

Interventions With Family Caregivers of Cancer Patients

Meta-Analysis of Randomized Trials

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Abstract

Family caregivers of cancer patients receive little preparation, information, or support to perform their caregiving role. However, their psychosocial needs must be addressed so they can maintain their own health and provide the best possible care to the patient. The purpose of this article is to analyze the types of interventions offered to family caregivers of cancer patients, and to determine the effect of these interventions on various caregiver outcomes. Meta-analysis was used to analyze data obtained from 29 randomized clinical trials published from 1983 through March 2009. Three types of interventions were offered to caregivers: psychoeducational, skills training, and therapeutic counseling. Most interventions were delivered jointly to patients and caregivers, but they varied considerably with regard to dose and duration. The majority of caregivers were female (64%) and Caucasian (84%), and ranged in age from 18 to 92 years (mean age, 55 years). Meta-analysis indicated that although these interventions had small to medium effects, they significantly reduced caregiver burden, improved caregivers' ability to cope, increased their self-efficacy, and improved aspects of their quality of life. Various intervention characteristics were also examined as potential moderators. Clinicians need to deliver research-tested interventions to help caregivers and patients cope effectively and maintain their quality of life. *CA Cancer J Clin* 2010;60:317-339. ©2010 American Cancer Society, Inc.

Introduction

Although family caregivers are the long-term care providers to people with cancer, they receive little preparation, information, or support to perform their vital role.^{1,2} Family caregivers often are expected to navigate an increasingly complex and fragmented health care system on their own and to find whatever help that may be available.³ In recent years, the caregiving responsibilities of family members have increased dramatically, primarily because of the use of toxic treatments in outpatient settings, the decline in available health care resources, and the shortage of health care providers. Family caregivers of cancer patients have participated in a limited number of intervention programs, but these programs have focused almost exclusively on improving patient outcomes (eg, symptom management, quality of life) with less attention directed toward the needs of family caregivers.⁴ Family caregivers have psychosocial needs that must be addressed so they can maintain their own health and provide the best care possible to the patient.

The purpose of this article is to analyze the findings of randomized clinical trials (RCTs) to understand the type and efficacy of interventions aimed at the needs of family caregivers of cancer patients. Individual studies have often had insufficient power to draw definitive conclusions. Therefore, meta-analysis was used because it combines data from multiple studies and then determines a more accurate estimate of the effect of interventions on specific

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DISCLOSURES: This study was supported by National Cancer Institute (Grant #CA090739).

The authors thank Barbara Given, PhD, RN, College of Nursing, Michigan State University; Charles W. Given, PhD, Department of Family Practice, Michigan State University; and Bernadine Cimprich, PhD, RN, School of Nursing, University of Michigan for reviewing the article and offering valuable suggestions.

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outcomes.⁵ We analyzed the type and content of interventions delivered to family caregivers of cancer patients, and we then examined the effect of these interventions on various family caregiver outcomes. We also identified some limitations in existing studies, and recommended directions for future research that could improve care strategies for family caregivers in practice settings.

Background

A large body of research has documented the effects that cancer can have on the emotional, social, and physical well-being of family caregivers.^{1,6-8} Cancer patients and their family caregivers react to cancer as one emotional system^{9,10}; there is a significant reciprocal relationship between each person's response to the illness, with family caregivers often reporting as much emotional distress, anxiety, or depression as patients.^{1,11-13} The advanced phase of cancer is especially difficult for family caregivers, who sometimes report more depression than the patients themselves.¹⁴ However, caregivers seldom use any form of mental health services to deal with their own depression or emotional distress,^{1,15} and this puts them at risk for long-term health problems.

Cancer can affect the patients' and caregivers' family and social well-being, especially in areas related to talking about the illness, sexual well-being, changing family roles and responsibilities, and maintaining individuals' social support systems.^{16,17} Problems occur when patients and caregivers hide worries from one another, and avoid talking about sensitive issues associated with cancer and its treatments. Family caregivers experience role overload when they take on a patient's household or family responsibilities in addition to their own.^{18,19} Difficulty communicating and negotiating family roles can hinder patients' and caregivers' ability to support one another, decrease couples' intimacy, and have a detrimental effect on marital and family relationships.^{16,20,21}

Cancer also can affect the physical well-being of caregivers. Although caregivers' health status is initially similar to that of the normal population, caregivers often report more problems with fatigue, sleep disturbances, and impaired cognitive function than noncaregivers.¹ Over time, the burden and strain on caregivers increases.²²⁻²⁴ Caregivers' physical

well-being is at greater risk because they have little time to rest, engage in fewer self-care behaviors (eg, physical activity), or often fail to seek medical care for themselves when sick.^{25,26} Greater than half of family caregivers have chronic health problems of their own, such as heart disease, hypertension, and arthritis,^{27,28} and these health problems can be exacerbated by the stress of caregiving.^{29,30}

Despite the multiple effects of a patient's illness on family caregivers, little is known regarding effective interventions for caregivers to ameliorate these effects. There is need for a critical analysis of interventions conducted with family caregivers of cancer patients to determine whether the interventions can improve caregivers' quality of life; their physical, mental, and social well-being; and their experiences in caregiving. Previously, 5 systematic reviews described interventions conducted with family caregivers of cancer patients, but did not evaluate the efficacy of these interventions on multiple caregiver outcomes.^{4,31-34} This article presents a meta-analysis that examined interventions delivered to family caregivers of cancer patients in published RCTs, and their effects on multiple caregiver outcomes.

Research Method

Identification and Selection of Studies

Our literature search was aimed at identifying available research studies that assessed interventions targeting family caregivers of cancer patients. Several criteria were used to select eligible studies: 1) the intervention had to involve family caregivers, either alone or with the cancer patient; 2) the intervention had to be psychosocially, cognitively, or behaviorally oriented; and 3) participants had to be randomly assigned to either the intervention or control arm of the study. Studies involving pediatric cancer patients were excluded because the nature of the parent-child relationship was likely to add significant heterogeneity to the studies analyzed. Pharmacological interventions also were excluded because they were not applicable to the scope of the current meta-analysis. The literature search focused solely on articles published in peer-reviewed journals to enhance the methodological rigor of the studies examined and the conclusions drawn regarding the efficacy of the interventions.

TABLE 1. Theoretical Framework for Organizing Data into Domains and Outcomes

DOMAIN	ILLNESS APPRAISAL FACTORS	COPING RESOURCES	QUALITY OF LIFE
Outcomes	Caregiving burden	Coping strategies	Physical functioning
	Caregiving benefit	Caregiver self-efficacy	Distress and anxiety
	Information needs		Depression
			Marital-family relationships
			Social functioning

Studies were identified by searching multiple literature databases, including Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google Scholar, Intercollegiate Studies Institute (ISI) Web of Knowledge, PsycINFO, and PubMed. The keywords “family caregiver,” “cancer patient,” “spouse,” “partner,” “couple,” and “intervention” were used in various combinations. When the query produced more than 200 titles, searches were further refined with the terms “random assignment” or “randomization.” Queries were limited to those involving human subjects and published in the English language. Studies published in languages other than English were excluded because of time and resource limitations. Hand searches of reference lists of relevant literature reviews were used to complement the computer searches.^{4,31-33}

Coding

Each research article was read and analyzed by at least 2 members of the research team. Data extraction was recorded on customized tables; disagreements were resolved through consensus. Because meta-analysis combines data from different instruments that measure similar variables or outcomes, a conceptual framework was used to organize extracted data in a meaningful way. The integration of stress and coping theory,³⁵ cognitive behavioral theory,³⁶ and quality of life frameworks^{37,38} guided the classification of interventions and the findings of the meta-analysis into clinically applicable domains. Extracted data were initially organized into 3 domains: illness appraisal factors, coping resources, and quality of life; within each domain, data were further categorized into specific intervention outcomes (see Table 1 for organization of the data).

When authors used more than one instrument to measure the same outcome, extracted data were reported from the most relevant instrument, which was determined by consensus of 3 of the authors (L.N.,

D.M., and M.K.) after reviewing the wording of the items used in each instrument. A similar procedure was followed when authors reported findings on multiple subscales of instruments, rather than on global scores. For the calculation of effect sizes, we used outcome data from the experimental and control arms of the study. When studies had more than one experimental arm, we chose the experimental arm hypothesized by the original authors to be the most effective. Finally, because some studies assessed intervention outcomes over time, we organized the extracted data into 3 time frames: initial follow-up from preintervention (baseline) to 3 months postintervention (T1), intermediate follow-up from greater than 3 months to 6 months postintervention (T2), and longer-term follow-up that occurred beyond 6 months postintervention (T3).

Statistical Analyses

Data were synthesized using meta-analytic methods.^{39,40} The standard mean difference, or the effect size between the treatment and control groups, was calculated using Hedges' *g* unbiased approach (similar to the Cohen *d* statistic⁴¹). Calculation of effect sizes was based on means, standard deviations, difference in mean scores, *P* values, and sample sizes of the groups. Data were statistically pooled by the standard meta-analysis approach, meaning that studies were weighted by the inverse of the sampling variance. The random effects model was used as a conservative approach to account for different sources of variation among studies. The *Q* statistic was used to assess heterogeneity among studies. A significant *Q* value indicates a lack of homogeneity of findings among studies.^{39,40} Several intervention characteristics were identified and their effects on outcomes were examined. Categorical characteristics were treated as moderators and intervention effectiveness was compared across subgroups formed by these moderators. Continuous characteristics were examined

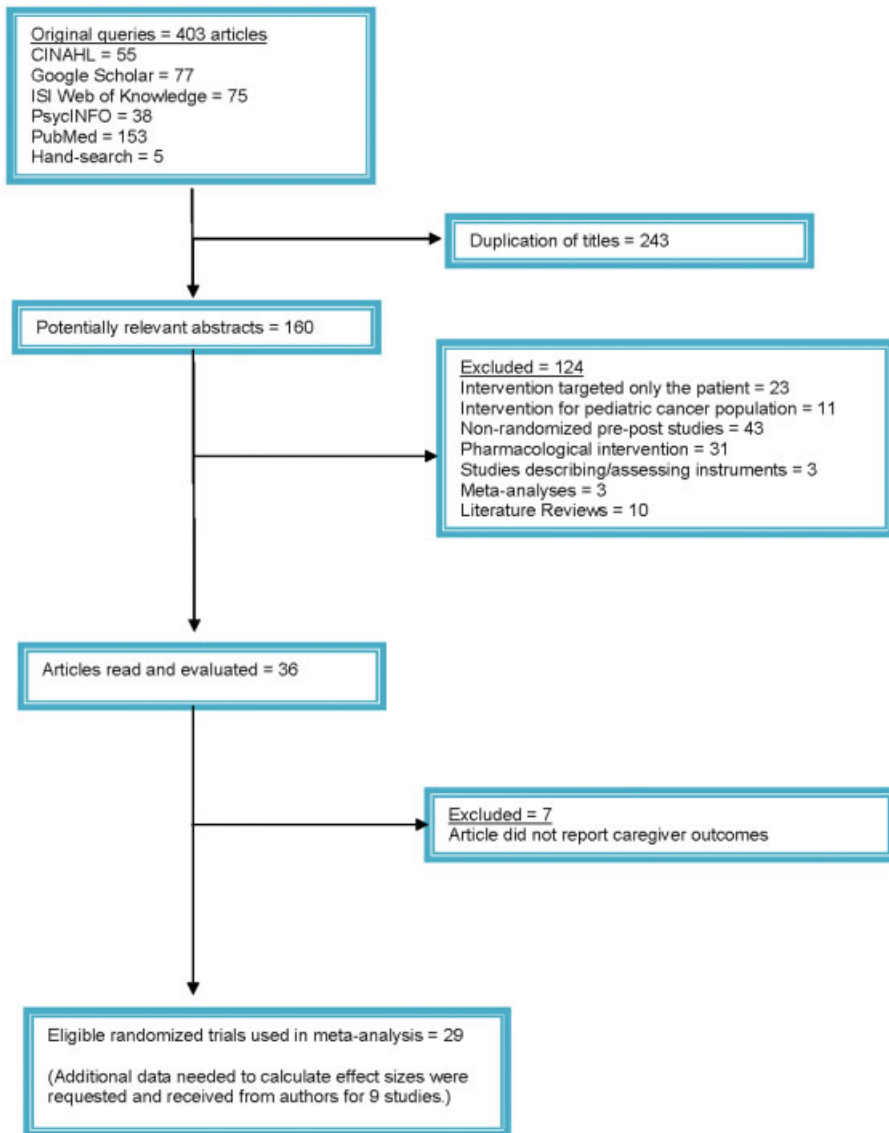


FIGURE 1. Selection Process of Randomized Trials. CINAHL indicates Cumulative Index to Nursing and Allied Health Literature; ISI, Intercollegiate Studies Institute.

as covariates using random effects (method of moments) meta-regression. We also assessed publication bias using the Egger's t test, with significance values based on 1-tailed P values.^{39,40} Publication bias can occur because journals are more likely to publish studies with positive results than those with negative or nonsignificant results, authors are less likely to report null (negative or inconclusive) outcomes in multioutcome studies, and studies with small sample sizes need to detect larger effects to be published compared with studies with large samples.

