the 1st and 8th weeks were 2.25 hours, and 6th week was 6 hours in length, topics of formal mindfulness practice included a body scan, gentle and appropriate lying and standing toga-based stretches, sitting medita-

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Hoffman 2012 *(Continued)*

	tion, some group discussions, and home formal mindfulness practice for 40-45 minutes for 6 or 7 days per week. Education (didactic teaching): integrated into the mindfulness-based stress reduction programme C: waiting-list control
Outcomes	Quality of life: FACT-B Others: FACT-ES, POMS, WHO-5
Notes	C: comparison, E: experimental, FACT-B: Functional Assessment of Cancer Therapy-Breast, FACT-ES: Functional Assessment of Cancer Therapy-Endocrine Symptoms scale, POMS: Profile of Mood States, RCT: randomised controlled trial, WHO-5: WHO five item well-being questionnaire. Dropouts or missing where reported: 7 participants from experimental group and 4 from control were excluded from analysis due to missing baseline questionnaire or with > 20% missing data.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random assignment was performed by using an externally computer-generated randomisation programme in blocks of four
Allocation concealment (selection bias)	Low risk	Random assignment was performed by operations director of the organisation, who was independent from the study, which ensured allocation concealment because no clinician/researcher could anticipate or direct the allocation of the participants
Blinding of participants and personnel (performance bias) All outcomes	High risk	Clinician-researcher conducting the study and delivering the intervention could not be blinded to allocation of participants to intervention or control group. Participants could be aware of allocated interventions since they had to go through the intervention
Blinding of outcome assessment (detection bias) All outcomes	High risk	Anonymised data were collected by a research assistant who was blinded to group assignment and independent from intervention delivery. Participants could be aware of allocated interventions since they had to go through the intervention
Incomplete outcome data (attrition bias) All outcomes	Low risk	The proration method (standard mean imputation) was used to address missing data within questionnaires. When whole questionnaires were missing at T2 or T3, data were imputed by using previous values carried forward. There were 3 instances (2 from intervention, 1 from control) in which more than 20% of data was missing from participants at T1, and their data was excluded. Reasons for attrition described in CONSORT diagram and attrition does not differ too much (11 from intervention, 4 from control)
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported.
Other bias	High risk	Participation rate was about 36.2%. Sampling bias likely present as non-probability sampling was used.

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Kim 2011

Methods	Design: single centre, RCT. Follow-up: 12 weeks post-experiment.
Participants	Major inclusion criteria: stage 0-3 breast cancer; within 2 years of diagnosis, completion of primary cancer treatment, unmet behavioural goals (no moderate-intensity exercise for a minimum of 30 min per day at least 5 day per week or had a poor diet) N = 45 (E: 23, C: 22) Mean age: E: 44.6 ± 9.9 years, C: 47.1 ± 7.3 years Stage of breast cancer: E: stage 0 (3, 13%), stage 1 (9, 39%), stage 2 (8, 35%); stage 3 (3, 13%); C: stage 0 (2, 9%), stage 1 (10, 45%), stage 2 (7, 32%); stage 3 (3, 14%)
Interventions	Physical (exercise) + education (balanced diet) Exercise: individual format, telephone counselling, conducted by a specially trained nurse with Master degree in nursing, 1 session per week of 30 minutes for 2 weeks, topic included stage-matched individualised prescription for regular exercise complemented with a workbook, with the goal to achieve a moderate-intensity exercise for a minimum of 30 minutes per day at least 5 day per week. Education (balanced diet): integrated into telephone counselling for exercise, with the goal to achieve a balanced diet. C: control
Outcomes	Quality of life: EORTC QLQ-C30 Others: HADS, BFI
Notes	BFI: Brief Fatigue Inventory, C: comparison, EORTC QLQ-C30: European Organisation for the Research and Treatment of Cancer Quality-of-Life Questionnaire-Core 30, E: experimental, HADS: Hospital Anxiety and Depression Scale , RCT: randomised controlled trial. Dropouts or missing where reported: 5 participants from experimental group and 4 participants from control dropped out but were included in data analysis as per intention-to-treat

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The authors used a random numbers table to assign participants to groups
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	For participants with missing data, the authors treated available data under the missing-at-random assumption of the generalised estimating equation analysis. 9 participants dropped out and reasons included car accident (1), aggravated health condition after colonoscopy (1), breast cancer recurrence (1),

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Kim 2011 *(Continued)*

		lack of interest (1) and loss to follow-up (1). Reasons for drop out not related to intervention and no differences in attrition observed between two groups (5 from intervention, 4 from control). Analysis based on intention-to-treat
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Participation rate was about 5.3%. Sampling bias likely present as non-probability sampling was used

Lahart 2016

Methods	Design: single centre, RCT. Follow-up: 6 months from baseline.
Participants	Major inclusion criteria: stage 1-3 breast cancer; post-surgery and had no surgery planned for the next 6 months at least; completion of adjuvant radiotherapy and/or chemotherapy not including hormonal therapy N = 80 (E: 40, C: 40) Mean age: E: 52.4 ± 10.3 years, C: 54.7 ± 8.3 years Stage of breast cancer: not reported
Interventions	Psychological (physical activity counselling) + educational Physical activity counselling: face-to-face counselling, follow-up phone calls and post-card prompts. Face-to-face counselling; individual format, conducted by the primary researcher, 1 session of 30-45 minutes for moderate-intensity physical activity guided by motivational interviewing principles, topics included decision balance exercise, benefits of physical activity, seeking social support, goal setting, types and intensities of physical activity, safety advice, and basic lifestyle information. Follow-up phone calls; individual format, conducted by the primary researcher, 3 session of 15-20 minutes at the end of month for the first 3 months, topics are similar to the face-to-face counselling. Participants were required to do home-based moderate-intensity physical activity over each week for 6 months. Post-card prompts: a reminder leaflets encouraging participants taking part in home-based physical activity were mailed to participants at months 4 and 5. Educational: an information booklet and a DVD, topics included exercising safety, exercise intensity, dealing with fatigue and exercising with lymphedema, and local physical activity opportunities. C: usual care (standard information of physical activity)
Outcomes	Quality of life: FACT-B
Notes	C: comparison, E: experimental, FACT-B: Functional Assessment of Cancer, RCT: randomised controlled trial. Dropouts or missing where reported: 3 participants from experimental group and 7 participants from control did not complete the post-intervention assessment but were included in data analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was performed using a computer-generated random numbers list

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Lahart 2016 *(Continued)*

Allocation concealment (selection bias)	Low risk	Allocation performed at a different site
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants were not blinded to treatment group. Personnel blinding not possible
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants and scientist not blinded to group allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	3 participants lost to follow-up in intervention group as they discontinued intervention (1 due to sciatica, 1 due to recurrence, 1 due to personal reasons). 7 participants lost to follow-up in control group (2 due to not wanting to come back to hospital to finish trial, 1 due to hip operation, 4 due to being unable to contact). Attrition somewhat balanced
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Participation rate was about 53.3%. The baseline characteristics of participants in the 2 groups were overall similar in most characteristics, with only a few dissimilarities (e.g. usual care group reported more comorbidities). Those in the usual care group were more physically active compared with the intervention group at baseline. For International Physical Activity Questionnaire Physical Activity categories at baseline, 15% (n = 6) more participants were categorised in the high activity category in the usual-care group compared with the intervention group. Sampling bias likely present as non-probability sampling used

Lengacher 2009

Methods	Design: single centre, RCT. Follow-up: 6 weeks after random assignment.
Participants	Major inclusion criteria: stage 0-3 breast cancer; within 18 months of treatment completion of surgery and adjuvant radiotherapy and/or chemotherapy N = 84 (E: 41, C: 43) Mean age: overall 57.5 ± 9.4 years, E: not reported, C: not reported Stage of breast cancer: E: stage 0 (12.2%), stage 1 (63.4%), stage 2 (17.1%); stage 3 (7.3%); C: stage 0 (20.9%), stage 1 (44.2%), stage 2 (27.9%); stage 3 (7%)
Interventions	E: Psychological (mindfulness-based stress reduction) + educational Mindfulness-based stress reduction: group format, conducted by a psychologist with Mindfulness-based stress reduction certification, 1 session per week of 2 hours for 6 weeks, topics included meditation, body scan procedures and with response to stress, yoga, and modification of stress to help manage psychological and physical symptoms and thus cope better with the distress associated with cancer; group interaction, discussion and support; home-based practice, formal meditation and yoga practice for at least 15-45 minutes per day for 6 days per week for 6 weeks, informal daily meditation and yoga practice for at least 15-45 minutes for 6 weeks. Educational: part of the components of mindfulness-based stress reduction, a training manual and 4 audiotapes covering materials related to relaxation, mediation, and mind-body connection so as to support participants' home practice of meditation and yoga.

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Lengacher 2009 *(Continued)*

	C: usual care (standard post-treatment clinic visits) + waitlisted control
Outcomes	Quality of life: SF-36 Others: STAI, CES, PSS, MDASI, CRS, LOT
Notes	C: comparison, CES-D: Center for Epidemiological Studies Depression Scale, CRS: fear of recurrence, E: experimental, LOT: Life Orientation Test, MBSR: Mindfulness-based stress reduction, MDASI: M.D Anderson Symptom Inventory, PSS: Perceived Stress Scale; RCT: randomised controlled trial, SF-36: Short Form (36) Health Survey, STAI: State-Trait Anxiety Inventory. Dropouts or missing data where reported: 1 participant from experimental group and 1 from control lost to follow up and were excluded from analysis

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation was performed but method was not described
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants were not blinded to treatment group. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants were aware of allocated interventions since they had to go through the intervention. Although data collectors were blinded to treatment assignment when baseline data were collected, no information was provided of whether they were blinded when data post-intervention was collected
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition balanced between groups (1 from intervention for disease recurrence, 1 from control for family obligation)
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Black people were more often assigned to usual-care regimen. Sampling method not described. Participation rate was about 43.5%

Loerzel 2008

Methods	Design: A secondary analysis of a RCT by Meneses 2007. Follow-up: 3 and 6 months from baseline.
Participants	Major inclusion criteria: aged 65 years and older who participated in the Breast Cancer Education Intervention research study of Meneses 2007, stage 1-2 breast cancer; within the first year after cancer treatment completion N = 50 (E: not reported, C: not reported) Mean age: overall 72.1 ± 5.1 years, E: not reported, C: not reported

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Loerzel 2008 *(Continued)*

	Stage of breast cancer: overall: stage 1 (35, 70%), stage 2 (15, 30%)
Interventions	E: Psycho-educational Psycho-educational: individual format, conducted by an intervention nurse, 3 face-to-face education and support sessions of 60-90 minutes followed by 5 support face-to face or telephone sessions of 30 minutes over a 6-month period, topics included fatigue, lymphedema, pain, menopausal symptoms, hot flushes, sleep problems, anxiety and depression, fear of cancer recurrence, uncertainty, sexual function, family and social relationships, work, financial, ways to maintain health, nutrition and healthy diet, adherence to cancer surveillance, and the unique problems and concerns that each individual participant facing, together with an education binder containing the corresponded materials with each education and support session; homework assignments, read about the topics, listen to audiotaped materials, and try new self-management tips C: control (attention control)
Outcomes	QOL-BC
Notes	C: comparison, E: experimental, RCT: randomised controlled trial, QOL-BC: Quality of Life-Breast Cancer. Dropouts or missing data where reported 2 participants did not complete the study; leaving 49 at 3 months and 48 at 6 months for data analysis. The data used in Loerzel 2008 should be extracted from Meneses 2007 but only limited to subjects aged 65 or above. Since Meneses 2007 only reported the changes of the scores for different period, their data could not be used in the analysis. Therefore, we included Loerzel 2008 to facilitate meta-analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation was performed but method not described
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	No unexpected missing data was noted. 2 participants did not complete study due to withdrawal before data collection at time 2 (1) and died prior to final data collection from causes unrelated to breast cancer or participation in the study. Attrition between groups insignificant
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely present as non-probability sampling used. Participation rate not described

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Mann 2012

Methods	Design: single centre, RCT. Follow-up: 9 and 26 weeks after randomisation.
Participants	Major inclusion criteria: diagnosed with breast cancer with no evidence of other cancers or metastases; had completed surgery, radiotherapy or chemotherapy; had had at least ten problematic HFNS per week for a duration of 2 months or more N = 88 (E: 43, C: 45) Mean age: E: 53.16 ± 8.1 years, C: 54.05 ± 7.8 years Stage of breast cancer: not reported
Interventions	E: Psycho-educational (cognitive behavioural therapy) Cognitive behavioural therapy: group format, conducted by a clinical psychologist, 1 session per week of 90 minutes for 6 weeks, topics included physiological, cognitive, behavioural and emotional components of HFNS, sharing the experiences of HFNS in the context of breast cancer and group discussion, triggers of HFNS, cognitive behavioural therapy strategies to reduce stress and anxiety and to manage HFNS, relaxation and paced breathing, behavioural reactions to hot flushes and ways to manage hot flushes in social situations, cognitive component of sleep problems, behavioural strategies to reduce wakefulness after night sweats, action plans to maintain cognitive and behavioural change; home-based practice, relaxation and paced breathing daily and during HFNS; educational material; a relaxation and paced breathing audio CD to support daily home practice. C: usual care
Outcomes	Quality of life: SF-36 Others: HFRS, WHQ
Notes	C: comparison, E: experimental, HFNS: hot flushes and night sweats, HFRS: Hot Flushes Rating Scale, RCT: randomised controlled trial, SF-36: Short Form (36) Health Survey, WHQ: Women s Health Questionnaire. Dropouts where reported: 4 from experimental group and 4 from control did not complete data collection and were excluded from data analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was done in cohort groups, whereby the trial clinical psychologist sent participants' identification details to a programmer for randomisation based on a computer-generated randomisation sequence, allocating participants in a one-to-one ratio, stratified by age with randomly varying block size
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Neither participants nor the clinical psychologist could be masked to group allocation
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Researchers collecting outcome data and analysing results were masked. Women were met by a separate researcher who collected questionnaires and

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Mann 2012 *(Continued)*

		who also asked the women not to disclose their treatment allocation to the researcher who did the outcome assessments
Incomplete outcome data (attrition bias) All outcomes	Low risk	Withdrawal rates were much the same in both treatment groups and reasons for attrition were stated. Reasons included unable to attend (1), ill health (2), symptoms ceased (1), chose not to participate (2), died (1), could not be contacted (7) and family problems (1)
Selective reporting (reporting bias)	Low risk	Study protocol was available and pre-specified outcomes were reported in pre-specified way
Other bias	High risk	Sampling bias likely present as non-probability sampling used. Participation rate was about 48.2%

Matthews 2014

Methods	Design: single centre, RCT. Follow-up: post-experiment, and at 3-and 6-month post-experiment.
Participants	Major inclusion criteria: stage 1-3 breast cancer; within 1-36 months of completion of primary cancer treatment, having chronic insomnia N = 56 (E: 30, C: 26) Mean age: E: 52.17 ± 6.9 years, C: 52.85 ± 7.8 years Stage of breast cancer: E: stage 1 (9, 30%), stage 2 (11, 36.7%); stage 3 (10, 33.3%); C: stage 1 (11, 42.3%), stage 2 (9, 34.6%); stage 3 (6, 23.1%)
Interventions	E: Psychological (cognitive behavioural therapy for insomnia) + educational (sleep hygiene education) Cognitive behavioural therapy for insomnia: individual format, conducted by an advanced practice nurse with specialised training in cognitive behavioural therapy for insomnia, 4 face-to-face sessions of 30-60 minutes at sessions 1-3 and 6, plus 2 phone sessions of 15-20 minutes at sessions 4-5, primary foci were reviewing the participants, cognitive behavioural therapy for insomnia overview, conceptual model of insomnia, sleep restriction and stimulus control, sleep hygiene principles, cognitive therapy, cognitive behavioural therapy for insomnia principles reinforcement, sleep schedules adjustment based on participants' sleep diary, and relapse prevention and skills to cope with setbacks; home assignment, adherence of the prescribed sleep schedule sleep diary at home. Educational: integrated into cognitive behavioural therapy for insomnia; sleep restriction, stimulus control, sleep hygiene education. C: behavioural placebo treatment
Outcomes	Quality of life: EORTC QLQ-C30 Others: HADS, PFS, ISI, AFI
Notes	AFI: Attentional Function Index, C: comparison, E: experimental, EORTC QLQ-C30: European Organisation for the Research and Treatment of Cancer Quality of Life Questionnaire-Core 30, HADS: Hospital Anxiety and Depressions Scale, ISI: Insomnia Severity Index, PFS: Piper Fatigue Scale, RCT: randomised controlled trial. Dropouts or missing data where reported: Of the 60 participants enrolled in the study, 2 from experimental group and 2 from control withdrew from the study and were excluded in data analysis.

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Matthews 2014 *(Continued)*

	17 participants did not complete all the follow-up measures but were included in data analysis as per intention-to-treat analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was performed using an adaptive randomisation programme, controlling for age, insomnia severity, recruitment site, and breast cancer stage
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants were blind to treatment condition, study therapist was not blind to treatment condition
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Participants were blind to treatment condition. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition from both groups equal (2 from each group, but reasons for attrition NS. Withdrawn participants included in analysis. No significant interactions were noted between missing data status and group, indicating that no systematic differences existed between those with or without data at follow-up that might influence treatment effects
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely to be present as non-probability sampling and volunteers were used. Participation rate was 80.0%

McClure 2010

Methods	Design: single centre, RCT. Follow-up: 2.5 week, 5 week and 3 months from baseline.
Participants	Major inclusion criteria: stage 1-2 unilateral breast cancer related lymphoedema with ≥10% increased affected arm size compared with the unaffected arm, breast cancer surgery >3 months previously N = 21 (E: 10, C: 11) Mean age: E: 57.0 ± 2.9 years, C: 59.7 ± 2.1 years Stage of breast cancer: not reported
Interventions	E: physical (exercise) + education Exercise: group format, no information about intervention provider, 1 session per week of 60 minutes for 5 weeks, sessions included participation in the video of "From Lymphoedema Onto Wellness (exercise and relaxation programme)", and the topics related to lymphoedema, coping and relaxation techniques, together with group discussion and hands-on practice; self-monitored home programme, daily practice of "From Lymphoedema Onto Wellness" and relaxation techniques for 3 months. Educational: written educational materials, topics included lymphedema, coping and relaxation techniques.

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McClure 2010 *(Continued)*

	C: usual care (to continue with the lymphoedema instructions from their medical team)
Outcomes	Quality of life: SF-36 Others: BDI, Internally generated questionnaire for measuring adherence
Notes	BDI: Beck Depression Inventory, C: comparison, E: experimental, RCT: randomised controlled trial, SF-36: Short Form (36) Health Survey. Dropouts or missing data where reported: Of the 32 participants entered into the study, 6 participants from experimental group and 5 subjects from control were excluded from analysis due to metastatic breast cancer, incomplete data collection or had lymphoedema < 10%.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation performed but method not described
Allocation concealment (selection bias)	High risk	Although each participant opened a randomised, sealed, sequentially numbered envelope informing him or her of group status, the next allocation may be guessed by the screener as randomisation was done in groups of 8 with 4 in intervention and 4 in control
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants were aware of group allocation. Study did not provide enough information to allow judgment as to whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants were aware of group allocation. Therapist was not aware of participant group status
Incomplete outcome data (attrition bias) All outcomes	Low risk	Of the 32 participants who entered the study, 11 were not included in analysis. Reasons for exclusion in intervention group are: metastatic breast cancer (1), did not continue past 2.5 weeks (3), L-Dex scores and percentage swelling < 10 (2). Reasons for exclusion in control group are: triple bypass after baseline testing (1), L-Dex scores and percentage swelling < 10 (4). No significant difference in participant characteristics for participants in primary analysis compared with those not included in primary analysis
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Participation rate not described. Sampling bias likely present as non-probability sampling used

Meneses 2007

Methods	Design: Single centre, RCT. Follow-up: 3 and 6 months from baseline.
Participants	Major inclusion criteria: stage 0-2 breast cancer and no evidence of local recurrence and metastatic disease; within one year of diagnosis, had surgery at least 1 month before, received radiotherapy or chemotherapy, may have been on hormonal therapy

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Meneses 2007 *(Continued)*

	N = 256 (E: 125, C: 131) Mean age: overall: 54.5 ± 11.6 years, E: not reported, C: not reportedStage of breast cancer: not reported
Interventions	E: Psycho-educational Psycho-educational: individual format, conducted by an intervention nurse, 3 face-to-face education and support sessions of 60-90 minutes followed by 5 monthly support face-to face or telephone sessions of 30 minutes over a 6-month period, topics included fatigue, lymphedema, pain, menopausal symptoms, hot flushes, sleep problems, anxiety and depression, fear of cancer recurrence, uncertainty, sexual function, family and social relationships, work, financial, ways to maintain health, nutrition and healthy diet, adherence to cancer surveillance, and the unique problems and concerns that each individual participant facing, together with an education binder containing the corresponded materials with each education and support session; do homework assignments, read about the topics, listen to audiotaped materials, and try new self-management tips C: control (attention control)
Outcomes	Quality of life: QOL-BC
Notes	C: comparison, E: experimental, RCT: randomised controlled trial, QOL-BC: Quality of Life-Breast Cancer. Dropouts or missing data where reported 4 participants from experimental group and 1 from control did not complete the study and were excluded from data analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation performed but method not described
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	4 women in intervention group withdrew during first month of participation but reasons NS. 1 participant in control group died from non-cancer-related cause during the study
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely present as non-probability sampling used. Participation rate was about 77.0%

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Rogers 2009b

Methods	Design: RCT. Follow-up: 12 weeks from baseline.
Participants	Major inclusion criteria: Stage 0-3A breast cancer, currently taking aromatase inhibitors or selective oestrogen receptor modulators N = 41 (E: 21, C: 20) Mean age: E: 52 ± 15 years, C: 54 ± 8 years Stage of breast cancer: E: stage 1 (6, 29%), stage 2 (11, 52%), stage 3 (4, 19%); C: stage 1 (6, 30%), stage 2 (10, 50%), stage 3 (4, 20%)
Interventions	E: Physical (exercise) + Psychological (group discussion session) Exercise: individual format, 12 supervised sessions in the first 6 weeks and 3 face-to-face sessions at the 8^{th}, 10^{th} and 12^{th} week; supervised and face-to-face sessions included walking where the intensity was derived from fitness test, discussion on flexibility exercises and exercise barriers, specific social cognitive theory constructs addressed by the individual sessions included self-efficacy, outcome expectations, behavioral capability, perceived barriers, and goal setting with self-monitoring; conducted by an exercise specialist. Group discussion session: group format, 6 sessions in the first 8 weeks, topics included social support, exercise role models, journaling, time management, stress management, exercise barriers, and behavior modification; specific social cognitive theory constructs included self-efficacy, emotional coping, reciprocal determinism, perceived barriers, outcome expectations, behavioral capability, goal setting, environment, observational learning, and self-control; conducted by a clinical psychologist. C: received written materials
Outcomes	Quality of life: FACT-B Others: PSQI, WOMAC, Process and program evaluation checklist, activity monitoring by accelerometer, Godin Leisure-Time Exercise Questionnaire, readiness for physical activity, fitness by submaximal treadmill test, muscle strength by a back/leg extensor dynamometer, anthropometric measures
Notes	RCT: Randomised controlled trial, C: Comparison, E: Experimental, FACT-B: Functional Assessment of Cancer Therapy—Breast, PSQI: Pittsburgh Sleep Quality Index, WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index. Dropouts or missing data where reported: 1 in experimental group withdrew due to unrelated medical problems and 1 in comparison group withdrew due to distance. As the data of Rogers 2009b and 2009cwere from the same trial, only Rogers 2009b data were used in the meta-analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was computer-generated
Allocation concealment (selection bias)	Low risk	Allocation was kept in sealed envelopes until randomisation to prevent bias in group allocation by study personnel
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded

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Rogers 2009b *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	1 participant refused to answer 4 of the endocrine symptom items and 2 of the cognitive function items and endocrine symptoms, cognitive function interference with functioning and total cognitive function could not be calculated for this participant. Attrition after randomisation was 7% (3 participants), with 1 not completing follow-up in intervention group owing to unrelated illness, 1 not completing follow-up in usual care group owing to distance and 1 providing incomplete follow-up data in usual care group
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely present as non-probability sampling and volunteers used. Participation rate was about 46.1%

Rogers 2009c

Methods	Design: RCT. Follow-up: 12 weeks and 6 months from baseline.
Participants	Major inclusion criteria: Stage 0-3A breast cancer, currently taking aromatase inhibitors or selective oestrogen receptor modulators N = 41 (E: 21, C: 20) Mean age: E: 52 ± 15 years, C: 54 ± 8 years Stage of breast cancer: E: stage 1 (6, 29%), stage 2 (11, 52%), stage 3 (4, 19%); C: stage 1 (6, 30%), stage 2 (10, 50%), stage 3 (4, 20%)
Interventions	E: Physical (exercise) + Psychological (group discussion session) Exercise: individual format, 12 supervised sessions in the first 6 weeks and 3 face-to-face sessions at the 8th, 10th and 12th week; supervised and face-to-face sessions included walking where the intensity was derived from fitness test, discussion on flexibility exercises and exercise barriers, specific social cognitive theory constructs addressed by the individual sessions included self-efficacy, outcome expectations, behavioral capability, perceived barriers, and goal setting with self-monitoring; conducted by an exercise specialist. Group discussion session: group format, 6 sessions in the first 8 weeks, topics included social support, exercise role models, journaling, time management, stress management, exercise barriers, and behavior modification; specific social cognitive theory constructs included self-efficacy, emotional coping, reciprocal determinism, perceived barriers, outcome expectations, behavioral capability, goal setting, environment, observational learning, and self-control; conducted by a clinical psychologist. C: received written materials
Outcomes	Quality of life: FACT-B Others: PSQI, WOMAC, activity monitoring by accelerometer, total daily activity counts, weekly minutes of moderate plus vigorous physical activity, readiness for physical activity
Notes	RCT: Randomised controlled trial, C: Comparison, E: Experimental, FACT-B: Functional Assessment of Cancer Therapy—Breast, PSQI: Pittsburgh Sleep Quality Index, WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index.

