Psychoeducation for breast cancer: A systematic review and meta-analysis

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ABSTRACT

Background: Psychoeducation has emerged as an intervention for women with breast cancer (BC). This meta-analysis evaluated the effectiveness of psychoeducation on adherence to diagnostic procedures and medical treatment, anxiety, depression, quality of life (QoL), and BC knowledge among patients with BC symptoms or diagnosis and BC survivors.
Methods: A systematic literature search (in PubMed, Embase, PsycINFO and Cochrane) for randomised controlled trials (RCTs) comparing the effects of psychoeducation to control among patients with BC symptoms or diagnosis and BC survivors. Effects were expressed as relative risks (RRs) and standardized mean differences (SMDs) with their 95% confidence intervals.
Results: Twenty-seven RCTs (7742 participants; 3880 psychoeducation and 3862 controls) were included. Compared with controls, psychoeducation had no significant effect on adherence to diagnostic procedures and medical treatment (RR 1.553; 95% CI 0.733 to 3.290, $p = .16$), but it significantly decreased anxiety (SMD -0.710, 95% CI -1.395 to −0.027, $p = .04$) and improved QoL with (SMD 0.509; 95% CI 0.096 to 0.923, $p < .01$). No effects were found for psychoeducation on depression (SMD -0.243, 95% CI -0.580 to 0.091, $p = .14$), or BC knowledge (SMD 0.718, 95% CI -0.800 to 2.236, $p = .23$).
Conclusion: We demonstrated that psychoeducation did not improve adherence to diagnostic procedures and treatment, depression and BC knowledge but was valuable for reducing anxiety and improving QoL. Future studies may explore the effectiveness of psychoeducation in promoting adherence across various types of cancer.

Contents

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1. Introduction

Breast cancer (BC) is currently the most frequently diagnosed cancer in 154 of 185 countries worldwide [1] and it affects women's health both physically and psychologically [2,3]. Throughout the BC care pathway, women may experience various psychosocial issues [4]. In the diagnostic phase, they report a lower QoL and health status than women in general [5], increased anxiety [6], and a lack of power to use resources (inability to pay for care, inability to access care) and social support [7]. During the treatment phase, women with BC may experience symptoms of anxiety and depression [8,9] due to the burden of treatment, and the uncertainties they face regarding recovery. Furthermore, in the survivorship phase (after completing curative primary treatment), the long-term side effects of cancer treatments may contribute to the poor QoL of BC survivors [10] and can also lead to psychological distress such as anxiety and depression [11].

Previous studies reported that over 75% of women with BC symptoms reported inadequate knowledge about BC and its treatment (e.g., symptoms or signs of BC, breast self-examination, the negative impact of delay in care, BC treatments) [7,12]. This may lead women with BC symptoms to be inclined to postpone or delay the timely diagnosis. Adherence to diagnostic and treatment procedures is an important public health problem, especially in low- and middle-income countries (LMICs), like Indonesia [13,14]. Non-adherence may negatively affect recovery and survivorship, including the risk of recurrence and mortality [15,16].

Psychoeducation has emerged in practice as an adjunctive psychosocial intervention for cancer for both patients and families [17]. Psychoeducation refers to strategies that involve information giving and receiving, discussion of concerns, problem-solving, coping skills training, expression of emotions, and social support [18]. Psychoeducation may be helpful for women with BC symptoms or diagnosis, and after recovery from BC to adhere to medical procedures that enable a timely diagnosis and treatment [14,19]. Therefore, psychoeducation is expected to have beneficial effects in improving patients' adherence to medical procedures throughout the BC care path. Further, it may help them cope with various challenges throughout the BC care time frame, reduce symptoms of anxiety and depression, and improve QoL [20–22]. Psycho-education can be delivered in an individual format, in group format or in guided self-help format [23] over a number of weeks and may include information about cancer, treatment, coping strategies and complementary therapies [24]. Psychoeducation is scalable, since it is, more easily administered and potentially better accessible than conventional psychological interventions that require delivery by trained mental health professionals [25]. Psychoeducation, on the other hand, can be delivered by trained non-specialist health workers, or in a self-help format (e.g., printed materials, audio-visual materials, internet contents) which requires fewer resources.

Previous meta-analyses indicated that among patients with various types of cancer, psychoeducation is effective in reducing anxiety [26], depression [27], and in improving knowledge about cancer and its treatment [26]. Concerning QoL, results were inconclusive, with one meta-analysis across general cancer patients finding positive effects for psychoeducation [28] whereas another that focused only on BC patients did not find any positive effect on QoL [29].

Until now, no meta-analyses have examined the effect of psychoeducation on adherence to diagnostic and treatment procedures in women with BC symptoms. Further, the most recent meta-analysis on psychoeducation in BC was published in 2014 [29] and many new studies have appeared since then (e.g., 14, 20, 22). This is the first meta-analysis to investigate the effectiveness of psycho-education on adherence to diagnostic procedures and medical treatment among patients with BC symptoms or diagnosis and BC survivors. Further, we examined the effects of psychoeducation on reductions in anxiety, depression, QoL, and on BC knowledge.

2. Method

2.1. Data sources and searches

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines throughout the design, conduct, and reporting of this review [30]. The study protocol was published on PROSPERO (registration number is: CRD42020146320). To identify all relevant publications, we conducted systematic searches in the bibliographic databases PubMed, Embase. com and Ebsco/PsycINFO and Wiley/Cochrane Library from inception up to July 13, 2020, in collaboration with a medical information specialist. The following terms were used (including

synonyms and closely related words) as index terms or free-text words: "Breast Neoplasms", "Psychotherapy", "Psycho-education", "Psycho-oncology". The references of the identified articles were searched for relevant publications. Duplicate articles were excluded. The full search strategies for all databases can be found in Appendix A.

2.2. Study selection and data extraction

We used the Rayyan QCRI web application [31] for screening the articles. Two reviewers (HS and HA) independently screened the titles of articles identified in the searches and references and eliminated irrelevant studies. Next, they independently screened the abstracts of the remaining studies according to the inclusion criteria. A reference check was performed as well. Any disagreements were resolved by joint discussion, and if consensus was not reached, a third author (MS) was consulted for a joint final decision.

Studies were included if they met the following criteria (a): they were RCTs published in the English-language scientific peer-reviewed journals (b); participants were patients with BC symptoms (define as patients who visited the healthcare professional with BC symptoms or who have received an abnormal mammogram before obtaining a definitive diagnosis), patients with BC diagnosis, and BC survivors (define as patients who completed curative primary BC treatments). We included all types of patients that underwent medical procedures from the diagnosis phase until the survivorship phase due to women experiencing various psychosocial concerns along the care path (c); studies evaluated a psychosocial intervention with a main focus on psychoeducation (including health educational, self-help, and self-management interventions) (d); the comparison control group was either treatment as usual, standard care or waiting list (e); at least one of the following outcomes was reported: adherence to medical procedures (defined as patient's adherence to BC diagnosis and treatment procedures) was measured using a self-reported questionnaire or an interview to assess "adhere or non-adhere" to medical recommendations, anxiety (measured mainly by using BAI, HADS, STAI), depression (measured mainly by using, CES-D, HADS), QoL (measured by WHOQOL-BREF and EORT QLQL C-30 as most used instruments), and BC knowledge (defined as patient's knowledge related to BC) was measured using knowledge test that consists of items to assess patient's knowledge related to BC. No restrictions were placed on the duration of the psychoeducational intervention.