Comprehensive Meta-Analysis V.2.0[®] software⁴² was used for the statistical analyses. Statistics reported in this meta-analysis conformed to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, a guideline

for describing meta-analyses of studies that evaluate health care interventions.^{5,43} Based on conventional standards, effect sizes of g equal to 0.20, 0.50, and 0.80 were considered small, medium, and large, respectively.⁴¹

Results

Initial queries identified a total of 403 articles from all databases and search methods. Comparison of the retrieved titles identified 243 studies that were duplicates, thus leaving 160 abstracts for further evaluation (Fig. 1). The current meta-analysis is based on data extracted from 29 studies of RCTs published between 1983 and March 2009 that assessed interventions that included family caregivers of cancer patients.⁴⁴⁻⁷² Among the 29 studies, additional data (not published in the reviewed article but needed to calculate effect sizes) were requested and received for 9 studies. The majority of studies (27 of 29) assessed initial outcomes during the first 3 months after the intervention. Approximately half (52%) assessed intermediate outcomes, and approximately one-fourth (24%) assessed longer outcomes.

Characteristics and Content of Interventions for Caregivers

A content analysis of the experimental arms of the 29 RCTs included in this meta-analysis identified 35 primary intervention protocols. The number of intervention protocols, signified by the symbol k (ie, $k = 35$) is greater than the number of studies ($N = 29$) because 6 studies had intervention protocols with more than one primary focus. Table 2 describes the type, the content elements, and the mode of delivery of the intervention protocols. Intervention protocols directed solely toward patients

are not described in Table 2. Control group protocols, the majority of which were some form of “usual care,” also are not described in Table 2.

Classification of Interventions

The interventions were classified into 3 major types. The majority of interventions were psychoeducational ($k = 20$; 57.1%), defined as protocols whose primary focus was to provide information regarding symptom management and other physical aspects of patient care as well as to direct some attention to the emotional and psychosocial needs of patients, caregivers, and/or marital or family relationships. Skills training ($k = 9$; 25.7%) was defined as protocols that focused primarily on the development of coping, communication, and problem-solving skills, with some focus on behavior change. The least frequent type of intervention was therapeutic counseling ($k = 6$; 17.1%), which focused primarily on the development of a therapeutic relationship to address concerns related to cancer or caregiving. Thirty-six secondary elements (ie, content that appeared secondary to the primary focus) also were coded, to better describe the complexity of some of the intervention protocols. The most common combinations of primary and secondary elements were those that included both psychoeducational and skills training, accounting for greater than two-thirds (68.6%) of all interventions.

Three measures of dose of intervention were calculated for each protocol (when available). The first measure was total number of hours (mean, 7.5 hours; range, 1.7-18 hours), the second was total number of sessions/contacts (mean, 6.7 sessions/contacts; range, 2-16 sessions/contacts), and the third was duration of intervention (mean, 11.5 weeks; range, 1.2-56 weeks from first to last session). Several studies had exceptionally long durations because of extended breaks between some sessions. If those outliers were excluded, the average duration of intervention dropped to 7.8 weeks. Because each of these measures was variable, the 3 measures represented independent assessments of the dose.

Format of Interventions

Nearly two-thirds of the interventions were offered jointly to cancer patients and their family caregivers ($k = 22$; 62.9%); just over one-third included only family caregivers ($k = 13$; 37.5%). Two of the interventions were delivered to caregivers alone while parallel protocols were delivered independently to the

patients.^{44,47} Most interventions were delivered as face-to-face visits ($k = 24$; 68.6%), with two-thirds provided in the clinical setting and the remainder in the home. Telephone delivery accounted for approximately one-fifth of the interventions ($k = 7$; 20.0%), whereas group meetings were the least frequent ($k = 4$; 11.3%). Face-to-face interventions often included additional contact by telephone ($k = 16$; 66.7%). Two studies^{54,61} provided joint face-to-face visits but gave additional attention to the caregivers through individual telephone calls. Nurses delivered the experimental intervention in 52% of the studies, social workers in 14%, and psychologists in 14%. In the remaining 20% of studies, the interventions were delivered by various combinations of these professionals.

Content of Interventions

The content of the interventions for caregivers were coded into 3 broad areas. Patient caregiving refers to information or skills (eg, changing a dressing, emptying an ostomy bag) to help caregivers perform their caregiving tasks, and was found in 25 (71.4%) intervention protocols. Marital/family care refers to information and skills to help caregivers or couples to manage family and marital concerns, including communication, teamwork, and intimate relationships, and was the primary focus in 25 (71.4%) intervention protocols. Caregiver self-care refers to information, skills, and support needed by caregivers to manage their own physical and emotional health needs, gain confidence in their caregiving role, maintain their social support system, and access resources to ease caregiving burden; these issues were addressed in 27 (77.1%) of the intervention protocols. It should be noted that the degree of emphasis given to these content areas within the intervention protocols varied considerably, from high (ie, comprising most of the content provided) to low (ie, accounting for less than 10% of the content provided).

Characteristics of Caregivers

Across the 29 studies, the number of caregivers who were enrolled and completed baseline assessments ranged from 14 to 329, with a mean sample size of 114 caregivers (median, 91 caregivers) (Table 3). Enrollment rates varied from 13% to 100% in the studies; however, not all of the studies reported the number of eligible participants who were approached. The average enrollment rate across studies was 58%. The attrition rate

TABLE 2. Intervention Protocols for Caregivers of Cancer Patients

■ STUDY AND PRIMARY GOAL	■ INTERVENTION TYPE ^a ■ CONTACTS: NO. AND LENGTH ■ LOCATION ^{b,c,d}	■ DURATION OF PROTOCOL ■ INTERVENER ^e	CONTENTS OF CAREGIVER INTERVENTION (AS SPECIFIED BY INVESTIGATOR)			■ THEORETICAL FRAMEWORK ■ FIDELITY ⁱ
			■ PATIENT CAREGIVING ^f	■ MARITAL/FAMILY CARE ^g	■ CAREGIVER SELF-CARE ^h	
Badger 2007 ⁴⁴ To reduce anxiety, depression in breast cancer patients and CGs <i>*Interventions delivered separately to CG & patient</i>	Experimental Arm I: B, A: 3, 4* Three 34-min biweekly CG counseling telephone calls <i>*Patients received 6 calls</i> Experimental Arm II: C: 3, 4* Three 11-min biweekly, CG exercise-related telephone calls <i>*Patients received 6 calls</i>	6 wk Psychiatric RN with oncology expertise	1, 3 Cancer information	1, 5 Modify role responsibilities	2, 3, 4, 6 Managing depression and anxiety, social support 3, 4 Low-impact exercise	Interpersonal counseling None cited ●
Baucom 2009 ⁴⁵ To manage effects of breast cancer on the marital relationship	A, B, C: 1, 5, 6 Six 75-min joint sessions in therapist's office; homework	12 wk Advanced clinical PSY doctoral students	1, 2, 3 Medical education; provide emotional and patient self-esteem support	1, 2, 3, 4, 5, 6 Communication for decision-making; sharing feelings; sexual adaptation	2, 3, 4, 5, 9 Skills for mutual problem solving; emotional support; find meaning	Cognitive-behavioral approach ●
Blanchard 1996 ⁴⁶ To reduce CG distress	C, A, B: 1, 4 (CWC) Four to 6 1-h CG counseling sessions in counselor's office	6 wk Oncology SW	2, 3 CGs apply problem-solving strategies to manage patient care needs	2 Communication with patient	1, 2, 3, 4, 5, 6 Use problem-solving skills for self-care; emotional support	Problem solving ●
Budin 2008 ⁴⁷ To enhance biopsychosocial adjustment of breast cancer patients and CGs <i>*Interventions delivered separately to CG and patient</i>	Experimental Arm I: A: 1, 4, 6* Four 1-h CG viewing of standardized, phase-specific videos Experimental Arm II: B: C: 3, 4* Four 1-2 h CG telephone counseling calls tailored to phase and recipient Experimental Arm III: A+B: 1, 4, 6* Combines Arms I and II (Four video plus 4 telephone sessions)	Approximately 32 wk RNs	1, 3 Medical information to facilitate coping and social support 1,3 Answer patient care questions, facilitate coping, social support 1,3 All interventions Arms I and II	2 Functional communication 2 Functional communication	1, 4, 6 Coping, psychosocial support 1, 4, 6, 9 Manage distress by coping, support, and behavior change 1, 4, 6, 9 All interventions Arms I and II	Stress and coping; crisis intervention ●
Bultz 2000 ⁴⁸ To help CGs of breast cancer patients manage patient care and self-care, marital issues	A: 2, 4, 6 Six 1.5-2 h wky CG group sessions at clinical site	6 wk PSY, MD	1, 2, 3 Medical and psychosocial information	1, 2, 3, 4 Discuss marital relationship, communication, and sexual issues	1, 2, 4, 5, 6, 8 Examine CGs' fears, concerns, and challenges; fears of disease recurrence, death and dying	Empirical base ●
Campbell 2007 ⁴⁹ To enhance self-efficacy and QOL in AA prostate cancer patients and spouse-CGs	A, C: 3, 5* (CST) Six 1-h joint telephone sessions <i>*Speakerphones provided for joint participation</i>	Average of 7 wk Medical PSY	1, 2, 3 Information regarding cancer's physical, emotional, and social side effects	1, 2, 6 Effects of cancer on marital relationship and communication skills; plan mutually pleasant activities	1, 2, 5 Progressive muscle relaxation, activity-rest cycles, and cognitive restructuring	Cognitive-behavioral approaches; culturally based health disparities ●
Carter 2006 ⁵⁰ To maximize CGs ability to improve sleep quality	C, A: 1, 4 (CASI) One 1-h training session plus a 1-h booster session at CG's choice of locations; practice at home	4 wk Masters' RNs			3, 4 Self-assess to improve sleep quality and sleep hygiene; relaxation, stimulus control	Stress and coping; cognitive and behavioral approaches ●

TABLE 2. (Continued)