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Rogers 2009c *(Continued)*

Dropouts or missing data where reported:

1 in experimental group withdrew due to unrelated medical problems and 1 in comparison group withdrew due to distance.

As the data of Rogers 2009b and 2009cwere from the same trial, only Rogers 2009b data were used in the meta-analysis.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was computer-generated
Allocation concealment (selection bias)	Low risk	Allocation was kept in sealed envelopes until randomisation to prevent bias in group allocation by study personnel.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. IStudy did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	3 participants withdrew at immediately post-intervention follow-up and another 2 withdrew at 6-month follow-up. 3 were in usual care and withdrew due to unrelated disease (1), distance (1) and ill spouse (1). 2 were from intervention group due to unrelated medical problems (1) and lost to follow-up (1)
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported.
Other bias	High risk	Sampling bias likely present as non-probability sampling and volunteers used. Participation rate was about 46.1%.

Rogers 2015

Methods	Design: RCT. Follow-up: 12 weeks and 6 months from baseline.
Participants	Major inclusion criteria: with history of ductal carcinoma in situ (DCIS) or Stage 1-3A breast cancer, not currently receiving or planning to receive chemotherapy or radiation therapy, 8 weeks or more post-surgical procedure. N = 222 (E: 110, C: 112) Mean age: E: 54.9 ± 9.3 years, C: 53.9 ± 7.7 years Stage of breast cancer: E: stage DCIS (13, 11.8%), stage 1 (47, 42.7%), stage 2 (37, 33.6%), stage 3 (13, 11.8%); C: DCIS (12, 10.7%), stage 1 (46, 41.1%), stage 2 (41, 36.6%), stage 3 (13, 11.6%)
Interventions	E: Physical (exercise) + Psychological (group discussion session) Exercise: individual format, 12 supervised sessions in the first 6 weeks and 3 bi-weekly face-to-face sessions in the second 6 weeks, 1-hour supervised session covered warm-up, aerobic walking on the treadmill, cool-down, and stretching, self-selected exercise after week 6, 30-minute face-to-face session

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Rogers 2015 *(Continued)*

	covered progress discussion, activity log sheets review, adherence and barriers assessment, heart rate monitor use assessment, and goals setting for the next two weeks; conducted by an exercise specialist. Group discussion session: group format, 6 sessions in the first 8 weeks, topics included goal setting, journaling, exercise benefits, time and stress management, activity logs reviewed, barriers, benefits, safety, role model presentation, relapse and wrap-up discussion; conducted by trained facilitators. C: received written materials
Outcomes	Quality of life: FACT-B Others: activity monitoring by accelerometer, Godin Leisure-Time Exercise Questionnaire, self-reported exercise intensity, fitness by submaximal treadmill test
Notes	RCT: Randomised controlled trial, C: Comparison, E: Experimental, DCIS: Ductal carcinoma in situ, FACT-B: Functional Assessment of Cancer Therapy—Breast. Dropouts or missing data where reported: 5 in experimental and 4 in comparison lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation to one of the two study group conditions was completed using computer-generated numbers in blocks of 4 within each recruiting site
Allocation concealment (selection bias)	Low risk	Random assignment was kept in sealed, opaque envelopes which were opened in the order in which participants completed baseline testing. Research staff members were unaware of the assignment until the envelope was opened
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel who delivered the intervention were not blinded to group allocation
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition somewhat balanced between groups. After treatment allocation, 5 participants from intervention group dropped out (due to time, family obligation, knee injury and fatigue). At 3-month follow-up, 4 were lost to follow-up in intervention group (due to time and family obligation) and 2 were lost to follow-up in control group (due to time and family obligation). At 6-month follow-up, 1 was lost to follow-up in intervention group (due to being unable to contact) and 2 were lost to follow-up in control group (due to time and stress). The study groups were balanced with regard to all characteristics except that a greater percentage of participants in the usual-care group had been on hormonal therapy for ≤ 1 year (P = 0.02)
Selective reporting (reporting bias)	Low risk	Protocol was available and outcomes are reported as stated in protocol
Other bias	High risk	Participation rate was about 68.9%. Sampling bias likely present as non-probability sampling used

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Savard 2005

Methods	Design: RCT. Follow-up: 8 weeks, 3, 6 and 12 months from baseline.
Participants	Major inclusion criteria: Stage 1-3 breast cancer, completed radiotherapy and chemotherapy at least 1 month prior to enrolment onto the study, met diagnostic criteria for a chronic insomnia syndrome N = 58 (E: 28, C: 30) Mean age: E: 54.81 ± 7.01 years, C: 53.37 ± 7.72 years Stage of breast cancer: E: stage 1 (16, 59.3%), stage 2 (10, 37%), stage 3 (1, 3.7%); C: stage 1 (17, 56.7%), stage 2 (11, 36.7%), stage 3 (2, 6.7%)
Interventions	E: Educational + Psychological Group format with 6 participants each, 90-minute session for 8 week conducted by a master-level psychologist. Psychological: Covered stimulus control therapy, sleep restriction, and cognitive restructuring Educational: Covered sleep hygiene, fatigue and stress management strategies through a treatment manual. C: waiting-list control
Outcomes	Quality of life: QLQ-C30+3 Others: IIS, SCID, Sleep diary, Polysomnography, ISI, HADS, MFI
Notes	RCT: Randomised controlled trial, C: comparison, E: experimental, QLQ-C30+3: The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire, IIS: Insomnia Interview Schedule, SCID: Structured Clinical Interview for the DSM-IV, ISI: Insomnia Severity Index, HADS: Hospital Anxiety and Depression Scale, MFI: Multidimensional Fatigue Inventory. Dropouts or missing data where reported: 12 in experimental and 5 in comparison group lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation performed but method not described
Allocation concealment (selection bias)	Unclear risk	Study did not provide enough information to allow judgment as concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	Attrition at various time points described with reasons. For intervention group, 3 lost interest and 1 developed a myocardial infarction during post-treatment follow-up, 2 lost interest and 1 developed severe major depression during 3-month follow-up and 1 was not available and 4 not initially planned in protocol at 12 month follow-up. In control group, 2 had metastatic evolution and 2

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Savard 2005 *(Continued)*

		lost interest at 3-month follow-up and 1 lost interest at 6 month follow-up. Attrition appeared quite imbalanced between groups. However, all missed treatment sessions were rescheduled and all participants received entire treatment programme, excluding the 4 participants who dropped out of study during course of interventions
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Group difference at pretreatment was for proportion of participants with a comorbid physical illness, which was greater in the treatment than in the control condition. Sampling bias likely present as non-probability sampling and volunteers were used. Participation rate about 55.2%

Sherman 2010

Methods	Design: quasi-experimental. Follow-up: 8 weeks from baseline.
Participants	Major inclusion criteria: Diagnosed with primary breast cancer, at least eight weeks post-breast cancer surgery and not actively in treatment N = 162 (E: 116, C: 46) Mean age: E: 57.75 ± 10.54 years, C: 54.30 ± 10.51 years Stage of breast cancer: E: stage 0 (1.8%), stage 1 (20.0%), stage 2 (20.9%), stage 3 (19.1%), stage 4 (2.7%); C: stage 0 (4.4%), stage 1 (26.7%), stage 2 (17.8%), stage 3 (17.8%), stage 4 (0.0%)
Interventions	E: Physical (exercise) + Educational Group format 2-hour session per week for 8 weeks conducted by trained Encore exercise coordinators. Physical: included low intensity floor-based mobility and stretching exercises (20 min), and slow and progressive hydrotherapy resistance exercises (30 min) with 5-min warm-up and cool-down periods. Educational: covered information relating to aspects of breast cancer survivorship (e.g., managing lymphedema risk, nutrition, breast reconstruction), and provided opportunities for group discussion. C: waitlist control
Outcomes	Quality of life: FACT-B Others: IES, STAI, SSQ-6, Satisfaction, Health-related Beliefs
Notes	C: comparison, E: experimental, FACT-B: Functional Assessment of Cancer Therapy – Breast, IES: Impact of Event Scale, STAI: State-Trait Anxiety Inventory, SSQ-6: Social Support Questionnaire 6. Dropouts or missing data where reported: 4 in experimental and 29 in comparison groups lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Non-random methods of group allocation performed based on the availability of the intervention. Women immediately offered a place in Encore were invited to join the Intervention arm of the study and those registered to wait for a

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Sherman 2010 *(Continued)*

		place in the Encore programme were invited to join the Waitlist control arm of the study
Allocation concealment (selection bias)	High risk	Non-random methods of group allocation performed based on the availability of the intervention. Women immediately offered a place in Encore were invited to join the Intervention arm of the study and those registered to wait for a place in the Encore programme were invited to join the Waitlist control arm of the study
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	In the intervention arm, 3 women had large amounts of missing data on the baseline questionnaire and 26 women either did not complete the follow-up questionnaire or did not participate in a minimum of 6 out of the 8 sessions, without reasons specified. 4 women in control condition did not return follow-up questionnaire. No difference between women who dropped out and women completing study in terms of demographic and baseline dependent variable values. 87 women completed intervention and 42 women completed control
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Groups found to differ on time since diagnosis, number of women who had developed lymphoedema symptoms, age and family history or breast cancer. These variables treated as covariates in further analysis. Study design was quasi-experimental. Sampling bias likely present as non-probability sampling was used. Participation rate was 90.0%

Spahn 2013

Methods	Design: single centre RCT. Follow-up: 10 and 22 weeks from baseline.
Participants	Major inclusion criteria: Stage 1-3 breast cancer patients, completed their tumour treatment at least 3 months before, felt unusual fatigue during the past month N = 64 (E: 32, C: 32) Mean age: E: 58.1 ± 8.5 years, C: 55.3 ± 11.4 years Stage of breast cancer: E: stage 1 (9, 30%), stage 2 (17, 56.7%), stage 3 (2, 6.7%); C: stage 1 (12, 48%), stage 2 (11, 44%), stage 3 (0, 0.0%)
Interventions	E: Educational+ Physical + Psychological Group format (10-20 participants) 6-hour session per week for 10 weeks conducted by experienced sports therapist (walking) and a multi-professional team (other components). Education: Included whole-food cooking, naturopathic and self-help strategies Physical: physical component included supervised sessions on walking.

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Spahn 2013 *(Continued)*

	Psychological: Covered meditation and mindfulness. C: received identical supervised sessions on walking
Outcomes	Quality of life: EORTC Others: German Fatigue Assessment Questionnaire, Unusual fatigue by VAS scale, MFI, HADS, MRS
Notes	RCT: randomised controlled trial, C: comparison, E: experimental, EORTC: European Organization for Research and Treatment of Cancer, MFI: Multidimensional Fatigue Inventory, HADS: Hospital Anxiety and Depression Scale, MRS: Menopausal Rating Scale. Dropouts or missing data where reported: 7 in experimental and 2 in comparison group lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants were randomly assigned to treatment groups by a non stratified block-randomisation with fixed block length of 10. The biometrician drew random numbers from the "ranuni" random number generator of the SAS software
Allocation concealment (selection bias)	Low risk	Assignments were kept in sealed, sequentially-numbered, opaque envelopes and when a patient fulfilled all enrolment criteria, the study physician opened the envelopes in ascending order to reveal that patient's assignment. The study physicians could not access the assignment sequence
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data were multiply imputed by Markov chain Monte Carlo methods. 2 intervention participants withdrew consent due to time limitations or difficult access routes. 7 control participants dropped out because of dissatisfaction with result of randomisation (2), metastatic disease (1), worsening of hip and/or knee pain (2), unexpected lack of time (1) and unwilling to return questionnaire (1)
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported
Other bias	High risk	Sampling bias likely present as participants were volunteers. Participation rate was about 42.1%

Swisher 2015

Methods	Design: RCT. Follow-up:12 weeks from baseline.
Participants	Major inclusion criteria: Stage 1-3 invasive breast cancer, > 3 months after completion of active treatment, BMI > 25, confirmed oestrogen/progesterone/HER2neu-negative status

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Swisher 2015 *(Continued)*

	N = 28 (E: 18, C: 10) Mean age: E: 53.8 years, C: 53.6 years Stage of breast cancer: Not mentioned
Interventions	E: Psychological + Physical Psychological: Two individual sessions for reviewing participants' 3-day diet record, setting diet goals and monitoring the progress, Physical: Three individually supervised and two unsupervised sessions per week for 12 weeks, supervised sessions included 30-mins moderate-intensity aerobic exercise together with stretching and resistance training (optional), unsupervised session involved 30-mins home exercise (typically walking), conducted by exercise physiologist and dietitian. C: received written materials on healthy eating and physical activity
Outcomes	Quality of life: FACT-B Others: BMI, waist and hip circumferences, body fat percentage, HAES, assays for serum cytokines and adipokines
Notes	RCT: randomised controlled trial, C: comparison, E: experimental, BMI: Body Mass Index, FACT-B: Functional Assessment of Cancer Therapy – Breast, HAES: Habitual Activity Estimation Scale. Dropouts or missing data where reported: 5 in experimental and 0 in comparison group lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation was determined a priori by the study statistician, but method of randomisation not described
Allocation concealment (selection bias)	Low risk	Group assignments were placed in opaque envelopes and not revealed until the completion of all baseline testing.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	5 participants lost to follow-up in intervention group but reasons not reported. Attrition somewhat imbalanced (0% in control group, 27.8% in intervention group). Baseline differences between groups not described
Selective reporting (reporting bias)	Low risk	Study previously registered as a randomised controlled clinical trial (NCT01498536). Outcomes were reported as described
Other bias	High risk	Sampling bias likely present as non-probability sampling was used. Participation rate was about 42.4%

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Wonghongkul 2008

Methods	Design: quasi-experimental. Follow-up: 6 and 18 weeks from baseline.
Participants	Major inclusion criteria: Breast cancer patients diagnosed for at least 5 years, no recurrence of disease during data collection. N = 61 (E: 30, C: 31) Mean age: E: 53.95 ± 5.59 years, C: 52.20 ± 7.37 years Stage of breast cancer: Not reported
Interventions	E: Educational+ Psychological Group format 4-hour session every 2 weeks for a total of 8 weeks conducted by nurses, doctors, or breast cancer survivors. Educational: Included 1.5 hours lecture on the topics about self-health management (e.g. living with cancer, maintaining wellness of mind and body, maintaining healthy relationships, and effectively managing family and daily living) and 1 hour video on cancer-related information Psychological: Included 0.5 hour stress reduction and relaxation through cassette tape. C: received routine care from the hospital
Outcomes	Quality of life: Quality of Life: Breast Cancer Version Questionnaire Others: Health Status Questionnaire (self-developed)
Notes	C: comparison, E: experimental. Dropouts or missing data where reported: Not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	No randomisation was performed
Allocation concealment (selection bias)	High risk	No randomisation was performed
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether personnel were blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participants could be aware of allocated interventions since they had to go through the intervention. Study did not provide enough information to allow judgment whether outcome assessors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	3 participants in intervention group dropped out due to study being inconvenient as a result of workload or travel. 2 participants in control group did not complete questionnaire
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available. Study did not provide enough information to allow conclusion if all expected outcome measures were reported

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Wonghongkul 2008 *(Continued)*

Other bias	High risk	Quasi-experimental design due to inability to have full control over extraneous variables and conduct random assignment. Sampling bias likely present as non-probability sampling was used. Participation rate was not described

AFI: Attentional Function Index
BDI: Beck Depression Inventory
BFI: Brief Fatigue Inventory
BFLUTS: Bristol Female Lower Urinary Tract Symptoms Questionnaire
BMI: body mass index
BPI: Brief Pain Inventory
BPT: behavioural placebo treatment
BSI-18: Brief Symptom Inventory
CBT: cognitive behavioural therapy
CD: compact disc
CES-D: Center for Epidemiologic Studies-Depression Scale
CRS: Concerns about Recurrence Scale
DCIS: ductal carcinoma in situ
EORTC QLQ-BR23: European Organisation for Research and Treatment of Cancer Quality of Life Breast Cancer Questionnaire
EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life C30
FACT-B: Functional Assessment of Cancer
FACT-Cog: FACT-Cognitive
FACT-ES: Endocrine subscale of the Functional Assessment of Cancer Therapy
FACT-F: FACT-Fatigue
FACT-G: Functional Assessment of Cancer Therapy-General
FOSQ: Functional Outcomes of Sleep Questionnaire
GCS: Greene Climacteric Scale
GEAQ: German Fatigue Assessment Questionnaire
HADS: Hospital Anxiety and Depression Scale
HFNS: Hot flushes and night sweats
HFRS: Hot Flush Rating Scale
IES: Impact of Event Scale
ISI: Insomnia Severity Index
LOT: Life Orientation Test
MDASI: M.D Anderson Symptom Inventory
MFI: Multidimensional Fatigue Inventory
MFSI-SF: Multidimensional Fatigue Symptom Inventory
MBSR: mindfulness-based stress reduction
MRS: Menopausal Rating Scale
NS: not stated
PE: physical exercises
PFS: Piper Fatigue Scale
POMS: Profile of Mood States
POMSF/I: Profile of Mood States Fatigue/Inertia Subscale
PSQI: Pittsburgh Sleep Quality Index
PSS: Perceived Stress Scale
QOL-BC: Quality of Life-Breast Cancer
QOL P/CS: Quality of Life Patient/Cancer Survivor
SAQ: Sexual Activity Questionnaire
SB-R: Symptom Bother-Revised Scale
SD: standard deviation
SE: standard error
SF-12: Medical Outcomes Study Short Form 12
SF-36: Short Form Health Survey
STAI: State-Trait Anxiety Inventory
TSD: Target Symptom Distress
TOI: Trial Outcome Index
VAS: visual analogue scale
WHO-5: WHO five item well-being questionnaire
WHQ: Women's Health Questionnaire

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WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Appling 2012	Non-home-based
Ashing 2016	Non-multidimensional
Basen-Engquist 2006	Non-home-based
Bjorneklett 2012	Non-home-based
Brown 2002	Non-multidimensional
Cadmus-Bertram 2013	Non-multidimensional
Cantarero-Villanueva 2012	Non-home-based
Carlson 2013	Non-home-based
Casla 2015	Non-home-based
Cheema 2006	Non-home-based
Courneya 2003	Non-multidimensional
Coward 2003	Non-home-based
Crane-Okada 2012	Non-multidimensional
Cuesta-Vargas 2014	Non-home-based
Culos-Reed 2006	Non-multidimensional
Daley 2004	Non-home-based
Daley 2007	Non-home-based
Darga 2007	Non-home-based
Dieli-Conwright 2014	Non-multidimensional
Djuric 2002	Non-home-based
Dolbeault 2009	Non-home-based
Dorai 2004	Non-multidimensional
Edelman 1999	Non-multidimensional
Fernandez-Lao 2013	Non-multidimensional
Freeman 2015	Non-multidimensional
Ganz 2000	Non-home-based

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Study	Reason for exclusion
Ganz 2004	Non-home-based
Garrett 1996	Non-multidimensional
Gellaitry 2010	Non-multidimensional
Graves 2002	Non-multidimensional
Grunfeld 2006	Non-home-based
Heim 2007	Non-home-based
Heiney 2012	Non-home-based
Hershman 2013	Non-home-based
Hockett 2005	Non-home-based
Howell 2005	Non-multidimensional
Hughes 2008	Non-multidimensional
Jeffs 2013b	Non-multidimensional
Johnston 2011	Non-home-based
Jones 2010	Non-multidimensional
Juarez 2015	Non-home-based
Jun 2011	Non-home-based
Khan 2012	Non-home-based
Korstjens 2006	Non-home-based
Kwiatkowski 2013	Non-home-based
Lechner 2014	Non-multidimensional
Lee 2010b	Non-multidimensional
Lengacher 2014	Non-multidimensional
Levine 2012	Non-home-based
Listing 2009	Non-multidimensional
Littman 2012	Non-multidimensional
Loprinzi 2011	Non-multidimensional
Lyons 2015	Non-multidimensional
Mandelblatt 2008	Non-home-based

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Study	Reason for exclusion
Manne 2005	Non-home-based
McKenzie 2003	Non-home-based
McKiernan 2010	Non-home-based
Milbury 2013	Non-multidimensional
Milne 2008	Non-home-based
Monti 2013	Non-multidimensional
Mustian 2004	Non-home-based
Mustian 2008	Non-home-based
Naumann 2012a	Non-home-based
Naumann 2012b	Non-home-based
Neil 2013	Non-home-based
Park JH 2012	Non-home-based
Piland 2011	Non-multidimensional
Poorkiani 2010	Non-home-based
Rowland 2009	Non-home-based
Schmitz 2009	Non-home-based
Schover 2006	Non-home-based
Schover 2011	Non-home-based
Schultz 2011	Non-home-based
Scott 2013a	Non-home-based
Shields 2004	Non-home-based
Shields 2010	Non-home-based
Simpson 2001	Non-home-based
Speck 2010	Non-multidimensional
Speed Andrews 2010	Non-home-based
Sprod 2010	Non-multidimensional
Sprod 2012	Non-home-based
Sterba 2015	Non-multidimensional

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Study	Reason for exclusion
Stolley 2009	Non-home-based
Vallance 2007	Non-multidimensional
Vallance 2008	Non-multidimensional
Vallance 2010	Non-multidimensional
von Ah 2012	Non-home-based
Winters-Stone 2012	Non-multidimensional
Witek-Janusek 2008	Non-home-based

Characteristics of ongoing studies *[ordered by study ID]*

Abrahams 2015

Trial name or title	A randomised controlled trial of web-based cognitive behavioral therapy for severely fatigued breast cancer survivors (CHANGE-study)
Methods	Design: Multicentre RCT. N (Target) = 120 Follow-up: baseline, after 6 months
Participants	Major inclusion criteria: Breast cancer survivors finished treatment at least 3 months previously, severely fatigued, able to assess internet
Interventions	E: Individual web-based CBT, consisting of three face-to-face sessions and maximally eight web-based modules over a period of 6 months; conducted by licensed cognitive behavioral therapists C: Care as usual
Outcomes	Quality of life (EORTC-QLQ-C30) Others CIS, SIP, BSI-18
Starting date	NS
Contact information	Harriet.Abrahams@radboudumc.nl
Notes	E: experimental, C: comparison, RCT: randomised control trial, EORTC-QLQ-C30: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30; CIS: Fatigue severity; SIP: Functional impairments; BSI-18: Psychological distress. The study is registered in the Dutch Trial Registry (reference no. NTR4309, date registered: December 6, 2013).

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Befort 2014

Trial name or title	Protocol and recruitment results from a randomised controlled trial comparing group phone-based versus newsletter interventions for weight loss maintenance among rural breast cancer survivors
Methods	Design: Multicentre RCT N: 80 + 80 (target) Follow-up: 6, 12, 18, and 24 months from baseline
Participants	Major inclusion criteria: Stage 0-3c post-menopausal breast cancer survivors, diagnosed within the past 10 years, BMI of 27–45 kg/m^2
Interventions	All received behavioral weight loss intervention delivered through group phone sessions E: Group phone-based treatment C: Newsletter by mail
Outcomes	Quality of life: SF-12 Others; Severity of physical symptoms: Breast Cancer Prevention Trial Symptom Scales, Costs, Adherence
Starting date	Recruitment occurred between October 2011 and September 2013
Contact information	Befort CA: cbefort@kumc.edu
Notes	E: experimental, C: comparison, RCT: randomised control trial; SF-12: Short Form (12) Health Survey.

Hummel 2015

Trial name or title	Internet-based CBT for sexual dysfunctions in women treated for breast cancer: design of a multicenter, randomised controlled trial
Methods	Design: Multicentre RCT; N = 160 (target). Follop-up: (E) 10 and 24 weeks from start of therapy, (C) 13 and 23 weeks from randomisation
Participants	Major inclusion criteria: Diagnosis of breast cancer 6 months-5 years prior to study entry, completion of breast cancer treatment (with the exception of endocrine therapy and immunotherapy), formal diagnosis of sexual dysfunction
Interventions	E: a maximum of 20 therapy sessions that are completed within a period of 24 weeks, minimum of 5 lower limit sessions (90-120 min/ week), weekly contact between therapist and client, internet-based CBT program; conducted by therapist and sexologist. C: Waiting-list control
Outcomes	Primary outcomes: Quality of Life: SF-36; FACT-ES ESS-18, Others: SAQ, FSFI, FSDS-R, PAIR Inventory, EORTC QLQ-BR 23 Body image subscale, MMQ, HADS, IIEF Intimacy (PAIR Inventory) Secondary outcomes Body image (QLQ-BR23 Body Image Subscale)

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Hummel 2015 *(Continued)*

	Menopausal symptoms (FACT-ES ESS-18) Marital functioning (MMQ) Psychological distress (HADS) (SF-36) Sexual function (male partners) (IIEF)
Starting date	September 2013
Contact information	n.aaronson@nki.nl
Notes	E: experimental, C: comparison, RCT: randomised control trial; SF-36: Short Form (36) Health Survey; FACT-ES ESS-18: Functional Assessment of Cancer Therapy-Endocrine Subscale: SAQ: Sexual Activity Questionnaire; FFSI: Female Sexual Function Index; FSDS-R: Female Sexual Distress Scale-Revised; EORTC QLQ-BR 23 Body image subscale: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Breast Cancer 23 items Body image subscale; MMQ: Maudsley Marital Questionnaire; HADS: Hospital Anxiety and Depression Scale; IIEF: International Index of Erectile Function The trial has been approved by the Institutional Review Board of The Netherlands Cancer Institute (under number NL44153.031.13).

