

Effects of Dyadic Interventions on Quality of Life among Cancer Patients: An Integrative Review

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ABSTRACT

Interventions delivered to cancer patients along with their caregiver as a unit of care indicates dyadic intervention. With the shift of care to home, dyadic interventions are being popular among cancer care. This review aims to identify the dyadic interventions targeting quality of life (QOL) of cancer patient. The current review examined different dyadic interventions for cancer patients from January 2009 to January 2020. PubMed, Psych-info, and CINAHL databases were searched, and 27 studies were included in the review. There were different dyadic interventions for cancer patients including skill based, psychosocial (psycho-educational, educational, counseling),

yoga, mindfulness, coping, dance, writing, training along with education, and counseling. Interventions were different in mode of delivery, duration, and delivery personnel. Interventions had improved some aspects of QOL among cancer patients as well as caregivers. Although some aspects of QOL were improved, precise dose and use of different approaches together could be integrated to develop further interventions. Further intervention based on strong theoretical framework guided by the standard protocol is recommended.

Key words: Cancer, dyadic interventions, quality of life

Introduction

Cancer journey is not just limited up to the patient, but it also includes patients along with their family caregiver mainly spouse.^[1,2] As the World Health Organization (WHO) estimated the rise to pile up reaching 18.1 million new cases of cancer and 9.6 million death in 2018,^[3] cancer has emerged as a burden of the 21st century. The aggregated 5-year survival rate for all cancers has increased from 50.3% to 67% from 1970–1977 to 2007–2013.^[4] At present, scenario with increasing number of long-term cancer survivors, family members being the main caregiver, and global shortage of healthcare providers has come up with a shift of care from hospital to community and home-based care for

cancer patients and survivors putting crucial responsibility on family caregivers.^[5-7] Studies have supported the existence of relationship between illness experience in cancer patients and their family caregivers.^[8,9] Living with cancer reduces quality of life (QOL) of not only patient but also the QOL of family caregiver.^[10]

The disease process of cancer, its treatment,^[11] and side effects of treatment^[12,13] results in remarkable distress among cancer patients and their family caregiver in physical,^[14,15] psychological, social, and spiritual domains.^[16-18] These are the domains collectively referred as “QOL.” The WHO has defined QOL as “an individual’s perception of their position

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in life in the context of the culture and value system in which they live and in relation to their goals, expectation, standard, and concerns.^[19] QOL is dynamic and it changes as individual moves along the cancer continuum.^[20] Reflecting the data from developing countries, a study in India showed that majority of cancer patients (82.3%) had QOL score below average.^[21] Thus, maintaining “QOL” has been one of the main goals of cancer treatment.^[22-25]

As caregiver provides care to the cancer patient in every possible dimensions of health: physical, emotional, social and goes through all the negative health consequences, caregiver and patient dyad is collectively viewed as a unit.^[26] When interventions are offered to the cancer patient and their family caregiver together as a unit of care, then it is patient-caregiver dyadic intervention. Couple-based/dyadic interventions for cancer patient and their partner have been found to enhance patient’s psychological and social adjustment such as communication and relationship functioning.^[27] Dyadic intervention in cancer has potential for achieving success as it simultaneously addresses survivor, caregiver, and relationship factor that hinders effective symptom management, caregiving, and rehabilitation.^[28] However, other study concluded that family-involved interventions were not superior to usual care or active controls at improving cancer patient’s outcome.^[29]

The objective of the study is to identify the dyadic interventions targeting QOL of cancer patient. Following review questions were used: What are the different types of dyadic interventions for cancer patients and their caregiver? What are the methodological features of interventions? Which domain of QOL is most influenced by the intervention?

Methods

Inclusion Criteria for the Study to be Considered for the Review

Type of studies included global studies with either pilot, randomized control trial, quasi-experimental with control group design, or pretest–posttest design. Peer-reviewed and full-text articles are included. All the published studies in English language between January 2009 and January 2020 were included. Studies that focused on adults diagnosed with any type of cancer and at any stage of cancer were included in the review. Any intervention directed toward the promotion of QOL of cancer patient, delivered by any mode including cancer patient and family caregiver, and given at any time during the cancer progression were included. The outcome of the interest is QOL of cancer patient.

Search technique

Study search was conducted using following keywords, “Family” or “couple” or “spouse” or “partner” or “patient caregiver dyads” AND “intervention” or “treatment” or “therapy” or “program” or “strategy” AND “quality of life” or “well being” or “well-being” AND “cancer” or “neoplasm” or “carcinoma” or “malignancy.”

Search in CINAHL included “family or couple or spouse or partner or patient caregiver dyads” AND “intervention or treatment or therapy or program or strategy” AND “quality of life or well being or well-being” AND “cancer or neoplasm or carcinoma or malignancy.” Articles from January 2009 to January 2020, peer-reviewed, and English language were included. There were a total of 690 articles from which 14 were retrieved.

In PubMed, search included (family[Title/Abstract] OR couple[Title/Abstract] OR spouse[Title/Abstract] OR partner[Title/Abstract] OR patient caregiver dyads[Title/Abstract]) AND (intervention[Title/Abstract] OR treatment[Title/Abstract] OR therapy [Title/Abstract] OR program[Title/Abstract] OR strategy[Title/Abstract]) AND (quality of life[Title/Abstract] OR well being[Title/Abstract] OR well-being[Title/Abstract]) AND (cancer[Title/Abstract] OR neoplasm [Title/Abstract] OR carcinoma[Title/Abstract] OR malignancy[Title/Abstract]). Articles from January 2009 to January 2020, English language, and age 19+ years were included. Total articles were 820 out of which 29 articles were retrieved.

In Psych info, search included ab (family OR couple OR spouse OR partner OR patient caregiver dyads) AND ab (intervention OR treatment OR therapy OR program OR strategy) AND ab (quality of life OR well being OR well-being) AND ab (cancer OR neoplasm OR carcinoma OR malignancy). Articles from January 2009 to January 2020, English language, full text, and peer reviewed were included. There were 480 articles, among which 12 were retrieved.

Articles meeting the inclusion criteria were retrieved and evaluated for deciding its relevancy.

Assessment of Risk and Bias of Individual Studies

The three reviewers checked the quality of the methodologies for each of the studies used in the review. Scottish Intercollegiate Guidelines Network Methodological Checklist 2: Controlled Trials (version 2.0), was used for checking methodological quality. It was developed by the Scottish Intercollegiate Guideline Network (SIGN), Healthcare Improvement Scotland, Gyle Square, 1 South Gyle Crescent, Edinburgh EH 12 9EB.^[30] All the eligible articles were assessed independently by three researchers. Further, any disagreement between them was resolved in consensus. All the selected articles met the acceptable criteria.

Data extraction

Data were extracted in data extraction form by researcher and validated by 2 independent researchers. Discussion was made for the resolution of disagreement. A Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flowchart for the review is presented in Figure 1.

Results

Twenty-seven articles were confirmed on meeting the inclusion criteria and were included for the analysis. Characteristics of included studies are presented in Table 1.

Design sampling method and sample size

Among 27 studies,^[31-57] 7 studies^[31,40,41,46,49,50,53] were pretest–posttest design. Mixed design was used in 3 studies^[32,42,45] and 17^[33-39,43,44,47,48,51,52,54-57] studies were randomized controlled trial. Majority, nineteen studies^[32-41,43,45-48,50,52,53,57] were conducted in the USA while two each in the Netherlands,^[42,51] the United Kingdom,^[44,56] and China.^[54,55] Finally, one study each was conducted in Indonesia^[49] and Chile.^[31]

Almost half of the studies^[33-39,41,43,47,48,51-53] were conducted in multi-sites and the remaining^[31,32,40,42,44,45,46,49,50,54-57] in one site. Sample size of 3 studies^[40,46,50] was less than or equal to ten dyads, while sample size was between 11 and 20 dyads in 3 studies^[31,56,57] 21 and 30 dyads in 4 studies,^[42,45,48,49] 31 and 40 dyads in 5 studies^[32,39,41,51,53] 41 and 50 dyads in 2 studies^[33,52] 61–70 dyads in 1 study^[38] 71 and 80 dyads in 3 studies^[35,36,44] 91 and 100 in 1 study^[43] 100 and 200 dyads in 2 studies^[54,55] 200 and 300 dyads in 2 studies^[34,47] and above 300 dyads, i.e., 302 dyads in one study^[37] Sample size calculation was shown in only four studies.^[37,41,51,53]