■ STUDY AND PRIMARY GOAL	■ INTERVENTION TYPE ^a ■ CONTACTS: NO. AND LENGTH ■ LOCATION ^{b,c,d}	■ DURATION OF PROTOCOL ■ INTERVENER ^e	CONTENTS OF CAREGIVER INTERVENTION (AS SPECIFIED BY INVESTIGATOR)			■ THEORETICAL FRAMEWORK ■ FIDELITY ⁱ
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Christensen 1983 ⁵¹ To alleviate patient and CG psychosocial discomfort after mastectomy	B: 1, 5, 7; also interactive art project Four wky couple counseling sessions in therapist's office	4 wk PhD SW therapist		1, 2, 3, 4 Sexual misconception, facilitate change, reinforce couple's strengths		Psychosexual counseling ●
Derdiarian 1989 ⁵² To improve patient and CG coping skills; satisfaction prior to cancer treatment	A, B: 1, 3, 5, 7 Session(s) in clinical setting with 1-2 follow-up telephone calls (dose unknown)	2 wk RAs	1, 2, 3 Information regarding disease and treatment	1 Information regarding managing family concerns	1, 3, 6, 9 Information concerning self-identified needs, concerns regarding patient's disease; resource information	Psychological stress and coping ●
Giarelli 2003 ⁵³ To prepare CG (and patient) for caregiving	A, C: 1, 3, 5, 7 (SNIP) Eight 1.5-h wky joint home visits alternating with 8 joint telephone calls (45 min each)	8 wk APNs	1, 2, 3 Practical information, skill training to enhance patient care	2, 3, 4, 6 Mutual effects of patient's illness on marital relationship	2, 3, 4, 6, 9 Manage personal needs and emotional effects; resources, referrals	Labor of caregiving
Given 2006 ⁵⁴ To enhance CGs' satisfaction and skills for caregiving	C, A: 1, 5 plus 3, 4 Three 32-min joint sessions at clinic alternating with 2 individual telephone calls to CGs only (15 min each)	10 wk RNs with oncology experience	1, 2, 3 Assess CGs' negative reactions to caregiving; plan and evaluate care strategies	2 Communication as a device to help CG assist in patient care	1, 2, 3, 4, 5 Coping, problem-solving skills, enhance self-efficacy; cognitive reframing, self-care	Cognitive-behavioral ●
Goldberg & Wool 1985 ⁵⁵ Social support counseling for CGs of patients with lung cancer	B: 1, 4 Twelve wky sessions for CGs with a therapist	12 wk 1 Masters' SW, 1 PSY	3, 4 Maintain patient's social support system; encourage patient autonomy; advocate for patient in health care system	1, 2, 5 Encourage family and social communication	1, 4, 5, 6, 8 Manage distress, increase competence, deal with grief and anticipatory mourning	Social support systems ●
Heinrich & Schag 1985 ⁵⁶ To increase knowledge, psychosocial adjustment, and daily activities	A, C: 2, 5, 6, 7 (SAM) Six 2-h wky couples group sessions in clinical setting	6 wk MD, PSY	2, 3 Medical information; skills to manage patient stress (coping, problem solving), relaxation, exercise, activities	1, 2 Increase positively valued couple activities; patient and CG share ideas and feelings in group discussion	1, 2, 3, 4 Apply information, skills, and activities to enhance self-care	Cognitive-behavioral approaches
Hudson 2005 ⁵⁷ To prepare CGs to care for self and dying patient	A: 1, 3, 4, 6, 7 Two 1.5-h CG home visits (patient could be present at CG's request), 1 telephone call (30 min) between visits	2 wk RNs	1, 2, 3 Enhance CG's ability and skills to assist in patient's physical and emotional care		3, 4, 5, 6, 7, 8, 9 Diet, exercise, and rest; use of social, spiritual, and health care resources; optimism; emotional and bereavement support	Stress and coping ●
Jepson 1999 ⁵⁸ To improve CGs' psychosocial status after patient's surgery	A, C: 1, 3, 5 (SNIP) Three 1.5-h joint home visits alternating with 6 telephone calls (45 min each)	4 wk RN with oncology expertise	1, 2, 3 Information, skills to care for patient's health care needs; coordinating care		2, 3, 4, 9 Assess patient and own personal needs; use resources; care for own health problems	None cited ●
Keefe 2005 ⁵⁹ Partner-guided pain management for patients at end of life	C, A: 1, 5, 6, 7 Three 20-90 min (M, 56 min) joint home visits	1-4.6 wk (M, 2 wk) RN educators	2, 3 CG coaching patient in use of behavioral pain relief strategies	6 Caregiving as teamwork	1, 3, 4, 5 Apply learned skills for self-care, greater confidence in caregiving	None cited ●
Kissane 2006 ⁶⁰ To reduce distress of bereavement	B: 1, 5 (>1 family member) Four to 8 family therapy sessions in clinic or home (90 min each)	9-18 mo (M, 13 mo) Family SW therapists	3 Identify patient's thoughts and feelings, provide support	1, 2, 5, 6 Family cohesion; communication; handling of conflict	4, 8 Examine thoughts and feelings, anticipate bereavement distress	Family-focused grief therapy ●

TABLE 2. (Continued)

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			■ PATIENT CAREGIVING ^f	■ MARITAL/FAMILY CARE ^g	■ CAREGIVER SELF-CARE ^h	
Kozachik 2001 ⁶¹ To reduce CG depression and enhance problem-solving skills	A , C: 1, 5; plus 3, 4 Five 1-h joint meetings alternating biweekly with 4 individual CG telephone calls (20 min each)	16 wk Masters' RNs certified in oncology	1, 2, 3, 5 Identify symptoms and their severity; select care strategies from computerized list	2, 6 Make joint decisions; plan and evaluate care strategies for both patient and CG problems	2, 3, 4, 5, 9 Acquire problem-solving skills, self-efficacy for patient care; use available resources	Family care model ●
Kuijjer 2004 ⁶² To restore couples' perception of equity and exchange of support	B : 1, 5, 7 Five 90-min couple counseling sessions	8 wk PSYs		1, 2, 3, 5, 6 Mutual support to reduce sense of inequity; enhance relationship quality and well-being		Cognitive-behavioral; equity theory
Kurtz 2005 ⁶³ To reduce CG and patient depression and distress by teaching skills to manage symptoms	C , A: 1, 3, 5 Five mo joint sessions at clinical site alternating with 5 mo CG telephone calls	20 wk RNs	2, 3, 4 Information, skills to care for and support patient; communicate with health care providers; plan and evaluate care strategies	1, 5, 6 Manage effects of role strain and CG burden on relationship	1, 2, 3, 4, 5, 6 Apply skills to care for self, increase self-confidence, and maintain social support	Cognitive-behavioral ●
Manne 2004 ⁶⁴ To reduce CG distress and increase coping, personal growth, and marital communication	A , C: 2, 4, 7 Six 1-h wky CG group sessions in clinical setting	6 wk MD, Masters' SW, PSY, and nutritionist	1,2, 3 Information regarding diagnosis, treatment, good nutrition, and providing support	1, 2, 3, 4 Maintaining good communication, intimacy; dealing with sexual concerns	1, 6, 8 Stress management and coping skills training; social support; survivorship	Stress coping; cognitive and social processing theories ●
McCorkle 1998 ⁶⁵ To enhance CGs' knowledge and skills in care of terminally ill patients with lung cancer; anticipate distress of bereavement	Experimental Arm I: A , C: 1, 3, 5, 7 (OHC) Ten 70-min wky home visits (on average) plus wky follow-up telephone calls Experimental Arm II: A : 1, 5 (SHC) Six (on average) wky home visits	1-24 wk (M, 12 wk) Masters' RNs with expertise in care of patients with terminal cancer 6 wk Multidisciplinary team (not cancer-specific)	1, 2, 3, 4 Information, skills to help manage patient's care needs; provide emotional support, communicate with health care providers 2, 4 Information regarding patient's medications, when to call MD; communicate with health care providers	2, 5, 6 Facilitate marital and family communication to fulfill patient's role and responsibilities; teamwork 2 Facilitate marital and family communication	2, 4, 6, 8, 9 (Referral to own health care provider to manage self-care needs); use of resources; receive emotional and bereavement support 8, 9 Offer bereavement support and information regarding available resources	Existential plight; chronic illness trajectory
McCorkle 2007 ⁶⁶ To improve spouse-CGs' depression, marital function with prostatectomy patients	A , C: 1, 3, 5, 7 (SNIP) Eight 1.5-h joint wky home visits alternating with 8 wky telephone calls (45 min each)	8 wk APNs	1, 2, 3 Assist patient with managing care needs	1, 4, 5, 6 Examine sexual functioning issues resulting from side effects of surgery	1, 2, 3, 4, 6, 9 Learn coping and problem-solving skills and patient care skills, assess needs and resources	Chronic illness and the life cycle ●
McMillan 2006 ⁶⁷ To improve CGs' QOL, burden, coping, mastery assisting patient in hospice care	Experimental Arm I: C : 1, 4 Three 1-h CG sessions to teach problem-solving methods Experimental Arm II: B : 1, 4 Three 1-h CG sessions to provide individual support	1.2 wk RNs and home health care aides (not employed at hospice site)	2, 3 Plan caregiving goals; receive expert information regarding assessing symptoms	1, 6 Involve patient in care planning; work as a team 1 Discussing relationship with patient	1, 2, 4, 5, 9 Creativity in problem solving, optimism, use of respite care resources 3 Discussing CG's fears and feelings	Family COPE model ●
Mokuau 2008 ⁶⁸ To increase knowledge and skills of family members of patients with breast cancer	A , C: 1, 5 (>1 family member), 6, 7; (included many Hawaiian traditions) Six 2-h family sessions held at location based on participants' preference	13 wk Masters' SWs in teams of 2 individuals	1, 2, 3, 4 Assist patient with managing care needs; communicate with health care providers	1, 2, 5 Family teamwork to meet patient care needs and share family chores	1, 2, 5, 7, 9 Use of conference telephone and computer access for cancer information	Culturally sensitive care

TABLE 2. (Continued)