Marcus 1998

Trial name or title	Telephone counselling of breast cancer patients after treatment: a description of a randomised clinical trial
Methods	Design: Multicentre RCT Target: 400 breast cancer survivors with a good prognosis randomised into two groups Follow-up: 3, 6, 12 and 18 months from baseline;
Participants	Major inclusion criteria: Stage 1-3 cancer patients, completed treatment where treatment plan did not include bone marrow transplantation
Interventions	E: 16 telephone counselling over a 12-month period; The intervention is structured as 6 discrete phases: (1) Orientation; (2) Assessment; (3) Coping skills training; (4) Educational counselling using thematic modules; (5) Reinforcement: contextual integration; and, (6) Summary; conducted by counsellors and supervisor C: standard care. Participants assigned to the control condition will receive standard care and a directory of breast cancer-specific resources in their area
Outcomes	Quality of life: FACT-B Others: Depressive symptoms: CES-D, IES, ISEL, perceived social support, Rand Medical Outcomes Study Family Functioning Measure, Cancer Patient Adjustment Questionnaire, ECOG Self-Description Questionnaire
Starting date	NS
Contact information	Marcus AC: Center for behavioural Studies, AMC Cancer Research Center, 1600 Pierce Street, Lakewood, CO 80214, USA. Tel:1 303 2393397; Fax:1 303 2331863

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Marcus 1998 *(Continued)*

Notes	E: experimental, C: comparison, RCT: randomised control trial; FACT-B: Functional Assessment of Cancer Therapy Scale for Breast Cancer; CES-D: Center for Epidemiological Studies Depression Scale; IES: Impact of Event Scale; ISEL: Interpersonal Support Evaluation List.

Matthews 2002

Trial name or title	A home-based walking intervention among breast cancer survivors
Methods	Design: RCT Follow-up: 12 weeks from baseline
Participants	Major inclusion criteria: early stage breast cancer survivors
Interventions	E: Home-based walking with in-person counselling visit and follow-up telephone-calls comparison: Wait-list control
Outcomes	Quality of life: SF-36 Others: Adherence
Starting date	NS
Contact information	Matthews CE: cematthe@sph.sc.edu
Notes	E: experimental, C: comparison, RCT: randomised control trial; SF-36: Short Form (36) Health Survey

McDonald 2014

Trial name or title	The muscle mass, omega-3, diet, exercise and lifestyle (MODEL) study – a randomised controlled trial for women who have completed breast cancer treatment
Methods	Design: Single-centre RCT N = 144 (target) Follow-up: 12 and 24 weeks from baseline
Participants	Major Inclusion criteria: Stage 0-3a breast cancer survivor, completed treatment more than 6 week but within 1 year, BMI between 20 and 35.
Interventions	Intervention: arms 1 and 2 E1 (N-3 group): daily consumption of LCn-3 FAs for 24 weeks E2 (EX+N-3 group): daily consumption of LCn-3 FAs for 24 weeks plus a supervised 12-week exercise and nutrition group education programme; conducted by dietitian and accredited exercise physiologist C: Placebo supplementation
Outcomes	Quality of life: Functional Assessment of Cancer Therapy-Breast + 4 (FACT-B + 4) Others: Body composition: Air displacement plethysmography, Adherence to exercise and dietary programme: Active Australia Survey, 7-d Uniaxial accelerometry and exercise log (Exercise); Dietary

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McDonald 2014 *(Continued)*

	Habits Questionnaire; Attendance at sessions; HAQ-DI; Menopausal symptoms: Greene Climacteric Scale
Starting date	NS
Contact information	MacDonald C: c.mcdonald4@uq.edu.au
Notes	E1: Experimental group 1; E2: Experimental group 2, C: comparison, RCT: randomised control trial; HAQ-DI: Body composition: Air displacement plethysmography. Funding for the study was put forward by the Wesley Research Institute, this funding covered blood analyses, purchase of necessary equipment and payment for research assistance when required. The authors acknowledge that all capsules were provided gratis by Blackmores Ltd, Australia. In addition, GymStick provided exercise equipment for all participants at cost price. Parties associated with the supply of capsules and exercise equipment have no part in the research design, administration, analyses and subsequent publications.

NCT01515124

Trial name or title	The Women In Steady Exercise Research (WISER) Survivor Trial
Methods	Design: RCT N: 555 (target) Follow-up: 6 and 12 months from baseline
Participants	Major inclusion Criteria: Breast cancer survivor, completed treatment for at least 2 months, overweight or obese
Interventions	E1**:** 60-90 min twice-weekly supervised weight-lifting sessions with 180 min of weekly aerobic exercise over 6 weeks; conducted by certified fitness professionals. E2: 24-week intensive phase that includes weekly meetings and provision of all meals and snacks from a commercial manufacturer, conducted by registered dietitians. E3: E1 + E2 C: No intervention
Outcomes	Quality of life: lymphoedema-related quality of life Others: Clinical lymphoedema exacerbation rate: Incident events requiring medical care for lymphoedema (e.g. flare-ups or cellulitic infections), arm swelling in the affected limb (Interlimb volume differences), and pain & lymphoedema symptoms (number and severity)
Starting date	January 2012
Contact information	Schmitz KH: schmitz@mail.med.upenn.edu
Notes	E1: Experimental group 1; E2: Experimental group 2, E3: Experimental group 3, C: comparison, RCT: randomised control trial. ClinicalTrials.gov Identifier: NCT01515124 Sponsor of the trial: University of Pennsylvania.

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Rock 2013

Trial name or title	Reducing breast cancer recurrence with weight loss, a vanguard trial: The Exercise and Nutrition to Enhance Recovery and Good Health for You (ENERGY) Trial
Methods	Design: Multicentre RCT N = 697 (E: 348, C:349) Follow-up: 6, 12, 18 and 24 months from baseline
Participants	Major inclusion criteria: Stage 1-3 breast cancer survivors, diagnosed within the previous 5 years, completed initial therapies, BMI 25-45
Interventions	E: group-based cognitive-behavioral weight loss program with telephone counselling and tailored newsletters to support initial weight loss and subsequent maintenance;four months of weekly one-hour group sessions for closed-group contingents of an average of 15 women, tapering to every other week for two months. from 6 months onward, the groups met monthly for the remainder of the year. C: standard weight loss and maintenance guidelines available for the general public
Outcomes	Quality of life: SF-36 Other CES-D, IOCv2, Breast Cancer Prevention Trial Symptom Scales Side effects of breast cancer treatment: Breast Cancer Prevention Trial Symptom Scales
Starting date	Fall of 2010
Contact information	Rock CL: clrock@ucsd.edu
Notes	E: experimental, C: comparison, RCT: randomised control trial, SF-36: Short Form (36) Health Survey, CES-D: Center for Epidemiologic Studies Depression Scale; IOCv2: Impact of cancer: Impact of Cancer Scale.

BMI: body mass index
CBT: cognitive behavioural therapy
HFNS: hot flushes and night sweats
NS: not stated
RCT: randomised controlled trial

DATA AND ANALYSES

Comparison 1. Quality of life by FACT-B

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 General	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Post intervention	4	399	Mean Difference (IV, Random, 95% CI)	1.47 [-3.03, 5.98]
1.2 1-3 months after intervention	1	213	Mean Difference (IV, Random, 95% CI)	3.30 [-0.77, 7.37]
2 Breast cancer	7		Mean Difference (IV, Fixed, 95% CI)	Subtotals only

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Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.1 Post intervention	7	764	Mean Difference (IV, Fixed, 95% CI)	4.55 [2.33, 6.78]
2.2 1-3 months after intervention	2	426	Mean Difference (IV, Fixed, 95% CI)	6.10 [2.48, 9.72]
3 Physical well-being	7		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Post intervention	7	764	Mean Difference (IV, Random, 95% CI)	0.81 [0.04, 1.58]
3.2 1-3 month after intervention	2	426	Mean Difference (IV, Random, 95% CI)	1.25 [0.35, 2.15]
4 Social well-being	7		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Post intervention	7	762	Mean Difference (IV, Fixed, 95% CI)	0.28 [-0.49, 1.04]
4.2 1-3 months after intervention	2	424	Mean Difference (IV, Fixed, 95% CI)	0.15 [-0.93, 1.24]
5 Emotional well-being	7		Mean Difference (IV, Random, 95% CI)	Subtotals only
5.1 Post intervention	7	762	Mean Difference (IV, Random, 95% CI)	0.41 [-0.25, 1.07]
5.2 1-3 months after intervention	2	424	Mean Difference (IV, Random, 95% CI)	1.38 [-0.40, 3.15]
6 Functional well-being	6		Mean Difference (IV, Random, 95% CI)	Subtotals only
6.1 Post intervention	6	740	Mean Difference (IV, Random, 95% CI)	0.97 [-0.33, 2.28]
6.2 1-3 months after intervention	2	425	Mean Difference (IV, Random, 95% CI)	1.46 [0.37, 2.56]
7 Endocrine subscale	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 Post intervention	2	421	Std. Mean Difference (IV, Fixed, 95% CI)	0.28 [0.09, 0.47]
7.2 1-3 months after intervention	2	421	Std. Mean Difference (IV, Fixed, 95% CI)	0.26 [0.07, 0.46]
8 Trial Outcome Index	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
8.1 Post intervention	2	345	Mean Difference (IV, Fixed, 95% CI)	4.36 [2.20, 6.53]
8.2 1-3 months after intervention	1	213	Mean Difference (IV, Fixed, 95% CI)	3.60 [0.01, 7.19]

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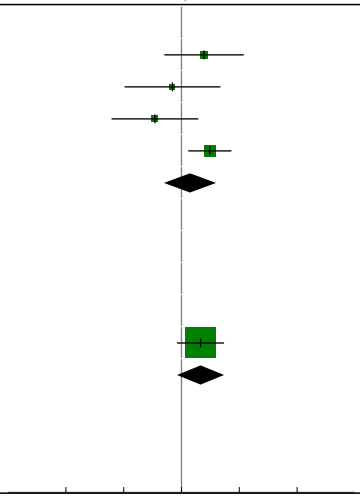
Analysis 1.1. Comparison 1 Quality of life by FACT-B, Outcome 1 General.

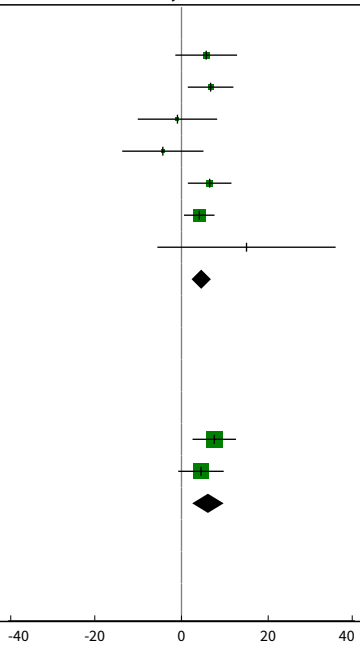
Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.1.1 Post intervention							
Dirksen 2008	34	91.6 (15)	38	87.7 (14.7)		23.14%	3.9[-2.98,10.78]
Lahart 2016	37	88 (18.5)	33	89.6 (16.8)		18.61%	-1.56[-9.85,6.73]
Rogers 2009b	21	87.4 (13.1)	20	92 (11.4)		20.97%	-4.6[-12.11,2.91]
Rogers 2015	106	88.1 (12.4)	110	83.2 (15.5)		37.28%	4.9[1.16,8.64]
Subtotal ***	**198**		**201**			**100%**	**1.47[-3.03,5.98]**
Heterogeneity: Tau^2=10.56; Chi^2=6.09, df=3(P=0.11); I^2=50.77%							
Test for overall effect: Z=0.64(P=0.52)							
1.1.2 1-3 months after intervention							
Rogers 2015	105	86.9 (14.5)	108	83.6 (15.8)		100%	3.3[-0.77,7.37]
Subtotal ***	**105**		**108**			**100%**	**3.3[-0.77,7.37]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.59(P=0.11)							
Test for subgroup differences: Chi^2=0.35, df=1 (P=0.56), I^2=0%							



Favours Control — Favours HBMS

Analysis 1.2. Comparison 1 Quality of life by FACT-B, Outcome 2 Breast cancer.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
1.2.1 Post intervention							
Dirksen 2008	34	118.8 (11.9)	38	113.1 (18.5)		9.78%	5.7[-1.42,12.82]
Hoffman 2012	106	103.6 (17.9)	107	96.8 (21.1)		17.9%	6.72[1.46,11.98]
Lahart 2016	37	114.4 (21.5)	33	115.3 (17.6)		5.91%	-0.93[-10.09,8.23]
Rogers 2009b	21	114.4 (16.2)	20	118.7 (14.4)		5.64%	-4.3[-13.67,5.07]
Rogers 2015	106	115.9 (17.2)	110	109.4 (20.4)		19.61%	6.5[1.47,11.53]
Sherman 2010	87	110.1 (9.5)	42	106 (9.6)		39.99%	4.1[0.58,7.62]
Swisher 2015	13	119.6 (14.6)	10	104.6 (30.6)		1.17%	15[-5.56,35.56]
Subtotal ***	**404**		**360**			**100%**	**4.55[2.33,6.78]**
Heterogeneity: Tau^2=0; Chi^2=7.19, df=6(P=0.3); I^2=16.54%							
Test for overall effect: Z=4.01(P<0.0001)							
1.2.2 1-3 months after intervention							
Hoffman 2012	106	103.8 (17.9)	107	96.2 (19.4)		52.23%	7.56[2.55,12.57]
Rogers 2015	105	115.1 (18.8)	108	110.6 (20.2)		47.77%	4.5[-0.74,9.74]
Subtotal ***	**211**		**215**			**100%**	**6.1[2.48,9.72]**
Heterogeneity: Tau^2=0; Chi^2=0.68, df=1(P=0.41); I^2=0%							
Test for overall effect: Z=3.3(P=0)							
Test for subgroup differences: Chi^2=0.51, df=1 (P=0.48), I^2=0%							



Favours Control — Favours HBMS

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Analysis 1.3. Comparison 1 Quality of life by FACT-B, Outcome 3 Physical well-being.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.3.1 Post intervention							
Dirksen 2008	34	24.8 (3.3)	38	24.3 (3.8)		14.2%	0.5[-1.14,2.14]
Hoffman 2012	102	22.9 (4.2)	111	21.8 (4.5)		20.62%	1.02[-0.16,2.2]
Lahart 2016	37	25.5 (9.3)	33	25.8 (9.2)		2.93%	-0.3[-4.64,4.04]
Rogers 2009b	21	23.3 (4.5)	20	25.4 (2.3)		9.57%	-2.1[-4.27,0.07]
Rogers 2015	106	24.1 (3.5)	110	22.5 (5)		21.11%	1.6[0.45,2.75]
Sherman 2010	87	24 (2.8)	42	22.8 (2.8)		23.12%	1.14[0.11,2.17]
Swisher 2015	13	25.4 (2.5)	10	23.8 (3.1)		8.46%	1.6[-0.75,3.95]
Subtotal ***	**400**		**364**			**100%**	**0.81[0.04,1.58]**
Heterogeneity: Tau²=0.39; Chi²=9.84, df=6(P=0.13); I²=39.05%							
Test for overall effect: Z=2.05(P=0.04)							
1.3.2 1-3 month after intervention							
Hoffman 2012	102	23 (4.3)	111	21.7 (4.9)		52.81%	1.3[0.06,2.54]
Rogers 2015	105	23.9 (3.9)	108	22.7 (5.7)		47.19%	1.2[-0.11,2.51]
Subtotal ***	**207**		**219**			**100%**	**1.25[0.35,2.15]**
Heterogeneity: Tau²=0; Chi²=0.01, df=1(P=0.91); I²=0%							
Test for overall effect: Z=2.73(P=0.01)							
Test for subgroup differences: Chi²=0.54, df=1 (P=0.46), I²=0%							

Analysis 1.4. Comparison 1 Quality of life by FACT-B, Outcome 4 Social well-being.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
1.4.1 Post intervention							
Dirksen 2008	34	23.3 (3.9)	38	21.4 (5.9)		11.22%	1.9[-0.39,4.19]
Hoffman 2012	102	18.4 (5.7)	109	18.3 (5.9)		24.28%	0.1[-1.46,1.66]
Lahart 2016	37	23.7 (5)	33	24.1 (4.1)		12.74%	-0.43[-2.58,1.72]
Rogers 2009b	21	22.6 (4.1)	20	21.8 (5.7)		6.31%	0.8[-2.25,3.85]
Rogers 2015	106	21 (5.7)	110	20.7 (5.8)		24.98%	0.3[-1.23,1.83]
Sherman 2010	87	20.8 (6.4)	42	20.8 (5.1)		14.05%	0[-2.04,2.04]
Swisher 2015	13	24.1 (4.1)	10	24.6 (3.3)		6.42%	-0.5[-3.53,2.53]
Subtotal ***	**400**		**362**			**100%**	**0.28[-0.49,1.04]**
Heterogeneity: Tau²=0; Chi²=2.84, df=6(P=0.83); I²=0%							
Test for overall effect: Z=0.71(P=0.48)							
1.4.2 1-3 months after intervention							
Hoffman 2012	102	18.1 (5.8)	109	18.3 (5.8)		48.68%	-0.21[-1.77,1.35]
Rogers 2015	105	21 (5.9)	108	20.5 (5.4)		51.32%	0.5[-1.02,2.02]
Subtotal ***	**207**		**217**			**100%**	**0.15[-0.93,1.24]**
Heterogeneity: Tau²=0; Chi²=0.41, df=1(P=0.52); I²=0%							
Test for overall effect: Z=0.28(P=0.78)							
Test for subgroup differences: Chi²=0.03, df=1 (P=0.86), I²=0%							

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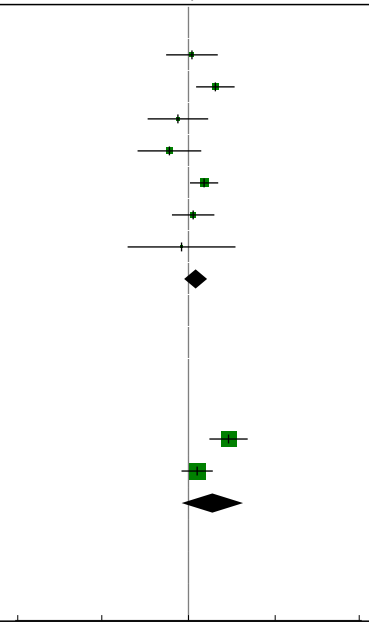
Analysis 1.5. Comparison 1 Quality of life by FACT-B, Outcome 5 Emotional well-being.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.5.1 Post intervention							
Dirksen 2008	34	20.8 (2.3)	38	20.6 (4)		13.4%	0.2[-1.29,1.69]
Hoffman 2012	102	18.1 (3.8)	109	16.6 (4.4)		19.19%	1.55[0.44,2.66]
Lahart 2016	37	20.1 (4.1)	33	20.7 (3.3)		10.67%	-0.61[-2.36,1.14]
Rogers 2009b	21	20 (3.1)	20	21.1 (2.9)		9.88%	-1.1[-2.94,0.74]
Rogers 2015	106	20.6 (2.9)	110	19.7 (3.2)		25.6%	0.9[0.09,1.71]
Sherman 2010	87	19.5 (3.3)	42	19.2 (3.3)		17.2%	0.27[-0.95,1.49]
Swisher 2015	13	23.5 (4.1)	10	23.9 (3.5)		4.07%	-0.4[-3.51,2.71]
Subtotal ***	**400**		**362**			**100%**	**0.41[-0.25,1.07]**
Heterogeneity: Tau^2=0.27; Chi^2=9.4, df=6(P=0.15); I^2=36.15%							
Test for overall effect: Z=1.22(P=0.22)							
1.5.2 1-3 months after intervention							
Hoffman 2012	102	18.6 (3.8)	109	16.3 (4.4)		48.39%	2.31[1.21,3.41]
Rogers 2015	105	20.5 (3.5)	108	20 (3.2)		51.61%	0.5[-0.4,1.4]
Subtotal ***	**207**		**217**			**100%**	**1.38[-0.4,3.15]**
Heterogeneity: Tau^2=1.37; Chi^2=6.2, df=1(P=0.01); I^2=83.87%							
Test for overall effect: Z=1.52(P=0.13)							
Test for subgroup differences: Chi^2=1, df=1 (P=0.32), I^2=0%							



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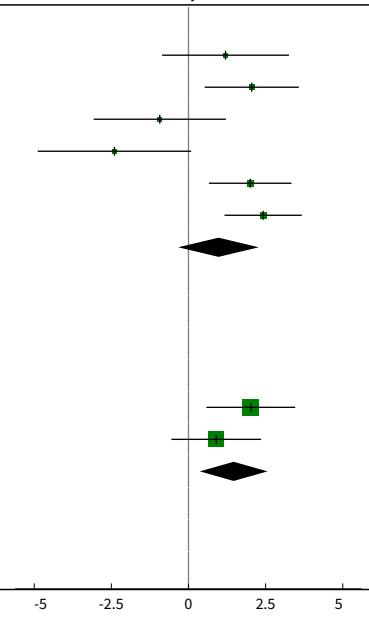
Analysis 1.6. Comparison 1 Quality of life by FACT-B, Outcome 6 Functional well-being.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.6.1 Post intervention							
Dirksen 2008	34	22.7 (4.2)	38	21.5 (4.7)		15.13%	1.2[-0.86,3.26]
Hoffman 2012	102	19.5 (5.3)	110	17.4 (6.1)		18.2%	2.05[0.52,3.58]
Lahart 2016	37	22 (4.4)	33	22.9 (4.7)		14.66%	-0.93[-3.07,1.21]
Rogers 2009b	21	21.4 (4.8)	20	23.8 (3.2)		12.9%	-2.4[-4.89,0.09]
Rogers 2015	106	22.3 (4.5)	110	20.3 (5.5)		19.31%	2[0.66,3.34]
Sherman 2010	87	20.9 (3.4)	42	18.5 (3.4)		19.8%	2.42[1.17,3.67]
Subtotal ***	**387**		**353**			**100%**	**0.97[-0.33,2.28]**
Heterogeneity: Tau^2=1.83; Chi^2=17.56, df=5(P=0); I^2=71.52%							
Test for overall effect: Z=1.46(P=0.14)							
1.6.2 1-3 months after intervention							
Hoffman 2012	102	19.5 (5.3)	110	17.4 (5.4)		50.36%	2.02[0.58,3.46]
Rogers 2015	105	21.4 (5.1)	108	20.5 (5.7)		49.64%	0.9[-0.55,2.35]
Subtotal ***	**207**		**218**			**100%**	**1.46[0.37,2.56]**
Heterogeneity: Tau^2=0.08; Chi^2=1.15, df=1(P=0.28); I^2=13.25%							
Test for overall effect: Z=2.61(P=0.01)							
Test for subgroup differences: Chi^2=0.32, df=1 (P=0.57), I^2=0%							



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Analysis 1.7. Comparison 1 Quality of life by FACT-B, Outcome 7 Endocrine subscale.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Std. Mean Difference Fixed, 95% CI	Weight	Std. Mean Difference Fixed, 95% CI
1.7.1 Post intervention							
Duijts 2012	109	51.3 (8)	103	49.5 (8.2)		50.59%	0.22[-0.05,0.49]
Hoffman 2012	102	135 (19.3)	107	127.4 (23.6)		49.41%	0.35[0.08,0.62]
Subtotal ***	**211**		**210**			**100%**	**0.28[0.09,0.47]**
Heterogeneity: Tau^2=0; Chi^2=0.47, df=1(P=0.49); I^2=0%							
Test for overall effect: Z=2.88(P=0)							
1.7.2 1-3 months after intervention							
Duijts 2012	109	51.5 (7.8)	103	50.4 (7.8)		50.75%	0.14[-0.12,0.41]
Hoffman 2012	102	135.3 (19.5)	107	127.4 (21.3)		49.25%	0.39[0.11,0.66]
Subtotal ***	**211**		**210**			**100%**	**0.26[0.07,0.46]**
Heterogeneity: Tau^2=0; Chi^2=1.52, df=1(P=0.22); I^2=34.01%							
Test for overall effect: Z=2.69(P=0.01)							
Test for subgroup differences: Chi^2=0.02, df=1 (P=0.89), I^2=0%							

Analysis 1.8. Comparison 1 Quality of life by FACT-B, Outcome 8 Trial Outcome Index.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
1.8.1 Post intervention							
Rogers 2015	87	69.9 (7.4)	42	66 (7.5)		62.43%	3.86[1.12,6.6]
Sherman 2010	106	74.2 (11.9)	110	69 (14.5)		37.57%	5.2[1.67,8.73]
Subtotal ***	**193**		**152**			**100%**	**4.36[2.2,6.53]**
Heterogeneity: Tau^2=0; Chi^2=0.35, df=1(P=0.56); I^2=0%							
Test for overall effect: Z=3.95(P<0.0001)							
1.8.2 1-3 months after intervention							
Rogers 2015	105	73.6 (12.4)	108	70 (14.3)		100%	3.6[0.01,7.19]
Subtotal ***	**105**		**108**			**100%**	**3.6[0.01,7.19]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.96(P=0.05)							
Test for subgroup differences: Chi^2=0.13, df=1 (P=0.72), I^2=0%							

Comparison 2. Quality of life measured by EORTC-QLQ

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Global	6		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Post intervention	6	299	Mean Difference (IV, Fixed, 95% CI)	4.38 [0.11, 8.64]
1.2 1-3 months after intervention	3	172	Mean Difference (IV, Fixed, 95% CI)	6.32 [0.61, 12.04]