The following descriptive data were extracted by the author (HS): (a) participants (women with BC symptoms, women with BC diagnosis, and women who completed curative primary BC treatments); (b) setting/recruitment; (c) interventions/groups (type of psychoeducation and control group); (d) number of participants; (e) duration of the intervention; (f) content of psychoeducation; and (g) measured outcomes. All descriptive data were checked by two independent bachelor-level research assistants. For the meta-analysis, two authors (HS and WY) independently extracted the outcome data, namely: (a) number of participants; (b) mean; (c) standard deviation.

2.3. Qualitative assessment of the risk of bias (RoB)

Risk of bias (RoB) was independently assessed by two researchers (HS and JH) with the Cochrane Collaboration's tool for assessing RoB [32]. Disagreements were discussed and resolved mediated by a third researcher (JP). We evaluated sources of bias across seven domains: (a) random sequence generation; (b) allocation concealment; (c) blinding participant and personnel; (d) blinding of outcome assessment; (e) incomplete outcome data; (f) selective reporting; (g) other bias. These domains aimed to detect

selection, performance, detection, attrition and reporting bias. We followed the criteria in the Cochrane Collaboration's tool for assessing RoB for judging "high risk", "low risk", and "unclear risk". In addition, studies with more than three high or unclear risk on the criterions were categorized as "high/unclear risk" and the others were categorized as "low risk studies".

2.4. Meta-analysis

This meta-analysis consisted of two types of outcome data. First, since the adherence outcomes were binary outcome data, the risk ratios (RRs) were calculated by comparing the RR of those who adhere to the medical procedures in the psychoeducation groups versus those who were in the control groups. As recommended, the random-effects model using Mantel-Haenszel method was used to combine the RRs from all studies [33]. Second, anxiety, depression, QoL and BC knowledge scores were continuous outcome data. Thus, we used random-effects meta-analyses and the inverse variance method. The effect of psychoeducation was expressed as a standardized mean difference (SMD) and its 95% confidence interval (95% CI). The SMDs were used to handle the differences in measurement scale from various studies. The values were calculated based on the differences of mean and standard deviation between intervention and control groups. However, several studies reported median, range and interquartile range. To handle these cases, we estimated samples and standard deviations as proposed by Wan, Wang [34]. Moreover, we used the average effect sizes for the studies with more than one measures for the same outcomes [35]. Cohen's *d* effect size guidelines [36] were used to interpret the SMD scores: 0.2 was considered a small, 0.5 a moderate, and 0.8 a large difference. We also calculated a test of homogeneity of effect sizes using I^2-statistic, which quantifies the heterogeneity in percentages. A value of <30%, 30–60%, and >60% was interpreted as low, moderate and high of heterogeneity, respectively [37].

In addition, subgroup analyses were conducted for subgroups with at least three studies. We compared the effect sizes between the following subgroups: patient status (BC patients vs. BC survivors), delivery format (individual vs. group and digital vs. face to face), type of guidance (self-help vs. helper-assisted), duration of the intervention (<8 weeks vs. ≥ 8 weeks), studies with high/unclear vs. low RoB, content (delivered within the context of Cognitive Behaviour Therapy (CBT) vs. other types of psychoeducation), and whether it provided by a single discipline or multidisciplinary professionals. All statistical analyses were conducted using the computer program R [38] with the meta package [39,40] following explanations from Harrer, Cuijpers [41].

3. Results

3.1. Selection and inclusion of studies

The literature search generated a total of 7530 publications: 1993 in PubMed, 3509 in Embase. com, 963 in APA PsycINFO, 1064 in Cochrane Library and 1 additional record identified through reference checking. After removing duplicates and screening titles and abstracts, 54 studies were selected for full-text evaluation. Ultimately, 27 studies were included in the meta-analysis (see Fig. 1).

3.2. Characteristics of included studies

The 27 studies included a total of 7742 participants (3880 in the intervention groups and 3862 in the control groups). Table 1 summarises the selected characteristics of the included studies.

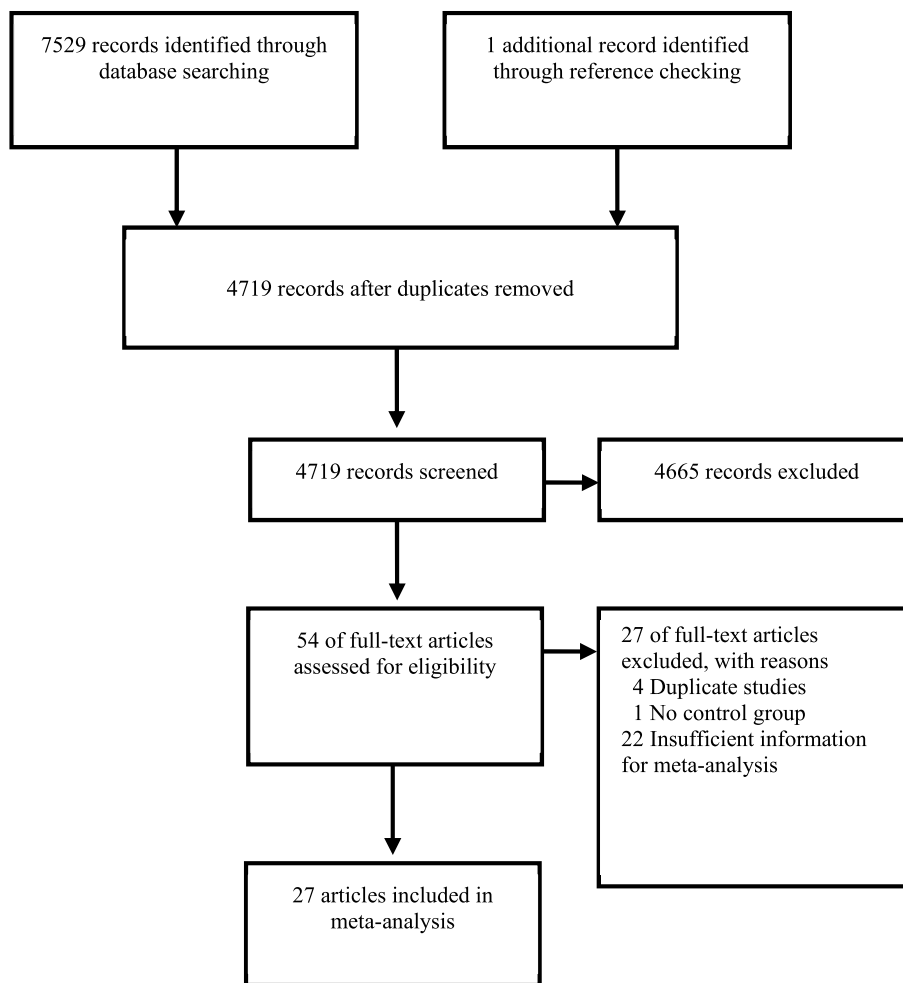Two studies involved women with BC symptoms before

Fig. 1. Study selection.

obtaining a definitive diagnosis, 13 studies involved patients with a diagnosis of BC, and 12 studies involved BC survivors (defined as patients who completed curative primary treatment). Patients were recruited from a clinic setting in 24 studies, and only three studies recruited participants in a non-clinical setting. Most studies (n = 25) were conducted in high-income countries (HIC). Fifteen studies compared psychoeducation to usual care, whereas nine studies included a waitlist control group, and three studies included a control group but did not specify the control condition (or the characteristic of the control group were not clear). Regarding the duration of the intervention, seventeen studies evaluated interventions taking eight weeks or more, whereas nine studies evaluated interventions of fewer than eight weeks. One study did not describe the intervention duration.