■ STUDY AND PRIMARY GOAL	■ INTERVENTION TYPE ^a ■ CONTACTS: NO. AND LENGTH ■ LOCATION ^{b,c,d}	■ DURATION OF PROTOCOL ■ INTERVENER ^e	CONTENTS OF CAREGIVER INTERVENTION (AS SPECIFIED BY INVESTIGATOR)			■ THEORETICAL FRAMEWORK ■ FIDELITY ⁱ
			■ PATIENT CAREGIVING ^f	■ MARITAL/FAMILY CARE ^g	■ CAREGIVER SELF-CARE ^h	
Northouse 2005 ⁶⁹ To improve psychosocial and QOL outcomes in patients with advanced breast cancer and their CGs	A , C: 1, 3, 5, 6, 7 (FOCUS) Three 90-min mo joint home visits (initial phase); Two 30-min mo joint telephone calls (booster phase)	Home visits for 13 wk; telephone calls during the next 13 wk Masters' RNs	1, 2, 3, 4 Manage patient's care needs; provide emotional support; assist patient with managing uncertainty and maintaining optimistic attitude	1, 2, 3, 4, 5, 6 Improve family functioning, open communication, and marital relationship; adapt to role changes; work as a team	1, 2, 3, 4, 5, 6, 9 Manage self-health; effective coping with stress; receive emotional support from patient, manage uncertainty, and use of community/social resources	Stress and coping ●
Northouse 2007 ⁷⁰ To improve appraisal, coping, symptom distress, and QOL in patients with prostate cancer and their spouse-CGs	A , C: 1, 3, 5, 6, 7 (FOCUS) Three 90-min mo joint home visits alternating with 2 joint telephone calls (30 min each)	13 wk Masters' RNs	1, 2, 3 Assist patient with managing care needs, provide support; communicate with health care providers	2, 3, 4, 5, 6 Open communication; mutual support, healthy lifestyle behaviors; maintain optimism and manage uncertainty as a team	1, 2, 3, 4, 5, 9 Maintain self-health, effective coping with stress; maintain social support system; use available resources effectively	Stress and coping ●
Scott 2004 ⁷¹ To enhance couple communication, coping, patient body image, and sexual adjustment in female patients with cancer and their intimate partners	Experimental Arm I: C , A, B: 1, 3, 5, 7 (CanCOPE) Five 2-h joint home visits plus 2 telephone calls (30 min each) Experimental Arm II: C , A, B: 1, 3, 4 (patient only), 7 Four 2-h patient (individual) home visits plus 2 patient telephone calls (30 min each)	7 wk plus a 6-mo follow-up session Female PSYs	1, 2, 3 Information regarding caring for patient's needs; enhancing patient body image	1, 2, 3, 4, 5 Supportive marital communication, joint coping, and sexual counseling	1, 2, 4, 5 Coping and problem-solving skills; social support training; counseling	Social-cognitive processing model of emotional adjustment to cancer; coping theory
			CGs received no intervention in this study arm, but provided data			
Walsh 2007 ⁷² To increase support for at-risk CGs of patients with advanced cancer	A , B: 1, 4 Six 50-min wky CG home visits* (or in other location in which privacy could be maintained) *Telephone calls occasionally substituted for home visit	6 wk RN and SW (team of CG advisors)			3, 4, 6, 8, 9 Attention to own care needs; respite; future planning, survivor benefits, and finances; maintain social networks; bereavement support; social service resources	None cited ●

CG indicates caregiver; biw/ky, biweekly; w/ky, weekly; h, hour; mo, monthly; QOL, quality of life; M, mean; CWC, Coping With Cancer; AA, African American; CST, coping skills training; CASI, Caregivers' Sleep Intervention; SNIP, Standardized Nursing Intervention Protocol; SAM, Stress and Activity Management; OHC, Specialized Oncology Home Care; SHC, Standard Home Care; COPE, acronym for Creativity, Optimism, Planning and Expert information; FOCUS, acronym for Family involvement, Optimism, Coping effectiveness, Uncertainty reduction and Symptom management; CanCOPE, Couples-Based Intervention.

^aPrimary intervention focus is shown in **bold** type; secondary element(s) shown in regular type.

^bAll available information was reported; any missing information was **unknown**.

^cA indicates psychoeducational; B, therapeutic counseling; C, skills training; 1, face-to-face; 2, group; 3, telephone; 4, CG only; 5, CG and patient (joint); 6, videos and audiotapes; 7, printed materials.

^dThe coding for Column 2 is comprised of 4 parts: A, B, and C indicate types of interventions; 1, 2, and 3 indicate mode(s) of presentation; 4 and 5 indicate CG alone (4) or jointly with the patient (5); and 6 and 7 indicate types of supplementary materials used. Thus, the string of codes for any particular intervention can be read like a sentence (eg, looking above at the study by Walsh et al, it is described as primarily a psychoeducational intervention (**A**) with secondary elements of therapeutic counseling (B), presented face-to-face (1) to the CG alone (4).

^eRN indicates nurse; SW, social worker; PSY, psychologist; MD, physician; RA, research assistant; APNs, advance practice nurses.

^f1 indicates general physical care; 2, symptom management; 3, emotional support; 4, communication with health care providers.

^g1 indicates relationship; 2, communication; 3, intimacy; 4, sexual functioning; 5, role transitions; 6, teamwork.

^h1 indicates coping skills; 2, problem solving; 3, health self-care; 4, emotional self-care; 5, self-efficacy and esteem; 6, social support; 7, spiritual care; 8, bereavement; 9, accessing resources.

ⁱSolid bullet indicates fidelity of intervention was discussed.

^jExperimental arm was excluded from multiarm studies (ie, not included in meta-analysis).

TABLE 3. Characteristics of Family Caregivers of Cancer Patients^a

STUDY	CAREGIVERS ENROLLED AND WITH BASELINE DATA	CAREGIVER ENROLLMENT RATE	PATIENT-CAREGIVER RELATIONSHIP	CANCER TYPE AND STAGE	CAREGIVERS' DEMOGRAPHIC CHARACTERISTICS			CAREGIVER ATTRITION ^b
					GENDER	RACE	AGE, YEARS	
Badger 2007 ⁴⁴	97	84%	77% Spouse/partner 23% Other	Breast Stage I-III	74% Male	87% Caucasian 11% Hispanic 2% Other	51.7	12%
Baucom 2009 ⁴⁵	14	13%	100% Spouse	Breast Stage I-II	100% Male	86% Caucasian 14% Other	50.0	43%
Blanchard 1996 ⁴⁶	86	27%	100% Spouse	Heterogeneous Stage not specified	52% Male	97% Caucasian 3% Other	52.3	23%
Budin 2008 ⁴⁷	184	36%	54% Spouse/partner 12% Children 34% Other	Breast Stage 0-III	58% Male	70% Caucasian 13% African American 7% Hispanic 10% Other	51.6	32%
Bultz 2000 ⁴⁸	34	32%	100% Spouse	Breast Stage I-II	100% Male	NA	51.0	6%
Campbell 2007 ⁴⁹	40	25%	100% Spouse	Prostate Early stage	100% Female	100% African American	58.7	25%
Carter 2006 ⁵⁰	35	100% ^c	57% Spouse 30% Adult children 13% Other	Heterogeneous Advanced stage	63% Female	80% Caucasian 10% African American 10% Hispanic	53.0	14%
Christensen 1983 ⁵¹	20	Unknown	100% Spouse	Breast Localized stage	100% Male	NA	39.7	0%
Derdiarian 1989 ⁵²	60	Unknown	100% Spouse	Heterogeneous Stage I-IV	100% Female	NA	41.0	Unknown
Giarelli 2003 ⁵³	116	Unknown	100% Spouse	Prostate Early stage	100% Female	87% Caucasian 13% Other	54.2	17%
Given 2006 ⁵⁴	237	39%	65% Spouse 35% Other	Heterogeneous 33% Early stage 67% Advanced stage	54% Female	NA	54.9	31%
Goldberg & Wool 1985 ⁵⁵	48	65%	73% Spouse 17% Adult children 10% Other	Lung Stage not specified	83% Female	Majority Caucasian	49.6	52%
Heinrich & Schag 1985 ⁵⁶	28	78%	100% Spouse	Heterogeneous Stage not specified	NA	NA	NA	11%
Hudson 2005 ⁵⁷	106	30%	67% Spouse 16% Adult children 17% Other	Heterogeneous Advanced stage	65% Female	74% Australian 26% Other	60.8	57%
Jepson 1999 ⁵⁸	161	75%	88% Spouse 8% Adult children 4% Other	Heterogeneous 35% Stage III-IV	68% Female	85% Caucasian 15% Other	62.3	26%
Keefe 2005 ⁵⁹	82	47%	76% Spouse 14% Adult children 10% Other	Heterogeneous Advanced stage	62% Female	79% Caucasian 20% African American 1% Other	58.5	28%
Kissane 2006 ⁶⁰	282 ^c	73%	28% Partner 59% Children 3% Other	Heterogeneous Advanced stage	53% Female	NA	36.6	24%
Kozachik 2001 ⁶¹	120	53%	100% Spouse/partner ^c	Heterogeneous 48% Stage I-II 52% Stage III-IV	51% Female	NA	52.1	27%
Kuijjer 2004 ⁶²	59	94%	100% Spouse	Heterogeneous 56% Advanced stage	69% Female	NA	49.5	34%

TABLE 3. (Continued)

STUDY	CAREGIVERS ENROLLED AND WITH BASELINE DATA	CAREGIVER ENROLLMENT RATE	PATIENT-CAREGIVER RELATIONSHIP	CANCER TYPE AND STAGE	CAREGIVERS' DEMOGRAPHIC CHARACTERISTICS			CAREGIVER ATTRITION ^b
					GENDER	RACE	AGE, YEARS	
Kurtz 2005 ⁶³	237	43%	100% Spouse/partner	Heterogeneous 33% Early stage 67% Advanced stage	53% Female	92% Caucasian 5% African American 3% Other	55.2	41%
Manne 2004 ⁶⁴	68	57%	100% Spouse	Prostate 80% Stage I-II 18% Stage III-IV	100% Female	84% Caucasian 13% African American 3% Other	59.6	12%
McCorkle 1998 ⁶⁵	91	72%	100% Spouse	Lung Terminal stage	Majority female	NA	58.0	49%
McCorkle 2007 ⁶⁶	126	93%	100% Spouse	Prostate Early stage	100% Female	85% Caucasian 15% Other	56.0	15%
McMillan 2006 ⁶⁷	329	93%	Unknown	Mixed Advanced stage	85% Female	NA	61.5	69%
Mokuau 2008 ⁶⁸	18	83%	Spouse Adult children % Unknown	Heterogeneous Stage not specified	50% Female	100% Hawaiian	54.0	0%
Northouse 2005 ⁶⁹	189	80%	62% Spouse 16% Adult children 22% Other	Breast Advanced stage	69% Male ^c	77% Caucasian 19% African American 4% Other	52.0	26%
Northouse 2007 ⁷⁰	263	69%	100% Spouse	Prostate 65% Localized stage 21% Advanced stage 14% Recurrent stage	99% Female ^c	84% Caucasian 14% African American 2% Other	59.0	17%
Scott 2004 ⁷¹	94	90%	100% Spouse/partner	Breast and gynecological Stage I-III	100% Male	98% Caucasian	53.0	20%
Walsh 2007 ⁷²	271	68%	64% Spouse 25% Children 11% Other	Heterogeneous Terminal stage	79% Female	86% Caucasian 14% Other	56.3	55%

NA indicates not available.

^aWhen discrepancies in sample size existed within an article, the sample size used was based on the analysis section of the article.

^bCaregiver attrition was based on the number of caregivers who dropped out of the study between baseline and the last follow-up session.

^cInformation was obtained from the authors.

for caregivers ranged from 0.0% to 69%, with attrition due primarily to patient death. Only a few studies, mainly in palliative care and whose intervention included a focus on managing bereavement experiences, continued to assess caregivers after the patient died. Most of the caregivers were spouses (84%); the remaining 16% were comprised of adult children, siblings, other family members, or friends. The average age of adult caregivers was approximately 55 years (range, 18-92 years). In 3 studies, family members aged younger than 18 years also were included.^{47,60,72} The majority of caregivers were female (61%) and Caucasian (84%).

The majority of studies were comprised of caregivers of patients who had various types of cancer (heterogeneous) (55%); the remaining caregivers were from homogeneous patient populations (ie, breast cancer [21%], prostate cancer [17%], or lung cancer [7%]). Of the studies that reported the patients' stage of illness, approximately one-fourth of the studies were with early stage cancer patients and one-third with late-stage patients, and the remaining studies included patients with different stages of disease.

Effect Sizes Obtained for Caregiver Outcomes

Table 4 presents an overview of study findings for the multiple domains and outcomes assessed. The table provides the pooled effect sizes for intervention outcomes, 95% confidence intervals, assessment of heterogeneity across studies (Q statistic), and the Egger's t test for publication bias. Forest plots for each outcome are shown in Figures 2 to 11. Forest plots depict the effect sizes calculated for each study by outcome (■ symbol) as well as the overall effect size obtained for the outcome across studies (◆ symbol) at each time interval. The forest plots also indicate whether effects obtained in each study and across studies favor the control group or the intervention group.