Subject characteristics

Regarding the type of cancer included, 6 studies^[40,42,46,51,54,55] included patients with lung cancer, 6 studies^[37,41,43,48,53,57] included different types and stages of cancer, 5 studies^[33,34,38,39,47] included breast cancer, 3 studies^[55,56,45,56] included prostate cancer, 2 studies^[31,49] included terminal cancer, 2 studies^[32,42] included gastrointestinal cancer, 1 study^[44] included ovarian cancer, and 1 study^[50] included high-grade glioma (brain cancer). In 18 studies, the eligibility age was mentioned to be 18 years or

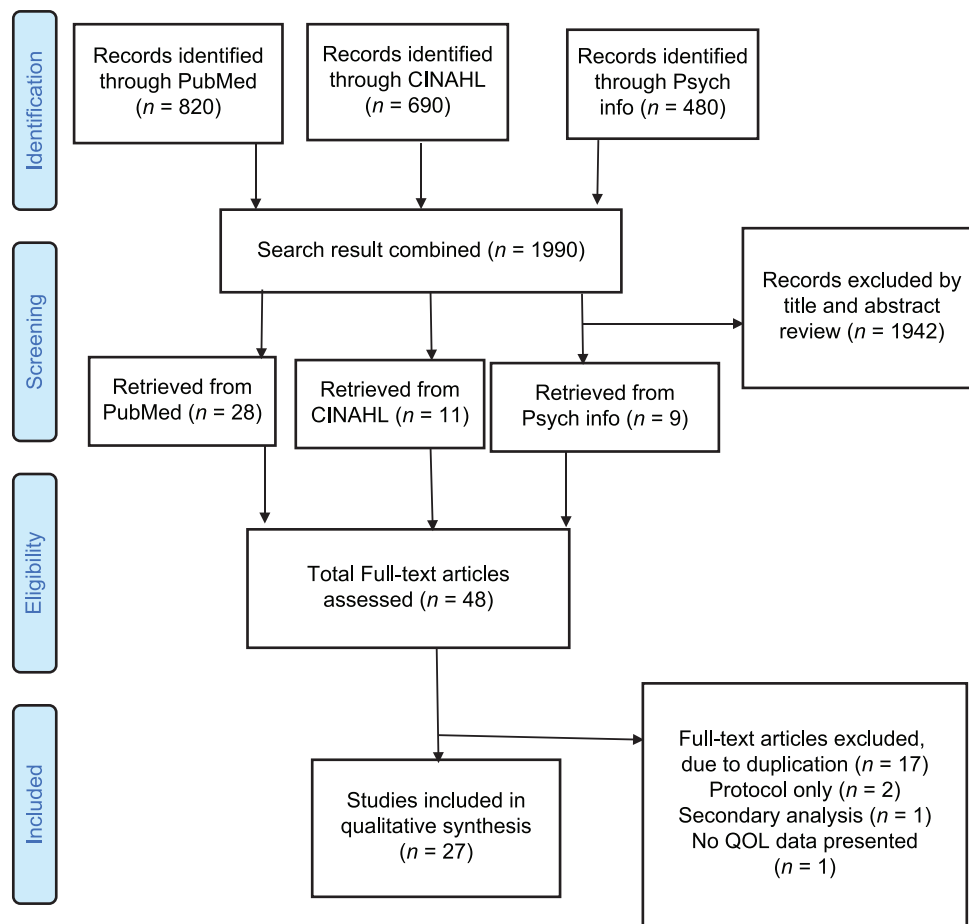


Figure 1: PRISMA 2009-2020 flow diagram. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analysis

Table 1: Characteristics of the included studies

PI and year	Eligibility, sample size	Tool used measuring quality of life	Outcomes measuring time	Duration	Delivered by
Hermosilla-Ávila and Sanhueza-Alvarado, 2019 ^[31]	Advanced or terminal cancer Registered users, over 18 years of age, in the palliative care service, together with their principal caregivers 17 patient-caregiver dyads	EORTC QLQ-30 WHOQOL-Brief for caregivers	T1 - Preintervention, T2-3 months' postintervention	3 months	Nurse
Atreya et al., 2018 ^[32]	Patient eligibility: Diagnosis of metastatic colon, rectum, or small bowel adenocarcinoma (intestinal cancer); a life expectancy of ≥6 months; and ECOG performance status ≥2. Focus group eligibility criteria: Patients were included if they were expected to receive chemotherapy for at least 12 weeks from the time of recruitment; caregivers were only eligible if paired with a participating patient Focused group discussion: 12 participants, Intervention: 33 patients and 20 caregivers	NIH PROMIS	Baseline, week 8 survey, and 3-month follow-up	8 weeks	Audio (MP3 player)
Kayser et al., 2010 ^[33]	Eligibility: Had received diagnosis of primary, nonmetastatic breast cancer within the last 3 months, was receiving treatment as chemo, radiation, or combination, was married or in relationship 63 couple enrolled, 47 couple completed all 3 data collection	FACT-B	3 times during the 1 st year after diagnosis	9 biweekly session	Clinical social worker with MSW degree
Wyatt et al., 2017 ^[34]	Patient inclusion: age ≥21; Stage III or IV breast cancer; able to perform basic activities of daily living; undergoing chemotherapy, targeted or hormonal therapy; able to speak and understand English; having access to a telephone; able to hear normal conversation; and cognitively oriented to time, place, and person. Caregiver inclusion: age ≥18; able and willing to provide at least one 30-min protocol session per week for 4 consecutive weeks; able to speak and understand English; access to a telephone; able to hear normal conversation; and cognitively oriented to time, place, and person (determined via recruiter) n=256 dyads	QLI	Baseline, week 5 (postintervention), and week 11	4 weeks	Caregiver-delivered reflexology
Badger et al., 2010 ^[35]	Diagnosis of prostate cancer, currently undergoing or had completed treatment within the past 6 months, ability to speak English, no physical or psychological disabilities, and availability of a social network member who was willing to participate in the investigation n=36 dyads in TIP-C, n=35 dyads in HEAC intervention	CES-D PANAS PSS Physical well-being by two scales: Fatigue and the urinary, bowel, and sexual functioning subscales from the UCLA prostate cancer index and spiritual well-being subscale of the quality of life-breast cancer version questionnaire	Baseline (T1), (T2) at (T1+8 weeks), and (T3) at (T2+8 weeks)	8 weeks for patients, the partners received a session every other week (4 sessions)	TIPC - Nurse or social worker The HEAC - research assistants
Manne et al., 2011 ^[36]	Diagnosed with localized prostate cancer in the last year; ECOG performance status of 0 or 1 and married or living with a significant other of either gender. In addition, survivors and partners had to be 18 years or older, live within a two hour commuting distance of the center from which they were recruited, be English speaking, and not have a hearing impairment n=71 survivors and their partners UC=34, IET=37	Mental health inventory	Baseline and 2 months postbaseline	5 session	t5 therapists training in T manual-based IET

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Table 1: Contd....