Two studies compared more than one type/format of psychoeducation to control: individual vs. group psychoeducation vs. control and videotape vs. face-to-face psychoeducation vs. control. Fourteen studies evaluated individual psychoeducation while fourteen used a group format. In terms of professional support, most studies (23 studies) evaluated a helper-assisted (defined as psychoeducation delivered or assisted by one or more professionals) intervention and five studies evaluated a self-help intervention. Most studies (21 studies) involved face-to-face psychoeducation, while the remaining seven studies utilised digital media (email, telephone, website, video).

The content of psychoeducation for women with BC symptoms included (a) BC symptoms and screening (2 studies); (b) promoting to continue the examination/diagnostic procedures (1 study); and (c) social support (1 study). Meanwhile, psychoeducation for BC patients consisted of: (a) information regarding BC (the medical aspect of their condition, including the treatment) (7 studies); (b) nutrition (1 study); (c) coping with BC (11 studies); (d) psychosocial support and use resources (7 studies). The content of psychoeducation for BC survivors was: (a) physical and psychological changes after treatment (8 studies); (b) diet and nutrition (2 studies); (c) coping and problem-solving (5 studies); (d) social support (1 study); (e) exercise or physical activities (4 studies).

Regarding outcomes measured, adherence to medical procedures was measured in three studies (4 comparisons), anxiety in fourteen studies (15 comparisons), depression in fifteen studies (19 comparisons), QoL in nineteen studies (21 comparisons) and BC knowledge in four studies (4 comparisons).

3.3. Quality of included studies based on the RoB tool

In total, 22 studies (81.5%) showed a high RoB on at least one criterion (Appendix B and Appendix C). The highest RoB was identified for the category 'other bias' (n = 19; 70.4%), while the lowest RoB was identified for 'incomplete outcome data' (n = 19; 70.4%) and 'selective reporting' (n = 19; 70.4%). Seventeen studies

Table 1
Summary of the included studies.

No	Studies	Participants	Setting	Intervention groups	N	Duration	Content	Format	Outcomes
1	Admiraal et al., 2017 [42]	BC survivors	Clinic; NL (HIC)	Psychoeducation	59	12 weeks	A web-based tailored psychoeducation that comprise background information about problems (including normalization), possible problem-solving strategies for coping, and resources including hyperlinks to other web sites and services (for self-referral).	Individual; Digital (internet); Self-help	QOL: QLQ-C30
				Usual care	61		Regular visit to medical specialist every three or four months during the first follow-up year.		
2	Ashing and Rosales, 2014 [43]	BC survivors	Non-clinic; US (HIC)	Telephone-based psychoeducational - English Language	45	4 weeks (8 sessions)	Telephone-based psychoeducational which is grounded in the health-related QOL, the cognitive-behavioural framework and socio-ecological factors to promote resource utilization and a solution-focused, resilient orientation to coping with BC.	Individual; Digital (Telephone); Helper-assisted	Depression: CES-D
				Telephonic-based psychoeducational - Spanish Language	54				
				Usual care - English Language	39		The survivor booklet containing information on cancer, the psychosocial impact, and culturally sensitive resources on low-cost surveillance and treatment, medical, and psychosocial services.		
				Usual care - Spanish Language	61				
3	Boesen et al., 2011 [44]	BC patients	Clinic; DK (HIC)	Psychoeducation and Group psychotherapy	89	10 weeks (10 sessions)	A group intervention to improve patients' QOL: promoting a supportive environment, facilitating grief over multiple losses, altering maladaptive cognitive patterns, enhancing problem-solving and coping skills, fostering a sense of mastery and providing an opportunity to sort out priorities for the future.	Group; Face to face; Helper-assisted	Anxiety: POMS; Depression: POMS; QOL: EORTC
				No Intervention	97				
4	Chan et al., 2017 [20]	BC survivors	Clinic; SG (HIC)	Psychoeducation group	34	3 weeks (3 sessions)	Psychoeducational group intervention based on the principles of cognitive behavioural therapy (CBT) to address and alleviate survivorship issues that they encounter after treatment.	Group; Face to face; Helper-assisted	Anxiety: Beck Anxiety Inventory; QOL: QLQ-C30
				Usual care	38		An information booklet on self-management of cancer and treatment-related symptoms.		
5	Dastan and Buzlu, 2012 [45]	BC patients	Clinic; TR (LMIC)	Semi structured psychoeducation	41	6 weeks (8 sessions)	A semi-structured "Psychoeducational Program" to provide education and support. Main content: basic	Group; Face to face; Helper-assisted	Anxiety: Mental Adjustment to Cancer Scale
				Wait-list control	42				

#	Study	Population	Setting	Arm	N	Duration	Description	Delivery	Outcomes
6	David et al., 2011 [46]	BC patients	Non-Clinic; DE (HIC)	Online counselling - Psychoeducational intervention	31	8 weeks	information regarding BC, Nutrition, Psychosocial factors, Coping with cancer, Interpersonal relationship, Problem solving, and Experience sharing & support. Online counselling via e-mail that took the form of Psychoeducation. Main components: Information transfer, emotional support, and the application of intervention techniques from CBT, RET and SFBT.	Individual; Digital; Helper-assisted	Anxiety: BSI Depression: BSI; QOL: QLQ-C30
				Wait-list control	34				
7	Dolbeault et al., 2009 [47]	BC survivors	Clinic; FR (HIC)	Psychoeducation group	81	8 weeks (8 sessions)	Psychoeducational group based on CBT principles (problem-solving and cognitive restructuring, relaxation exercises) and general medical information and peer exchanges on causes and significance of cancer, the impact of treatments on body image, managing uncertainty, improving communication with loved ones, etc.	Group; Face to face; Helper-assisted	Anxiety: STAI, POMS; Depression: POMS; QOL: QLQ-C30
				Wait-list control	87				
8	Edgar et al., 2001 [48]	BC patients	Clinic, CA (HIC)	Individual Nucare	30	24 weeks (5 session) 24 weeks (5 sessions)	A psychoeducational intervention embraces two major areas: the enhancement of a sense of personal control, and the learning of emotional and instrumental coping responses. Main content: Problem solving techniques; Goal setting; Cognitive reappraisal; Relaxation training; Social support; The use of resources. Meeting every four months with research assistant for assessment.	Individual; Face to face; Helper-assisted Group; Face to face; Helper-assisted	Depression: POMS; QOL: FACT
				Group Nucare	36				
				No Intervention	34				
9	Fenlon et al., 2020 [49]	BC patients	Clinic, UK (HIC)	Group CBT	61	6 weeks (6 sessions)	Group CBT including psychoeducation and CBT, stress management, paced breathing strategies to improve well-being and for managing hot flushes, night sweats, and sleep, and maintaining change.	Group; Face to face; Helper-assisted	Anxiety: GAD-7 Depression: PHQ;
				Usual care	66		Patients were given ad hoc advice about hot flush night sweats. Participants in the usual care arm were offered a version of self-help CBT after final assessment.		