Illness Appraisal Domain

Appraisal of Caregiving Burden

Caregiving burden was conceptualized as caring as a strain or demanding activity, an overinvestment, or a negative reaction to activities related to caring for the patient. Among the 11 studies that assessed caregiving burden during the first 3 months after the intervention, the overall effect size was small but significant ($g = 0.22$). Effect sizes for the 11 individual studies ranged from -0.12 to 0.62 . Five studies assessed caregiving burden between 3 and 6 months after the intervention, and the overall effect was found to be small and not significant ($g = 0.10$). Only one study reported on longer outcomes beyond 6 months, and the effect size was not found to be significant (Fig. 2).

Appraisal of Caregiving Benefit

Only a few studies addressed the appraisal of caregiving benefit as an intervention outcome. Caregiving benefit was conceptualized as caring as an opportunity for personal growth, as a rewarding experience, as an investment, and as enhancing one's self-esteem. Among the 5 studies that examined caregiving benefit during the first 3 months after the intervention, the overall effect size was small and not significant ($g = 0.17$). Effect sizes among the 5 individual studies ranged from -0.52 to 0.61 . However, based on 2 studies, interventions had a positive, significant effect on appraisal of caregiving benefit between 3 and 6 months after the intervention ($g = 0.31$). A larger but nonsignificant effect was found beyond 6 months after the intervention (Fig. 3).

Information Needs

Only 3 studies assessed whether the intervention was effective in addressing caregivers' appraisal of their information needs, such as information regarding cancer

prognosis, survival, and available resources. The number of caregivers was small in these 3 studies, and they each reported large effect sizes. The overall effect size was large and significant ($g = 1.36$). Effect sizes among the individual studies ranged from 0.85 to 1.87 . None of the studies assessed intervention effects beyond 3 months (Fig. 4).

Coping Resources Domain

Coping Strategies

Coping strategies were conceptualized as interventions to enhance coping behavior either by promoting active coping, such as problem solving, or by reducing ineffective coping, such as avoidance and denial. Interventions were superior to the usual care in enhancing coping efforts of caregivers, and this effect appeared to be long lasting. Among the 10 studies that evaluated changes in coping efforts during the first 3 months after the intervention, the overall effect size was moderate, but significant ($g = 0.47$). Effect sizes among individual studies ranged from -0.47 to 1.46 . Four studies evaluated changes in coping efforts between 3 and 6 months postintervention, and the overall effect size was smaller but still significant ($g = 0.20$). The 2 studies that evaluated coping efforts beyond 6 months of follow-up reported a persistent moderate effect that was significant ($g = 0.35$) (Fig. 5).

Self-Efficacy

Self-efficacy was conceptualized as the caregivers' perceived confidence, preparation, and/or mastery to provide care and manage the patients' symptoms. Interventions were superior to the usual care. Among the 8 studies that evaluated self-efficacy during the first 3 months after the intervention, the overall effect size was small but significant ($g = 0.25$). Effect sizes among individual studies ranged from -0.13 to 0.93 . This positive significant effect persisted over time despite the fewer number of studies that assessed self-efficacy at 3 to 6 months postintervention ($g = 0.20$) and beyond 6 months of follow-up (Fig. 6).

Quality of Life Domain

Physical Functioning

Caregivers' physical functioning was conceptualized as the performance of self-care behaviors, such as an increase in physical activity, participation in recreational activities, or improvement in their sleep quality. Among the 7 studies that assessed caregivers' physical

TABLE 4. Pooled Effect Sizes of Outcomes for Caregivers of Cancer Patients

DOMAINS/OUTCOMES	NO. OF TRIALS	NO. OF CGS	POOLED EFFECT SIZE HEDGES' <i>g</i> (95% CI)	Q FOR HETEROGENEITY	EGGER'S <i>t</i> TEST FOR PUBLICATION BIAS
ILLNESS APPRAISAL FACTORS					
Caregiving burden					
0-3 mo	11	1172	0.22 (0.08 to 0.35) ^b	13.15	1.77
3.1-6 mo	5	714	0.10 (-0.04 to 0.25)	0.65	0.42
>6 mo	1	218	0.08 (-0.19 to 0.34)	—	—
Caregiving benefit					
0-3 mo	5	380	0.17 (-0.13 to 0.46)	6.87	0.18
3.1-6 mo	2	224	0.31 (0.02 to 0.61) ^a	1.16	—
>6 mo	1	14	0.48 (-0.53 to 1.49)	—	—
Information needs					
0-3 mo	3	103	1.36 (0.92 to 1.77) ^b	1.91	7.62 ^a
3.1-6 mo	—	—	—	—	—
>6 mo	—	—	—	—	—
COPING RESOURCES					
Coping strategies					
0-3 mo	10	790	0.47 (0.16 to 0.78) ^b	37.64 ^b	1.62
3.1-6 mo	4	477	0.20 (0.02 to 0.38) ^a	1.96	3.92 ^a
>6 mo	2	267	0.35 (0.10 to 0.58) ^a	1.12	—
Caregiver self-efficacy					
0-3 mo	8	757	0.25 (0.03 to 0.47) ^a	14.24 ^a	1.49
3.1-6 mo	4	532	0.20 (0.03 to 0.37) ^a	0.47	0.38
>6 mo	1	218	0.29 (0.03 to 0.56) ^a	—	—
QUALITY OF LIFE					
Physical functioning					
0-3 mo	7	757	0.11 (-0.05 to 0.27)	6.98	4.88 ^a
3.1-6 mo	6	706	0.22 (0.04 to 0.41) ^a	6.88	1.81
>6 mo	2	278	0.26 (0.02 to 0.49) ^a	0.92	—
Distress and anxiety					
0-3 mo	16	1119	0.20 (0.08 to 0.32) ^a	6.30	0.07
3.1-6 mo	11	882	0.16 (0.03 to 0.29) ^a	6.40	0.53
>6 mo	6	447	0.29 (0.06 to 0.51) ^a	6.46	1.46
Depression					
0-3 mo	16	1315	0.06 (-0.06 to 0.18)	18.52	1.17
3.1-6 mo	11	1133	0.06 (-0.05 to 0.18)	8.23	0.12
>6 mo	3	295	-0.03 (-0.38 to 0.33)	6.62	-0.38
Marital-family relationships					
0-3 mo	10	840	0.20 (0.02 to 0.38) ^a	13.78	0.39
3.1-6 mo	8	782	0.13 (0.00 to 0.28) ^a	7.29	0.63
>6 mo	5	481	-0.04 (-0.38 to 0.31)	11.63 ^a	0.75
Social functioning					
0-3 mo	4	367	-0.14 (-0.34 to 0.07)	0.30	1.00
3.1-6 mo	6	416	0.12 (-0.06 to 0.31)	1.67	1.30
>6 mo	2	137	0.39 (0.03 to 0.74) ^a	1.06	—

CG indicates caregiver; 95% CI, 95% confidence interval.

^a*P* < .05.^b*P* < .001.

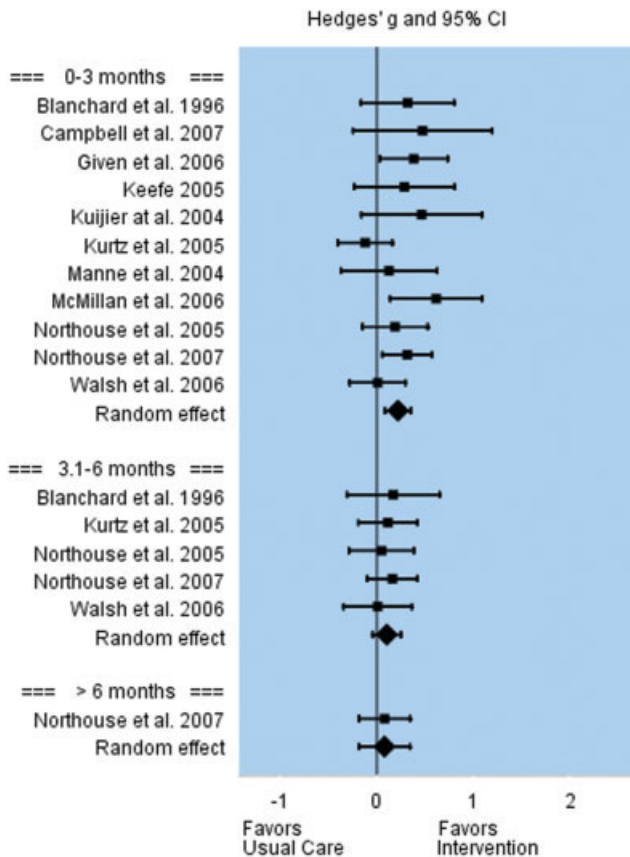


FIGURE 2. Effect Sizes for Caregiving Burden. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

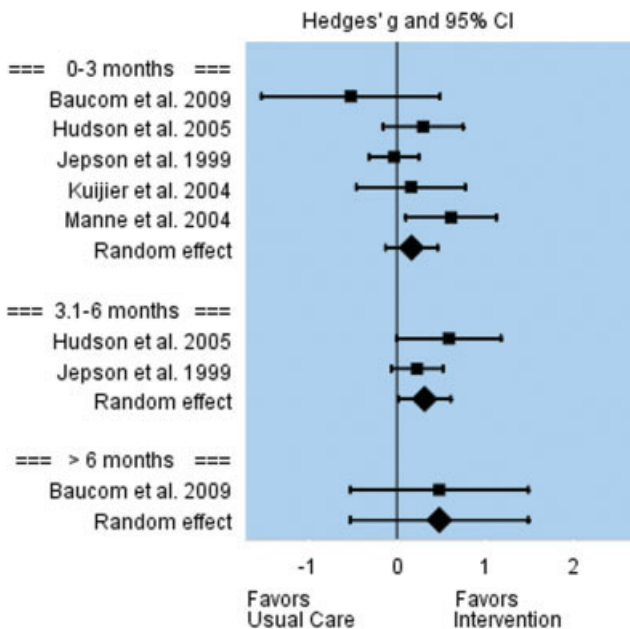


FIGURE 3. Effect Sizes for Caregiving Benefit. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

functioning during the first 3 months after the intervention, the overall effect size was small and not significant ($g = 0.11$). Effect sizes among individual studies ranged

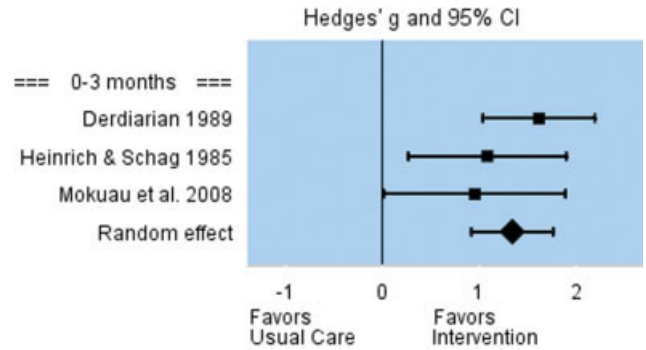


FIGURE 4. Effect Sizes for Information Needs. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