PI and year	Eligibility, sample size	Tool used measuring quality of life	Outcomes measuring time	Duration	Delivered by
Northouse <i>et al.</i> , 2012	Patient is eligible if: diagnosed with advanced breast, colorectal, lung, or prostate cancer (i.e., Stage III or IV), within a 6-month window of having a new advanced cancer diagnosis, progression of their advanced cancer, or change of treatment for it, a life expectancy of ≥ 6 months, aged 21 or older; living within 75 miles of participating cancer centers, and having a family caregiver willing to participate Caregivers were eligible if: were aged 18 or older and identified by patients as their primary caregiver (i.e., provider of emotional and/or physical care) Control group $n = 109$, extensive FOCUS $n = 99$, Brief FOCUS $n = 99$ dyads	General functional assessment of cancer therapy, functional assessment of cancer therapy for caregiver	Baseline (time 1), following the intervention at 3 months after baseline (time 2) and at 6 months after baseline (time 3)	Both the program were 10 weeks in duration	Masters-prepared nurses
Badger <i>et al.</i> , 2012	Survivor eligibility: Stage I-III breast cancer, receiving adjuvant treatment, spoke Spanish or English, no physical or psychological disabilities that would prevent participation, access to telephone, and had a SP who was willing to participate SP eligibility: > 21 years of age, spoke Spanish or English, access to telephone, and no physical or psychological disabilities that would prevent participation TIP-C group $n = 34$ dyads, THE group $n = 36$ dyads, completed the intervention	Psychological distress (depression, negative affect, stress, and anxiety); physical well-being (fatigue and symptom distress), social and spiritual well-being Center for Epidemiological Studies-Depression Scale (CES-D), PANAS, Perceived Stress Scale, State Trait Anxiety Inventory, Physical well-being: Fatigue Inventory, General Symptom Distress Scale, Social and spiritual well-being subscale of the Quality of Life Breast Cancer instrument	Baseline, immediately after the 8-week interventions, and at an 8-week follow-up	Latinas received eight weekly sessions, and their SPs received four sessions every other week	TIP-C = bilingual, bicultural master's prepared social worker THE intervention delivered by two bilingual bicultural paraprofessionals
Badger <i>et al.</i> , 2013	Eligible if had a diagnosis of breast cancer, were within 1 year of diagnosis, were currently receiving treatment, were at least 21 years of age, were able to talk on the telephone, and had a partner who was willing to participate in the study. Survivors designated a supportive partner to participate in the study and were not restricted to selecting spouses $n = 52$ dyads, THE = 18, TIP-C = 20, VIP-C = 14 Completed the program, THE = 9, TIP-C = 18, VIP-C = 13	CES-D, GSDS Survivors and partners completed the 9-item social well-being scale at T1 and T3 7-item spiritual well-being scale at T1 and T3 to measure feelings of uncertainty, purpose for living, hopefulness, and increased life meaning	Baseline (T1) following recruitment, (T2) at the end of intervention, (T3) 8 weeks after the T2	8 weekly session for participant and 4 sessions every other week to partners All sessions of 30 min, in either English or Spanish	THE = information Specialist One social worker provided the counseling
Milbury <i>et al.</i> , 2014	Patients diagnosed with nonsmall-cell lung cancer stage I through IIIB; going to receive minimum 5 weeks of radiotherapy; having consenting family caregiver Patient and caregiver had to be at least 18 years old; communicate in English; able to provide informed consent $n = 10$ dyads	Centers for epidemiological studies-depression measure Anxiety by dimension of the brief symptom inventory-18 Health-related QOL - by medical outcomes study 36-item SF survey using the PCS and MCS Spiritual well-being by functional assessment of cancer therapy spiritual well-being scale (V4)	Baseline (T1) and during the last week of patients' radiotherapy (T2)	Two to three weekly sessions: 45-60 min each over 5-6 weeks	Yoga instructor

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Table 1: Contd...

PI and year	Eligibility, sample size	Tool used measuring quality of life	Outcomes measuring time	Duration	Delivered by
Northouse <i>et al.</i> , 2014	Patient were eligible if 18 years or older; diagnosed with lung, colorectal, breast, or prostate cancer; and with either early (Stage I or II) or advanced (Stage III or IV) cancer; had to be diagnosed within 2-12 months before enrollment, having 1 family caregiver willing to participate in the study and access to the internet The caregiver had to be aged 18 years or older and willing to complete the web-based program with the patient <i>n</i> =38 dyads	FACT-G version 4, and caregivers reported their own QOL, by using a slightly modified version of the FACT-G	Web-based baseline questionnaires T1 in week 1; T2 on 8 th week	Three sessions that were offered over a 6-week period	Web
van den Hurk <i>et al.</i> , 2015	Included patients who were (1) diagnosed with cytological or histological proven nonsmall-cell or small-cell lung cancer and (2) had completed or were still receiving treatment Patients and partners were excluded when they (1) were <18 years of age, (2) were not able to understand or use the Dutch language, (3) had already participated in a mindfulness-based intervention, (4) had current and regular treatment by a psychologist or psychiatrist, or (5) had participated in another psychosocial program A total of 19 lung cancer patients and 16 partners participated 16 patients and 13 partners completed the program	EORTC Core Quality of Life Questionnaire for Lung Cancer (QLQ-LC13)	Baseline, after MBSR training, and 3 months later	8 sessions of 2.5 h	Health professionals and qualified mindfulness trainers who maintained a personal meditation practice
Collinge <i>et al.</i> , 2012	Cancer: Any type any stage Eligibility criteria included age 18 years or above; ability to speak, and read and write in English, Spanish, or Chinese; the patient currently experiencing the effects of any type or stage of cancer or its treatments; both patient and caregiver willing to participate; and caregivers with no prior instruction in massage or touch therapy techniques 97 dyads; 50 dyads in reading group, 47 in massage group	FACT-G, version 4	Pre-session (baseline) and post-session over the 4 weeks	A 78-min instructional DVD was produced to deliver the instruction Suggested duration of session is 20 min At least 3 times a week for both	Caregiver delivered message/reading
Arden-Close <i>et al.</i> , 2013	Eligible participants had been diagnosed with ovarian cancer, were no more than 5 years posttreatment, able to read and write in English, and aged 18 years or above. Spouses lived with a partner with ovarian cancer 102 completed baseline measures and were randomized. GDP (53 dyads), control writing (49 dyads)	FACT-G	Couples were assessed at baseline, 3-month, and 6-month follow-ups	For 15 min, a day over 3 days within the same week (ideally consecutive)	Single researcher
Song <i>et al.</i> , 2015	Patients had to (a) be diagnosed with localized prostate cancer, (b) have completed initial primary treatment, (c) have a partner willing to participate in the study, and (d) have access to a computer and the internet. The patient's partner had to (a) be aged 21 years or older, (b) be identified as the partner by the patient, and (c) not have been diagnosed with any cancer or been the recipient of any cancer treatment within the past 12 months. Both needed to be able to read, speak, and write English 26 couples were recruited, 25 completed PERC, and 22 completed the postintervention survey. The final sample size for analysis was 22 couples	Functional Assessment of Chronic Illness Therapy-General (FACT-G) scale spousal version of FACT-G with modified wording	Patients and partners separately completed online surveys before and after the intervention ranging from 3 to 8 weeks. Postpilot qualitative interview	Each couple was given a maximum of 8 weeks to complete the modules; they were asked to complete one module each week or to complete the modules at their own pace	Internet web
Milbury <i>et al.</i> , 2015	Patient with NSCLC Stages I through IIIB; going to receive at least 5 weeks of radiotherapy with a consenting family caregiver (e.g., spouse, sibling, parent) Both patients and caregivers had to be at least 18 years old, proficient in English, and able to provide written informed consent <i>n</i> =9 dyads	Medical Outcomes Study SF-36 Functional Assessment of Cancer Therapy Spiritual Well-Being Scale (V4)	Dyads completed survey measures at baseline (T1) and during the last week of patients' radiotherapy (T2)	Total 15 sessions over 5-6 weeks of radiotherapy	Instructor and self/ dyadic practice

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Table 1: Contd...