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Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.3 4-6 months after intervention	2	117	Mean Difference (IV, Fixed, 95% CI)	0.08 [-7.28, 7.44]
1.4 12 months after intervention	1	57	Mean Difference (IV, Fixed, 95% CI)	2.04 [-9.91, 13.99]
2 Functional scale	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Post intervention	3	127	Mean Difference (IV, Fixed, 95% CI)	3.16 [0.09, 6.22]
3 Symptom scale	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Post intervention	2	82	Mean Difference (IV, Random, 95% CI)	2.53 [-5.56, 10.61]
4 Role function	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Post intervention	2	100	Mean Difference (IV, Fixed, 95% CI)	3.18 [-4.57, 10.93]
4.2 1-3 months after intervention	1	55	Mean Difference (IV, Fixed, 95% CI)	0.40 [-12.60, 13.40]
5 Emotion function	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
5.1 Post intervention	2	100	Mean Difference (IV, Random, 95% CI)	12.22 [6.07, 18.37]
5.2 1-3 months after intervention	1	55	Mean Difference (IV, Random, 95% CI)	6.40 [-7.12, 19.92]
6 Cognitive function	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6.1 Post intervention	2	100	Mean Difference (IV, Fixed, 95% CI)	0.98 [-5.27, 7.23]
6.2 1-3 months after intervention	1	55	Mean Difference (IV, Fixed, 95% CI)	-0.10 [-14.01, 13.81]
7 Social function	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 Post intervention	2	100	Mean Difference (IV, Fixed, 95% CI)	1.57 [-6.98, 10.13]
7.2 1-3 months after intervention	1	55	Mean Difference (IV, Fixed, 95% CI)	-3.90 [-19.01, 11.21]
8 Physical function	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
8.1 Post intervention	2	115	Mean Difference (IV, Fixed, 95% CI)	3.29 [-2.80, 9.38]
8.2 1-3 months after intervention	2	107	Mean Difference (IV, Fixed, 95% CI)	14.05 [4.00, 24.10]
8.3 4-6 months after intervention	1	60	Mean Difference (IV, Fixed, 95% CI)	5.56 [-3.71, 14.83]

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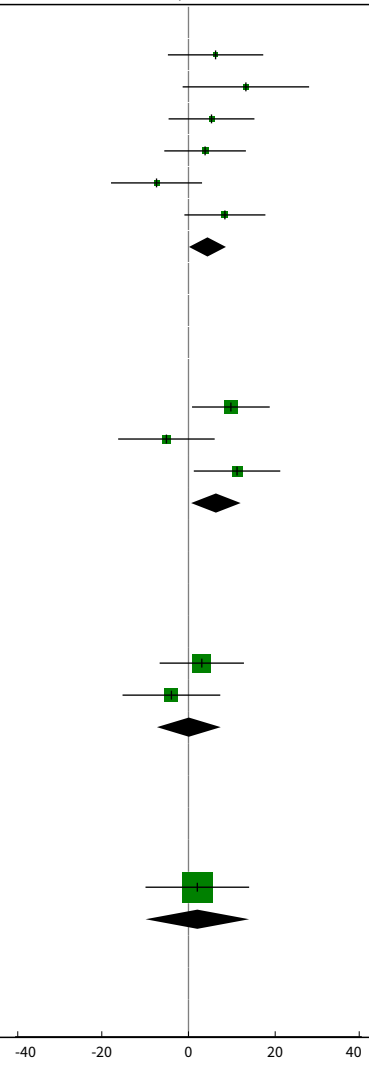
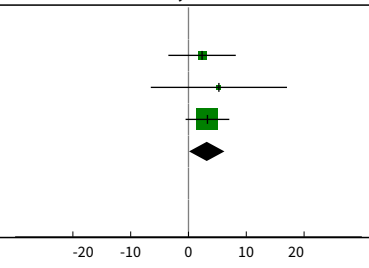
Analysis 2.1. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 1 Global.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
2.1.1 Post intervention							
Ergun 2013	20	74.2 (18.7)	20	67.9 (16.7)		15.04%	6.25[-4.75,17.25]
Eyigor 2010	27	77 (21.8)	15	63.8 (23.8)		8.55%	13.24[-1.35,27.83]
Kim 2011	23	73.3 (17.7)	22	68 (16.2)		18.55%	5.31[-4.59,15.21]
Matthews 2014	32	73.7 (14)	28	69.8 (21.8)		20.54%	3.83[-5.58,13.24]
Savard 2005	27	67.6 (20.9)	30	74.9 (19.3)		16.5%	-7.37[-17.87,3.13]
Spahn 2013	30	68.1 (15.9)	25	59.7 (18.9)		20.84%	8.4[-0.94,17.74]
Subtotal ***	**159**		**140**			**100%**	**4.38[0.11,8.64]**
Heterogeneity: Tau²=0; Chi²=7.1, df=5(P=0.21); I²=29.57%							
Test for overall effect: Z=2.01(P=0.04)							
2.1.2 1-3 months after intervention							
Matthews 2014	32	73.7 (15.2)	28	63.9 (19.6)		40.73%	9.78[0.82,18.74]
Savard 2005	27	70.6 (22.3)	30	75.7 (20.4)		26.39%	-5.09[-16.22,6.04]
Spahn 2013	30	68.9 (16.5)	25	57.7 (20.5)		32.88%	11.2[1.23,21.17]
Subtotal ***	**89**		**83**			**100%**	**6.32[0.61,12.04]**
Heterogeneity: Tau²=0; Chi²=5.53, df=2(P=0.06); I²=63.83%							
Test for overall effect: Z=2.17(P=0.03)							
2.1.3 4-6 months after intervention							
Matthews 2014	32	75 (15.7)	28	71.9 (21.7)		57.35%	3.07[-6.65,12.79]
Savard 2005	27	69.8 (22.3)	30	73.8 (21)		42.65%	-3.94[-15.21,7.33]
Subtotal ***	**59**		**58**			**100%**	**0.08[-7.28,7.44]**
Heterogeneity: Tau²=0; Chi²=0.85, df=1(P=0.36); I²=0%							
Test for overall effect: Z=0.02(P=0.98)							
2.1.4 12 months after intervention							
Savard 2005	27	75.5 (24.7)	30	73.5 (20.9)		100%	2.04[-9.91,13.99]
Subtotal ***	**27**		**30**			**100%**	**2.04[-9.91,13.99]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.33(P=0.74)							
Test for subgroup differences: Chi²=1.86, df=1 (P=0.6), I²=0%							



Analysis 2.2. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 2 Functional scale.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
2.2.1 Post intervention							
Ergun 2013	20	85.7 (8.1)	20	83.3 (10.6)		27.6%	2.35[-3.48,8.18]
Eyigor 2010	27	83.3 (14.7)	15	78 (20.5)		6.76%	5.26[-6.52,17.04]
Kim 2011	23	85.7 (6)	22	82.4 (6.9)		65.63%	3.28[-0.5,7.06]
Subtotal ***	**70**		**57**			**100%**	**3.16[0.09,6.22]**
Heterogeneity: Tau²=0; Chi²=0.2, df=2(P=0.9); I²=0%							
Test for overall effect: Z=2.02(P=0.04)							



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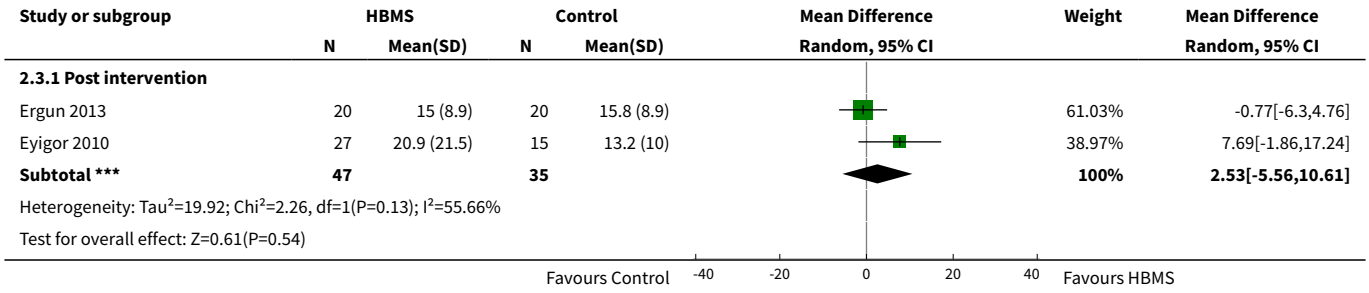
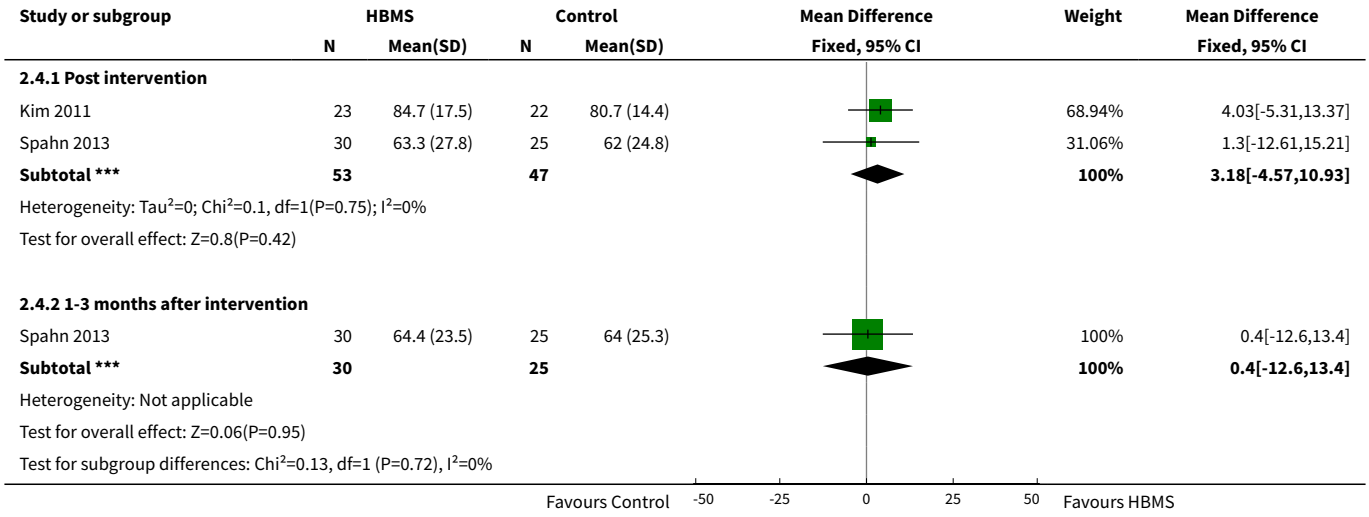
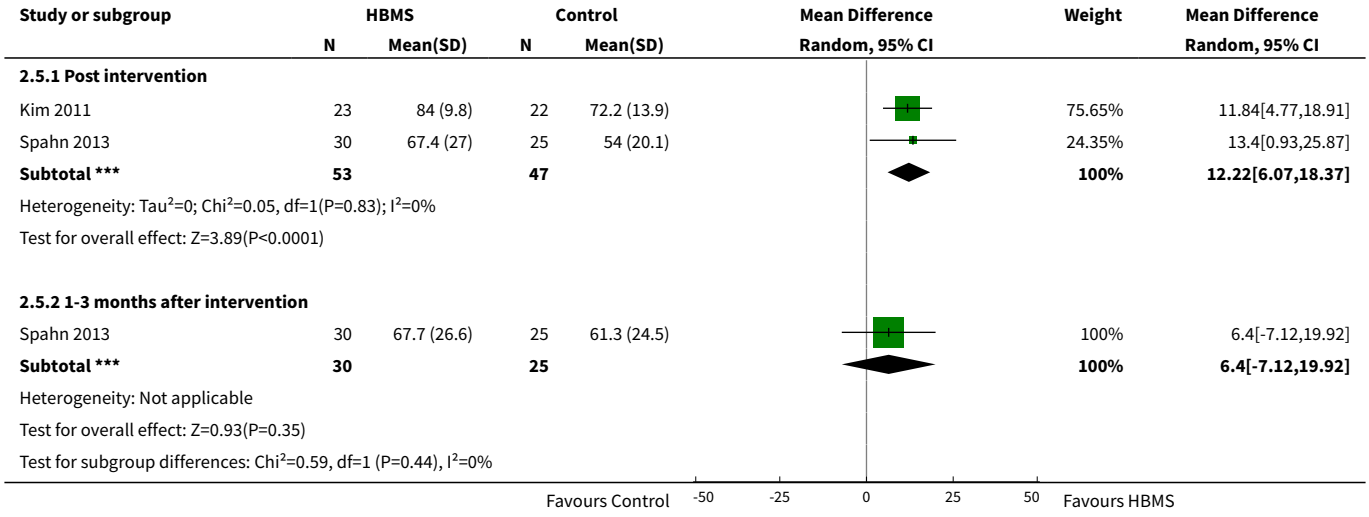
Analysis 2.3. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 3 Symptom scale.



Analysis 2.4. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 4 Role function.



Analysis 2.5. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 5 Emotion function.



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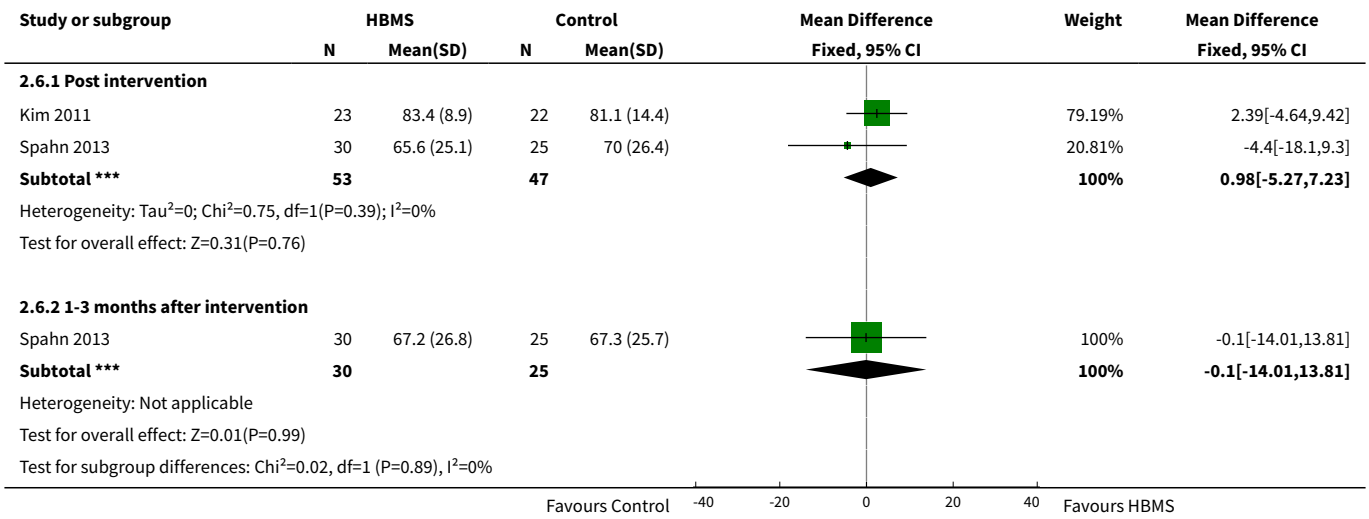
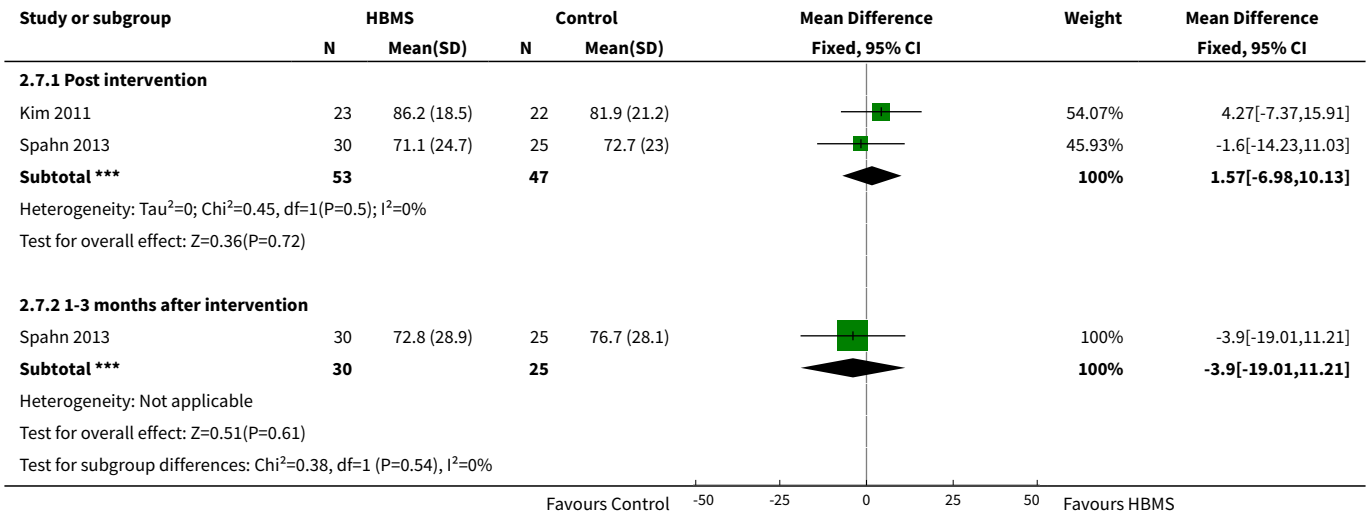
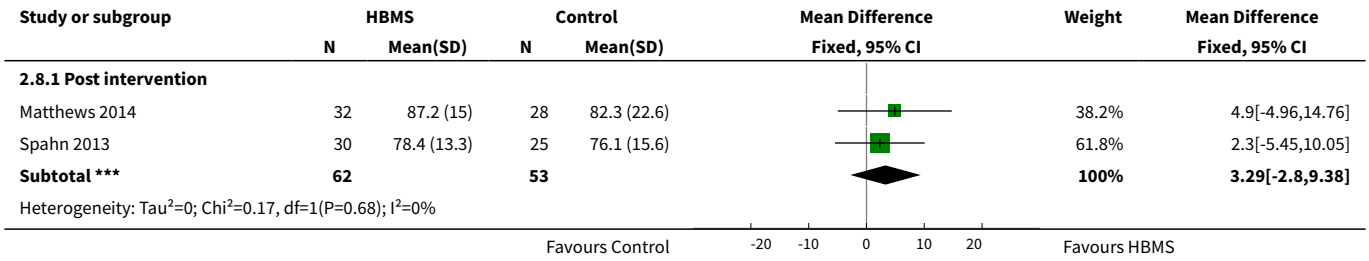
Analysis 2.6. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 6 Cognitive function.



Analysis 2.7. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 7 Social function.



Analysis 2.8. Comparison 2 Quality of life measured by EORTC-QLQ, Outcome 8 Physical function.



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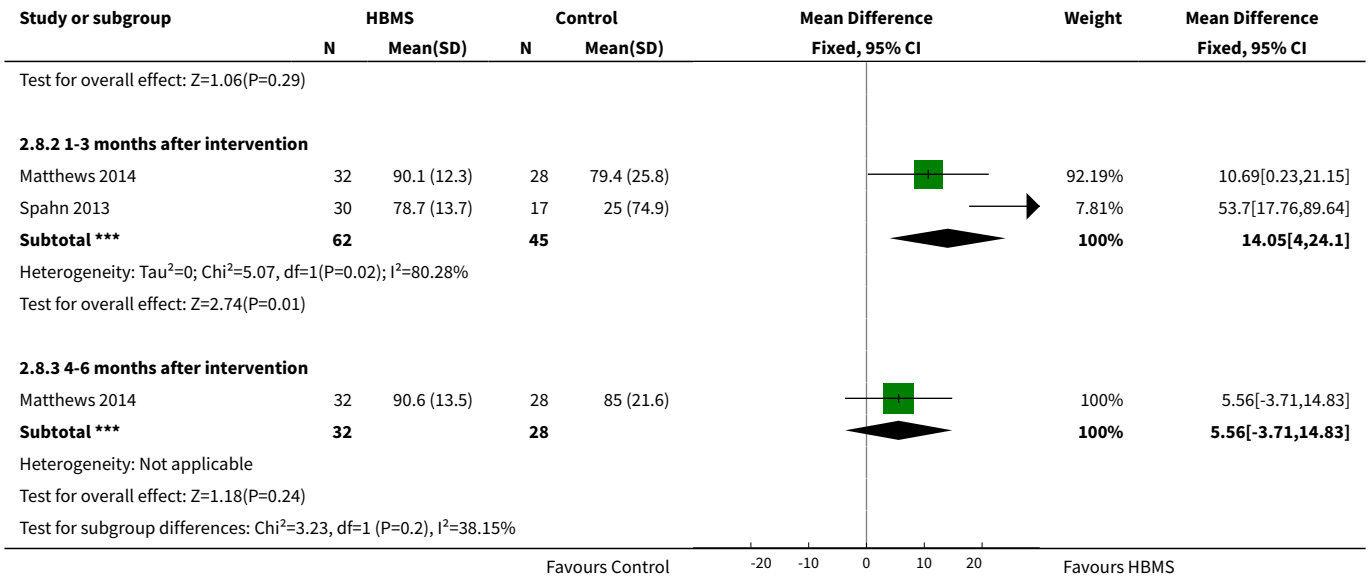
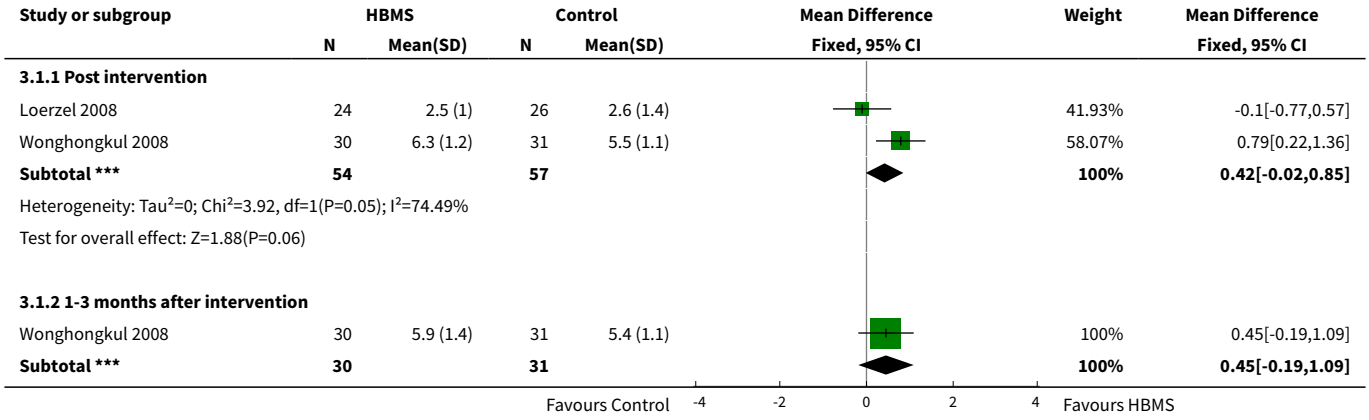


Comparison 3. Quality of life measured by Quality of Life-Breast Cancer

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Overall	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Post intervention	2	111	Mean Difference (IV, Fixed, 95% CI)	0.42 [-0.02, 0.85]
1.2 1-3 months after intervention	1	61	Mean Difference (IV, Fixed, 95% CI)	0.45 [-0.19, 1.09]
2 Physical	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Post intervention	1	50	Mean Difference (IV, Fixed, 95% CI)	-0.06 [-0.65, 0.53]

Analysis 3.1. Comparison 3 Quality of life measured by Quality of Life-Breast Cancer, Outcome 1 Overall.



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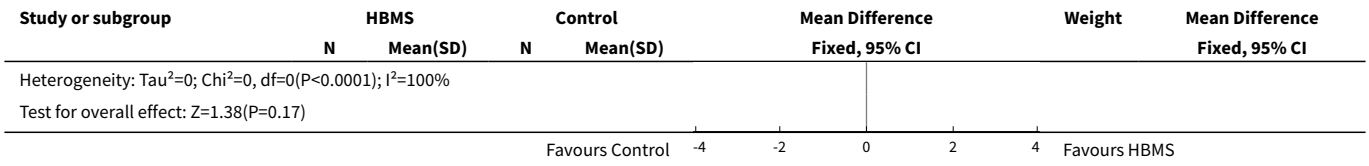
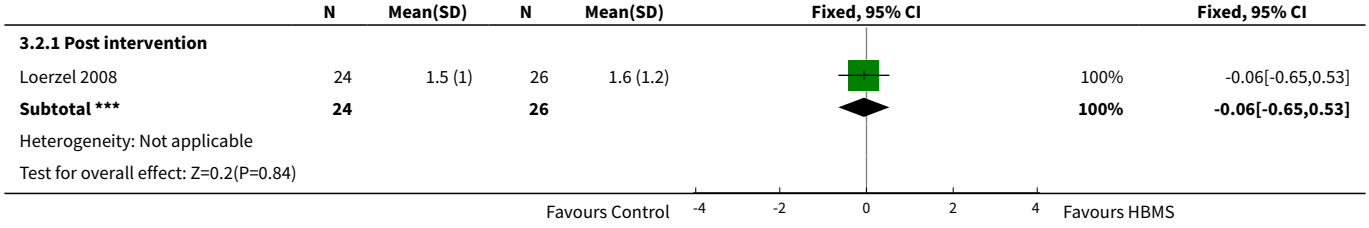


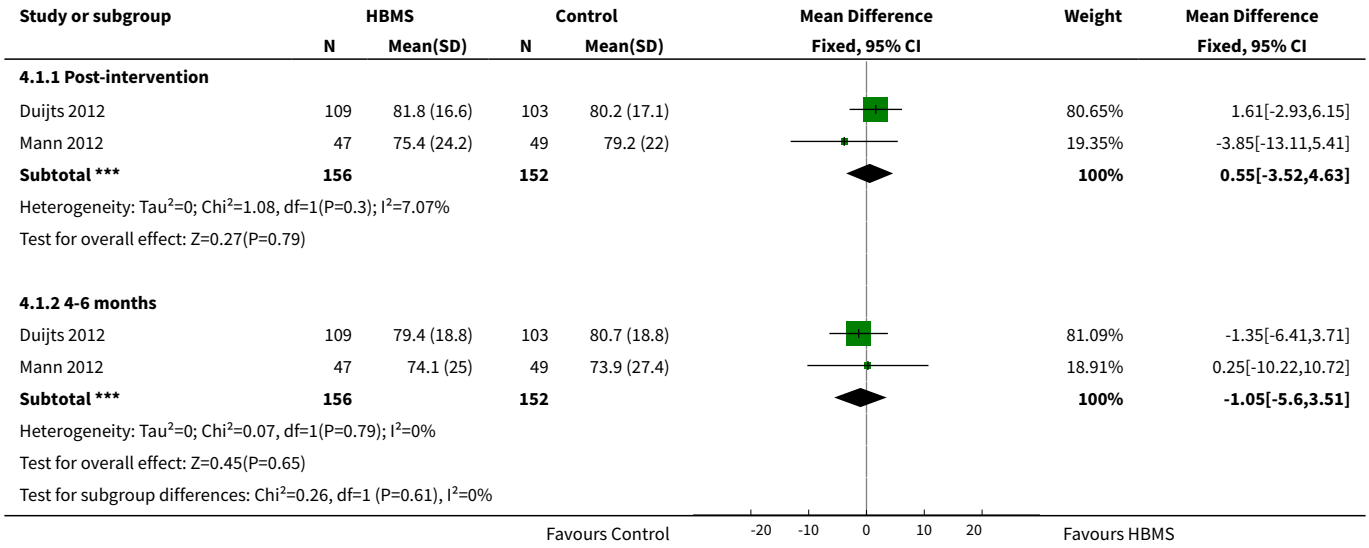
Analysis 3.2. Comparison 3 Quality of life measured by Quality of Life-Breast Cancer, Outcome 2 Physical.