Table 1 (*continued*)

No	Studies	Participants	Setting	Intervention groups	N	Duration	Content	Format	Outcomes
10	Fillion et al., 2008 [50]	BC survivors	Clinic CA (HIC)	Group Education	44	4 weeks (4 sessions)	A brief group intervention that combines stress management psychoeducation and physical activity (i.e., independent variable) intervention in reducing fatigue and improving energy level, QOL (mental and physical), fitness (VO2submax), and emotional distress in BC survivors.	Group; Face to face; Helper-assisted	QOL: MOS SF-12
				Usual care	43		The conventional medical follow-up for BC treatments.		
11	Johns et al., 2020 [51]	BC survivors	Clinic; US (HIC)	Survivorship education	32	6 weeks (6 sessions)	Survivorship education coving relevant survivorship topics: symptom management, weight management, physical activity, and survivorship care plan, didactic discussion guided by masters-level oncology social workers	Group; Face to face; Helper-assisted	Anxiety: GAD; Depression: PHQ; QOL: PROMIS
				Usual care	26		Standard care and received booklet entitled: facing forward: Life after cancer treatment, and list of supplemental resources.		
12	Jones et al., 2013 [52]	BC survivors	Clinic; CA (HIC)	Brief group psychoeducational	190	12 weeks +1 session (2 h)	GBOT: Life After Treatment - Group, brief group psychoeducation that covers: Nursing, Radiation Therapy; Physiotherapy, Nutrition, Social Work, and Occupational Therapy.	Group; Face to face; Helper-assisted	BC knowledge: Knowledge regarding re-entry transition;
				Usual care	190		Received Getting Back On Track (GBOT) book, contains information on what to expect after treatment and introduces self-management strategies to deal with physical, social, and psychological effect of breast cancer diagnosis and treatment, and list of community resources.		
13	Lerman et al., 1992 [19]	Patients with BC symptoms	Non-Clinic; US (HIC)	Psychoeducational booklet -positive framing	94	12 weeks	Psychoeducation sent by email that described the meaning of abnormal mammograms and emphasized the necessity of continued screening (with positive framing).	Individual; Digital (Email); Self-help	Adherence: Self-reported
				Psychoeducational booklet -negative framing	109		Psychoeducation sent by email that described the meaning of abnormal mammograms and emphasized the necessity of continued screening (with negative framing).		
				Usual care	91		The standard breast screening packet sent by email, which included the free mammogram referral.		

14	Meneses et al., 2007 [53]	BC survivors	Clinic; US (HIC)	BC Education Intervention	125	28 weeks (8 sessions)	A psychoeducational support intervention designed for BC survivors and consists of three education and support sessions: education about physical changes after treatment; personal and emotional changes after BC and ways to maintain health; psychological distress and the spiritual effects of cancer and its treat.	Individual; Face to face; Helper-assisted	QOL: QOL-BC
				Wait-list control	131				
15	Meneses et al., 2009 [54]	BC survivors	Clinic; US (HIC)	BC Education Intervention	27	28 weeks (8 sessions)	A psychoeducational support intervention designed specifically for BC survivors during post-treatment survivorship that consist of three sessions on: Physical wellbeing; psychological and social wellbeing; Spiritual wellbeing.	Individual; Face to face; Helper-assisted	QOL: QOL-BC
				Wait-list control	26				
16	Park et al., 2012 [55]	BC survivors	Clinic; KR (HIC)	Psychoeducation support	25	12 weeks (9 sessions)	A psychoeducational support program which focused on helping women to prevent, identify, and resolve problems that they might confront after primary treatment of BC and to develop beneficial coping and management strategies.	Individual; Face to face; Helper-assisted	QOL: FACT-G
				Usual care	23		Standard medical care and a short booklet on cancer information related to cancer, treatment adverse effects, follow-up care, and healthy eating and were instructed to contact their medical team to continue with follow-up care.		
17	Park et al., 2020 [56]	BC patients	Clinic; JP (HIC)	Mindfulness-based cognitive therapy	35	8 weeks (8 sessions)	The program consisted of formal meditational exercises, psychoeducation based on cognitive therapy, and discussion and interaction among the participants to facilitate their learning	Group; Face to face; Helper-assisted	Anxiety: HADS; Depression: HADS QOL: FACT-G
				Wait-list control	36				
18	Ploos van Amstel et al., 2020 [57]	BC patients	Clinic; NL (HIC)	Nurse-led DT intervention-NDTI	31		The NDTI comprised a discussion of the DT results by a study nurse. The intervention encompassed providing emotional support and education about cancer and its treatment. It also included giving practical advice on emotional, social, practical, and/or physical issues raised.	Individual; Face to face; Helper-assisted	Anxiety: HADS; Depression: HADS QOL: EORT QLQL C-30
				Usual care	26		Routine follow up visit with healthcare professionals		

Table 1 (*continued*)

No	Studies	Participants	Setting	Intervention groups	N	Duration	Content	Format	Outcomes
19	Ruiz-Vozmediano et al., 2020 [58]	BC survivors	Clinic; ES (HIC)	Multidisciplinary program Wait-list control	31 32	24 weeks	Program on dietary habits, physical activity, and mindfulness received program on dietary, habits, physical activity, and mindfulness.	Group; Face to face; Helper-assisted	Adherence: Mediterranean Diet Adherence Screener (MEDAS); QOL: QLQ-C-30;
20	Schou Bredal et al., 2014 [59]	BC patients	Clinic: NO (HIC)	Psychoeducation group Usual care	185 182	5 weeks (5 sessions) 3 weeks (3 sessions)	Psychoeducational group that consist of: health education, stress management, enhancement of problem-solving skills, and psychological support. Support group that consists of 3 weekly 2-h sessions for encouraging patients to share their experiences and feelings.	Group; Face to face; Helper-assisted	Anxiety: HADS; Depression: HADS
21	Setyowibowo et al., 2020 [14]	BC symptoms	Clinic; IND (LMIC)	Self-help psychoeducation materials Usual care	54 50	1 week	A self-help psychoeducational program, named PERANTARA to motivate of women with BC symptoms to comply with diagnostic procedures and to seek social support. It consists of printed material with information about symptoms and actions to be taken and of audiovisual material with testimonials of BC survivors. Consultations with an oncologist about medical examination procedures and an educational poster on the wall in the hospital waiting room.	Individual; Digital (DVD); Self-help	Adherence: Medical record; Anxiety: HADS; Depression: HADS; QOL: WHOQOL-Bref,: EQ5D5L; BC knowledge: BC Knowledge Test
22	Stanton et al., 2005 [60]	BC patients	Clinic; US (HIC)	Psychoeducational counselling -EDU	143	2 weeks (2 sessions)	Individual psychoeducational intervention with 1 face-to-face session and 1 telephone session with trained cancer educators. Session 1: reviewing cancer-related concerns across physical health, emotional well-being, interpersonal relations, and life perspectives, develop action plan to address primary concern and associated. Session 2: evaluate progress on action plan, and address generalization of strategies to other challenges.	Individual; Face to face; Helper-assisted	Depression: CES-D; QOL: SF;
				Peer Modelling Videotape -VID	139	1 session	A 23-min film addressing re-entry challenges in four life domains: physical health, emotional well-being, interpersonal relations, and life perspectives. Peer modelling by presenting four BC survivors describing their experiences and coping skills they used to meet challenges.	Individual; Digital (Video); Self-help	