PI and year	Eligibility, sample size	Tool used measuring quality of life	Outcomes measuring time	Duration	Delivered by
Manne <i>et al.</i> , 2016	Inclusion: (a) patient had a primary diagnosis of Ductal surgery in the last 12 months, could be in active treatment, (c) patient and spouse were 18 years of age or older; (d) patient and spouse were able to give informed consent, (e) patient and spouse were English-speaking, (f) patient currently married or living with a significant other of either sex, and (g) couple lives within 1 h commuting distance to the center from which they were recruited Participants were 302 women with early-stage breast cancer and their significant others (two female spouses)	Anxiety (9 items) and depression (4 items), and the well-being (10 items) subscales of the mental health inventory-38	Baseline, 1 week after the 8-week intervention, 6 months' postintervention, and 12 months' postintervention.	Eight 90-min weekly groups	Two therapist for each ECG and SG 35 interventionists as leaders - master's level social workers or psychologists or doctoral level psychologists Group therapy and couples' therapy experience
Pisu <i>et al.</i> , 2017	Cancer: Any cancer Eligibility, at least 19 years old, able to read and understand English, 3 months or more past their cancer treatment, married or in a romantic relationship for 12 months or more, not pregnant or planning to be pregnant, and not planning on moving more than 50 miles away during the project period. Self-reported exercising <5 days/week for at least 30 min in previous the 6 months, physically able to participate, the FFABQ and the fall efficacy scale were implemented. Patients excluded if they reported fear of falling or low confidence for doing normal life activities without falling Once deemed eligible, medical clearance was obtained from physicians 31 couple randomized; 15 in intervention and 16 in control	SF-36	At baseline and 12 weeks' postbaseline	10 private 45-min weekly dance lessons and 2 group lessons (practice parties) over 12 weeks	Senior dance instructor at one Fred Astaire Studio
Kristanti <i>et al.</i> , 2017	Cancer: Any advanced cancer Inclusion criteria: stage 3 or 4 cancer; PPS score of <60; patients and family caregivers consented to participating in the study, and family caregivers were functionally literate <i>n</i> =30 dyads	EORTC QOQL C30	Baseline, at the end of 4 weeks after training posttest data were collected	4 weeks	Nurse educators
Milbury <i>et al.</i> , 2017	RT; Karnofsky performance status of ≤80; family caregiver willing to participate; dyad had to be at least 18 years old; able to read and speak English, and able to provide informed consent <i>n</i> =5 dyads	Short-form survey (SF-36)	Dyads completed survey within the 1 st week of patients' RT (T1) and during the last week of RT (T2)	12 session; dyads attended 2 or 3 weekly session (60 min each) over the course of patients' 5 to 6 weeks of RT	By a certified yoga instructor
Schellekens <i>et al.</i> , 2017	Inclusion consisted of patients and/or partners of patients presenting nonsmall cell or small cell lung cancer. Patients in the curative and palliative stage were included, with stage being based on the intent of the anticancer treatment. Patients and partners of age less than 18 years were excluded. "Partners" could be the life partner or another close relative/friend 31 patients and 21 partners were randomized to CAU+MBSR and 32 patients and 23 partners to CAU	EORTC QLQ-C30-GHS	At baseline (T0), postintervention (T1), and 3 months' post-T1 (T2)	8-week MBSR program, consisting of 2.5-h weekly sessions and one 6-h silent day, including daily 45-min home practice	Three formally trained MBSR teachers
Mosher <i>et al.</i> , 2017	Eligible: Had been diagnosed with Stage IV gastrointestinal cancer at least 8 weeks before enrollment and had a consenting primary family caregiver Eligible caregivers: Lived with the patient or had visited the patient at least twice a week for the past month, both patients and caregivers had to be adults (18 years of age), who were fluent in English, and one or both dyad members had to report moderate to severe distress, defined as a score of 3 or higher on the distress thermometer <i>n</i> =50 dyads; 25 dyads in each group	Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACTIT-Sp)	Baseline, follow-up at 1 and 5 weeks' postintervention	Participants in both groups completed five weekly 50-60 min telephone sessions	Ph.D. students in clinical psychology; trained and supervised by two psychologists

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PI and year	Eligibility, sample size	Tool used measuring quality of life	Outcomes measuring time	Duration	Delivered by
Titler, et al., 2017	Patient age 18 or older; diagnosis of any cancer type including advanced cancer, currently in the treatment or completed treatment in the past 18 months; physically and mentally able to participate; able to read and speak English; and have a family caregiver willing to participate in the program. Caregiver eligibility include age 18 or older, physically and mentally able to participate, able to speak and read English, identified by the patient as the primary caregiver, and willing to participate in the study Among 56 eligible, 40 completed baseline n=36 dyads and completed 2nd assessment n=36 dyads	Functional Assessment of Cancer Treatment-General (FACT-G) QOL Scale (version 4)	Baseline (time 1) and 5 weeks later (time 2), following program completion	Five weekly face-to-face sessions of 2 h each	Delivered by a master's prepared facilitator (licensed social worker, family therapist)
Chen et al., 2017	Eligibility: Patients with resected lung cancer, lung cancer was initial diagnoses and not combined with other cancer, age 18 years, the life expectancy > 6 months after surgery, currently married, and their partners have ability to take care of them n= 132 dyads	36-item short-form health survey (SF-36)	All patients received 3 coping training at admission (before surgery), 2 months after discharge, and 6 months after discharge Outcomes were assessed at 3 time points before 3 coping training sessions	All patients received 3 coping training sessions	Full-time nurse
Li et al., 2019	Cancer: Lung cancer For patient: Outpatients initiated icotinib hydrochloride as the first-line treatment. ECOG performance status 0 to 2, > 18 years of age; histologically confirmed Stage III-IV NSCLC (UICC/AJCC Staging Manual, 6th edition 27), and confirmed activating mutation in EGFR. For caregiver: at least 18 years of age, spouse or adult child of the patient, living with the patient, and no cognitive impairment n=67 dyads intervention; 71 dyads control	Functional Assessment of Cancer Therapy-Lung (FACT-L29; validated Chinese version 30) Caregiver QOL Index - Cancer Scale (CQOLC31; validated Chinese version 32)	Baseline (T0, week 0) and at the end of 8 week wellness education (T1, week 8)	Six sessions; 45 min each; multidisciplinary component over 8 weeks	Intervention group included 4 physicians and 3 nurses
McCaughan et al., 2018	The inclusion criteria were men aged 18 years and over, diagnosed with localized adenocarcinoma of the prostate, immediately postsurgical or postradiotherapy treatment (curative intent) with or without hormone treatment, physically and mentally able to participate and provide informed written consent, cohabiting with their spouse/partner who was residing in Northern Ireland 17 dyads participated; 13 dyads in intervention, 4 dyads in control	FACT-G For partners - slightly modified version of the FACT-G	Baseline (T1), postintervention (T2), and 1-month follow-up (T3) was conducted	Five intervention sessions over a 9-week period of time	Four facilitators and the co-facilitator with cancer counseling background
Milbury et al., 2019	Eligibility: Patients with Stage I-IIIB nonsmall cell lung or esophageal cancer undergoing at least 5 weeks of TRT having a consenting family caregiver (e.g., spouse, sibling, adult child). Both had to be at least 18 years old, proficient in English, and able to provide informed consent. Excluded if patient were disoriented; practiced yoga on a regular basis year before diagnosis; and had a physician-rated Eastern Cooperative Oncology Group (ECOG) performance status of >2. 26 dyads randomized (13 in each group), 10 dyads in DY program and 9 dyads in wait-list control completed all assessment	SF-36	Baseline/T1 and then again on the last day of TRT (T2), and 3 months later (T3)	15 sessions, 2-3 times per week for a total of 6 weeks; 60 min per session	Two certified yoga instructors

ECOG: Eastern Cooperative Oncology Group, QLI: Quality of life index, TIP-C: Telephone interpersonal counseling, HEAC: Health education attention condition, CES-D: Center for Epidemiological Studies-Depression Scale, PANAS: Positive and Negative Affect Schedule, PSS: Perceived Stress Scale, IET: Intimacy-enhancing therapy, FOCUS: Family involvement, optimistic attitude, coping effectiveness, uncertainty reduction, and symptom management, GSDS: General Symptom Distress Scale, SF-36: Short-form, PCS: Physical component summaries, MCS: Mental component summaries, FACT-G: Functional Assessment of Cancer Therapy- General, IMBSR: Mindfulness based stress reduction, GDP: Guided disclosure protocol, NSCLC: Nonsmall cell lung cancer, ECG: Enhanced couples focused group, FFABQ: Fear of falling avoidance behavior questionnaire, PPS: Palliative Performance Scale, EORTC QOOL C30: European Organization for Research and Treatment Cancer Quality of Life C30 version 3, HGG: High-grade glioma, RT: Radiotherapy, CAU: Care as usual, GHS: Global Health Status subscale, UCLA: University of California, Los Angeles, UC: Usual care, SP: Supportive partners, DVD: Digital Versatile Disc, FACT-B=Functional assessment of cancer therapy- breast cancer, PI: Principal investigator, WHOQOL- BREF: World Health Organization's Quality of Life instrument, NIH PROMIS: National Institutes of Health Patient Reported Outcomes Measurement Information System, QLO-C30-GHS: Quality of life questionnaire-Global Health Status subscale, TRT: Thoracic radiotherapy

more for providing consent. While five studies had eligibility age being 21 years or more and the age eligibility was not indicated in four studies.^[32,33,35,49]

Intervention characteristics

Characteristics of the interventions in studies included in the review are presented in Table 2.