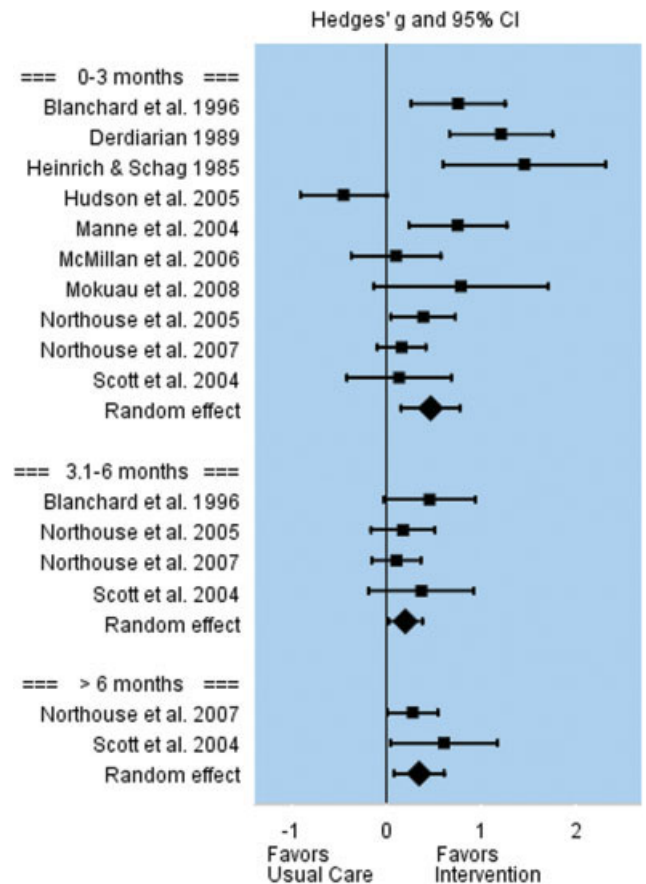


FIGURE 5. Effect Sizes for Coping. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

from -0.06 to 0.80 . However, interventions were superior to usual care for improving caregivers' physical functioning between 3 and 6 months after the intervention with small but significant effect sizes ($g = 0.22$), and beyond 6 months of follow-up ($g = 0.26$) (Fig. 7).

Distress and Anxiety

Distress and anxiety was conceptualized as emotional distress, worry, negative affect, or mood. Interventions were superior to usual care in reducing caregivers'

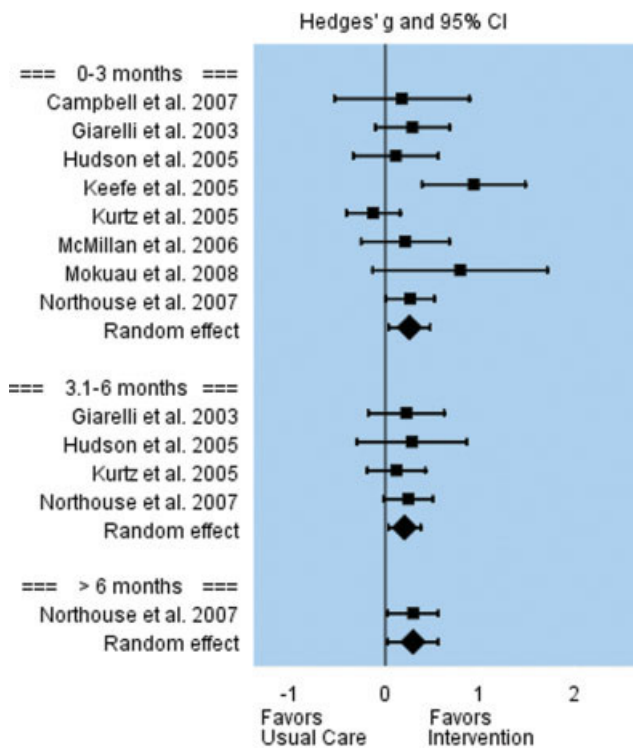


FIGURE 6. Effect Sizes for Caregiver Self-Efficacy. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

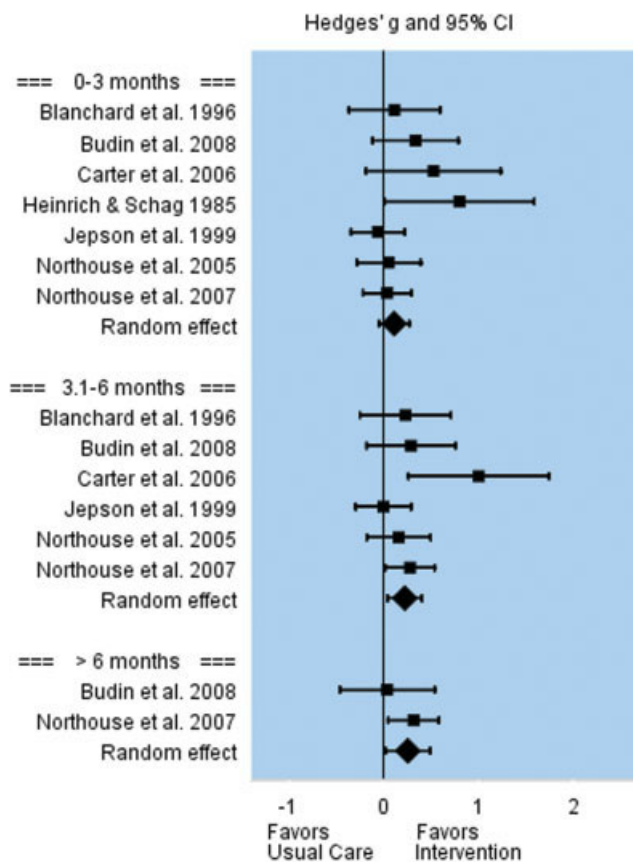


FIGURE 7. Effect Sizes for Physical Functioning. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

distress and anxiety, and the effect appeared to last for at least 12 months. Among the 16 studies that evaluated changes in mental distress and anxiety during the first 3 months after the intervention, the overall effect size was small but significant ($g = 0.20$). Effect sizes among individual studies ranged from -0.18 to 0.51 . Eleven studies evaluated changes in mental distress and anxiety between 3 and 6 months after the intervention, and the overall effect remained small and significant ($g = 0.16$). The 6 studies that evaluated caregivers' mental distress and anxiety beyond 6 months after the intervention reported a persistent small to moderate significant effect ($g = 0.29$) (Fig. 8).

Depression

Interventions were not successful in reducing caregivers' depression. Among the 16 studies that evaluated changes in caregivers' depression during the first 3 months after the intervention, the overall effect size was small and not significant ($g = 0.06$). Effect sizes among individual studies ranged from -0.25 to 0.55 . Eleven studies evaluated changes in caregivers' depression between 3 and 6 months after the intervention, and the overall effect remained small and not significant ($g = 0.06$). Three studies that evaluated caregivers' depression beyond 6 months of follow-up reported a nonsignificant effect ($g = -0.03$) (Fig. 9).

Marital-Family Relationships

Marital-family relationships were conceptualized as marital or sexual satisfaction, family support, and couple communication. Interventions were superior to usual care in improving marital-family relationships, yet this positive effect was not long lasting. Among the 10 studies that evaluated changes in marital and family relationships during the first 3 months after the intervention, the overall effect size was small but significant ($g = 0.20$). Effect sizes among individual studies ranged from -0.18 to 0.47 . Eight studies evaluated changes in marital-family relationships 3 to 6 months after the intervention, but the overall effect was no longer significant ($g = 0.13$). Five studies that evaluated marital-family relationships beyond 6 months of follow-up reported a nonsignificant effect ($g = -0.04$) (Fig. 10).

Social Functioning

Caregivers' social functioning was conceptualized as the ability to perform domestic and family roles and increased interactions with family members, friends, and peers. Interventions appear to have a delayed effect in improving caregivers' social functioning.

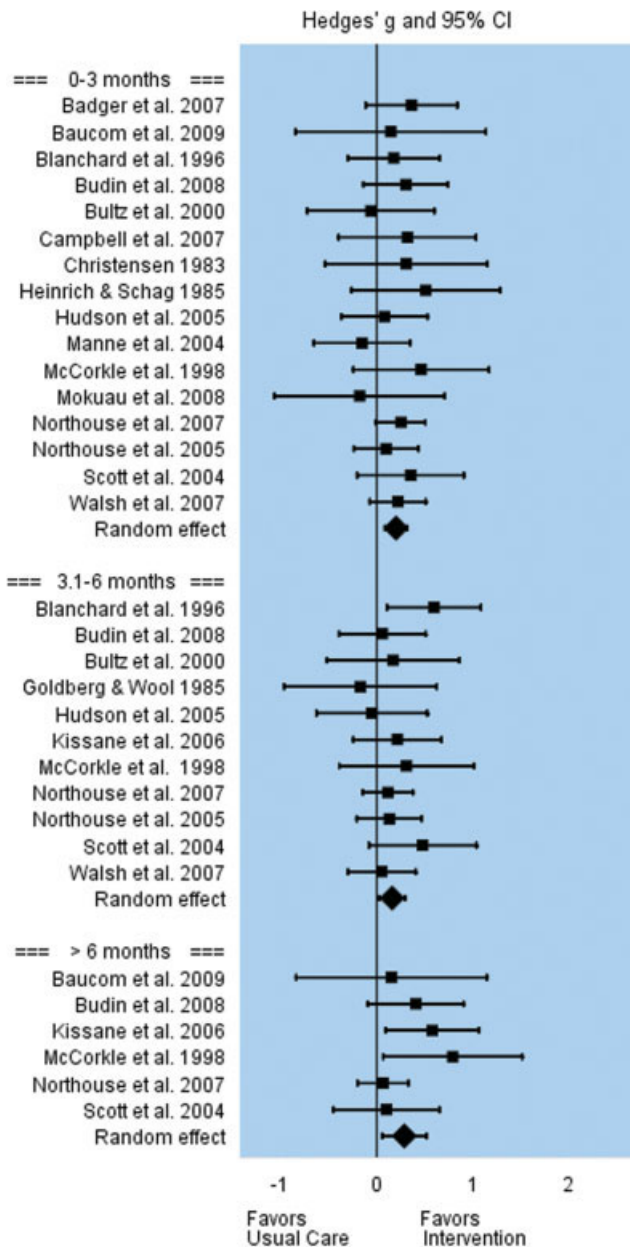


FIGURE 8. Effect Sizes for Distress and Anxiety. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

Among the 4 studies that evaluated changes in social functioning in the first 3 months after the intervention, the overall effect size was found to be nonsignificant ($g = -0.14$). Effect sizes among individual studies ranged from -0.18 to -0.04 . Six studies evaluated changes in social functioning 3 to 6 months after the intervention and, although the overall effect was positive, it was not significant ($g = 0.12$). The 2 studies that evaluated social functioning beyond 6 months postintervention reported an overall moderate effect ($g = 0.39$) that was significant (Fig. 11).