Comparison 4. Quality of life measured by SF-36

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Physical function	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Post-intervention	2	308	Mean Difference (IV, Fixed, 95% CI)	0.55 [-3.52, 4.63]
1.2 4-6 months	2	308	Mean Difference (IV, Fixed, 95% CI)	-1.05 [-5.60, 3.51]

Analysis 4.1. Comparison 4 Quality of life measured by SF-36, Outcome 1 Physical function.



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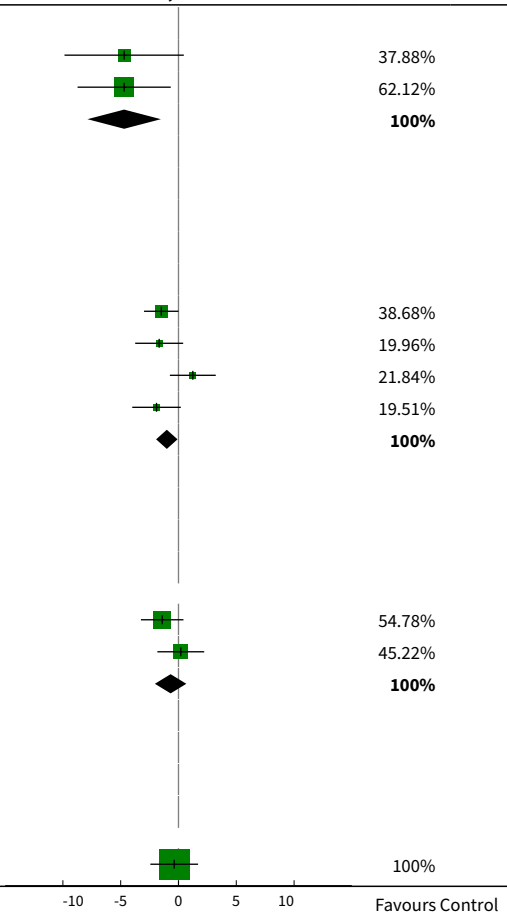
Comparison 5. Anxiety

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Anxiety	7		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 State-Trait Anxiety Inventory (STAI) - post intervention	2	154	Mean Difference (IV, Fixed, 95% CI)	-4.70 [-7.88, -1.52]
1.2 Hospital Anxiety and Depression Scale (HADS) - post intervention	5	253	Mean Difference (IV, Fixed, 95% CI)	-1.01 [-1.94, -0.08]
1.3 Hospital Anxiety and Depression Scale (HADS) - 1-3 months after intervention	2	113	Mean Difference (IV, Fixed, 95% CI)	-0.68 [-2.04, 0.68]
1.4 Hospital Anxiety and Depression Scale (HADS) - 4-6 months after intervention	1	57	Mean Difference (IV, Fixed, 95% CI)	-0.37 [-2.43, 1.69]

Analysis 5.1. Comparison 5 Anxiety, Outcome 1 Anxiety.

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
5.1.1 State-Trait Anxiety Inventory (STAI) - post intervention							
Dirksen 2008	34	29 (8.8)	38	33.7 (13.3)		37.88%	-4.7[-9.86,0.46]
Lengacher 2009	40	28.3 (9.2)	42	33 (9.4)		62.12%	-4.7[-8.73,-0.67]
Subtotal ***	**74**		**80**			**100%**	**-4.7[-7.88,-1.52]**
Heterogeneity: Tau^2=0; Chi^2=0, df=1(P=1); I^2=0%							
Test for overall effect: Z=2.9(P=0)							
5.1.2 Hospital Anxiety and Depression Scale (HADS) - post intervention							
Galantino 2010	20	0.3 (0)	20	0.2 (0)			Not estimable
Kim 2011	23	4 (2.3)	22	5.5 (2.8)		38.68%	-1.49[-2.98,0]
Matthews 2014	26	5.8 (3.1)	30	7.4 (4.7)		19.96%	-1.67[-3.75,0.41]
Savard 2005	27	7.2 (4)	30	6 (3.7)		21.84%	1.24[-0.74,3.22]
Spahn 2013	30	5.7 (3.9)	25	7.6 (4)		19.51%	-1.9[-4,0.2]
Subtotal ***	**126**		**127**			**100%**	**-1.01[-1.94,-0.08]**
Heterogeneity: Tau^2=0; Chi^2=6.42, df=3(P=0.09); I^2=53.27%							
Test for overall effect: Z=2.13(P=0.03)							
5.1.3 Hospital Anxiety and Depression Scale (HADS) - 1-3 months after intervention							
Matthews 2014	26	5.7 (3.1)	30	7.1 (4)		54.78%	-1.41[-3.25,0.43]
Savard 2005	27	5.9 (4)	30	5.7 (3.8)		45.22%	0.2[-1.82,2.22]
Subtotal ***	**53**		**60**			**100%**	**-0.68[-2.04,0.68]**
Heterogeneity: Tau^2=0; Chi^2=1.33, df=1(P=0.25); I^2=24.87%							
Test for overall effect: Z=0.98(P=0.33)							
5.1.4 Hospital Anxiety and Depression Scale (HADS) - 4-6 months after intervention							
Savard 2005	27	5.3 (4)	30	5.7 (3.9)		100%	-0.37[-2.43,1.69]



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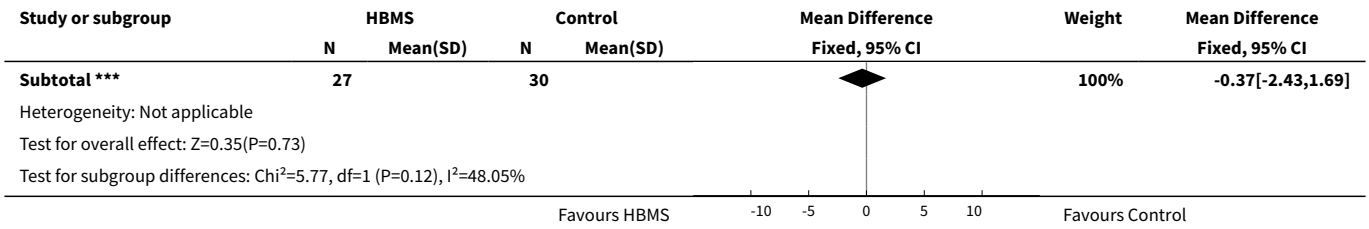
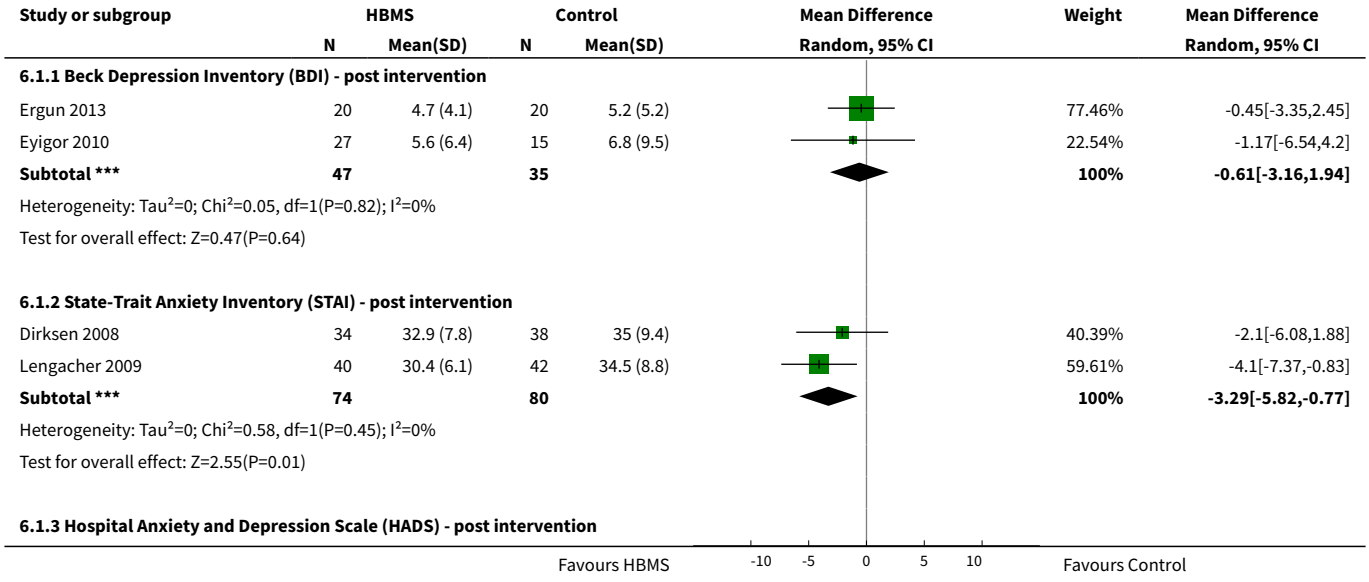


Comparison 6. Depression

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	8		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Beck Depression Inventory (BDI) - post intervention	2	82	Mean Difference (IV, Random, 95% CI)	-0.61 [-3.16, 1.94]
1.2 State-Trait Anxiety Inventory (STAI) - post intervention	2	154	Mean Difference (IV, Random, 95% CI)	-3.29 [-5.82, -0.77]
1.3 Hospital Anxiety and Depression Scale (HADS) - post intervention	4	213	Mean Difference (IV, Random, 95% CI)	-1.36 [-2.94, 0.22]
1.4 Hospital Anxiety and Depression Scale (HADS) 1-3 months after intervention	3	168	Mean Difference (IV, Random, 95% CI)	-0.74 [-2.71, 1.22]
1.5 Hospital Anxiety and Depression Scale (HADS) 4-6 months after intervention	1	57	Mean Difference (IV, Random, 95% CI)	0.54 [-0.77, 1.85]

Analysis 6.1. Comparison 6 Depression, Outcome 1 Depression.



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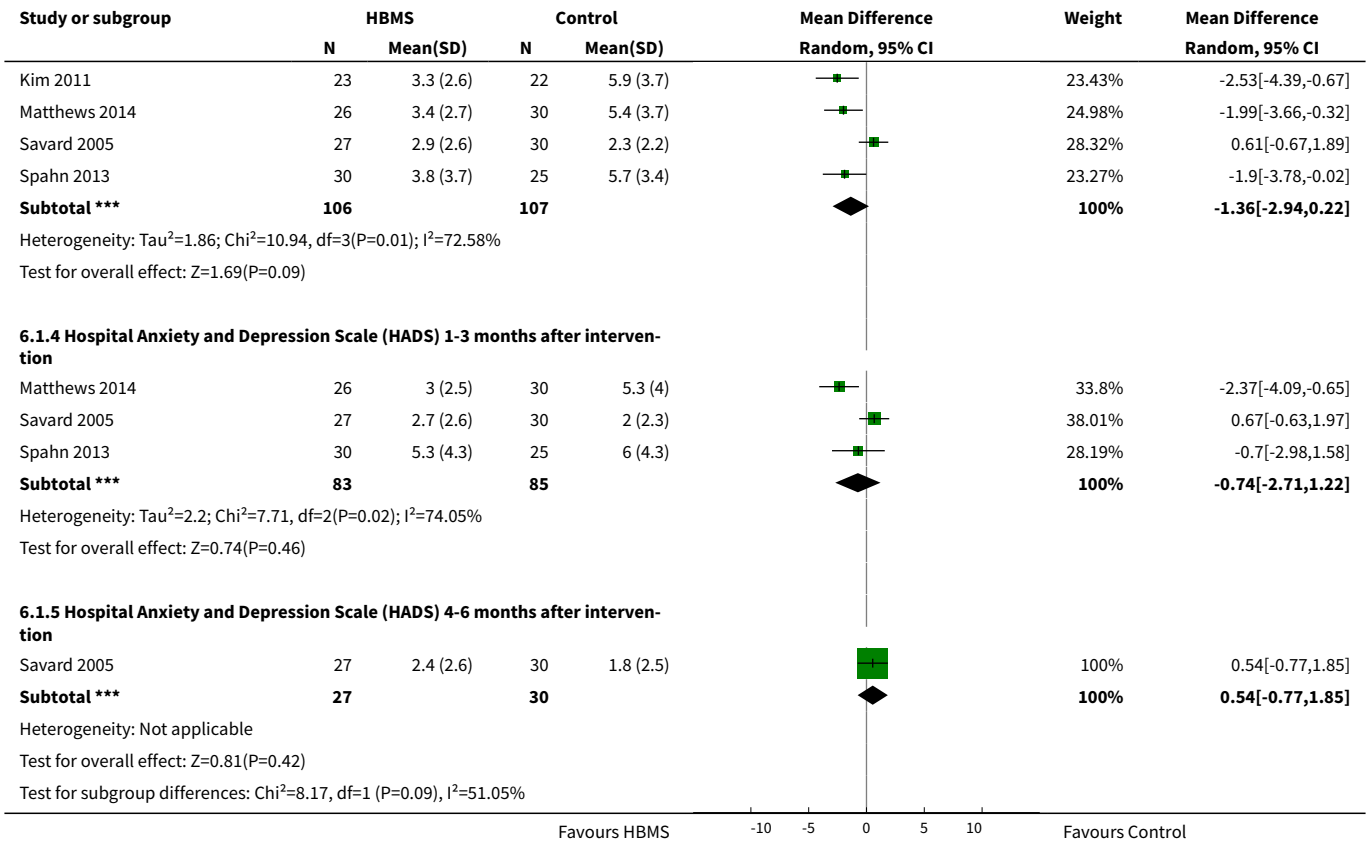

Comparison 7. Fatigue

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Fatigue	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Brief Fatigue Inventory (BFI) - post intervention	3	127	Mean Difference (IV, Random, 95% CI)	-1.11 [-1.78, -0.45]
1.2 Multidimensional Fatigue Inventory (MFI) - post intervention	2	144	Mean Difference (IV, Random, 95% CI)	-0.04 [-0.69, 0.62]
1.3 Multidimensional Fatigue Inventory (MFI) 1-3 months after intervention	1	57	Mean Difference (IV, Random, 95% CI)	0.67 [-0.63, 1.97]
1.4 Multidimensional Fatigue Inventory (MFI) 4-6 months after intervention	1	57	Mean Difference (IV, Random, 95% CI)	0.54 [-0.77, 1.85]

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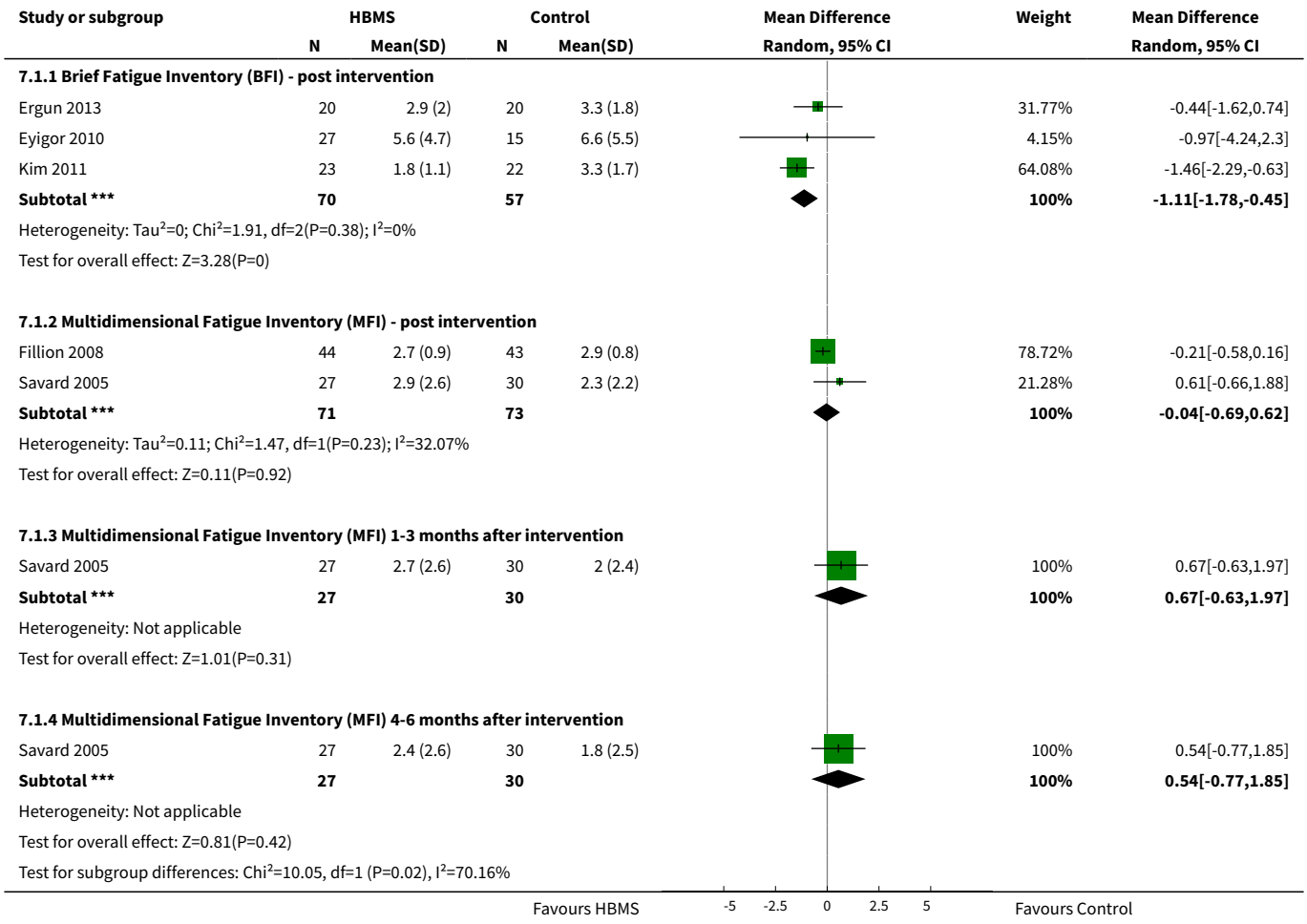
Analysis 7.1. Comparison 7 Fatigue, Outcome 1 Fatigue.



Comparison 8. Insomnia measured by Insomnia Severity Index (ISI) 3 months

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 ISI	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Post intervention	3	185	Mean Difference (IV, Fixed, 95% CI)	-1.81 [-3.34, -0.27]
1.2 1-3 months after intervention	2	113	Mean Difference (IV, Fixed, 95% CI)	-2.27 [-4.22, -0.33]
1.3 4-6 months after intervention	1	57	Mean Difference (IV, Fixed, 95% CI)	-0.18 [-3.08, 2.72]

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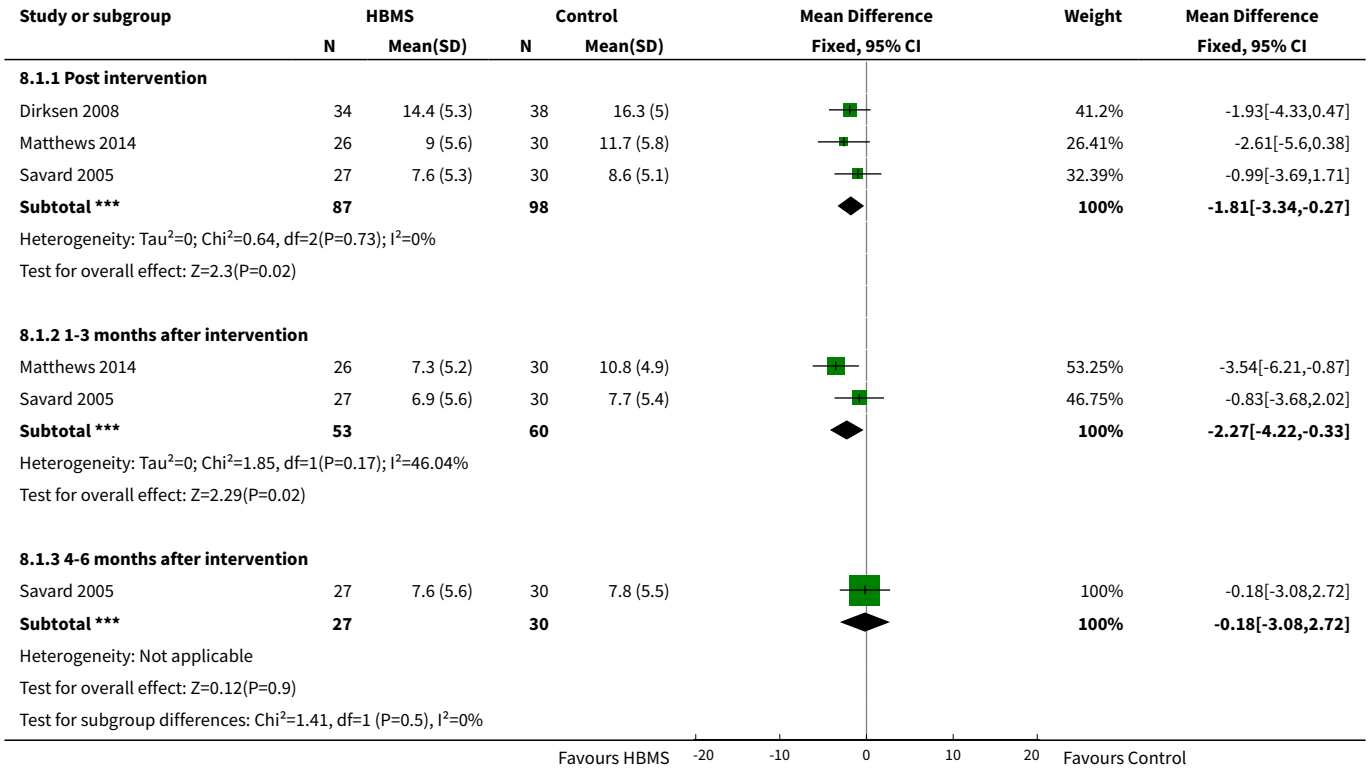
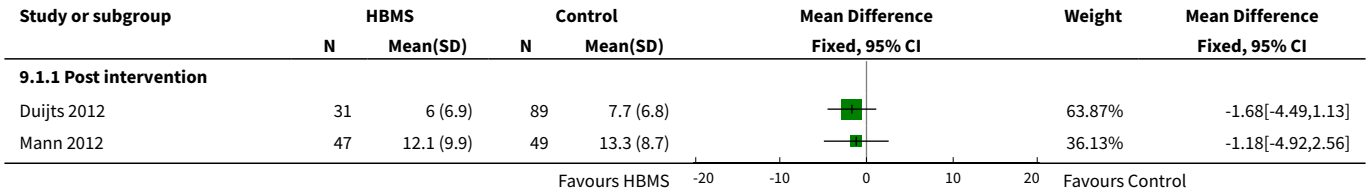
Analysis 8.1. Comparison 8 Insomnia measured by Insomnia Severity Index (ISI) 3 months, Outcome 1 ISI.



Comparison 9. Flushes and night sweats measured by Hot Flushes and Night Sweats Frequency Rating (HFRS)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 HFRS	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Post intervention	2	216	Mean Difference (IV, Fixed, 95% CI)	-1.50 [-3.75, 0.75]
1.2 1-3 months after intervention	1	114	Mean Difference (IV, Fixed, 95% CI)	-0.51 [-3.28, 2.26]
1.3 4-6 months after intervention	1	96	Mean Difference (IV, Fixed, 95% CI)	-2.19 [-6.01, 1.63]

Analysis 9.1. Comparison 9 Flushes and night sweats measured by Hot Flushes and Night Sweats Frequency Rating (HFRS), Outcome 1 HFRS.