Among all the included studies, intervention of studies included skill development,^[34,36,43,47,49] psychoeducation, i.e., Family involvement, Optimistic attitude, Coping effectiveness, Uncertainty reduction, and Symptom management (FOCUS) program;^[37,41,45,53,56] yoga based,^[40,46,50,57] mindfulness based,^[32,42,51] and coping.^[33,52,54] Studies^[35,38,39] tested between counseling and education. One study each had intervention education,^[55] dance,^[48] writing,^[44] and training along with education and counseling.^[31]

Interventions focused in skill development

In reflexology intervention,^[34] caregivers were trained by reflexologists in two home visits; 9 reflexes on foot with thumb walking pressure were provided. Reflexologist coached caregiver and adjusted as needed. Caregiver delivered session for 2 weeks. Intimacy enhancing therapy (IET)^[36] focused on improving couples' ability to share thoughts, share feelings regarding cancer, promote mutual understanding, and support, enhance, and maintain emotional intimacy. IET comprised of five couple sessions with skill practice and home practice. Another intervention was multimedia instructional program in touch-based techniques^[43] focusing on touch and massage methods. Instructional digital versatile disc (DVD) was developed featuring dyads of different ethnic group and relationship. Content included safety precautions related to touch, communication, manual techniques for comfort and relaxation, acupressure, anxiety, and nausea. DVD had a multilingual voice and captions and was given with manual. They practice at least three times/week for 20 min. Enhanced couple group^[47] included expression of feelings about the cancer experience, constructive communication skills, expressing support needs, creating a "Wish List" for positive acts for their spouse to do for them, being a good support to one's partner, stress management and sexual intimacy, and created an intimacy deck, problem-solving, and emotion-focused coping. Skills practice included focused-breathing relaxation induction, progressive muscle relaxation as a group, guided imagery, and cognitive restructuring practice. This also assisted couples for preparing "survivorship" phase. Basic skill training (BST) educational package^[49] included video and a module of five chapters on assisting a bedridden patient with bathing, providing oral hygiene, hair washing, assisting with

urination and bowel movements, and managing feeding orally and using a nasogastric tube. Three training sessions were given at the hospital and home where caregivers observed a demonstration by the nurse educators, watched the video, and then practiced the skills. After 2 weeks, nurse educator did home visits and assist them in developing skills.

Yoga-based interventions

All the yoga interventions were given to dyads over 5–6 weeks of radiotherapy. Vivekananda Yoga^[46,50,57] included: (1) Joint loosening with breath synchronization; (2) postures (asanas) and a deep relaxation technique; (3) breath energization (*pranayama*) with sound resonance; and (4) meditation. Another study^[40] had five main components: (1) deep breathing awareness with visualization; (2) breath retention exercises; (3) mindfulness and focused attention through guided meditation; (4) Tsa Lung movements; and (5) a brief compassion-based meditation. Sessions 1–4 focused on introducing practices while further sessions focused on refining practice.

Mindfulness-based intervention

Mindfulness meditation^[32] was delivered through audio (MP3), preloaded with eight mindfulness meditation tracks and a study booklet with practice diary. Mindfulness-based stress reduction program (MBSR)^[42,51] was delivered by mindfulness trainer. Program contained 8 sessions along with silent day and home assignments. Psychoeducation about grief and stress was added.

Psycho-social interventions

Psychoeducational-Family involvement, Optimistic attitude, Coping effectiveness, Uncertainty reduction, and Symptom management program

Studies^[37,53] included the original FOCUS program. In a previous study,^[37] to determine the optimal dose, original 5-session program was revised into brief (three contacts) and extensive versions (six contacts) and was delivered by a nurse over 10 weeks while intervention in previous study^[53] by licensed social worker, family therapist. Study^[41] was web-based format, including only family involvement module. Content included cancer effect on family, value of teamwork, family strength, family concerns, addressing problems, communication tips, types of support, and finding meaning in illness, looking to the future. Tailored e-mail with the summary of key content was sent in alternate weeks. Personalization, tailored feedback, and content matching were used as tailoring strategies. Prostate Cancer Education and Resources for Couples (PERC)^[45] integrated the family involvement and symptom management modules from the FOCUS program

Table 2: Characteristics of the intervention

PI and year	Medium	Intervention	Results which are relevant for the review
Hermosilla-Ávila and Sanhueza-Alvarado, 2019	Nursing counseling (face-to-face) at home, online counseling with educational platform and telephone contact	Humanized nursing accompaniment	Highly significant improvement in the global health subscale ($P<0.001$, $d=0.841$), while social function ($P=0.008$, $d=0.473$), emotional role ($P=0.084$, $d=1.001$), physical function ($P=0.003$, $d=0.429$), daily activities ($P=0.006$, $d=0.489$), cognitive function ($d=0.553$) score declined in posttest, improvement existed in relation with the symptom of constipation ($P=0.023$, $d=0.856$), fatigue ($P=0.012$, $d=0.473$), dyspnea (0.020 , $d=0.388$), and anorexia ($P=0.033$, $d=0.672$)
Atreya et al., 2018	Audio based mindfulness meditation program	Audio-based mindfulness meditation intervention	Compared to baseline, postintervention surveys demonstrated significantly reduced distress ($P=0.01$) and anxiety ($P=0.03$), as well as increased nonreactivity ($P<0.01$) and feeling at peace ($P<0.01$)
Kayser et al., 2010	Face to face	SSWS and P1CP	In the interviews, participants described reduced stress/anxiety and increased relaxation/calm. Benefits appeared to be accentuated in patient-caregiver pairs as compared to unpaired patients. 79% planned to continue practice
Wyatt et al., 2017	At home, direct touch	Caregiver-delivered reflexivity or attention control	No statistical significant difference between two arms on subscale and total scale of QOL
Badger et al., 2010	Telephone	TIP-C HEAC	Significant reductions in summed symptom severity in the reflexology group compared to attention control (mean difference -4.34 , SE, 1.85 , $P=0.02$) and interference (mean difference -3.69 , SE= 1.39 , $P<0.01$), reductions in symptom severity began at week 2 ($P<0.01$) and continued at weeks 3-5 with small differences at week 11 follow-up
Manne et al., 2011	In session, skill practice and home practice assignment Mode of delivery not mentioned	IET	Men in the HEAC condition had significant improvement in all four QOL dimensions: psychological well-being (decreased depression [$b=-3.6012$], negative affect [$b=-2.8142$], perceived stress [$b=-3.1142$]), physical well-being (decreased fatigue [$b=-5.2955$]), social well-being (increased social support from family members [$b=1.5593$], and spiritual well-being [$b=2.6108$])
Northouse et al., 2012	Delivered in home	The brief FOCUS program The extensive FOCUS program Control group	Improvements in depression, negative affect, perceived stress, fatigue, and spiritual well-being were significantly higher for survivors in HEAC than for those in the TIP-C condition
Badger et al., 2012	Telephone	TIP-C THE	In the HEAC condition, partners improved in multiple dimensions of QOL; psychological well-being (depression [$b=-3.8946$]), social well-being (social support from family [$b=1.6075$], social well-being [$b=4.4571$]), and spiritual well-being ($b=4.0452$) IET effects were largely moderated by preintervention psychosocial and relationship factors. Similar moderating effects for preintervention levels were reported for the effects of IET on self-disclosure, perceived partner disclosure, and perceived partner responsiveness
Badger et al., 2013	Telephone and videophone	THE TC VC	For patients, there was a significant increase in emotional QOL for control, extensive, and brief patients at the 3-month follow-up (all $P<0.05$); extensive and brief dyads maintained their social QOL at 3-month and 6-month follow-ups Significant increase in extensive and brief caregivers' emotional QOL at 3 months (all $P<0.01$), sustained to 6-month follow-ups (all $P<0.05$) The average length of the brief ($M=223$ min, and extensive programs ($M=348$ min) was significantly different ($P<0.001$) Latina survivors improved significantly on all measures of QOL over time, except for spiritual well-being. On all measures, SPs exhibited statistically significant improvements in QOL over time Cancer knowledge improvements were more predominant among THE participants, and social support improvements were more predominant among TIP-C participants. No evidence suggesting that either intervention was superior at producing these outcomes Preliminary cost analysis found that the counseling intervention cost about \$164.68 for one dyad compared with \$107.03 for health education Survivors' and partner symptoms of depression at the three times of measurement had a significant effect for time ($P=0.001$); decrease over time for all groups, but no significant group \times time interaction For survivors, distress decreased over time for all participants For partners, physical symptom total also decreased over time ($P=0.01$), this main effect for time was qualified by a significant group \times time interaction ($P=0.01$). The physical symptom totals decreased over time for partners in the THE and VC groups but not for those in the TC group For survivors and care giver, social well-being had increased. There was also a significant group \times time interaction ($P=0.01$). The social well-being increased from T1 to T3 for both in the TC and VC groups, but not in the THE group, largest increase was in TC participants survivors' spiritual well-being increased significantly ($P=0.01$), with no significant group \times time interaction. Participant preferences for the different delivery methods revealed a preference by survivors for the telephone (69%), partners for telephone (73%)

Contd...