No	Study	Population	Setting; Country	Intervention/Control	N	Duration	Description	Delivery	Outcome measures
				Usual care	136	1 session	The 43-page booklet contains general information for cancer survivors and focuses on health care after cancer treatments, managing emotions, and financial issues.		
23	Stanzer et al., 2019 [61]	BC patients	Clinic; Austria (HIC)	Psychoeducational Wait-list control	30 22	8 weeks (8 sessions)	Psychoeducational intervention to promote BC knowledge, reducing anxiety and fear and promoting empowerment.	Group; Face to face; Helper-assisted	Anxiety: STAI; Depression: BDI-II; QOL: EORTC-QLQ-C-30
24	Taylor et al., 2003 [62]	BC patients	Clinic; US (HIC)	Psychoeducational Group Intervention The assessment only control condition	40 33	8 weeks (8 sessions)	Semi-structured meeting that covers four psychosocial topics: (a) relaxation training, (b) the role of spirituality and religion in coping with BC, (c) coping with fears of cancer recurrence, and (d) ways of using and maintaining social support to help cope with BC. Group meeting for assessment-only.	Group; Face to face; Helper-assisted	BC knowledge: BC-related knowledge
25	Teo et al., 2020 [63]	BC patients	Clinic; US and SG (HIC)	Psychosocial intervention (IG) Wait-list control	34 38	8 weeks (4 sessions)	Combination of psychoeducation, skills training for symptom management, mindfulness techniques, values clarification, and value-guided action planning.	Individual; Face to face; Helper-assisted	Anxiety: HADS; Depression: HADS
26	van den Berg et al., 2015 [64]	BC survivors	Clinic; NL (HIC)	BC E-Health	70	16 weeks	Web-based self-management intervention on basis of cognitive behavioural therapy, facilitating psychological adjustment.	Individual; Digital; Self-help	QOL: EORTC QLQ-C30
				Usual care	80		Visit to oncologist three times per month and psychosocial care on demand or referral		
27	Wu et al., 2018 [22]	BC patients	Clinic; CN (HIC)	Psychoeducation	20	18 weeks (6 sessions)	Information about medical aspects of their condition and treatments, promoting self-management.	Individual; Face to face; Helper-assisted;	Anxiety: HADS; Depression: HADS; QOL: EORTC QLQ-C30; BC
				Usual care	20		The traditional pamphlet education approach in the outpatient department		knowledge: the disease-specific care knowledge scale

BC: Breast cancer; BDI-II: Beck depression inventory-II; BSI: Brief Symptom Inventory; CES-D: Center for Epidemiological Studies Depression; EORTC-QLQ-C-30: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire; FACT: Functional Assessment of Cancer Therapy; FACT-B: Functional Assessment of Cancer Therapy Breast questionnaire; GAD 7: General Anxiety Disorder-7; HADS: Hospital Anxiety and Depression Scale; HIC: High Income Countries; LMIC: Low - and Middle Income countries; MOS SF-12: Medical Outcomes Study Short Form 12; POMS: Profile of Mood States; PHQ: Patient Health Questionnaire-8; PROMIS: Patient-Reported Outcomes Measurement Information System; QOL: Quality of life; QOL-BC: the Quality of Life-BC Survivors; SF-36: Short Form-36 Vitality Subscale; STAI: State-Trait Anxiety Inventory; WHOQOL-BREF: World Health Organization Quality of Life- BREF.
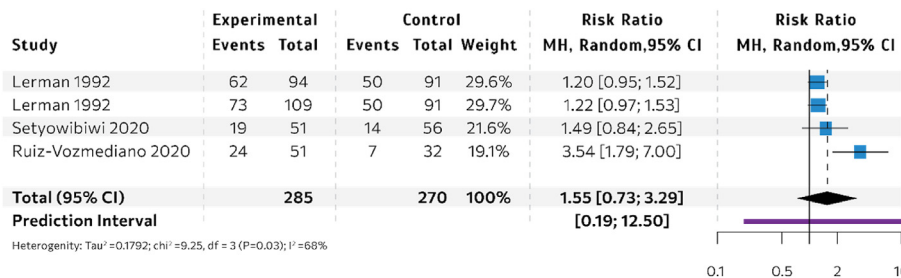
Fig. 2. *Standardized effect sizes between psychoeducation for BC compared to control on adherence.*

(63%) were rated as low risk on at least three domains. On other potential sources of bias, nineteen studies (70.4%) were rated as high risk, seven studies (25.9%) were rated as unclear risk, and one study (3.7%) was rated as low risk. We also categorized every study into "low risk" vs "high/unclear risk". The studies with more than three high or unclear risks on the criterions were categorized as "high/unclear risk" studies (n = 19, 70.4%) and the others were categorized into "low risk" studies (n = 8, 29.6%).

3.4. Meta-analysis

3.4.1. Adherence

Psychoeducation had no significant effect on adherence to the diagnostic and treatment procedures (4 comparisons, $n = 555$; RR 1.553; 95% CI 0.733 to 3.290, $p = .16$), with high heterogeneity ($I^2 = 68\%$) (Fig. 2 and Table 2).

3.4.2. Mental health outcomes

Psychoeducation significantly decreased anxiety symptoms and the effect was moderate (15 comparisons, $n = 1915$; SMD -0.710, 95% CI -1.395 to -0.027, $p = .04$), with high heterogeneity (89.2%), (Fig. 3 A and Table 2). The effect of psychoeducation on depression symptom was not significant (19 comparisons, $n = 2250$; SMD -0.243, 95% CI -0.580 to 0.091, $p = .14$), with high heterogeneity ($I^2 = 82/\%$), (Fig. 3 B and Table 2). In addition, psychoeducation had a significant moderate effect on QoL (21 comparisons, $n = 2425$; SMD 0.509; 95% CI 0.096 to 0.923, $p < .01$; with high heterogeneity; $I^2 = 91\%$), (Fig. 3C and Table 2).

3.4.3. BC knowledge

Psychoeducation did not have an effect on BC knowledge (4 comparisons, $n = 597$; SMD 0.718, 95% CI -0.800 to 2.236, $p = .23$; and heterogeneity was high, $I^2 = 87\%$) (Fig. 4 and Table 2).

3.4.4. Subgroup analyses

The following subgroup comparisons were conducted, BC vs BS survivors, individual vs group intervention, face to face vs digital delivery, self-help vs helper-guided, low vs non-low risk of bias studies, duration of intervention <8 weeks vs $\geq$ 8 weeks, content (delivered within the context of CBT vs. other types of psychoeducation), and helper-assisted (single discipline vs. multidisciplinary professionals). If subgroups consisted of less than three studies, no subgroup analysis was done. This was the case for comparisons between the self-help vs helper-assisted psychoeducation for anxiety and depression, and face to face vs digital delivery for anxiety. Lastly, no subgroup analysis was done for BC knowledge as outcome, since the number of studies in one subgroup was less than three for all subgroup comparisons.