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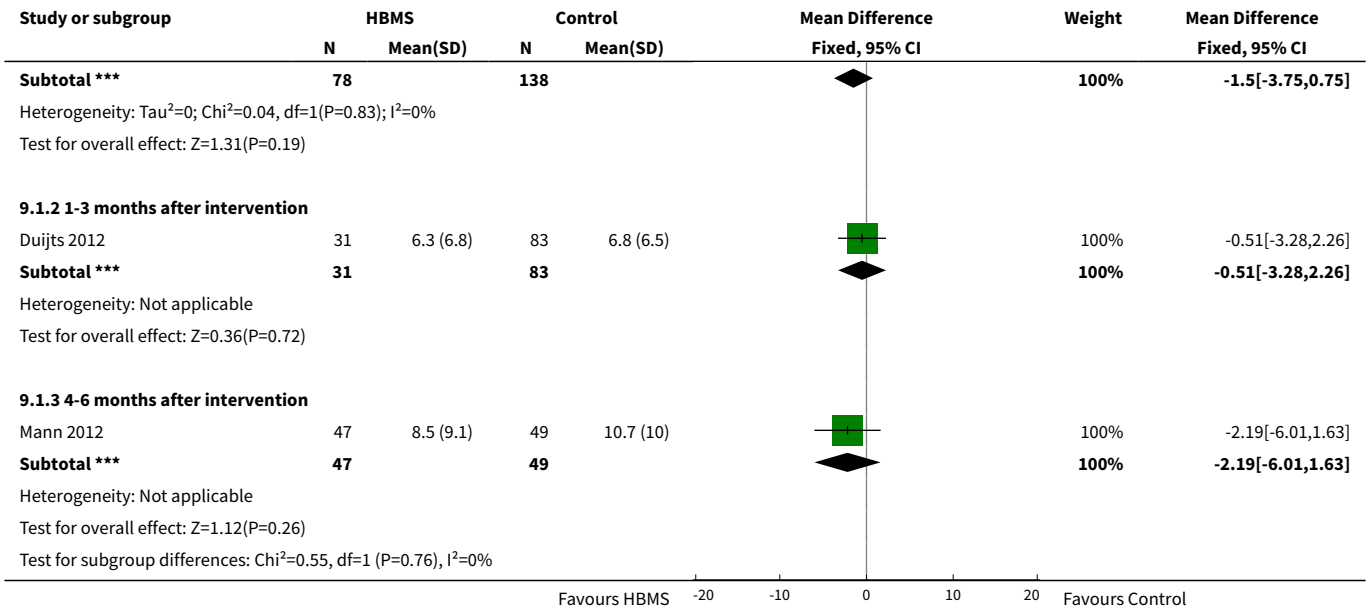
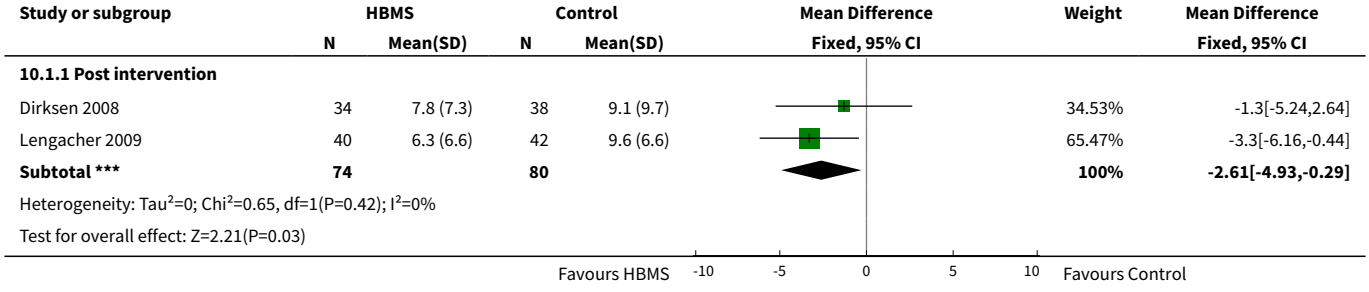


Comparison 10. Depressive symptoms measured by Center for Epidemiologic Studies-Depression Scale (CES-D)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depressive symptoms	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Post intervention	2	154	Mean Difference (IV, Fixed, 95% CI)	-2.61 [-4.93, -0.29]

Analysis 10.1. Comparison 10 Depressive symptoms measured by Center for Epidemiologic Studies-Depression Scale (CES-D), Outcome 1 Depressive symptoms.



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Comparison 11. Subgroup analyses: quality of life by FACT-B - components of intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Breast cancer (post intervention)	7	764	Mean Difference (IV, Fixed, 95% CI)	4.55 [2.33, 6.78]
1.1 Intervention with education and psychological components	3	355	Mean Difference (IV, Fixed, 95% CI)	5.08 [1.24, 8.92]
1.2 Intervention with education and physical components	1	129	Mean Difference (IV, Fixed, 95% CI)	4.10 [0.58, 7.62]
1.3 Intervention with physical and psychological components	3	280	Mean Difference (IV, Fixed, 95% CI)	4.57 [0.24, 8.90]
2 Physical well-being (post intervention)	7	764	Mean Difference (IV, Random, 95% CI)	0.81 [0.04, 1.58]
2.1 Intervention with education and psychological components	3	355	Mean Difference (IV, Random, 95% CI)	0.79 [-0.14, 1.72]
2.2 Intervention with education and physical components	1	129	Mean Difference (IV, Random, 95% CI)	1.14 [0.11, 2.17]
2.3 Intervention with physical and psychological components	3	280	Mean Difference (IV, Random, 95% CI)	0.45 [-1.85, 2.74]
3 Social well-being (post intervention)	7	762	Mean Difference (IV, Fixed, 95% CI)	0.28 [-0.49, 1.04]
3.1 Intervention with education and psychological components	3	353	Mean Difference (IV, Fixed, 95% CI)	0.38 [-0.73, 1.48]
3.2 Intervention with education and physical components	1	129	Mean Difference (IV, Fixed, 95% CI)	0.0 [-2.04, 2.04]
3.3 Intervention with physical and psychological components	3	280	Mean Difference (IV, Fixed, 95% CI)	0.25 [-1.00, 1.50]
4 Emotional well-being (post intervention)	7	762	Mean Difference (IV, Random, 95% CI)	0.41 [-0.25, 1.07]
4.1 Intervention with education and psychological components	3	353	Mean Difference (IV, Random, 95% CI)	0.51 [-0.77, 1.80]
4.2 Intervention with education and physical components	1	129	Mean Difference (IV, Random, 95% CI)	0.27 [-0.95, 1.49]
4.3 Intervention with physical and psychological components	3	280	Mean Difference (IV, Random, 95% CI)	0.07 [-1.37, 1.51]
5 Functional well-being (post intervention)	6	740	Mean Difference (IV, Random, 95% CI)	0.97 [-0.33, 2.28]
5.1 Intervention with education and psychological components	3	354	Mean Difference (IV, Random, 95% CI)	0.89 [-0.83, 2.61]

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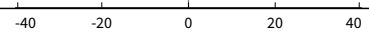
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
5.2 Intervention with education and physical components	1	129	Mean Difference (IV, Random, 95% CI)	2.42 [1.17, 3.67]
5.3 Intervention with physical and psychological components	2	257	Mean Difference (IV, Random, 95% CI)	-0.07 [-4.37, 4.23]

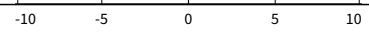
Analysis 11.1. Comparison 11 Subgroup analyses: quality of life by FACT-B - components of intervention, Outcome 1 Breast cancer (post intervention).

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
11.1.1 Intervention with education and psychological components							
Dirksen 2008	34	118.8 (11.9)	38	113.1 (18.5)		9.78%	5.7[-1.42,12.82]
Hoffman 2012	106	103.6 (17.9)	107	96.8 (21.1)		17.9%	6.72[1.46,11.98]
Lahart 2016	37	114.4 (21.5)	33	115.3 (17.6)		5.91%	-0.93[-10.09,8.23]
Subtotal ***	**177**		**178**			**33.59%**	**5.08[1.24,8.92]**
Heterogeneity: Tau^2=0; Chi^2=2.06, df=2(P=0.36); I^2=2.8%							
Test for overall effect: Z=2.59(P=0.01)							
11.1.2 Intervention with education and physical components							
Sherman 2010	87	110.1 (9.5)	42	106 (9.6)		39.99%	4.1[0.58,7.62]
Subtotal ***	**87**		**42**			**39.99%**	**4.1[0.58,7.62]**
Heterogeneity: Not applicable							
Test for overall effect: Z=2.28(P=0.02)							
11.1.3 Intervention with physical and psychological components							
Rogers 2009b	21	114.4 (16.2)	20	118.7 (14.4)		5.64%	-4.3[-13.67,5.07]
Rogers 2015	106	115.9 (17.2)	110	109.4 (20.4)		19.61%	6.5[1.47,11.53]
Swisher 2015	13	119.6 (14.6)	10	104.6 (30.6)		1.17%	15[-5.56,35.56]
Subtotal ***	**140**		**140**			**26.43%**	**4.57[0.24,8.9]**
Heterogeneity: Tau^2=0; Chi^2=5, df=2(P=0.08); I^2=59.97%							
Test for overall effect: Z=2.07(P=0.04)							
Total ***	**404**		**360**			**100%**	**4.55[2.33,6.78]**
Heterogeneity: Tau^2=0; Chi^2=7.19, df=6(P=0.3); I^2=16.54%							
Test for overall effect: Z=4.01(P<0.0001)							
Test for subgroup differences: Chi^2=0.14, df=1 (P=0.93), I^2=0%							



Analysis 11.2. Comparison 11 Subgroup analyses: quality of life by FACT-B - components of intervention, Outcome 2 Physical well-being (post intervention).

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
11.2.1 Intervention with education and psychological components							
Dirksen 2008	34	24.8 (3.3)	38	24.3 (3.8)		14.2%	0.5[-1.14,2.14]



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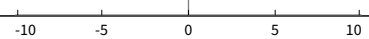
Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
Hoffman 2012	102	22.9 (4.2)	111	21.8 (4.5)		20.62%	1.02[-0.16,2.2]
Lahart 2016	37	25.5 (9.3)	33	25.8 (9.2)		2.93%	-0.3[-4.64,4.04]
Subtotal ***	**173**		**182**			**37.75%**	**0.79[-0.14,1.72]**
Heterogeneity: Tau^2=0; Chi^2=0.51, df=2(P=0.78); I^2=0%							
Test for overall effect: Z=1.66(P=0.1)							
11.2.2 Intervention with education and physical components							
Sherman 2010	87	24 (2.8)	42	22.8 (2.8)		23.12%	1.14[0.11,2.17]
Subtotal ***	**87**		**42**			**23.12%**	**1.14[0.11,2.17]**
Heterogeneity: Not applicable							
Test for overall effect: Z=2.16(P=0.03)							
11.2.3 Intervention with physical and psychological components							
Rogers 2009b	21	23.3 (4.5)	20	25.4 (2.3)		9.57%	-2.1[-4.27,0.07]
Rogers 2015	106	24.1 (3.5)	110	22.5 (5)		21.11%	1.6[0.45,2.75]
Swisher 2015	13	25.4 (2.5)	10	23.8 (3.1)		8.46%	1.6[-0.75,3.95]
Subtotal ***	**140**		**140**			**39.13%**	**0.45[-1.85,2.74]**
Heterogeneity: Tau^2=3.16; Chi^2=9.09, df=2(P=0.01); I^2=78%							
Test for overall effect: Z=0.38(P=0.7)							
Total ***	**400**		**364**			**100%**	**0.81[0.04,1.58]**
Heterogeneity: Tau^2=0.39; Chi^2=9.84, df=6(P=0.13); I^2=39.05%							
Test for overall effect: Z=2.05(P=0.04)							
Test for subgroup differences: Chi^2=0.41, df=1 (P=0.81), I^2=0%							

Analysis 11.3. Comparison 11 Subgroup analyses: quality of life by FACT-B - components of intervention, Outcome 3 Social well-being (post intervention).

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
11.3.1 Intervention with education and psychological components							
Dirksen 2008	34	23.3 (3.9)	38	21.4 (5.9)		11.22%	1.9[-0.39,4.19]
Hoffman 2012	102	18.4 (5.7)	109	18.3 (5.9)		24.28%	0.1[-1.46,1.66]
Lahart 2016	37	23.7 (5)	33	24.1 (4.1)		12.74%	-0.43[-2.58,1.72]
Subtotal ***	**173**		**180**			**48.24%**	**0.38[-0.73,1.48]**
Heterogeneity: Tau^2=0; Chi^2=2.37, df=2(P=0.31); I^2=15.45%							
Test for overall effect: Z=0.67(P=0.5)							
11.3.2 Intervention with education and physical components							
Sherman 2010	87	20.8 (6.4)	42	20.8 (5.1)		14.05%	0[-2.04,2.04]
Subtotal ***	**87**		**42**			**14.05%**	**0[-2.04,2.04]**
Heterogeneity: Not applicable							
Test for overall effect: Not applicable							
11.3.3 Intervention with physical and psychological components							
Rogers 2009b	21	22.6 (4.1)	20	21.8 (5.7)		6.31%	0.8[-2.25,3.85]
Rogers 2015	106	21 (5.7)	110	20.7 (5.8)		24.98%	0.3[-1.23,1.83]
Swisher 2015	13	24.1 (4.1)	10	24.6 (3.3)		6.42%	-0.5[-3.53,2.53]



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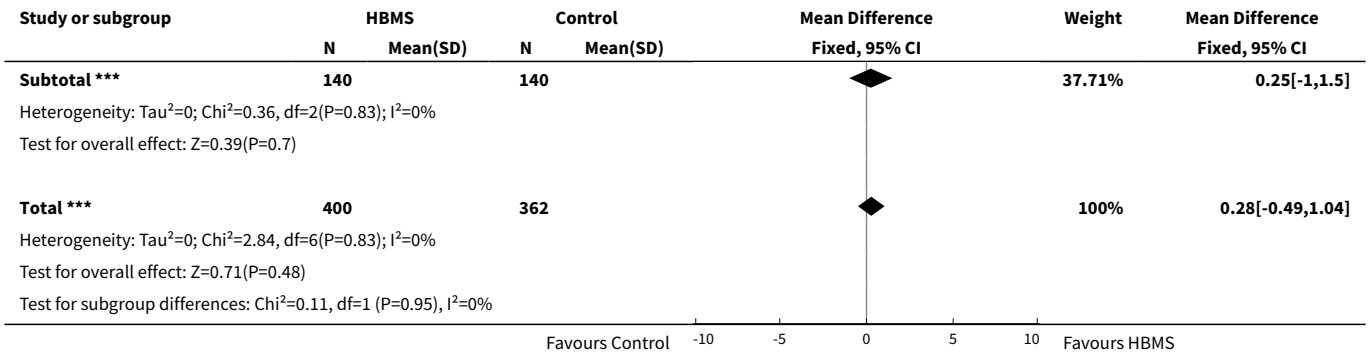
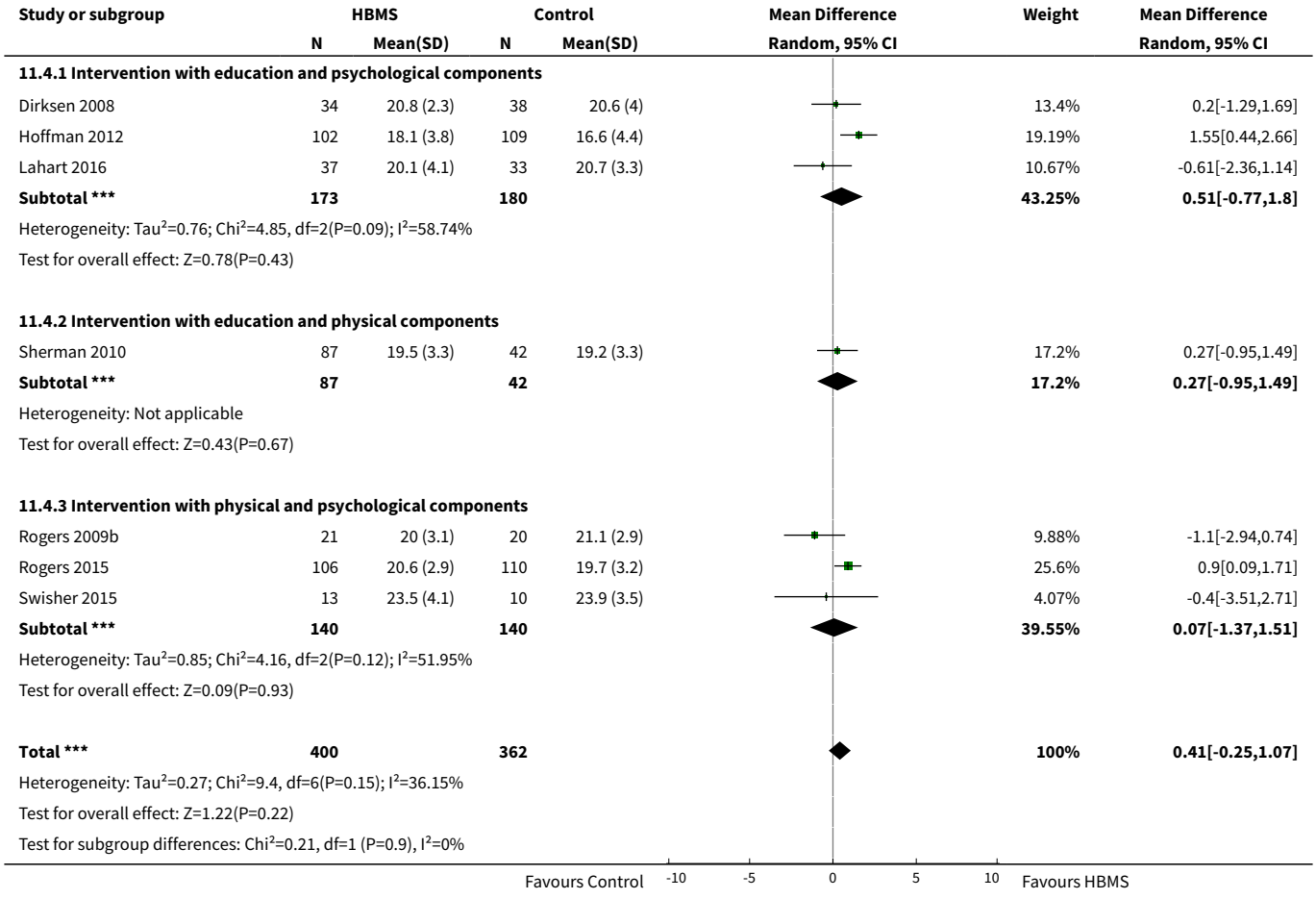


Analysis 11.4. Comparison 11 Subgroup analyses: quality of life by FACT-B - components of intervention, Outcome 4 Emotional well-being (post intervention).



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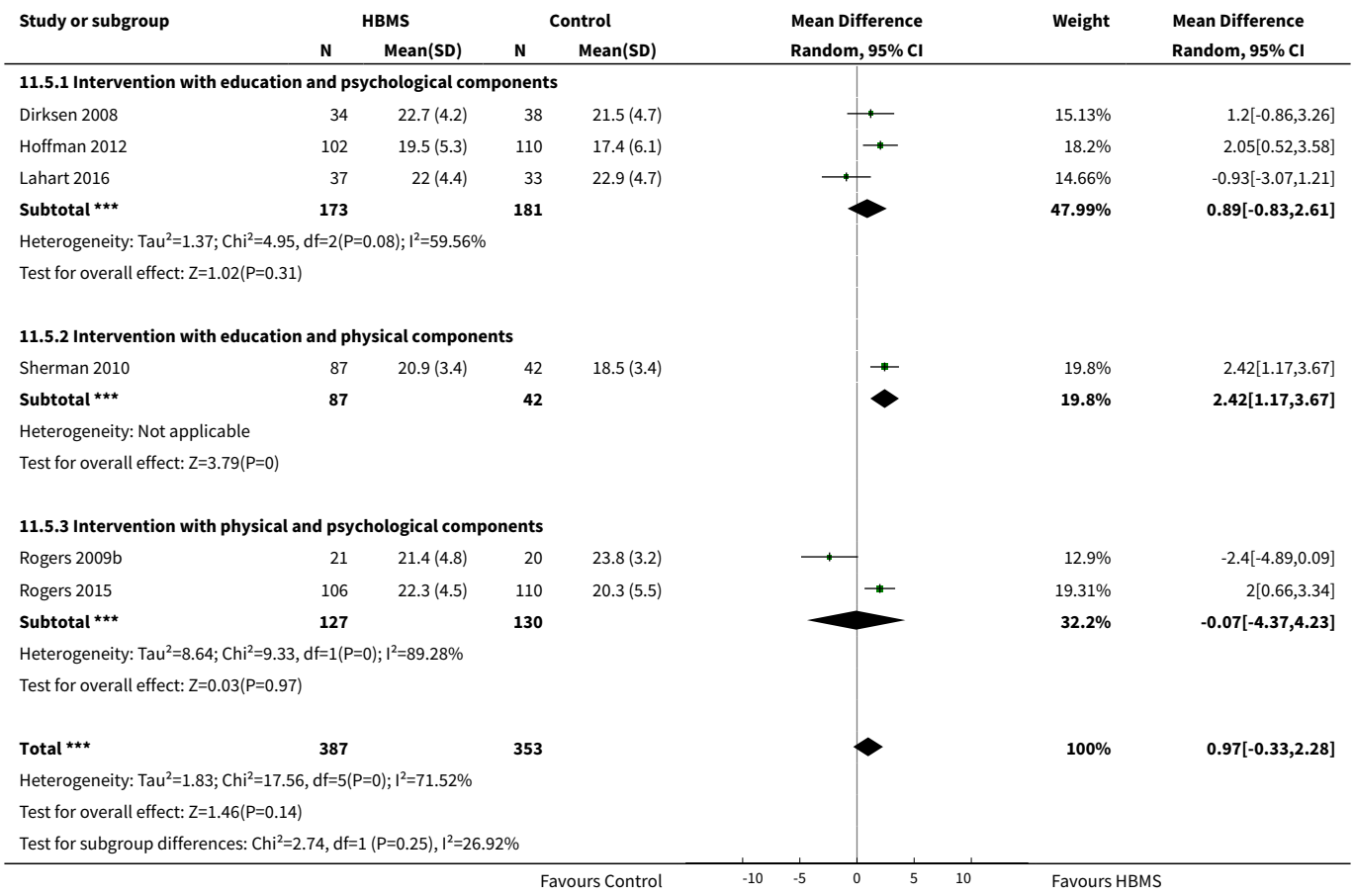
Analysis 11.5. Comparison 11 Subgroup analyses: quality of life by FACT-B - components of intervention, Outcome 5 Functional well-being (post intervention).



Comparison 12. Sub-group analysis: quality of life by EORTC-QLQ - components of intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Global (post intervention)	6	299	Mean Difference (IV, Fixed, 95% CI)	4.38 [0.11, 8.64]
1.1 Intervention with education and psychological components	2	117	Mean Difference (IV, Fixed, 95% CI)	-1.16 [-8.17, 5.85]
1.2 Intervention with education and physical components	3	127	Mean Difference (IV, Fixed, 95% CI)	7.25 [0.68, 13.82]
1.3 Intervention with education, physical and psychological components	1	55	Mean Difference (IV, Fixed, 95% CI)	8.40 [-0.94, 17.74]

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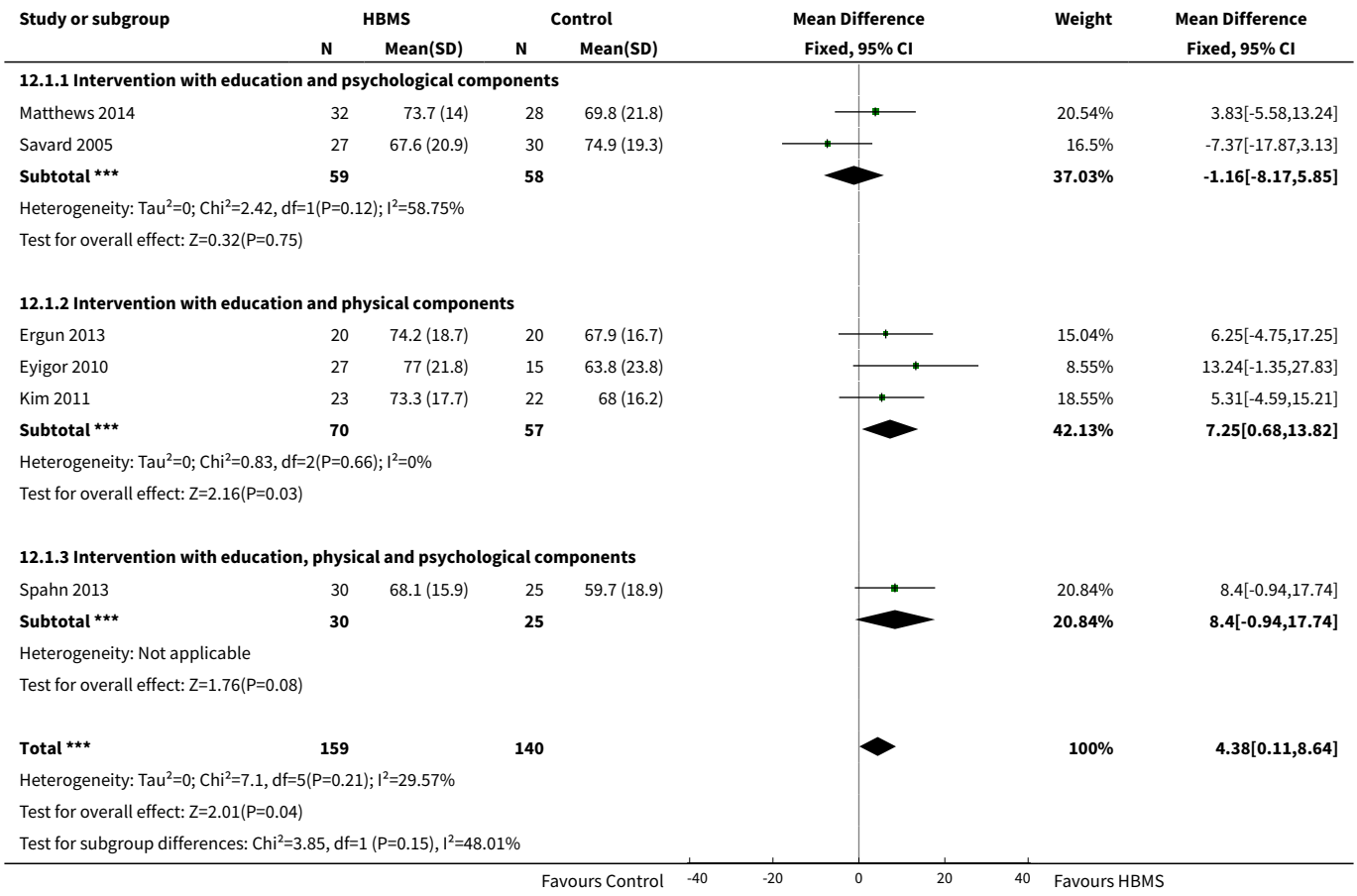
Analysis 12.1. Comparison 12 Sub-group analysis: quality of life by EORTC-QLQ - components of intervention, Outcome 1 Global (post intervention).