Table 2: Contd...		Results which are relevant for the review	
PI and year	Medium	Intervention	Results which are relevant for the review
Milbury et al., 2014	Face to face by instructor and using CD	Couple based Tibeian yoga program	For patients, paired t-tests revealed a significant increase in spiritual well-being ($t=3.0, P=0.03, d=1.12$). For caregivers, there were significant decreases in fatigue ($t=2.7, P=0.03; d=0.89$) and anxiety ($t=2.4, P=0.04; d=0.81$) 92.2% rated the program as useful or very useful
Northouse et al., 2014	Web-based format	Web-based FOCUS format; only family involvement module included	Dyads had significant decreases in their overall (total) emotional distress ($P<0.05$), anger-hostility ($P<0.01$), and fatigue-inertia ($P<0.05$) from pre to postintervention and significant improvements in their overall (total) QOL ($P<0.05$), physical QOL ($P<0.01$), functional QOL ($P<0.01$), and perceived benefits of illness/caregiving ($P<0.01$) from pre to postintervention. Caregivers had greater improvement in their self-efficacy than did patients ($P<0.05$). Effect sizes for patients for benefits of illness ($d=0.77$) and other (ranges $d=0.32-0.43$)
van den Hurk et al., 2015	Face-to-face, CD to guide home practice	The MBSR	No significant differences The extent to which caregiving was experienced as burdensome by the partners decreased significantly after the MBSR training, both posttreatment ($P<0.05$) and at follow-up ($P<0.01$). Qualitative, facilitators and barriers theme; physical functioning, participating in groups, participating with partners Themes of process of change: Standing still, being aware, insight, letting go, changing behavior, acceptance
Collinge et al., 2012	Home-based practice using DVD	Multimedia instruction in touch and massage and attention control; reading group	Patients in the massage condition had significant greater decrease in pain (34 vs. 18%, $P=0.04$), nausea (29 vs. 12%, $P=0.02$), and other self-reported symptoms (42 vs. 17%, $P=0.02$) than control Massage caregivers showed significant gains in confidence, comfort, and self-efficacy using touch and massage as forms of caregiving
Arden-Close et al., 2013	By mail and telephone and the writing completed at home	Written emotional disclosure: The GDP Neutral writing	Change in illness-related communication moderated the effect of group on QoL in patients. The interaction explained 2.3% of the variance in QoL at 3-month follow-up. Change in intrusive thoughts moderated the effect of group on perceived stress in patients. This interaction explained 3% of the variance in perceived stress at 3-month follow-up
Song et al., 2015	Web based	PERC	Improvement in physical and social quality of life for patients ($d=0.32$) and small increase ($d=0.25$) in social QoL for partners. Pre- to postintervention improvement in urinary irritability and bowel dysfunction scores for patients ($d=0.18$ and $d=0.17$, respectively). Improvement in partners' perception of patients' symptoms as problems was particularly promising (0.18-0.51). Small effect sizes for improvement of general symptoms for patients and partners ($d=0.21$ and $d=0.38$, respectively)
Milbury et al., 2015	Face-to-face and printed material	Vivekananda Yoga (VKC) program	For patients, significant decrease in anxiety ($t=2.41, P=0.04; d=0.81$), increase in mental health aspects of QOL ($t=2.51, P=0.04, d=0.84$). Improvements in benefit finding ($d=0.64$), sleep disturbances and spiritual well-being ($d=0.36$ and 0.31 , respectively). For caregivers, significant reduction in sleep disturbances ($t=3.04, P=0.02; d=1.01$), improved physical aspects of QOL ($d=0.50$), depressive symptoms and spiritual well-being. Greater attendance was significantly related to greater reductions in fatigue ($r=0.71, P=0.03$) and depressive symptoms ($r=0.80, P=0.02$) in caregiver. Dyads completed a mean of 10 VKC sessions with 78% attending more than 50% of all sessions. (89% rated "very useful")
Manne et al., 2016	Face-to-face group session	ECG and SG	Anxiety, depressive symptoms, and cancer-specific distress declined and positive well-being improved for couples enrolled in both ECG and SG. neither treatment was superior When the patient's perceived partner unsupportive behavior was high, couples in SG were less anxious on average than couples in ECG. However, when the patient's perceived partner unsupportive behavior by the spouse was low, there was average anxiety in ECG and was lower than in SG
Pisu et al., 2017	Face to face	RHYTHM project a wait-list control	Survivors in RHYTHM had significant improvements at 12 weeks in physical activity ($P=0.01$), functional capacity ($P=0.03$), in the mental component of quality of life ($P=0.01$), vitality ($P=0.004$), social functioning ($P=0.04$), and mental health ($P=0.04$). In the control group, survivors had significant changes at 12 weeks in bodily pain ($P=0.03$). Partners in the intervention group had improvement in dyadic agreement and happiness ($P=0.04$), physical activity ($P=0.05, d=0.78$), mental component of quality of life ($P=0.04, d=1.05$), on vitality ($P=0.03, d=0.81$), dyadic trust scale ($P=0.04, d=0.58$). 80% completed the 10 dance lessons one practice party
Kristanti et al., 2017	Face to face training, CD	Basic skill training intervention	Patient's global health status/QoL was significantly improved after intervention from $M=40.27; SD=17.79$ to $M=56.94; SD=18.05$ with $P=0.001, d=0.92$ Functional scales; EF and SF improved after intervention, from $M(SD)=63.33(30.21)$ to $M(SD)=79.44(26.77)$ $P=0.003$ and from $M(SD)=20.56(25.40)$ to $M(SD)=35.56(33.82)$ $P=0.012$, respectively. Reductions in fatigue ($P=0.022$), pain ($P=0.028$), dyspnea ($P=0.02$), insomnia ($P=0.013$), appetite loss ($P=0.030$), constipation ($P=0.004$), and financial issue ($P=0.009$). There was a significant difference related to the patient's sex on global health status/QoL ($P=0.038$), dyspnea ($P=0.046$), and constipation ($P=0.030$). The patient's age significantly affected the scales of global health status/QoL ($P=0.002$) and financial issue ($P=0.039$)

Table 2: Contd...