The result of subgroup analyses (Table 2) showed no significant differences in terms of patient status (BC patients vs BC survivors), delivery mode of the intervention (face to face vs digital, self-help vs helper-assisted, and individual vs group), low and non-low RoB, the duration of the intervention (<8 vs $\geq$ 8 weeks), content (delivered within the context of CBT vs. other types of psychoeducation), and helper-assisted (single discipline vs. multidisciplinary professionals) on adherence, anxiety, depression, QoL and BC knowledge. However, we found significant differences on depression when psychoeducation was delivered face-to-face (14 comparisons, n = 1607; SMD -0.389, 95% CI -0.832 to 0.054) than digitally (5 comparisons, $n = 643$; SMD -0.110, 95% CI -0.218 to 0.439; $\chi 2 = 4.45$, $p = .03$). Furthermore, psychoeducation with $\geq$ 8 weeks duration had a higher effect on QoL (14 comparisons, $n = 1463$; SMD 0.695, 95% CI 0.07 to 1.319) than <8 weeks duration (6 comparisons, $n = 875$; SMD 0.1104, 95% CI -0.037 to 0.245, $p = .04$).

4. Discussion

This meta-analysis examined the effects of psychoeducation in patients with BC symptoms, BC diagnosis and BC survivors. The results showed that compared with control groups psychoeducation did not have a significant effect on improving adherence to medical procedures. However, psychoeducation significantly decreased anxiety and improved QoL, with moderate effect sizes. No effects were found for reducing depression and improving BC knowledge.

This is the first systematic review and meta-analysis that examined the effects of psychoeducation on adherence to medical recommendations from the first discovery of symptoms to the survivorship phase in BC patients. We found only three studies that included adherence to medical procedures as an outcome [14,19,58], which may explain the lack of finding a positive effect. A recent meta-analysis in patients with end-stage renal disease [65] and patients with coronary heart disease [66] indicated that psychoeducation has the potential to be utilised for enhancing adherence to medical treatment. In addition, the same might be the case for enhancing BC knowledge, the outcome for which only four studies could be included.

Our finding that psychoeducation reduced anxiety in BC is in line with the results of a previous meta-analysis showing positive effects of psychoeducation in reducing anxiety among various types of cancer [26,28]. Psychoeducation may alleviate anxiety by enabling patients to feel less isolated and find reassurance through social support while elevating their understanding of coping strategies, and teaching stress management strategies (breathing and relaxation exercises). We did not find a beneficial effect on

Table 2
Comparative effects (RR and SDMs) of psychoeducation versus control on adherence, anxiety, depression, Quality of Life, BC Knowledge both overall and for the subgroups.

Variable	n-comp	RR	95% CI	I^2	p
Adherence					
All Studies	4	1.553	0.733; 3.290	67.60	
Anxiety					
All Studies	15	−0.711	−1.395 to −0.027	89.20	
Subgroup analyses					
Patient status					
BC	11	−0.674	−1.296 to −0.053	89.36	.65
BC Survivor	3	−1.37	−7.808 to 5.067	92.96	
Individual versus Group					
Individual	6	−0.203	−0.595 to 0.19	45.53	.11
Group	9	−1.077	−2.273 to 0.119	93.23	
Risk of Bias					
High/Unclear Risk	11	−0.784	−1.773 to 0.206	91.42	.69
Low Risk	4	−0.583	−1.291 to 0.126	63.07	
Duration of intervention					
<8 weeks	6	−0.306	−1.018 to 0.406	87.37	.21
≥8 weeks	8	−1107	−2.462 to 0.249	91.95	
Content					
Non-CBT	9	−0.624	−1.444 to 0.195	91.51	.72
CBT-Based	6	−0.893	−2.605 to 0.819	85.17	
Helper-assisted/guided					
Single discipline	8	−0.366	−0.688 to −0.044	49.79	.17
Multidiscipline	6	−1.44	−3.411 to 0.531	95.45	
Depression					
All Studies	19	−0.244	−0.58 to 0.092	82.07	
Subgroup analyses					
Patient status					
BC	14	−0.365	−0.81 to 0.08	84.35	.11
BC Survivor	4	0.102	−0.552 to 0.756	79.17	
Individual versus Group					
Individual	11	0.005	−0.267 to 0.277	59.21	.09
Group	8	−0.574	−1.34 to 0.193	87.86	
Digital versus Face to Face					
Digital	5	0.11	−0.218 to 0.439	45.73	.03*
Face to Face	14	−0.389	−0.833 to 0.054	84.49	
Risk of Bias					
High/Unclear Risk	13	−0.205	−0.673 to 0.263	82.99	.69
Low Risk	6	−0.329	−0.928 to 0.27	83.21	
Duration of intervention					
<8 weeks	8	0.019	−0.197 to 0.236	57.64	.08
≥8 weeks	10	−0.508	−1.158 to 0.141	87.68	
Content					
Non-CBT	9	−0.418	−1.092 to 0.256	86.125	.35
CBT-Based	10	−0.102	−0.475 to 0.271	78.851	
Helper-assisted/guided					
Single discipline	10	−0.199	−0.581 to 0.183	76.865	.37
Multidiscipline	7	−0.399	−1.351 to 0.553	89.231	
Quality of Life					
All Studies	21	0.509	0.096 to 0.923	91.34	
Subgroup analyses					
BC	10	0.695	0.036 to 1.355	87.83	.45
BC Survivor	10	0.380	−0.303 to 1.062	93.82	
Individual versus Group					
Individual	12	0.569	−0.036 to 1.175	93.77	.74
Group	9	0.432	−0.259 to 1.123	85.21	
Self-help versus Leader Guided					
Self-help	4	0.560	−0.934 to 2.053	96.57	.91
Helper-assisted	17	0.499	0.019 to 0.979	88.83	
Digital versus Face to Face					
Digital	5	0.487	−0.545 to 1.52	95.42	.94
Face to Face	16	0.520	0.007 to 1.033	89.53	
Risk of Bias					
High/Unclear Risk	12	0.477	−0.145 to 1.098	89.59	.84
Low Risk	9	0.559	−0.11 to 1.228	92.66	
Duration of intervention					
<8 weeks	6	0.104	−0.037 to 0.245	5.34	.04*
≥8 weeks	14	0.695	0.07 to 1.319	93.90	
Content					
Non-CBT	14	0.512	−0.084 to 1.108	90.57	.97
CBT-Based	7	0.525	−0.122 to 1.172	91.82	
Helper-assisted/guided					

(continued on next page)

Table 2 (*continued*)

Variable	n-comp	RR	95% CI	I^2	p
Single discipline	9	0.546	−0.215 to 1.307	91.50	.84
Multidiscipline	8	0.451	−0.33 to 1.232	85.74	
Breast Cancer Knowledge					
All Studies	4	0.718	−0.799 to 2.236	86.63	

RR = Risk Ratio; SMD = standardized mean difference; CI = confidence interval; n comp = number of comparisons; The P[a]-values in this column indicate whether the difference between the effect sizes in the subgroups is significant. *$p \leq .05$; **$p < .01$.

depression, which differed from a previous meta-analysis in patients with various types of cancer, showing beneficial effects of internet-based psychoeducation on depression [27]. The lack of effect of psychoeducation on depression may be explained by the fact that the focus of the interventions we included was more strongly on strategies to reduce arousal and stress (e.g., relaxation exercises), that do not address typical depressive symptoms such as low mood and lack of energy. Depressive symptoms may be reduced more effectively by strategies such as behavioural activation [67,68].