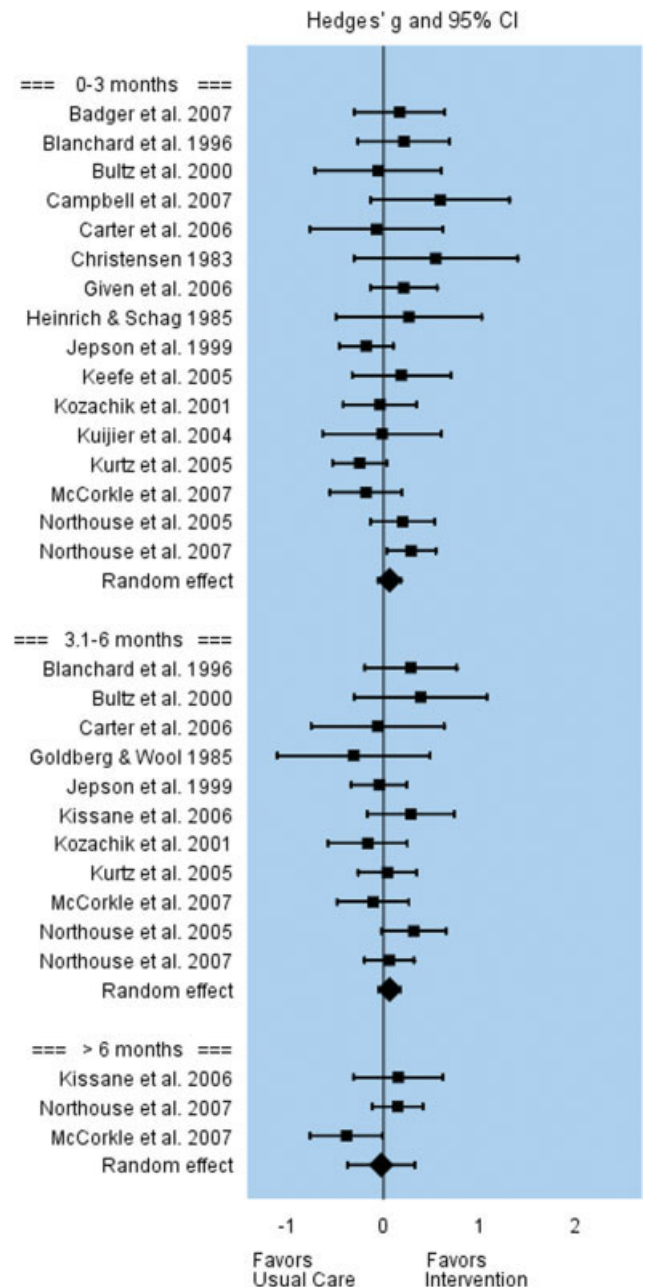


FIGURE 9. Effect Sizes for Depression. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

Moderator Analyses for Intervention Characteristics

The moderation effects of intervention characteristics were tested on each outcome. Study characteristics examined were: 1) intervention participants (caregivers alone vs caregivers with patients); 2) mode of delivery (face-to-face vs telephone vs group vs mixed); 3) primary content (psychoeducational vs skills training vs therapeutic counseling); and 4) intervention dose (total hours, total number of sessions, and duration in weeks).

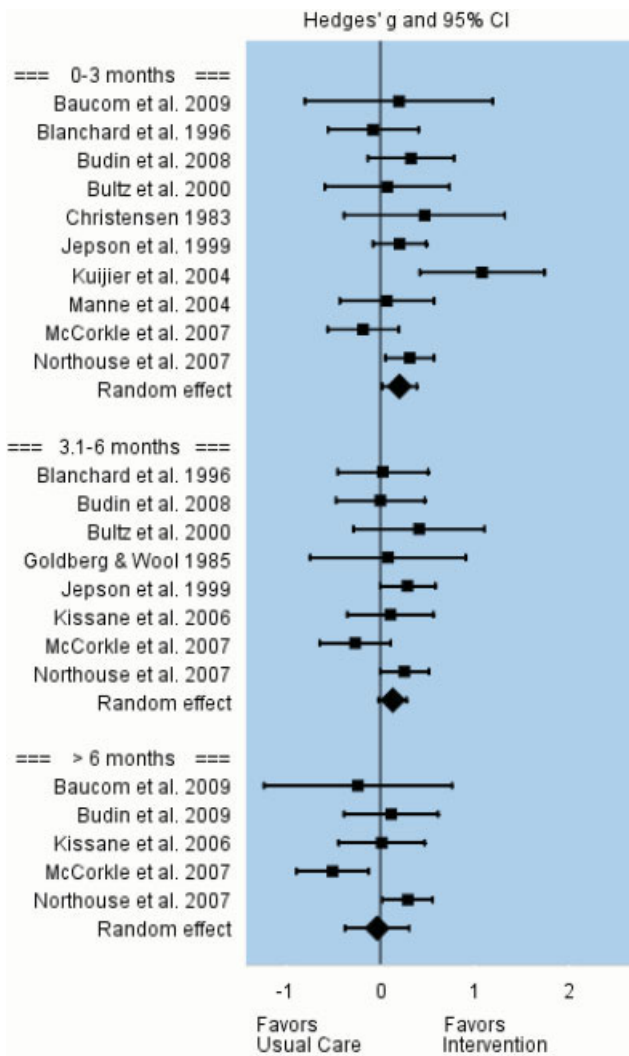


FIGURE 10. Effect Sizes for Marital-Family Relationships. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

Moderators of intervention outcomes were examined for the initial follow-up after the completion of the intervention when the number of studies assessed was the largest. Among the 29 studies, the initial follow-up occurred an average of 5.86 weeks after the completion of the intervention.

Table 5 presents intervention characteristics that significantly affected specific outcomes. For categorical intervention characteristics (eg, type of participants), the Hedges' *g* for a subgroup refers to the effect of the interventions pooled across all studies with the same characteristic. A significant and positive coefficient indicates that the intervention was effective for that subgroup. The significance level of the *Q* statistic on the overall moderator line denotes whether there were significant differences in intervention effect sizes between subgroups. For continuous

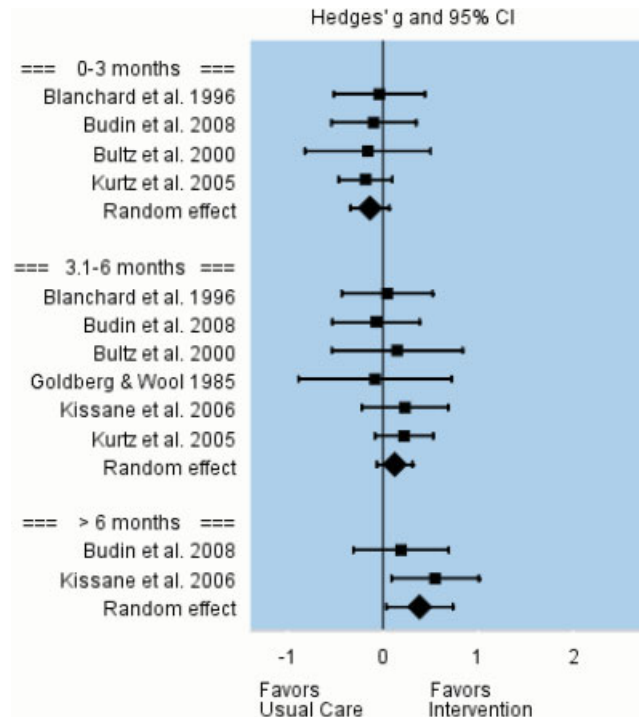


FIGURE 11. Effect Sizes for Social Functioning. 95% CI indicates 95% confidence interval; ■, effect sizes calculated for each study by outcome; ◆, the overall effect size obtained for the outcome across studies at each time interval.

intervention characteristics (eg, the number of intervention hours), the sign of the coefficient indicates the direction of the relation between study effectiveness and intervention dose level.

Coping was found to be significantly influenced by several intervention characteristics. Studies using face-to-face and group methods of intervention delivery yielded better outcomes than those using mixed methods of intervention delivery. The intervention hours (mean, 7.0) and the number of sessions (mean, 5.2 sessions) were found to be both positively and significantly correlated with the coping outcome; longer intervention hours and/or more sessions yielded better results in coping. In contrast, in the case of caregiver burden, depression, and marital-family relationship outcomes, interventions with more sessions reported significantly more negative (worse) outcomes than those with fewer sessions. Finally, interventions that included caregivers alone reported significantly better outcomes in the appraisal of caregiving benefit than interventions that included both caregivers and cancer patients.

Discussion

The current meta-analysis examined the content of 29 RCTs addressing the needs of family caregivers of cancer patients, and examined the efficacy of these

TABLE 5. Moderator Analyses

OUTCOMES AT INITIAL FOLLOW-UP AND MODERATORS	NO. OF TRIALS	NO. OF CGs	POOLED EFFECT SIZE OF HEDGES' <i>g</i> (95% CI) ^c	<i>Q</i> FOR HETEROGENEITY
CAREGIVING BURDEN				
No. of intervention sessions (M, 5.3)	11	1192	-0.08 (-0.13 to -0.02) ^a	7.17 ^b
CAREGIVING BENEFIT				
Participants				4.77 ^a
CGs only	2	135	0.44 (0.10 to 0.77) ^a	0.83
CGs + patients	3	245	0.03 (-0.28 to 0.22)	1.27
COPING STRATEGIES				
Mode of delivery				10.23 ^a
Face-to-face	2	78	1.06 (0.42 to 1.71) ^b	0.60
Group	2	85	1.01 (0.39 to 1.63) ^a	1.89
Mixed	3	444	0.07 (-0.07 to 1.43)	8.63 ^a
No. of intervention h (M, 7.0)	9	730	0.08 (0.00 to 0.17) ^a	3.66 ^a
No. of intervention sessions (M, 5.2)	9	730	0.23 (0.04 to 0.42) ^a	5.42 ^a
DEPRESSION				
No. of intervention sessions (M, 6.5)	11	1448	-0.05 (-0.08 to -0.02) ^a	11.19 ^b
MARITAL-FAMILY RELATIONSHIPS				
No. of intervention sessions (M, 7.2)	12	942	-0.04 (-0.08 to -0.001) ^a	4.09 ^a

CG indicates caregiver; 95% CI, 95% confidence interval. M, mean.

^a $P < 0.05$.

^b $P < 0.001$.

^cA significant and positive coefficient indicates that intervention was effective for that subgroup.

interventions on different caregiver outcomes. The types of interventions delivered to caregivers in the 29 RCTs were psychoeducational, skills training, and/or therapeutic counseling. Many protocols were comprehensive in scope and addressed psychoeducational and skills training activities as primary or secondary goals. The majority of these interventions included content for caregivers that addressed caring for the patient, maintaining family and marital relationships, and caring for themselves, suggesting some consensus that these are essential content areas for interventions offered to caregivers. However, it should be noted, that many of the interventions were designed to address primarily patient care. Content regarding caregiver self-care was a secondary focus provided incidentally or as an afterthought in some patient-focused interventions. Fewer intervention protocols were designed with a goal of focusing on content related to caregivers' self-care.

We observed 2 indicators of intervention quality in the studies reviewed. First, the majority (86%) included theory-driven intervention protocols, which

decreased the likelihood of isolated or chance findings. There was considerable variability, however, because some studies mentioned the theory in passing or in generic terms (eg, cognitive-behavioral approach), whereas others indicated specific theories (eg, Lazarus or Bandura) and demonstrated how the theory was used in the identification of hypotheses, the selection of intervention content, and the choice of outcomes. Second, the majority of studies (75%) instituted ways to examine the fidelity of the interventions (ie, the extent to which the designated protocol was delivered by intervention staff in a consistent manner). Investigators used protocol manuals, taperecorded sessions, intervention logs, and/or independent reviewers to assess or maintain intervention fidelity, indicating a growing understanding of the importance of adherence to standardized protocols.

The majority of interventions were delivered jointly to patients and their family caregivers, suggesting that investigators recognize that both persons are affected by the illness. Only 9 of the 29 studies focused solely

on caregivers by design, and those that did generally used an individual face-to-face or telephone format. Only 2 studies conducted caregiver groups, an approach with potential value for caregivers to interact openly with other caregivers without the presence of the patient. There was considerable variability in the intervention “dose” among protocols, both in the number of sessions (range, 2-12 sessions) and the duration of interventions (range, several days to 18 months). There also was variability regarding the proportion of the intended “dose” the caregiver could miss and still be considered an evaluable case. Mode of delivery and intervention dose appear to be areas that need further evaluation or standardization within studies; otherwise, it is difficult to determine whether, or how much, the dose of the intervention or mode of delivery affects study outcomes.