PI and year	Medium	Intervention	Results which are relevant for the review
Milbury et al., 2017	Face-to-face with instructor, practice at home	DYP: Vivekananda yoga	Insignificant, yet clinically meaningful, decrease in patient's cancer symptoms, patient sleep disturbances. 67% rated intervention "very useful"
Schellekens et al., 2017	Face-to-face group session; with on average 9 participants per group	MBSR + CAU and CAU	Patients in CAU + MBSR showed significantly less psychological distress at postintervention and follow-up than those in CAU ($P=0.008$, $d=0.69$), less anxiety (mean difference of 2.78, $P=0.007$, $d=0.62$), and less depressive symptoms (Mean difference of 2.55, $P=0.027$, $d=0.69$) than CAU patients Significant improvement in quality of life ($P=0.047$, $d=0.60$), mindfulness skills ($P=0.001$, $d=0.84$), self-compassion ($P=0.009$, $d=0.80$), and rumination ($P=0.018$, $d=0.67$) Moderation: Baseline distress predicted the difference in psychological distress between CAU + MBSR and CAU ($P=0.023$). With each additional unit of baseline distress, the difference between CAU + MBSR and CAU increased with 0.52 (95% CI=0.08; 0.96)
Mosher et al., 2017	Telephone based	Peer helping + coping skills group coping skills group	Significant time × group effect on meaning in life/peace ($d=0.53$, $P=0.01$), means for the coping skills group had a small increase at 1-week postintervention, was maintained at the 5-week follow-up, had significant main effects of role and time on fatigue; patients had higher levels of fatigue than caregivers and both patients and caregivers experienced small decreases in fatigue over time Main effect of role on anxiety symptoms; caregivers had higher levels of anxiety than patients, there was a time × role effect on general distress, and caregivers had small decreases in distress at both follow-ups relative to baseline. There was a main effect of role on emotional support; patients reported higher levels of emotional support than caregivers Significant positive effect of intervention on dyads total QOL ($P=0.014$), emotional ($P=0.012$), functional ($P=0.049$) well-being, and emotional distress ($P=0.002$), benefits of illness ($P=0.013$), and self-efficacy ($P=0.001$) Enrollment rate was 71.4% and the retention rate was 90%. Intervention fidelity was 85%
Titler, et al., 2017	Group format of three to four dyads	FOCUS	Significant main effect of training time ($P<0.05$) and group ($P<0.05$) on VT, SF, RE, and MH of SF-36 The CBCI group had higher VT, SF, RE, and MH compared with the ICI group at 2 months after operation and at 6 months after operation
Chen et al., 2017	One-to-one and group-based training	ICI CBCI	WE improved emotional well-being (from 18.9 to 12.8, $P=0.037$) and trial outcome index (from 56.2 to 44.6, $P=0.021$) scores of FACT-L and improved anxiety (from 10.4 to 6.1, $P=0.022$) and depression (from 10.5 to 5.8, $P=0.039$). WE group had better scores at 8 weeks for emotional well-being (12.8 vs. 15.6, $P=0.014$) and anxiety (6.1 vs. 6.7, $P=0.030$) The men in the intervention group had higher mean scores than the men in the control group on only two outcomes (communication and social support) Quality of life increased and uncertainty decreased for both groups Due to the small number of participants and the unequal allocation to groups (only 4 dyads in the control group), only the mean scores were presented, it did not allow for statistical significance to be established; statistical results cannot be meaningfully assessed
Li et al., 2019	At hospital	Wellness education and control group	Only significant clinical improvements for patients in the DY group compared to the WLC group for the 6 MWT (means: DY=473 vs. WLC=397 m, $d=1.19$) and SF-36 physical function (means: DY=38.77 vs. WLC=30.88; $d=0.66$) and social function (means: DY=45.24 vs. WLC=39.09; $d=0.44$) across the follow-up period. Caregivers in the DY group reported marginally clinically significant improvements in SF-36 vitality (means: DY=53.05 vs. WLC=48.84; $d=0.39$) and role performance (means: DY=52.78 vs. WLC=48.59; $d=0.51$) relative to those in the WLC group.
McCaughan et al., 2018	Small-group sessions and telephone sessions	CONNECT (couple care, optimistic outlook, navigating the journey, new normality, empowering self, change lifestyle, target setting)	Telephone health, WLC: Wait list control, 6MWT: 6-min walk test, TIP-C: Telephone interpersonal counseling, IET: Intimacy-Enhancing Therapy, SSWs: Social work services, P/CP: Partners in coping program, SE: Standard error, HEAC: Health education attention condition, THE: Telephone health education, TC: Telephone interpersonal counseling, VC: Videophone interpersonal counseling, MBSR: Mind-fulness based stress reduction, GDP: Guided disclosure protocol, PERC: Prostate cancer education and resources for couples, ECG: Enhanced Couples focused Group, SG: Couple support group, RHYTHM: The restoring health in you (and your partner) through movement, DYP: Dyadic yoga program, CAU: Care as usual, CI: Confidence interval, ICI: Individual coping intervention, CBCI: Couple based coping intervention, FOCUS: Family involvement, optimistic attitude, coping effectiveness, uncertainty reduction, and symptom management, M (SD): Mean (standard deviation)
Milbury et al., 2019	All sessions delivered to dyads either in a designated space for behavioral interventions or a family consult room	Dyadic yoga program The WLC group	Significant improvements for patients in the DY group compared to the WLC group for the 6 MWT (means: DY=473 vs. WLC=397 m, $d=1.19$) and SF-36 physical function (means: DY=38.77 vs. WLC=30.88; $d=0.66$) and social function (means: DY=45.24 vs. WLC=39.09; $d=0.44$) across the follow-up period. Caregivers in the DY group reported marginally clinically significant improvements in SF-36 vitality (means: DY=53.05 vs. WLC=48.84; $d=0.39$) and role performance (means: DY=52.78 vs. WLC=48.59; $d=0.51$) relative to those in the WLC group.

and guidelines for symptom management. PERC website included seven education modules: 2 mandatory (teamwork and survivorship issues) and 5 optional (symptom management). Couple care, optimistic outlook, navigating the journey, new normality, empowering self, change lifestyle, target setting (CONNECT)^[56] was based on FOCUS, including discussions on symptom management, sexual and urinary dysfunction, uncertainty management, positive thinking, and healthy lifestyles delivered as 3 group and 2 individualized telephone sessions.

Health education compared with counseling

Patients received eight weekly sessions and partners received four sessions every other week. Telephone interpersonal counseling (TIP-C) was compared with health education attention condition (HEAC) in a study.^[35] Telephone health education (THE) was compared to TIP-C^[38] while with telephone counseling (T-C) or videophone interpersonal counseling (V-C) in a study.^[39]

Wellness education^[55] included education in physical therapy, coping and communication strategies, mental health (MH), spirituality, social needs, knowledge about lung cancer, TKI treatment, nutrition, physical activity, symptom, and pain management. It was delivered in hospital.

Coping-based interventions

Partners in Coping Program (PICP)^[33] included assessment of couple's relationship, social support network, integrating tasks of illness into a couples daily routine, caring for children when mother has cancer, personal coping and preserving physical and psychological health, learning new coping skills, enhancing the couple's communication, promoting supportive exchanges, enhancing intimacy and sexual functioning, and living with cancer. PICP was compared with standard social work services. Study^[52] compared peer helping + coping skills group (Dyads helped to create an informational resource for other dyads coping with cancer. Therapist introduced topics, e.g., physical symptoms, stress, social changes, and asked experiences and advice. Dyad indicated helpful skills to others, followed by in-session practice of one or more coping skills) with coping skills group (dyads discussed the same topics but did not help create an informational resource). Another study^[54] compared individual coping intervention (ICI) with couple-based coping intervention (CBCI). Both group patients received cognitive, behavioral, and psychological intervention. In the CBCI group, partners attended training sessions, accompanied patients over 3 h a day, and helped patients to adopt an active coping style.

Humanized nursing accompaniment^[31] included home visits for training family caregiver on seeking palliative care from the nursing setting, teaching care as per need. Nursing

counselingat home (through 3 home visits per month per family), on-line counseling with educational platform supported by audiovisual content, and telephone service to solve unforeseen inquiries were also used.

The Restoring Health in You (and Your Partner) through Movement (RHYTHM) project^[48] is a ballroom dance intervention including 10 private and 2 group lessons. Couples learned Foxtrot, Waltz, Cha-Cha, and East Coast Swing.

The Guided Disclosure Protocol for written emotional disclosure^[44] had 3-day writing protocol including describing the diagnosis and treatment chronologically, describing feelings and impact of diagnosis on life, current feelings, and coping similar situations. It was compared to neutral writing where couple wrote about what the patient did the previous day.

Theoretical Framework behind Intervention

Humanized nursing accompaniment^[31] was based on care factors by Jean Watson, PICP^[33] on cognitive-behavioral framework. IET^[36] was based on cognitive-behavioral and behavioral marital therapy; FOCUS was guided by stress-coping theory. Interventions TIP-C and THE^[35,38,39] were based on stress process model whereas TIP-C^[35,38,39] developed from the standard interpersonal psychotherapy combined with cancer education. All the dyadic yoga interventions^[40,46,50,57] were based on the principles of interconnectedness, interdependence: reciprocal support, teamwork, and equity. The MBSR intervention^[42,51] was based on the original MBSR program as developed by Kabat-Zinn. The written emotional disclosure^[44] used the cognitive processing hypothesis and the social interaction hypothesis. The RHYTHM project^[48] was based on cognitive interaction and intimacy model. Peer helping + coping skills^[52] were based on the helper therapy principle.