We found evidence for an effect of psychoeducation on QoL, in contrast with a previous meta-analysis on psychoeducation for women with early-stage BC that found only an effect of psychoeducation on the BC Symptoms subscale but not on global QoL [29]. However, the Matsuda, Yamaoka [29] study included only eight studies that evaluated QoL, whereas we were able to include eighteen studies evaluating QoL in our more recent meta-analysis. A reasonable explanation is that psychoeducation promoted QoL by helping participants to manage their BC-related problems, taught stress management strategies (breathing and relaxation exercises) and taught adaptive strategies for coping with BC.

Interestingly, subgroup analyses showed that the delivery format of psychoeducation (face-to-face or digital) had a differential effect in terms of reducing depression, with the strongest reduction in depression found for the face-to-face format. These results should be interpreted with caution due to the fact that study sample sizes were very different (digital n = 5 comparisons vs. face to face = 14 comparisons). The digital interventions included both web-based and phone-based interventions. This may partially be explained since drop-out within the digital psychoeducation (up to 33%) was slightly higher than in the face-to-face psychoeducation (up to 24%). Attrition is a common problem in e-health interventions [69], and for patients with BC it may be more feasible to integrate psychoeducation into the regular psychosocial care delivered at the hospital instead of offering it digitally or remotely. Another explanation for reduced effectiveness of digital delivery of psychoeducation may be that patients with BC, who are more often middle-aged than young women, may not all have optimal digital proficiency. However, it should be noted that a previous meta-analysis showed no indication for a difference in efficacy between guided self-help and face-to-face interventions for depression [70]. Furthermore, face-to-face interventions are generally more time-consuming and costly than self-help interventions [71]. Several digital formats have been utilised to provide psychoeducation for patients with cancer [27], and these remain promising alternatives that deserve further evaluations.

Another subgroup finding was that psychoeducation with more than eight sessions had a higher effect in improving QoL than fewer than eight sessions. It is not surprising that longer interventions have stronger effects from the perspective of a dose-effect relationship (the higher the dose, the more effect). Given that more sessions also require more effort and the requirement of more resources, a careful balance should be found between providing the
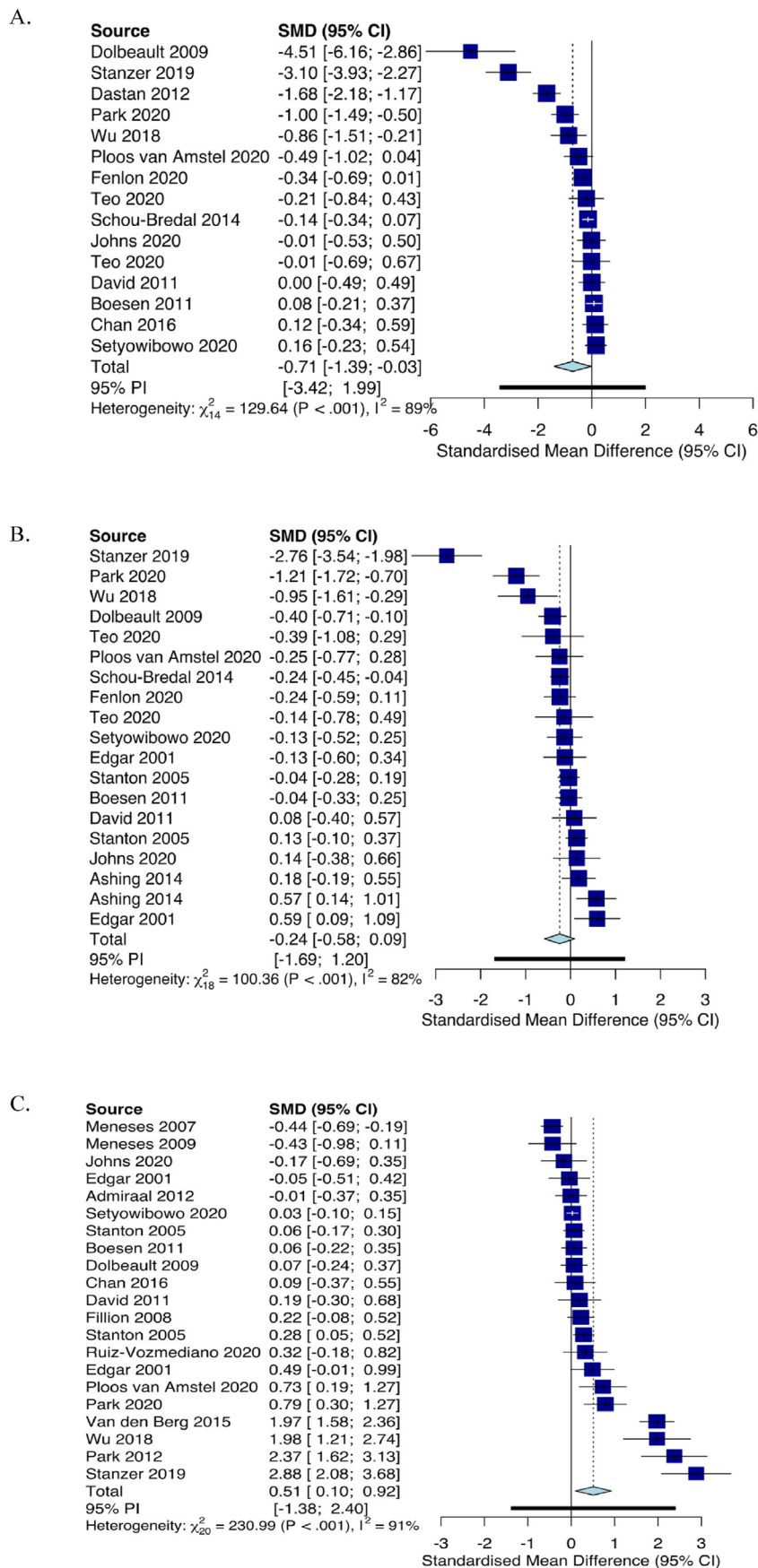
A.

Source	SMD (95% CI)
Dolbeault 2009	-4.51 [-6.16; -2.86]
Stanzer 2019	-3.10 [-3.93; -2.27]
Dastan 2012	-1.68 [-2.18; -1.17]
Park 2020	-1.00 [-1.49; -0.50]
Wu 2018	-0.86 [-1.51; -0.21]
Ploos van Amstel 2020	-0.49 [-1.02; 0.04]
Fenlon 2020	-0.34 [-0.69; 0.01]
Teo 2020	-0.21 [-0.84; 0.43]
Schou-Bredal 2014	-0.14 [-0.34; 0.07]
Johns 2020	-0.01 [-0.53; 0.50]
Teo 2020	-0.01 [-0.69; 0.67]
David 2011	0.00 [-0.49; 0.49]
Boesen 2011	0.08 [-0.21; 0.37]
Chan 2016	0.12 [-0.34; 0.59]
Setyowibowo 2020	0.16 [-0.23; 0.54]
Total	-0.71 [-1.39; -0.03]
95% PI	[-3.42; 1.99]

Heterogeneity: $\chi^2_{14} = 129.64$ (P < .001), $I^2 = 89\%$

Standardised Mean Difference (95% CI)

B.