One of the most important findings of this meta-analysis was that interventions delivered to family caregivers of cancer patients had a significant, positive effect on multiple outcomes. The multiple caregiver outcomes exemplify the multifaceted impact of caregiving and point to the diversity of intervention effects that can be achieved. Caregivers reported better outcomes in the illness appraisal domain (less caregiving burden, greater caregiving benefit, and fewer information needs), coping resources domain (use of more effective coping strategies and higher self-efficacy), and quality of life domain (better physical functioning, less distress and anxiety, better marital-family relationships, and improved social functioning). Intervention effects were evident soon after the intervention for many outcomes, but were delayed for other outcomes such as caregiver benefit, physical functioning, and social functioning in longitudinal studies. These delayed effects may be because of the additional time required for caregivers to make the necessary changes or adjustments, and to realize the improvements in these outcomes as a result of their efforts. Positive and sustained intervention effects were found for coping, self-efficacy, and distress/anxiety outcomes across studies and at initial, intermediate, and long-term assessments.

The small to medium effect sizes found for interventions in this meta-analysis were similar to the effect sizes found for outcomes in other meta-analyses either with family caregivers of patients with chronic illness⁷³⁻⁷⁵ or with cancer patients themselves. For example, prior meta-analyses that examined the efficacy of psychosocial

interventions found an overall moderate effect on cancer patients' quality of life,^{76,77} and on cancer patients' anxiety.^{76,78,79} These findings are comparable to the small to moderate intervention effects we found with regard to most quality of life outcomes for caregivers in the current meta-analysis.

Interventions were not found to be effective in reducing caregiver depression. Explanations provided by individual investigators included low levels of baseline caregiver depression⁶³ and the high rate of attrition among depressed caregivers.⁶¹ A previous meta-analysis, examining patients with all types of cancer, reported that interventions were not effective in reducing cancer patients' depression,⁷⁸ a finding comparable to the current study. However, another meta-analysis reported a moderate to strong effect in trials assessing depression in patients with breast cancer.⁷⁶ These conflicting reports could potentially be attributed to the effects of gender and/or type of cancer. Finally, a prior meta-analysis indicated that interventions that improve coping in cancer patients appear to be more effective than those that aim to reduce depression in cancer patients.⁷⁶ This finding is directly comparable to our findings for depression and for the positive and sustained outcomes we found in the coping resources domain.

There are several factors that may have contributed to the small to medium effects observed in the current meta-analysis. Many of the studies we analyzed had small sample sizes (eg, pilot studies) and high attrition rates, causing them either to be underpowered to detect intervention effects (Type 2 error) or to report inaccurate, large effect sizes (publication bias).⁴⁰ The only large intervention effect we found was for reducing caregivers' need for information, and the significance of this finding is compromised by a significant Egger's *t* test, which suggested a possible publication bias. However, the meta-analysis from Sorensen et al⁷⁵ also found large effects for improving caregivers' ability/knowledge, which implies that this finding may not be accidental. It is interesting to note that although the provision of information was included in nearly all of the interventions analyzed in this meta-analysis, very few measured change in the level of knowledge as a specific outcome. In addition, only 24% of the studies assessed intervention effects beyond 6 months after the intervention, hindering the power to detect long-term or delayed effects. Some studies were conducted with cancer patients and caregivers during a time when patients were doing well

and caregiving demands were low, thereby leaving little room for improvement in intervention outcomes.⁴⁶ In some studies, caregivers received fewer intervention sessions than patients (ie, 3 vs 6 sessions) or a less targeted intervention compared with patients, thereby decreasing the likelihood of detecting intervention effects.^{44,66} Finally, although interventions improved caregiver outcomes in some studies, they could not cure the patient's disease or stop the disease from progressing, which therefore remained ongoing threats for the caregiver.

Moderator analyses yielded interesting results. Studies that addressed coping as an outcome were found to have better results with a higher intervention dose (more intervention hours and more sessions). Coping behavior was enhanced either by promoting active coping, such as problem solving, or by reducing ineffective coping, such as avoidance and denial. Thus, the finding that a higher intervention dose yielded better outcomes makes intuitive sense; changing a problematic coping behavior or enhancing a good coping strategy requires engagement with the task and changes take time to occur. Interventions delivered in face-to-face or in group meetings yielded better coping outcomes than those using a mixed method of intervention delivery. One possible explanation for this finding is that in some studies that used a mixed method of intervention delivery (face-to-face and telephone), the face-to-face meetings were focused primarily on patients' needs with the caregiver in attendance, whereas the telephone calls were focused entirely on the caregiver alone. It is possible that this approach did not allow the patient and the caregiver to work together as a team and enhance a common coping strategy. In any case, when using a mixed mode of delivery, it is difficult to separate the results attributable to the telephone portion of the intervention from those from the face-to-face portion because these 2 approaches are nested in one set of results.

Interventions that included only caregivers resulted in a more positive appraisal of caregiving benefit. These interventions were better able to focus on caregivers' own needs and gave them the opportunity to better reflect on the meaning and importance of, as well as their confidence in, their caregiving role. The finding that interventions addressing caregiving burden, depression, and marital-family relationships yielded worse outcomes with a

higher number of sessions is more difficult to interpret. Perhaps caregivers experiencing more burden or more marital-family conflict have difficulty participating in longer interventions because such interventions take time away from their caregiving tasks or family responsibilities and unintentionally add to their caregiver stress. It is also possible that more depressed caregivers are more likely to drop out of longer interventions, thereby lessening the effect of the intervention on caregiver outcomes. Clearly, more research is needed to fully examine the correlation between intervention length and caregiver outcomes.

Limitations of the Study

First, we did not include studies published in languages other than English, unpublished studies, dissertations, or abstracts from conference proceedings. On the one hand, including only published materials ensures that higher quality, peer-reviewed studies were included in the meta-analysis; conversely, excluding unpublished studies is likely to introduce an upward bias into the size of the effects found, which means that calculated effect sizes are likely to be larger.⁴⁰ To address this limitation, we assessed the heterogeneity of findings with the *Q* statistic and publication bias with the Egger's *t* test statistic. Publication bias appeared in only 3 outcomes, and may be related to a few studies with smaller sample sizes that assessed these outcomes. However, the effect sizes we reported are comparable to the effect sizes of other meta-analyses that assessed the outcomes of cancer patients. Second, given the large number of moderators and the multiple outcomes we tested, we had a high chance of incidental findings of statistically significant moderators. To account for this bias, we presented and interpreted moderators that were significant at a .05 level for an overall outcome and not those that were significant for a subgroup within a particular outcome. Third, each of the moderators was examined in separate analyses. We did not assess multiple moderators in one meta-regression model due to the small/moderate number of studies for each outcome. Finally, we limited our choice of moderators to characteristics of the interventions rather than characteristics of the caregivers (ie, age, gender, education, etc).

Clinical Application of Findings

There are several implications from this meta-analysis for clinicians and other health professionals working with cancer patients and their family caregivers. First, clinicians need to recognize that patients and their family caregivers react to cancer as a unit and, as a result, they both have legitimate needs for help from health care professionals. There is general consensus in the literature that when patients and caregivers are treated simultaneously, important synergies are achieved that contribute to the well-being of each person.^{9,80} When caregivers' needs are not addressed, their mental and physical health is at risk, and patients are denied the opportunity to obtain optimal care from a well-prepared family caregiver. Programs of care directed only toward patients are seldom sufficient to meet patients' needs because so much of the patient's care depends on family caregivers. To provide optimal comprehensive cancer care, the care plan must focus on these patient-caregiver units.

Second, there is clear evidence from this meta-analysis that interventions provided to caregivers of cancer patients can have many positive effects on important caregiver outcomes. Although effects were small to moderate in size, interventions show promise in achieving clinically significant outcomes. Although interventions did not improve caregivers' overall quality of life, there is evidence that specific components of quality of life were responsive to these interventions. Interventions significantly reduced caregivers' burden, improved their ability to cope, increased their confidence as caregivers, reduced their anxiety, and improved marital and family relationships. These interventions appear to produce more prepared, less distressed caregivers which, in turn, is likely to result in more positive benefits for patients. Our findings are consistent with reports of interventions targeting caregivers of chronically ill patients with dementia. Caregivers of dementia patients benefited from enhanced knowledge about the disease, the caregiving role, and available resources.⁸⁰ Once their information needs were met, they benefited from additional training in general problem-solving skills.⁸⁰

Third, there are several theory-based, comprehensive interventions that have been developed and tested in randomized trials. To our knowledge, few, if any, of these interventions have been translated to or implemented in clinical practice settings. Both researchers

and clinicians need to work together to determine ways to implement efficacious, evidence-based interventions in oncology treatment sites in which caregivers can benefit from them. The majority of these evidence-based interventions will not move from efficacy studies (Phase 3) to effectiveness studies (Phase 4) unless researchers, clinicians, and funding agencies collaborate to facilitate the implementation of these studies in practice settings.

Directions for Future Research

Based on the findings from this meta-analysis, we have identified several areas in need of further research.

- Future studies need to have more racial, cultural, and socioeconomic diversity. In this meta-analysis, 16% of the participants were self-identified as members of a minority group and only 2 studies were tailored for a particular cultural or racial group.^{49,68}
- More studies need to examine caregivers' self-care behaviors and the physical health outcomes that follow. Caregivers often place patients' needs above their own and as a result spend less time on health promotion activities for themselves such as physical activity or cancer screening. Over time, this could have negative consequences on caregivers' health.
- There is a need for more research studies that identify patients and caregivers who are at higher risk for poorer outcomes, so that interventions can be targeted to them. Although all caregivers should be provided with basic caregiving information as part of a comprehensive cancer care program, every effort should be made to identify those families at greater risk who are likely to benefit the most from additional interventions.
- There is a need for large, well-funded, multisite studies to obtain larger samples of patients and caregivers in a reasonable amount of time, with long-term, postintervention follow-up, and with a greater ability to generalize findings. Conducting intervention studies with cancer patients and their family caregivers is challenging and requires the support of clinicians, who can inform potential participants about available studies and encourage them to participate. These studies also need to be integrated into clinical care to determine how effectively they can be implemented in practice settings.

- Studies are also needed that assess intervention costs and their possible effect on health care resources. Of the 29 studies we examined, none addressed cost issues. More research is needed regarding how efficacious interventions can be delivered in a cost-effective manner.
- There is a need for studies that assess the potential for using technology to deliver effective interventions to caregivers. In our search of the literature for this meta-analysis, we found no published studies using the World Wide Web with our target population. This may be an important mode of intervention delivery to consider for future studies.
- There is a need to consider the clinical significance of interventions targeting the caregivers of cancer patients in addition to their statistical significance. One major step in accomplishing this goal is to increase their methodological rigor by being equally

assured that studies are neither underpowered nor overpowered. A second step is to obtain consensus among health care professionals from multiple disciplines on a set of core outcomes that are important to include and measure in all caregiver studies.⁸⁰ Finally, consensus also is needed regarding the importance of the relationship between clinical and statistical significance, because even if effects are small, they may be important and associated with clinically meaningful outcomes.

In summary, findings from this meta-analysis indicate that interventions targeted to family caregivers of cancer patients can have a positive effect on many important caregiver outcomes. Researchers and clinicians need to work together to find ways to deliver research-tested interventions to patients and their caregivers so that both can cope effectively with the demands of cancer, and maintain their quality of life. ■

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