Comparison 13. Subgroup analyses: quality of life by FACT-B - mode of intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Breast cancer (post intervention)	7	764	Mean Difference (IV, Fixed, 95% CI)	4.55 [2.33, 6.78]
1.1 Group-based	4	630	Mean Difference (IV, Fixed, 95% CI)	5.36 [2.97, 7.74]
1.2 Individual-based	2	93	Mean Difference (IV, Fixed, 95% CI)	1.71 [-6.66, 10.07]
1.3 Group- and individual-based	1	41	Mean Difference (IV, Fixed, 95% CI)	-4.30 [-13.67, 5.07]
2 Physical well-being (post intervention)	7	764	Mean Difference (IV, Random, 95% CI)	0.81 [0.04, 1.58]
2.1 Group-based	4	630	Mean Difference (IV, Random, 95% CI)	1.15 [0.55, 1.75]

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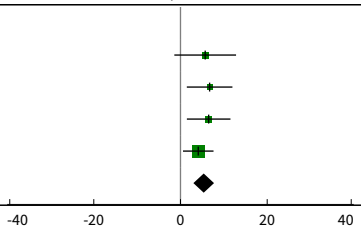
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.2 Individual-based	2	93	Mean Difference (IV, Random, 95% CI)	1.17 [-0.90, 3.24]
2.3 Group- and individual-based	1	41	Mean Difference (IV, Random, 95% CI)	-2.10 [-4.27, 0.07]
3 Social well-being (post intervention)	7	762	Mean Difference (IV, Fixed, 95% CI)	0.28 [-0.49, 1.04]
3.1 Group-based	4	628	Mean Difference (IV, Fixed, 95% CI)	0.42 [-0.47, 1.31]
3.2 Individual-based	2	93	Mean Difference (IV, Fixed, 95% CI)	-0.45 [-2.20, 1.30]
3.3 Group- and individual-based	1	41	Mean Difference (IV, Fixed, 95% CI)	0.80 [-2.25, 3.85]
4 Emotional well-being (post intervention)	7	762	Mean Difference (IV, Random, 95% CI)	0.41 [-0.25, 1.07]
4.1 Group-based	4	628	Mean Difference (IV, Random, 95% CI)	0.84 [0.28, 1.39]
4.2 Individual-based	2	93	Mean Difference (IV, Random, 95% CI)	-0.56 [-2.08, 0.96]
4.3 Group- and individual-based	1	41	Mean Difference (IV, Random, 95% CI)	-1.10 [-2.94, 0.74]
5 Functional well-being (post intervention)	6	740	Mean Difference (IV, Random, 95% CI)	0.97 [-0.33, 2.28]
5.1 Group-based	4	629	Mean Difference (IV, Random, 95% CI)	2.05 [1.32, 2.79]
5.2 Individual-based	1	70	Mean Difference (IV, Random, 95% CI)	-0.93 [-3.07, 1.21]
5.3 Group- and individual-based	1	41	Mean Difference (IV, Random, 95% CI)	-2.40 [-4.89, 0.09]

Analysis 13.1. Comparison 13 Subgroup analyses: quality of life by FACT-B - mode of intervention, Outcome 1 Breast cancer (post intervention).

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
13.1.1 Group-based							
Dirksen 2008	34	118.8 (11.9)	38	113.1 (18.5)		9.78%	5.7[-1.42,12.82]
Hoffman 2012	106	103.6 (17.9)	107	96.8 (21.1)		17.9%	6.72[1.46,11.98]
Rogers 2015	106	115.9 (17.2)	110	109.4 (20.4)		19.61%	6.5[1.47,11.53]
Sherman 2010	87	110.1 (9.5)	42	106 (9.6)		39.99%	4.1[0.58,7.62]
Subtotal ***	**333**		**297**			**87.28%**	**5.36[2.97,7.74]**



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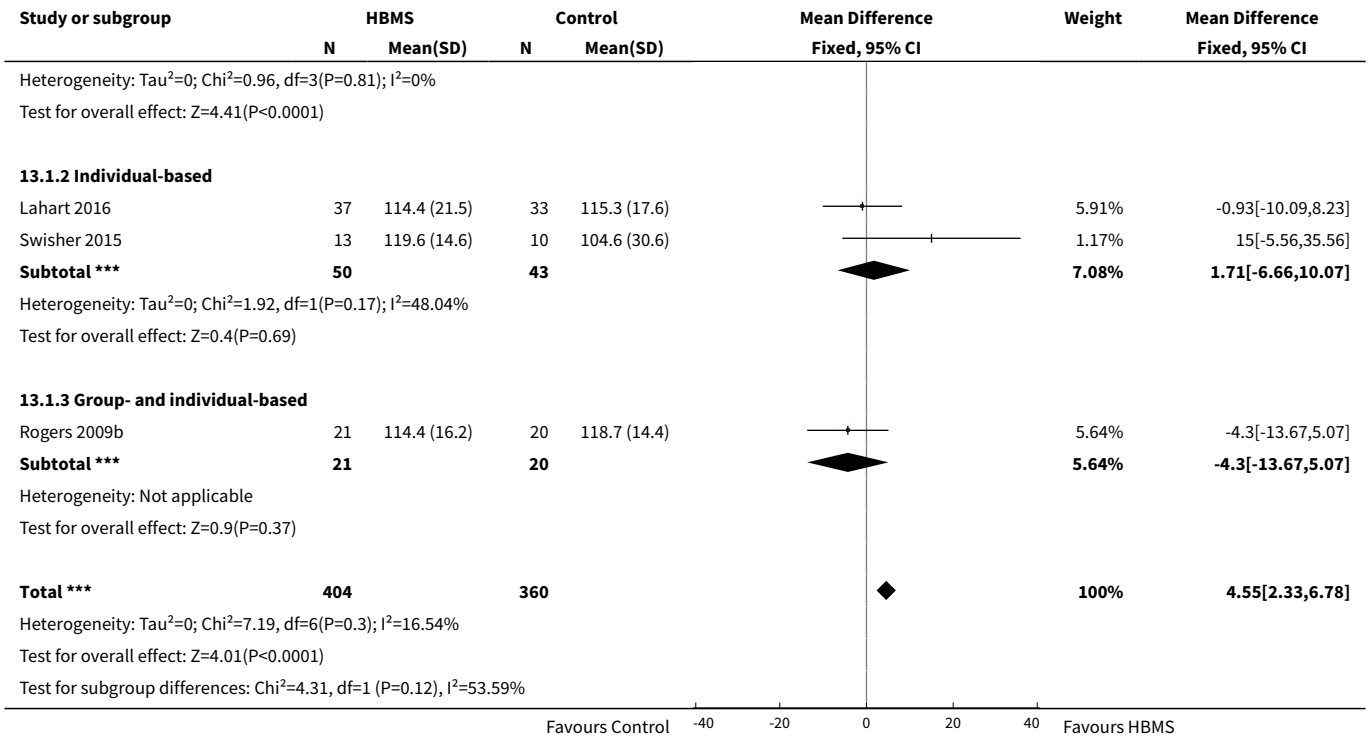
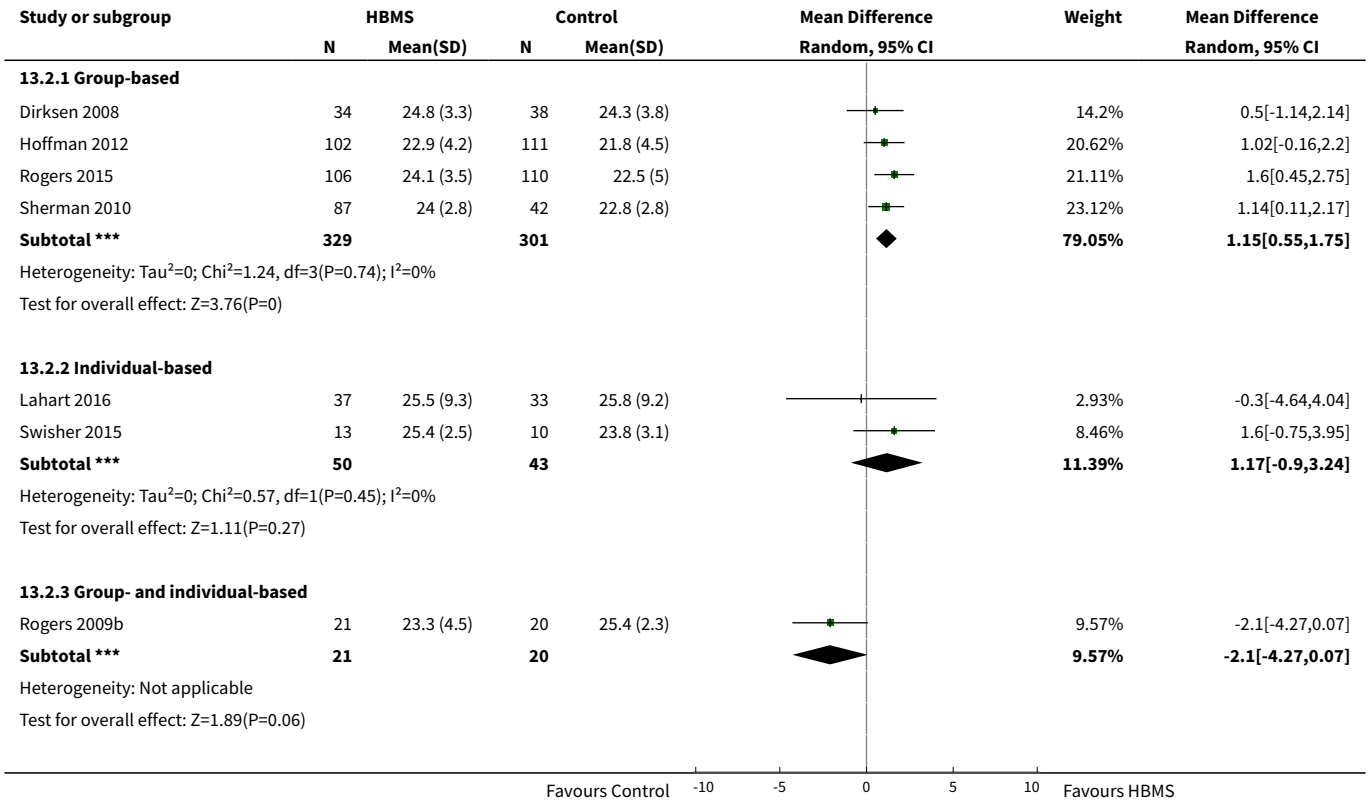


Analysis 13.2. Comparison 13 Subgroup analyses: quality of life by FACT-B - mode of intervention, Outcome 2 Physical well-being (post intervention).



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Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
Total ***	**400**		**364**			**100%**	**0.81[0.04,1.58]**
Heterogeneity: Tau²=0.39; Chi²=9.84, df=6(P=0.13); I²=39.05%							
Test for overall effect: Z=2.05(P=0.04)							
Test for subgroup differences: Chi²=8.03, df=1 (P=0.02), I²=75.11%							

Favours Control -10 -5 0 5 10 Favours HBMS

Analysis 13.3. Comparison 13 Subgroup analyses: quality of life by FACT-B - mode of intervention, Outcome 3 Social well-being (post intervention).

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
13.3.1 Group-based							
Dirksen 2008	34	23.3 (3.9)	38	21.4 (5.9)		11.22%	1.9[-0.39,4.19]
Hoffman 2012	102	18.4 (5.7)	109	18.3 (5.9)		24.28%	0.1[-1.46,1.66]
Rogers 2015	106	21 (5.7)	110	20.7 (5.8)		24.98%	0.3[-1.23,1.83]
Sherman 2010	87	20.8 (6.4)	42	20.8 (5.1)		14.05%	0[-2.04,2.04]
Subtotal ***	**329**		**299**			**74.53%**	**0.42[-0.47,1.31]**
Heterogeneity: Tau²=0; Chi²=1.95, df=3(P=0.58); I²=0%							
Test for overall effect: Z=0.93(P=0.35)							
13.3.2 Individual-based							
Lahart 2016	37	23.7 (5)	33	24.1 (4.1)		12.74%	-0.43[-2.58,1.72]
Swisher 2015	13	24.1 (4.1)	10	24.6 (3.3)		6.42%	-0.5[-3.53,2.53]
Subtotal ***	**50**		**43**			**19.16%**	**-0.45[-2.2,1.3]**
Heterogeneity: Tau²=0; Chi²=0, df=1(P=0.97); I²=0%							
Test for overall effect: Z=0.51(P=0.61)							
13.3.3 Group- and individual-based							
Rogers 2009b	21	22.6 (4.1)	20	21.8 (5.7)		6.31%	0.8[-2.25,3.85]
Subtotal ***	**21**		**20**			**6.31%**	**0.8[-2.25,3.85]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.51(P=0.61)							
Total ***	**400**		**362**			**100%**	**0.28[-0.49,1.04]**
Heterogeneity: Tau²=0; Chi²=2.84, df=6(P=0.83); I²=0%							
Test for overall effect: Z=0.71(P=0.48)							
Test for subgroup differences: Chi²=0.88, df=1 (P=0.64), I²=0%							

Favours Control -10 -5 0 5 10 Favours HBMS

Analysis 13.4. Comparison 13 Subgroup analyses: quality of life by FACT-B - mode of intervention, Outcome 4 Emotional well-being (post intervention).

Study or subgroup	HBMS N	HBMS Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
13.4.1 Group-based							
Dirksen 2008	34	20.8 (2.3)	38	20.6 (4)		13.4%	0.2[-1.29,1.69]
Hoffman 2012	102	18.1 (3.8)	109	16.6 (4.4)		19.19%	1.55[0.44,2.66]

Favours Control -10 -5 0 5 10 Favours HBMS

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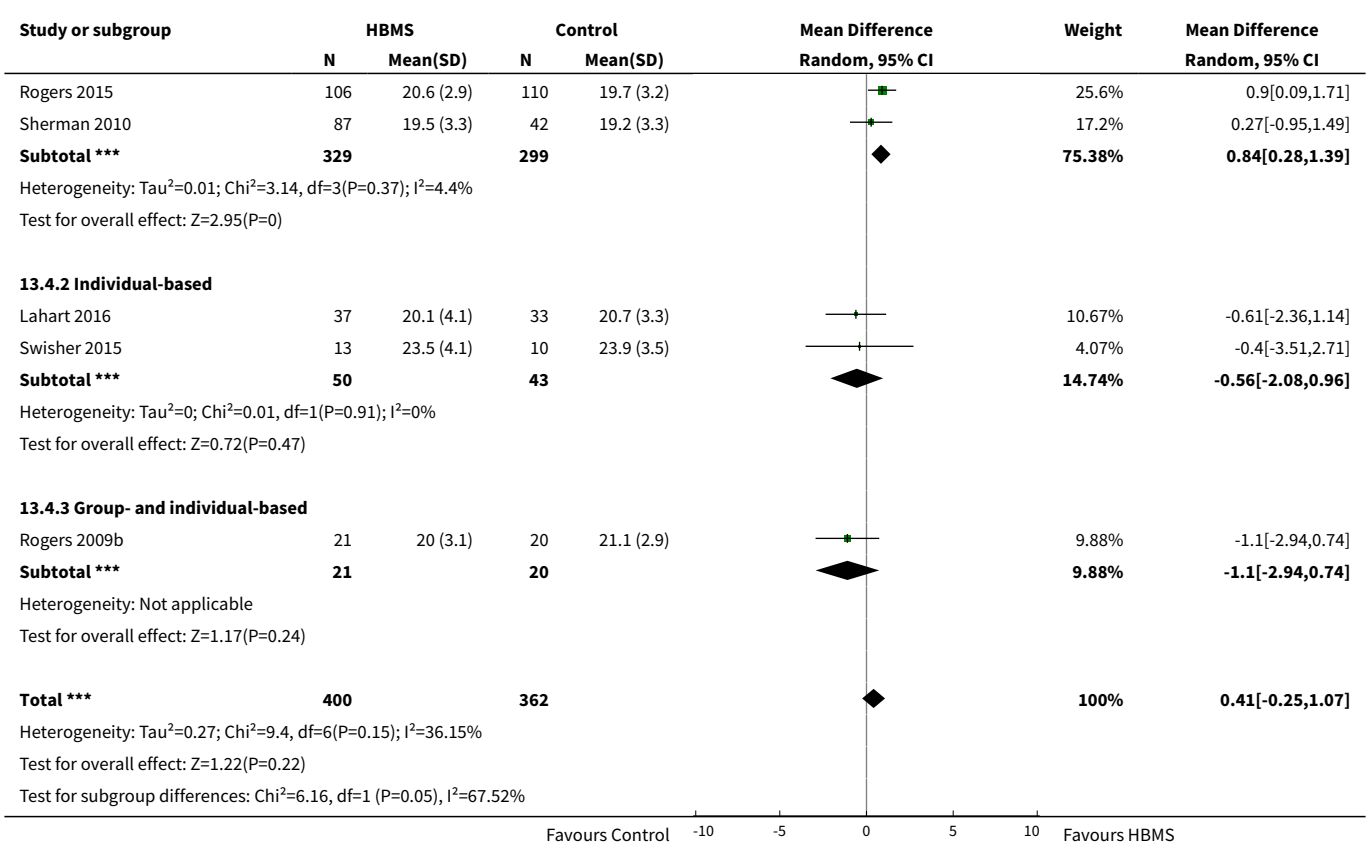
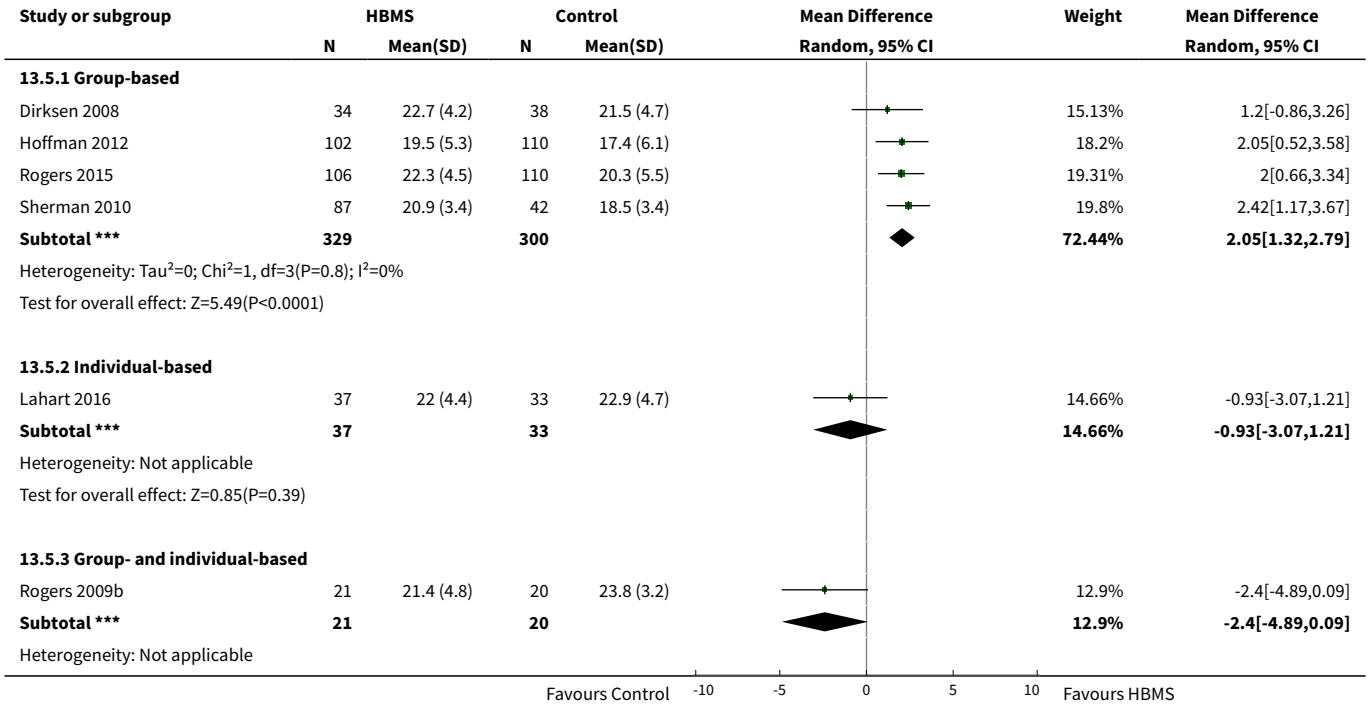


Analysis 13.5. Comparison 13 Subgroup analyses: quality of life by FACT-B - mode of intervention, Outcome 5 Functional well-being (post intervention).



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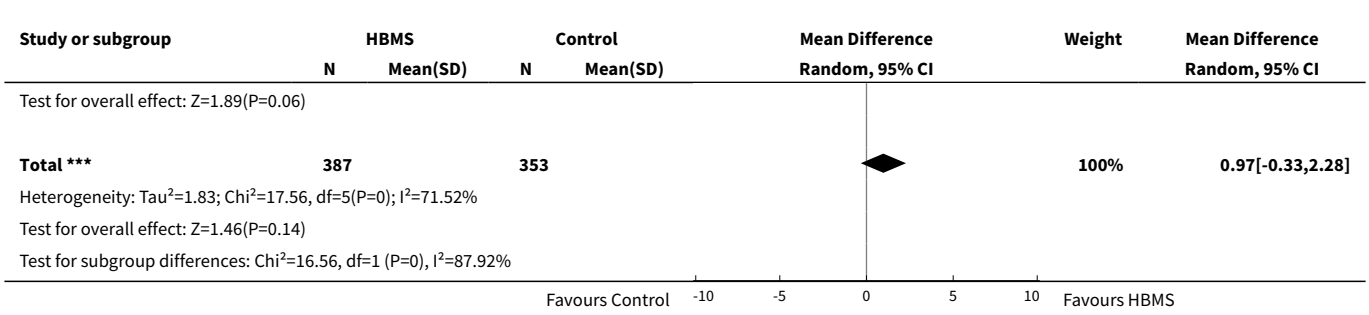
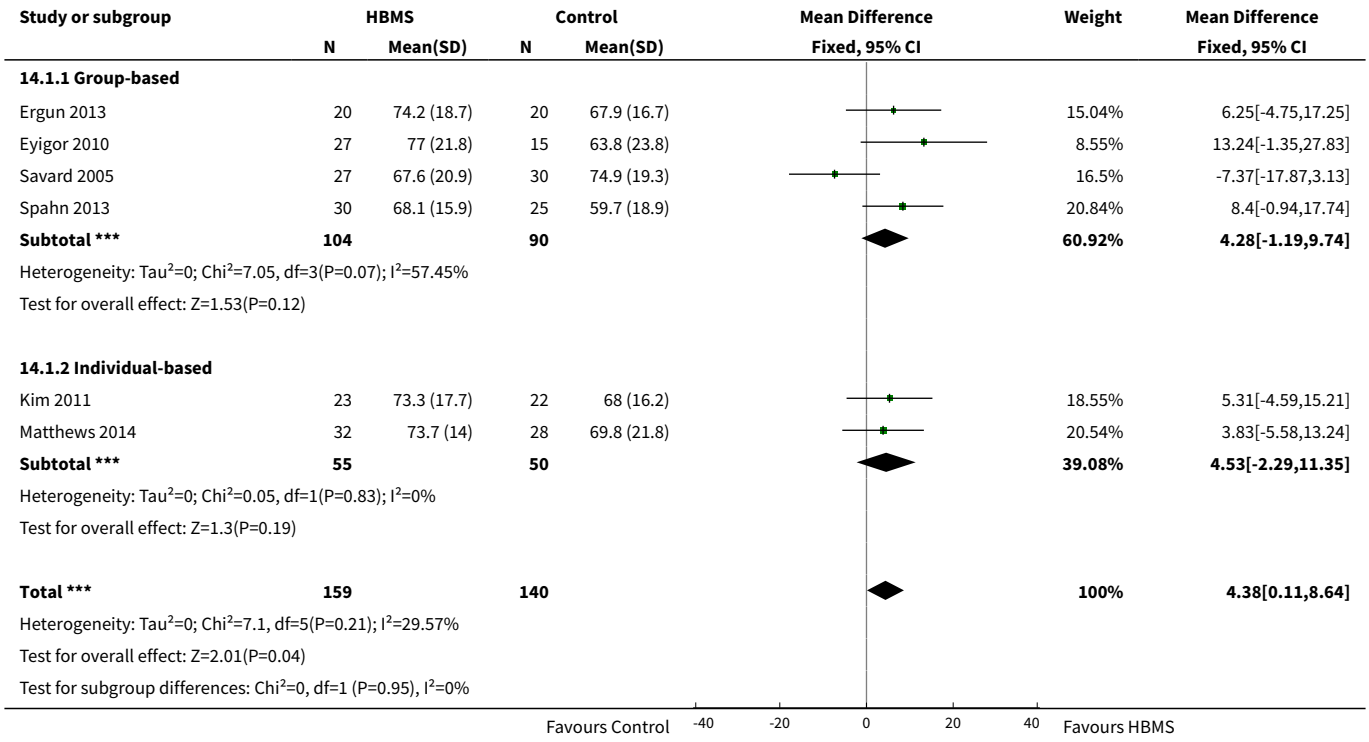


Comparison 14. Subgroup analysis: quality of life by EORTC QLQ - mode of intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Global (post intervention)	6	299	Mean Difference (IV, Fixed, 95% CI)	4.38 [0.11, 8.64]
1.1 Group-based	4	194	Mean Difference (IV, Fixed, 95% CI)	4.28 [-1.19, 9.74]
1.2 Individual-based	2	105	Mean Difference (IV, Fixed, 95% CI)	4.53 [-2.29, 11.35]

Analysis 14.1. Comparison 14 Subgroup analysis: quality of life by EORTC QLQ - mode of intervention, Outcome 1 Global (post intervention).