Source	SMD (95% CI)
Stanzer 2019	-2.76 [-3.54; -1.98]
Park 2020	-1.21 [-1.72; -0.70]
Wu 2018	-0.95 [-1.61; -0.29]
Dolbeault 2009	-0.40 [-0.71; -0.10]
Teo 2020	-0.39 [-1.08; 0.29]
Ploos van Amstel 2020	-0.25 [-0.77; 0.28]
Schou-Bredal 2014	-0.24 [-0.45; -0.04]
Fenlon 2020	-0.24 [-0.59; 0.11]
Teo 2020	-0.14 [-0.78; 0.49]
Setyowibowo 2020	-0.13 [-0.52; 0.25]
Edgar 2001	-0.13 [-0.60; 0.34]
Stanton 2005	-0.04 [-0.28; 0.19]
Boesen 2011	-0.04 [-0.33; 0.25]
David 2011	0.08 [-0.40; 0.57]
Stanton 2005	0.13 [-0.10; 0.37]
Johns 2020	0.14 [-0.38; 0.66]
Ashing 2014	0.18 [-0.19; 0.55]
Ashing 2014	0.57 [0.14; 1.01]
Edgar 2001	0.59 [0.09; 1.09]
Total	-0.24 [-0.58; 0.09]
95% PI	[-1.69; 1.20]

Heterogeneity: $\chi^2_{18} = 100.36$ (P < .001), $I^2 = 82\%$

Standardised Mean Difference (95% CI)

C.

Source	SMD (95% CI)
Meneses 2007	-0.44 [-0.69; -0.19]
Meneses 2009	-0.43 [-0.98; 0.11]
Johns 2020	-0.17 [-0.69; 0.35]
Edgar 2001	-0.05 [-0.51; 0.42]
Admiraal 2012	-0.01 [-0.37; 0.35]
Setyowibowo 2020	0.03 [-0.10; 0.15]
Stanton 2005	0.06 [-0.17; 0.30]
Boesen 2011	0.06 [-0.22; 0.35]
Dolbeault 2009	0.07 [-0.24; 0.37]
Chan 2016	0.09 [-0.37; 0.55]
David 2011	0.19 [-0.30; 0.68]
Fillion 2008	0.22 [-0.08; 0.52]
Stanton 2005	0.28 [0.05; 0.52]
Ruiz-Vozmediano 2020	0.32 [-0.18; 0.82]
Edgar 2001	0.49 [-0.01; 0.99]
Ploos van Amstel 2020	0.73 [0.19; 1.27]
Park 2020	0.79 [0.30; 1.27]
Van den Berg 2015	1.97 [1.58; 2.36]
Wu 2018	1.98 [1.21; 2.74]
Park 2012	2.37 [1.62; 3.13]
Stanzer 2019	2.88 [2.08; 3.68]
Total	0.51 [0.10; 0.92]
95% PI	[-1.38; 2.40]

Heterogeneity: $\chi^2_{20} = 230.99$ (P < .001), $I^2 = 91\%$

Standardised Mean Difference (95% CI)

Fig. 3. *Standardized effect sizes between psychoeducation for BC compared to control on mental health outcomes.*
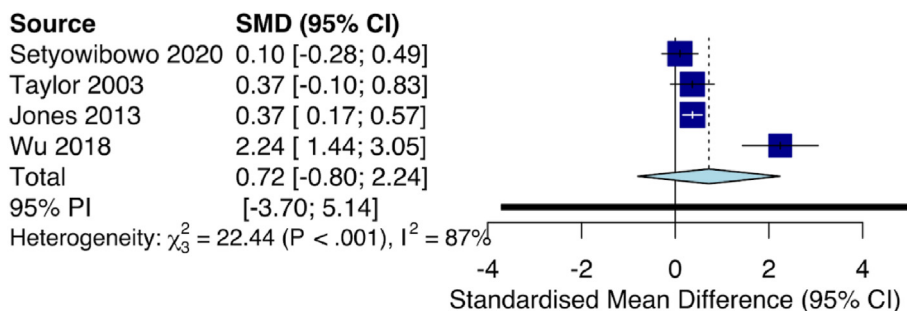
Fig. 4. *Standardized effect sizes between psychoeducation for BC compared to control on BC Knowledge.*

most optimal and effective intensity of psychoeducation, while remaining its feasibility and acceptability for the individual patient. The optimal intensity may also be different for the different phases of BC diagnosis and treatment.

Various health professionals delivered psychoeducation with helper-assisted (or guided) format. This variety impeded a statistical comparison between the different types of health professionals. However, we compared the effect of psychoeducation delivered or assisted by a single discipline versus a multidisciplinary professional on anxiety, depression, and quality of life. This sub-group analysis indicated no differences between psychoeducation delivered by a single discipline or multidisciplinary professionals on any of these outcomes. Moreover, we found no differences between psychoeducation within a CBT framework vs. other types of psychoeducation on anxiety, depression, and quality of life.

4.1. Study limitations

This meta-analysis has a few limitations. First, the included studies showed a large variation in quality, and most of them were rated as having a high or unclear risk of bias, the latter meaning that authors did not provide sufficient information to decide whether a measure to reduce bias was taken. Other limitations of our study are the high heterogeneity between the studies, the variety in terms of contents of psychoeducation that might have affected the results of the review, the limited number of studies that assessed adherence and BC knowledge which may have limited statistical power, and the different outcome measures for assessing anxiety, depression, QoL, and BC knowledge across studies. Furthermore, most studies were conducted in HICs and their outcomes might not be translated to LMICs, due to the differences between settings in health facilities, access to health services, and differences in local concepts and idioms of distress.

4.2. Clinical implications

In clinical practice, psychoeducation is a crucial tool to reduce anxiety and improve QoL, and there is enough reason to promote the wide-scale use of psychoeducation in BC. When offered as a face-to-face, integrated into or added-on to clinical care, its effects may be most optimal. Further, its content may be adapted to the BC care stage of patients. Women with early symptoms of BC may benefit from psychoeducational strategies that promote adherence to diagnostic and treatment procedures, whereas at later stages in the BC care path psychoeducation may be targeted at promoting wellbeing, recovery and quality of life. To improve the effectiveness of psychoeducation on promoting adherence, we suggest that psychoeducation should be targeted to address the variety of concerns that women present with throughout the BC care path:

from the early discovery of BC symptoms to the recovery phases. Psychoeducation should be delivered in multiple sessions and the delivery method should be adapted to fit in with the local context, and may include group discussions, individual consultations, or audio-visual or interactive materials. Further, effective strategies (e.g., supporting behavioural activation) should be added to address depression symptoms.

4.3. Research implications

For future studies, we recommend evaluating the effectiveness of psychoeducation in promoting adherence to medical procedures and reducing depression across various types of cancer and its long-term effects. In addition, research is needed into which elements of an intervention contribute to promoting adherence. Further, studies may evaluate the optimal dosage of psychoeducation. Although we found that psychoeducation of a longer duration was more effective in improving QoL, lengthy interventions may not be feasible or acceptable for BC patients and may not be scalable. The minimum required intensity of psychoeducation to effectively promote adherence and reduce distress including anxiety and depression deserves further investigation.

5. Conclusion

This review indicates that psychoeducation is a promising intervention to help patients throughout the BC care pathway. While finding no effects for improving adherence to diagnosis and treatment, as well as depression and BC knowledge, this meta-analysis shows that psychoeducation, especially when delivered face-to-face and over an extended duration, was effective in reducing anxiety and improving QoL.

Ethical approval

Approval was not required.

Declaration of interest

The authors have no conflicts to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.breast.2022.01.005.

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