Retention

Majority, 13 studies^[32-34,36,38,40,44,47,49,51-54] had retention between 70% and 80%, while 7 studies^[41-43,45,48,55,57] was between 80% and 90%. Retention rate above 90% was in three studies;^[56,43,50] in reading intervention condition^[43] and Yoga,^[50] there was 100% retention while retention was not given in two studies.^[31,35]

Significant findings for patients/survivors

Majority, 18 studies^[31,32,35,37-41,45-49,51-55] had significant improvements in some aspects of QOL of cancer patients. Overall QOL/global health was improved in five studies.^[31,41,49,51,53] HEAC group of study^[35] had improvement in all the aspects of QOL, while study^[38] had an improvement in all aspects of QOL except spiritual well-being. Spiritual well-being was found to be improved in five studies^[32,39,40,46,52] (counseling groups). Emotional

QOL was found to be increased in four studies.^[49,53-55] Social QOL was increased in three studies^[39,48,49] (counseling group). Further, three studies had improvements in physical QOL,^[41,45,48] functional QOL,^[41,48,53] MH of QOL.^[46,48,54] In a study,^[54] although all the aspects of QOL decreased from preoperative to 2 months' postoperative and 6 months' postoperative, there was a significant difference; CBCI group had higher mean score in vitality (VT), social functioning (SF), emotional problems (RE), and MH than ICI at both follow-ups. Overall well-being improved in a study.^[47] Significant improvement in symptom was present in six studies^[31,34,39,43,45,49] while five studies each had significant reduction in distress^[32,41,47,51,53] and anxiety.^[32,46,47,51,55] Similarly, four studies^[35,39,47,51] had significant decrease in depression.

Significant findings for caregivers

Ten studies^[31,32,35,37-39,45-47,53] reported significant increase in overall QOL or some aspects of QOL among caregivers. Anxiety, depression, and/or negative feelings were found to be decreased in seven studies.^[31,32,35,39,40,46,47] Distress was found to be reduced in 5 studies,^[32,41,47,52,53] fatigue in 3,^[40,41,46] burden in 3,^[42,52,55] and increase in self-efficacy in 3.^[41,43,53] Decreased physical symptoms were in two studies^[39,45] while one study each had decreased in sleep disturbance,^[46] anger hostility,^[41] intrusive thoughts,^[44] increase in confidence and comfort,^[43] partner's perception of patient's cancer symptoms,^[45] agreement and happiness,^[48] and benefit finding.^[53]

Program evaluation

Fidelity was reported in four studies (87.4%,^[36] 88%–98%,^[47] 99%,^[52] and 85%^[53]). Studies^[32,42,45,46,48,50,52,55,57] mentioned the interventions to be feasible. Interventions were rated as beneficial/useful/satisfied in six studies.^[32,38,39,41,53,57]

Discussion

The main aim of this review was to explore existing dyadic/family interventions for cancer dyads and to identify the effectiveness of intervention on patient QOL outcome. This review provides future direction for family-based intervention. The review provides crucial suggestions for developing interventions. There are different dyadic interventions focusing on QOL of cancer patients. Eighteen studies had significant improvements in some aspects of QOL of cancer patients. However, social well-being was not improved in majority of studies. Among skill-based interventions, reduction in symptom severity was observed as in reflexology group. Significantly greater decrease in pain, nausea, and other self-reported symptoms was seen for patients in the massage condition (multimedia instructional program in touch-based techniques). On a BST, educational

package, patient's global health status/QoL, functional scales, EF and SF, improved significantly. Further, reduction in fatigue, pain, dyspnea, insomnia, appetite loss, constipation, and financial issue were also noted.

Although yoga intervention was feasible, the sample size included in the studies were smaller and studies had clinical significance in many outcomes while one study^[46] had statistically significant decrease in fatigue and anxiety among patients and^[40] had significant increase in spiritual well-being.

FOCUS program had significant effect on emotional QOL, total QOL, physical QOL, symptoms; as well, in one study, improvement in social QOL was observed among patient as well as caregiver. While mindfulness-based interventions were successful in reducing distress, anxiety, and depression. Coping skill interventions were successful in decreasing both patient's and caregiver's fatigue and caregiver's distress.

HEAC for prostate cancer had significant improvement in patient's psychological, social, physical, and spiritual well-being as well as partner's depression, fatigue, social well-being, and spiritual well-being in comparison to dyads in TIP-C condition. While the health education (THE) compared to TIP-C delivered by telephone or video call among breast cancer dyads, both the intervention yield significant improvements in measures of QOL (physical, social, and psychological), but superiority of intervention could not be determined. In these studies, QOL and its domains were assessed using many tools as presented in Table 1. Wellness education also gained significant improvement in emotional well-being. RHYTHM significantly improved physical activity, functional capacity, in the mental component of QOL, VT, SF, and MH. Humanized nursing accompaniment gained significant improvement in the global health subscale in 3-month posttest. In addition, improvement in symptom of constipation, fatigue, dyspnea, and anorexia was found.

Majority of the studies included in this review had a sample size <100; another review also mentioned that most dyadic intervention studies have sample size ($N < 100$), indicating that they are less powerful in examining changes in multiple outcome that were considered which could have contributed to small-to-moderate effect sizes.^[58]

As adolescent and young adults with cancer have problems with the maintenance and development of family/peer relationships, intimate/marital relationship, and peer support,^[59] this desire of patient for social well-being could be addressed through more structured dyadic intervention.

Among the included studies, two studies^[37,54] did follow-up data until 6 months where some outcome

improvements were found in 3 months' follow-up while only few were sustained till 6 months.^[37] One study^[47] did 1-year follow-up data where well-being was found to be improved until 1-year follow-up. Thus, dyadic interventions seem to have short-term as well as long-term benefit, but more rigorous study is required for concluding its long-term benefit.

All the yoga intervention could be integrated with radiotherapy treatment as it was feasible. The study conducted by Budin compared psycho-education and psycho-education plus telephone counseling; both were superior to standard care but superiority among intervention was not significant^[60] as seen in this review. In one study,^[32] 33 patients and 20 caregivers participated which does not address patient and caregiver as a dyad. Further studies included in the review had caregiver comprising spouse, family members, or even member of social network in the studies.

As majority of the studies included here were conducted in the USA, this limits knowledge of dyadic characteristics and efficacy of dyadic intervention, with regard to diverse culture, ethnicity, healthcare systems, and socioeconomic status. Some studies included in the review still lack theoretical framework as stated in another review, many dyadic interventions lacked theoretical framework, while others used either individual stress and coping theories or resource theories or dyadic models^[58] as in this review.

Limitations

Findings of the review should be considered along with its limitations. This review included only published studies. There remains possibility that studies without significant treatment effects were never published. Further studies published in only English language were focused. Further, we did not perform quantitative analysis or assess the quality of results reviewed but presented the interventions in descriptive way.

Recommendations

For future dyadic intervention, focus on dyad as a unit should be given. For future research, theoretical framework incorporating cancer dyad as a unit and approaches of interventions and outcome measure should be well defined. As evident in this review, single intervention could not address all the QOL dimensions, so integrating some skill along with psychoeducational could be conceptualized. As dyads are the sample, family and social integration can also be considered for developing new intervention as social well-being seems to be not highlighted among the review studies. Precise dose must be planned as retention rate decreases as the doses of intervention increases. Intervention, as well as its mode of delivery, should depend

on and be accepted culturally and economically and should synchronize with the lifestyle and technology adaptation of the dyad. Well-trained and intervention specific workforce should be utilized for delivering the intervention.

For healthcare practices, addressing cancer patient and caregiver as a unit throughout cancer journey could foster dyadic adoption and adjustment with chronic illness like cancer.

As dyadic interventions seem to be feasible and beneficial for cancer patients and their caregiver, healthcare system should include dyads at community and household level for addressing different issues concerning cancer journey.

Conclusions

This review showed that dyadic interventions in the context of cancer are feasible and can bring about a significant positive outcome in some domains of QOL. More rigorous study with precise dose, integrating different approaches is needed. Further intervention with a strong theoretical framework and guided by standard protocol and in diverse group of population has to be conducted.

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Conflicts of interest

There are no conflicts of interest.

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