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ADDITIONAL TABLES

Table 1. Quality-of-life subscale results

Questionnaires	HBMS group vs comparison group (MD, 95% CI)	
	Assessed: immediately post intervention	Assessed: 1 to 3 months post intervention
FACT-B		
Physical well-being	MD 0.81[a], 95% CI 0.04 to 1.58 764 participants 7 studies (Dirksen 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2015; Sherman 2010; Swisher 2015) I^2 = 39% Analysis 1.3	MD 1.25[b], 95% CI 0.35 to 2.15 426 participants 2 studies (Hoffman 2012; Rogers 2015) I^2 = 0% Analysis 1.3
Social well-being	MD 0.28, 95% CI -0.49 to 1.04 762 participants 7 studies (Dirksen 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2015; Sherman 2010; Swisher 2015) I^2 = 0% Analysis 1.4	MD 0.15, 95% CI -0.93 to 1.24 424 participants 2 studies (Hoffman 2012; Rogers 2015) I^2 = 0% Analysis 1.4
Emotional well-being	MD 0.41, 95% CI -0.25 to 1.07 762 participants 7 studies (Dirksen 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2015; Sherman 2010; Swisher 2015) I^2 = 36% Analysis 1.5	MD 1.38, 95% CI -0.40 to 3.15 424 participants 2 studies (Hoffman 2012; Rogers 2015) I^2 = 84% Analysis 1.5
Functional well-being	MD 0.97, 95% CI -0.33 to 2.28 740 participants 6 studies (Dirksen 2008; Hoffman 2012; Lahart 2016; Rogers 2009b; Rogers 2015; Sherman 2010) I^2 = 72% Analysis 1.6	MD 1.46[b], 95% CI 0.37 to 2.56 425 participants 2 studies (Hoffman 2012; Rogers 2015) I^2 = 13% Analysis 1.6
Endocrine symptoms	SMD 0.28[b], 95% CI 0.09 to 0.47 421 participants 2 studies (Duijts 2012; Hoffman 2012) I^2 = 0% Analysis 1.7	SMD 0.26[b], 95% CI 0.07 to 0.46 421 participants 2 studies (Duijts 2012; Hoffman 2012) I^2 = 34% Analysis 1.7

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Table 1. Quality-of-life subscale results *(Continued)*

Trial Outcome Index	MD 4.36[b], 95% CI 2.20 to 6.53 345 participants 2 studies (Rogers 2015; Sherman 2010) I^2 = 0% Analysis 1.8	MD 3.60[a], 95% CI 0.01 to 7.19 213 participants 1 study (Rogers 2015) Analysis 1.8
EORTC QLQ		
Functional	MD 3.16[a], 95% CI 0.09 to 6.22 127 participants 3 studies (Ergun 2013; Eyigor 2010; Kim 2011) I^2 = 0% Analysis 2.2	Data were not available
Symptom	MD 2.53, 95% CI -5.56 to 10.61 82 participants 2 studies (Ergun 2013; Eyigor 2010) I^2 = 56% Analysis 2.3	Data were not available
Role	MD 3.18, 95% CI -4.57 to 10.93 100 participants 2 studies (Kim 2011; Spahn 2013) I^2 = 0% Analysis 2.4	MD 0.40, 95% CI -12.60 to 13.40 55 participants 1 study (Spahn 2013) Analysis 2.4
Emotion	MD 12.22[b], 95% CI 6.07 to 18.37 100 participants 2 studies (Kim 2011; Spahn 2013) I^2 = 0% Analysis 2.5	MD 6.40, 95% CI -7.12 to 19.92 55 participants 1 study (Spahn 2013) Analysis 2.5
Cognitive	MD 0.98, 95% CI -5.27 to 7.23 100 participants 2 studies (Kim 2011; Spahn 2013) I^2 = 0% Analysis 2.6	MD -0.10, 95% CI -14.01 to 13.81 55 participants 1 study (Spahn 2013) Analysis 2.6
Social	MD 1.57, 95% CI -6.98 to 10.13	MD -3.90, 95% CI -19.01 to 11.21

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Table 1. Quality-of-life subscale results *(Continued)*

	100 participants 2 studies (Kim 2011; Spahn 2013) I^2 = 0% Analysis 2.7	55 participants 1 study (Spahn 2013) Analysis 2.7
Physical Function	MD 3.29, 95% CI -2.80 to 9.38 115 participants 2 studies (Matthews 2014; Spahn 2013) I^2 = 0% Analysis 2.8	MD 14.05[b], 95% CI 4.00 to 24.10 107 participants 2 studies (Matthews 2014; Spahn 2013) I^2 = 80% Analysis 2.8
QOL - BC		
Physical	MD -0.06, 95% CI -0.65 to 0.53 50 participants 1 study (Loerzel 2008) Analysis 3.2	Data were not available

CI: confidence interval;
EORTC QLQ: European Organisation for Research and Treatment of Cancer - General;
FACT-B Functional Assessment of Cancer Therapy - Breast cancer;
HBMS: home-based multidimensional survivorship;
MD: mean difference;
QOL - BC Quality of Life - Breast Cancer Overall
[a]Significant results, P < 0.05
[b]Significant results, P < 0.01

Table 2. Subgroup analyses: quality-of-life subscale results by component

Questionnaires	Educational and psychological group (group I) HBMS group vs comparison group	Eductional and physical group (group 2) HBMS group vs comparison group	Physical and psychological group (group 3) HBMS group vs comparison group	Difference among subgroups
FACT-B				
Physical well-being	Insignificantly higher score in HBMS group MD 0.79, 95% CI -0.14 to 1.72 355 participants 3 studies (Dirksen 2008; Hoffman 2012; Lahart 2016) I^2 = 0%	Significantly higher score in HBMS group MD 1.14, 95% CI 0.11 to 2.17[b] 129 participants 1 study (Sherman 2010) Analysis 11.2	Insignificantly lower score in HBMS group MD 0.45, 95% CI -1.85 to 2.74 280 participants 3 studies (Rogers 2009b; Rogers 2015; Swisher 2015) I^2 = 78%	No significant difference (Chi^2 = 0.41, P = 0.81) Analysis 11.2

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Table 2. Subgroup analyses: quality-of-life subscale results by component *(Continued)*

	Analysis 11.2		Analysis 11.2	
Social well-being	MD 0.38, 95% CI -0.73 to 1.48 353 participants 3 studies (Dirksen 2008; Hoffman 2012; Lahart 2016) I^2 = 15% Analysis 11.3	MD 0.00, 95% CI -2.04 to 2.04 129 participants 1 study (Sherman 2010) Analysis 11.3	MD 0.25, 95% CI -1.00 to 1.50 280 participants 3 studies (Rogers 2015; Rogers 2009b; Swisher 2015) I^2 = 0% Analysis 11.3	No significant difference (Chi^2 = 0.11, P = 0.95) Analysis 11.3
Emotional well-being	MD 0.51, 95% CI -0.77 to 1.80 353 participants 3 studies (Dirksen 2008; Hoffman 2012; Lahart 2016) I^2 = 59% Analysis 11.4	MD 0.27, 95% CI -0.95 to 1.49 129 participants 1 study (Sherman 2010) Analysis 11.4	MD 0.07, 95% CI -1.37 to 1.51 280 participants 3 studies (Rogers 2015; Rogers 2009b; Swisher 2015) I^2 = 52% Analysis 11.4	No significant difference (Chi^2 = 0.21, P = 0.90) Analysis 11.4
Functional well-being	MD 0.89, 95% CI -0.83 to 2.61 354 participants 3 studies (Dirksen 2008; Hoffman 2012; Lahart 2016) I^2 = 60% Analysis 11.5	MD 2.42, 95% CI 1.17 to 3.67[b] 129 participants 1 study (Sherman 2010) Analysis 11.5	MD -0.07, 95% CI -4.37 to 4.23 257 participants 2 studies (Rogers 2009b; Rogers 2015) I^2 = 89% Analysis 11.5	No significant difference (Chi^2 = 2.74, P = 0.25) Analysis 11.5

CI: confidence interval;
FACT-B Functional Assessment of Cancer Therapy - Breast cancer;
HBMS: home-based multidimensional survivorship;
MD: mean difference
[a]Significant results, P < 0.05
[b]Significant results, P < 0.01

Table 3. Subgroup analyses: quality-of-life subscale results by mode

Questionnaires	**Group-based** HBMS group vs comparison group	**Individual-based** HBMS group vs comparison group	**Group- & individual-based** HBMS group vs comparison group	Difference among subgroups
FACT-B				
Physical well-being	MD 1.15, 95% CI 0.55 to 1.75[b] 630 participants 4 studies (Dirksen 2008; Hoffman 2012;Rogers 2015; Sherman 2010) I^2 = 0%	MD 1.17, 95% CI -0.90 to 3.24 93 participants 2 studies (Lahart 2016; Swisher 2015) I^2 = 0%	MD -2.10, 95% CI -4.27 to 0.07 41 participants 1 study (Rogers 2009b) Analysis 13.2	Significant difference (Chi^2 = 8.03, P = 0.02[a]) Analysis 13.2

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Table 3. Subgroup analyses: quality-of-life subscale results by mode *(Continued)*

	Analysis 13.2	Analysis 13.2		
Social well-being	MD 0.42, 95% CI -0.47 to 1.31 628 participants 4 studies (Dirksen 2008; Hoffman 2012;Rogers 2015; Sherman 2010) I^2 = 0% Analysis 13.3	MD -0.45, 95% CI -2.20 to 1.30 93 participants 2 studies (Lahart 2016; Swisher 2015) I^2 = 0% Analysis 13.3	MD 0.80, 95% CI -2.25 to 3.85 41 participants 1 study (Rogers 2009b) Analysis 13.3	No significant difference (Chi^2 = 0.88, P = 0.64) Analysis 13.3
Emotional well-being	MD 0.84, 95% CI 0.28 to 1.39 628 participants 4 studies (Dirksen 2008; Hoffman 2012;Rogers 2015; Sherman 2010) I^2 = 4% Analysis 13.4	MD -0.56, 95% CI -2.08 to 0.96 93 participants 2 studies (Lahart 2016; Swisher 2015) I^2 = 0% Analysis 13.4	MD -1.10, 95% CI -2.94 to 0.74 41 participants 1 study (Rogers 2009b) Analysis 13.4	Significant difference (Chi^2 = 6.16, P = 0.049[a]) Analysis 13.4
Functional well-being	MD 2.05, 95% CI 1.32 to 2.79[b] 629 participants 4 studies (Dirksen 2008; Hoffman 2012;Rogers 2015; Sherman 2010) I^2 = 0% Analysis 13.5	MD -0.93, 95% CI -3.07 to 1.21 70 participants 1 study (Lahart 2016) Analysis 13.5	MD -2.40, 95% CI -4.89 to 0.09 41 participants 1 study (Rogers 2009b) Analysis 13.5	Significant difference (Chi^2 = 16.56, P < 0.01[b]) Analysis 13.5

CI: confidence interval;
FACT-B Functional Assessment of Cancer Therapy - Breast cancer;
HBMS: home-based multidimensional survivorship;
MD: mean difference
[a]Significant results, P < 0.05
bSignificant results, P < 0.01

APPENDICES

Appendix 1. CENTRAL

1. MeSH descriptor: [Breast Neoplasms] explode all trees

2. breast near cancer*

3. breast near neoplasm*

4. breast near carcinoma*

5. breast near tumour*

6. breast near tumor*

7. #1 or #2 or #3 or #4 or #5 or #6

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8. survivor*

9. #7 and #8

10. survivorship or therap* or interven* or program* or evaluat* or educat* or rehabilit* or effect* or train* or "post treatment care" or "survivorship surveillance" or "continuum of care" or "transitional care" or "home based" or "home-based" or "self care" or "self-care" or "self help" or "self-help" or "self manag*" or "self-manag*" or "multidimension*" or "multi-dimension*"

11. #9 and #10

Appendix 2. Embase

Search strategy to 2014 (via Embase.com)

1. random* OR factorial* OR crossover* OR cross NEXT/1 over* OR placebo* OR (doubl* AND blind*) OR (singl* AND blind*) OR assign*orAND allocat* OR volunteer* OR 'crossover procedure'/exp OR 'double blind procedure'/exp OR 'randomized controlled trial'/exp OR'single blind procedure'/exp

2. 'breast cancer'/exp OR 'breast cancer'

3. 'breast neoplasm'

4. 'breast carcinoma'/exp OR 'breast carcinoma'

5. 'breast tumour'

6. 'breast tumor'/exp OR 'breast tumor'

7. 'mamma carcinoma'/exp OR 'mamma carcinoma'

8. 'mammary neoplasm'

9. 'mammary carcinoma'/exp OR 'mammary carcinoma'

10. 'mammary gland carcinoma'

11. #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10

12. survivor*

13. #11 AND #12

14. survivorship OR therap* OR interven* OR program* OR evaluat* OR educat* OR rehabilit* OR effect* OR train* OR 'post treatment care' OR 'survivorship surveillance' OR 'continuum of care' OR 'transitional care'OR 'home based' OR 'home-based' OR 'self care'/exp OR 'self care' OR 'self-care'/exp OR 'self-care' OR 'self help'/exp OR 'self help' OR'self-help'/exp OR 'self-help' OR 'self managed' OR 'self manage' OR 'self management'/exp OR 'self management' OR multidimension* OR 'multi dimension' OR 'multi dimensional' OR 'multi dimensions'

15. #1 AND #13 AND #14

16. #15 NOT ([animals]/lim NOT [humans]/lim)

17. #16 AND [embase]/lim

Search strategy for 2014-2016 (via OvidSP)

1	Randomized controlled trial/
2	Controlled clinical study/
3	Random$.ti,ab.
4	randomization/

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(Continued)

5	intermethod comparison/
6	placebo.ti,ab.
7	(compare or compared or comparison).ti.
8	((evaluated or evaluate or evaluating or assessed or assess) and (compare or compared or comparing or comparison)).ab.
9	(open adj label).ti,ab.
10	((double or single or doubly or singly) adj (blind or blinded or blindly)).ti,ab.
11	double blind procedure/
12	parallel group$1.ti,ab.
13	(crossover or cross over).ti,ab.
14	((assign$ or match or matched or allocation) adj5 (alternate or group$1 or intervention$1 or patient$1 or subject$1 or participant$1)).ti,ab.
15	(assigned or allocated).ti,ab.
16	(controlled adj7 (study or design or trial)).ti,ab.
17	(volunteer or volunteers).ti,ab.
18	human experiment/
19	trial.ti.
20	or/1-19
21	exp breast/
22	exp breast disease/
23	(21 or 22) and exp neoplasm/
24	exp breast tumor/
25	exp breast cancer/
26	exp breast carcinoma/
27	(breast$ adj5 (neoplas$ or cancer$ or carcin$ or tumo$ or metasta$ or malig$)).ti,ab.
28	23 or 24 or 25 or 26 or 27
29	survivor$.tw.
30	28 and 29
31	exp self help/

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(Continued)

32	exp self care/
33	(survivorship or therap$ or intervene$ or program$ or evaluat$ or educat$ or rehabilit$ or effect$ or train$ or 'survivorship care plan' or 'post treatment care' or 'survivorship surveillance' or 'continuum of care' or 'individual care plan' or 'transitional care' or 'home based' or 'home-based' or 'self care' or 'self-care' or 'self help' or 'self-help' or 'self managed' or 'self manage' or 'self management' or multidimension$ or 'multi dimension' or 'multi dimensional' or 'multi dimensions').tw.
34	31 or 32 or 33
35	20 and 30 and 34
36	limit 35 to (embase and yr="2014 -Current")
37	36 not (1 or 2)

Appendix 3. PubMed

STUDY DESIGN (i.e. RCTs and quasi-RCTs):

1. (randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tw] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab])

CONDITION (i.e. breast cancer survivors):

2. (((Breast neoplasms[mh] OR ((breast[mh] OR breast diseases[mh]) AND neoplasms[mh])) AND humans[mh]) OR DCIS[tiab] OR LCIS[tiab] OR ductal carcinoma in situ[tiab] OR lobular carcinoma in situ[tiab] OR (breast[tiab] AND (ductal carcinoma*[ti] OR lobular carcinoma*[ti])) OR ((Breast[ti] OR mammary[ti]) AND (cancer*[ti] OR neoplas*[ti] OR tumor*[ti] OR tumour*[ti] OR carcinoma*[ti] OR malignan*[ti] OR sarcoma[ti] OR lymphoma[ti])))

3. (survivor*)

4. (survivorship OR therap* OR interven* OR program* OR evaluat* OR educat* OR rehabilit* OR effect* OR train* OR "post treatment care" OR "survivorship surveillance" OR "continuum of care" OR "transitional care" OR "home based" OR "home-based" OR "self care" OR "self-care" OR "self help" OR "self-help" OR "self manag*" OR "self-manag*" OR "multidimension*" OR "multi-dimension*")

5. #1 AND #2 AND #3 AND #4

6. Animals [MH] NOT Humans [MH]

7. #5 NOT #6

Appendix 4. Cumulative Index to Nursing and Allied Health Literature Plus (CINAHL Plus) via EBSCO host

S1. (MH "Clinical Trials+")

S2. PT Clinical trial

S3. TX clinic* n1 trial*

S4. TX ((singl* n1 blind*) or (singl* n1 mask*)) or TX ((doubl* n1 blind*) or (doubl* n1 mask*)) or TX ((tripl* n1 blind*) or (tripl* n1 mask*)) or TX ((trebl* n1 blind*) or (trebl* n1 mask*))

S5. TX randomi* control* trial*

S6. (MH "Random Assignment")

S7. TX random* allocat*

S8. TX placebo*

S9. (MH "Placebos")

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S10. (MH "Quantitative Studies")

S11. TX allocat* random*

S12. S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11

S13. (MH "Breast Neoplasms+")

S14. TX breast cancer*

S15. TX breast neoplasm*

S16. TX breast carcinoma*

S17. TX breast tumour*

S18. TX breast tumor*

S19. S13 OR S14 OR S15 OR S16 OR S17 OR S18

S20. (MM "Cancer Survivors")

S21. TX survivor*

S22. S20 OR S21

S23. S19 AND S22

S24. TX survivorship OR TX therap* OR TX interven* OR TX program* OR TX evaluat* OR TX educat* OR TX rehabilit* OR TX effect* OR TX train* OR TX "post treatment care" OR TX "survivorship surveillance" OR TX "continuum of care" OR TX "transitional care" OR TX "home based" OR TX "home-based" OR TX "self care" OR TX "self-care" OR TX "self help" OR TX "self-help" OR TX "self manag*" OR TX "self-manag*" OR TX "multidimension*" OR TX "multi-dimension*"

S25. S12 AND S23 AND S24

Appendix 5. PsycINFO via OvidSP

1. exp Treatment Effectiveness Evaluation/

2. exp Treatment Outcomes/

3. exp Placebo/

4. exp Followup Studies/

5. placebo*.mp.

6. random*.mp.

7. comparative stud*.mp.

8. (clinical adj3 trial*).mp.

9. (research adj3 design).mp.

10. (evaluat* adj3 stud*).mp

11. (clinical adj3 trial*).mp

12. (research adj3 design).mp.

13. (evaluat* adj3 stud*).mp.

14. (prospectiv* adj3 stud*).mp.

15. ((singl* or doubl* or trebl* or tripl*) adj3 (blind* or mask*)).mp.

16. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15

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17. exp Breast Neoplasms/

18. (breast adj6 cancer$).mp.

19. (breast adj6 neoplasm$).mp.

20. (breast adj6 carcinoma$).mp.

21. (breast adj6 tumour$).mp.

22. (breast adj6 tumor$).mp.

23. 17 or 18 or 19 or 20 or 21 or 22

24. survivor*.af.

25. 23 and 24

26. (survivorship or therap* or interven* or program* or evaluat* or educat* or rehabilit* or effect* or train* or "post treatment care" or "survivorship surveillance" or "continuum of care" or "transitional care" or "home based" or "home-based" or "self care" or "self-care" or "self help" or "self-help" or "self manag*" or "self-manag*" or "multidimension*" or "multi-dimension*").af.

27. 16 and 25 and 26

Appendix 6. Web of Science via Web of Knowledge

1. TS= clinical trial* OR TS=research design OR TS=comparative stud* OR TS=evaluation stud* OR TS=controlled trial* OR TS=follow-up stud* OR TS=prospective stud* OR TS=random* OR TS=placebo* OR TS=(single blind*) OR TS=(double blind*)

2. TS=("Breast Neoplasm*") OR TS=("Breast Cancer*") OR TS=("Breast Carcinoma*") OR TS=("Breast Tumour*") OR TS=("Breast Tumor*")

3. TS=(survivor*)

4. #3 AND #2

5. TS=(survivorship) OR TS=(therap*) OR TS=(interven*) OR TS=(program*) OR TS=(evaluat*) OR TS=(educat*) OR TS=(rehabilit*) OR TS=(effect*) OR TS=(train*) OR TS=("post treatment care") OR TS=("survivorship surveillance") OR TS=("continuum of care") OR TS=("transitional care") OR TS=("home based") OR TS=("home-based") OR TS=("self care") OR TS=("self-care") OR TS=("self help") OR TS=("self-help") OR TS=("self manag*") OR TS=("self-manag*") OR TS=("multidimension*") OR TS=("multi-dimension*")

6. #5 AND #4 AND #1

Appendix 7. OpenGrey Database

1) breast AND survivor*

Appendix 8. WHO ICTRP

Basic search

1) Breast AND Survivor*

Appendix 9. ClinicalTrials.gov

To 2014 search

Basic search

1) Breast AND Survivor*

2014-2016 search

Basic search:

1. breast cancer AND survivorship AND survivor

Advanced search:

1. Search terms: survivor

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Recruitment: All studies

Study results: All studies

Study type: All studies

Gender: All studies

Conditions: breast cancer OR breast neoplasm

Interventions: survivorship OR mutlidimension OR self care OR self help OR self management

Appendix 10. ProQuest Dissertation and Theses Global

(SU.EXACT("Treatment Effectiveness Evaluation") OR SU.EXACT.EXPLODE("Treatment Outcomes") OR SU.EXACT("Placebo") OR SU.EXACT("Followup Studies") OR placebo* OR random* OR "comparative stud*" OR clinical NEAR/3 trial* OR research NEAR/3 design OR evaluat* NEAR/3 stud* OR prospectiv* NEAR/3 stud* OR (singl* OR doubl* OR trebl* OR tripl*) NEAR/3 (blind* OR mask*)) AND AB,FT,IF,TI("Breast Neoplasm*" OR "Breast Cancer*" OR "Breast Carcinoma" OR "Breast Malignanc*" OR "Breast Tumor*") AND AB,FT,IF,TI(survivor*) AND AB,FT,IF,TI(survivorship OR therap* OR interven* OR program* OR evaluat* OR educat* OR rehabilit* OR effect* OR train* OR "post treatment care" OR "survivorship surveillance" OR "continuum of care" OR "transitional care" OR "home based" OR "home-based" OR "self care" OR "self-care" OR "self help" OR "self-help" OR "self manag*" OR "self-manag*" OR "multidimension*" OR "multi-dimension*")

CONTRIBUTIONS OF AUTHORS

Karis Cheng (KC) conceptualised the protocol, and contributed to the development and writing of the protocol and the review. She will also be responsible for the update.

Ethel Lim (EL) and Wilson Tam (WT) contributed to the development of the search strategies, and drafting of the protocol and the review.

EL and Zhi Min Koh (ZMK) were involved in screening studies and organizing data extraction.

KC and WT were involved in analysis and interpretation of the data.

All authors contributed to the final review for publication.

DECLARATIONS OF INTEREST

KC: nothing to declare
EL: nothing to declare
WT: nothing to declare
ZMK: nothing to declare

SOURCES OF SUPPORT

Internal sources

- National University of Singapore, Singapore.

External sources

- None, Other.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We incorporated functional status into the functional subscales of the quality-of-life measures, and there is no separate reposting of the functional status as a secondary outcome in this review.

In relation to symptom severity and distress, the outcomes of anxiety, depression, fatigue, sleep-related outcomes, endocrine symptoms, symptom distress and joint pain, stiffness and physical function are reported, as these outcomes were reported in the included studies. We performed meta-analysis for anxiety, depression, fatigue, insomnia, hot flushes and night sweats, and depressive symptoms due to the availability of adequate studies.

The secondary outcomes of service needs and utilisation, including psychosocial and supportive care needs, unplanned readmission and hospitalisation, and cost of care are not reported due to the unavailability of these data in the included studies.

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One of the criteria for considering types of participants of studies for this review was women with a breast cancer diagnosis between stages 0 to 3. It implied that we excluded studies with women diagnosed with stage 4 or recurrent breast cancer. In order to make the eligibility criteria more explicit and clearer in this review, we have further specified an exclusion criteria in the Methods sections as “women with stage 4 or recurrent breast cancer were excluded” in the Methods section.

INDEX TERMS

Medical Subject Headings (MeSH)

*Exercise; *Program Evaluation; *Quality of Life; *Survivors; Anxiety [rehabilitation]; Breast Neoplasms [*rehabilitation] [therapy]; Depression [rehabilitation]; Fatigue [rehabilitation]; Home Care Services; Non-Randomized Controlled Trials as Topic; Patient Education as Topic [methods] [*organization & administration]; Prognosis; Randomized Controlled Trials as Topic; Sleep Initiation and Maintenance Disorders [rehabilitation]; Survival Rate

MeSH check words

Female; Humans

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