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Interventions to Improve the Preparedness to Care for Family Caregivers of Cancer Patients

A Systematic Review and Meta-analysis

KEY WORDS

Cancer
Caregivers
Education
Meta-analysis
Nurse
Preparedness

Background: Preparedness for caregiving could balance the negative impacts of caregiving. The interventions aimed at increasing readiness among the caregivers are important during the illness period for both patients and their caregivers. **Objectives:** The aims of this study were to review the interventions applied to the caregivers of cancer patients and to examine the effects of these interventions on the preparedness to care. **Methods:** The ScienceDirect, Scopus, CENTRAL, Web of Science, MEDLINE, and PubMed were searched for relevant studies published between 2000 and 2020. The methodological quality was assessed using the Quality Assessment Tool for Quantitative Studies. The statistical analyses were performed using the Comprehensive Meta-Analysis software version 3.0. The publication bias was assessed using the Egger test, for funnel plots. **Results:** Eleven studies were selected for the meta-analysis, including those about psychoeducation programs ($n = 5$), education programs ($n = 3$), supportive programs ($n = 2$), and a self-care support program for the caregivers ($n = 1$). The methodological quality assessment revealed 2 studies as “strong.” The results indicated an increase in the caregivers’ preparedness to care after the interventions. The subgroup analysis revealed that the programs with higher ratios of female caregivers were more effective. **Conclusion:** The interventions applied to the family caregivers can exert beneficial effects on caregivers’ preparedness to care. Nonetheless, future studies should focus on

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The authors have no funding or conflicts of interest to disclose.

Author Contributions: Conceptualization: A.B. and L.O. Data curation: A.B. and L.O. Formal analysis: A.B. and L.O. Investigation: A.B. and L.O. Methodology: A.B. and L.O. Resources: A.B. and L.O. Software: A.B. Supervision: A.B. and L.O. Validation: A.B. and L.O. Visualization: A.B. Roles/writing – original draft: A.B. and L.O. Writing – review and editing: A.B. and L.O.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal’s Web site (www.cancernursingonline.com).

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Accepted for publication July 13, 2021.

DOI: 10.1097/NCC.0000000000001014

methodological issues, such as randomization and blinding. **Implications for Practice:** Nurse-driven interventions may be used as a useful strategy to improve the preparedness to care among the caregivers of cancer patients. The male caregivers should be closely followed by healthcare professionals for knowledge and support needs.

Preparedness is defined as a caregiver's readiness for the caregiving roles, such as fulfilling the physical and emotional requirements of the patient, planning care, and managing the stressors.^{1,2} Preparedness consists of 2 domains: emotional and practical preparedness.^{3,4} Emotional preparedness covers coping with a broad range of emotions from burden in the caregiving process to the loss of the patient. Practical preparedness includes adapting to necessary changes in daily life, such as assuming the new household, financial, and other daily responsibilities. Both emotional and practical preparedness for the caregiving process may balance the negative impacts of caregiving.⁵ Studies have reported that the caregivers who felt prepared experienced fewer worries during caregiving.^{6,7} In addition, increasing the caregivers' preparedness to care is associated with a lower burden.^{8,9} Scherbring¹⁰ reported that every 1-unit increase in the preparedness to care resulted in a decrease of approximately 17% in the caregiver's burden. Considering its effect on caregiver burden, the preparedness to care is of critical importance for family members who care for patients in need of long-term support.²

Cancer patients need long-term care because of numerous symptoms, including pain, fatigue, sleep issues, depression, anxiety, and stress.¹¹⁻¹³ The symptom burden results in the cancer patients encountering difficulties in their daily activities, such as eating, walking, and even communicating. Therefore, the dependence of cancer patients on family caregivers increases.^{14,15} Family caregivers have to put several efforts into supporting the daily requirements of patients, decrease their symptom burden, and endure the stress of having a loved one experiencing a life-threatening disease.^{7,16} The family caregivers have essential responsibilities, including symptom management, medication monitoring, transportation, care coordination, and emotional support.^{17,18} The family caregivers endeavoring to fulfill both familial and caregiver roles may face several problems associated with their own physical and psychological health, daily-life activities, work life, social activities, and recreation.^{19,20} The family caregivers may feel highly burdened during the illness period as they deal with several challenges associated with loss and death during the palliative care period.^{9,21} Usually, the caregivers experiencing these physical and psychosocial problems initially define caregiving as a daunting task.²² According to recent studies, the caregivers reported feeling heavily burdened and having poor preparedness to care.^{1,2} The lack of caregiver preparedness to provide complex care may increase their physical problems, such as lack of sleep and fatigue. These physical problems decrease their well-being and overall quality of life.^{6,8} In addition, when the physical and psychological well-being of the caregivers is reduced, the status of the patients also worsens.³ In particular, the patients with caregivers unprepared for care can experience

higher symptom burden, anxiety, and stress due to inadequate symptom management and emotional support.^{3,22}

To foster beneficial effects of the preparedness to care on caregivers and patients, several interventions are required for better management of the care process and to increase the level of caregiving preparedness.¹⁰ These interventions that are aimed at increasing the readiness among the caregivers are important during the illness period for both patients and caregivers.^{1,23} Interventions include educational, supportive, self-care, and psychoeducational programs conducted by a nurse-led or an interdisciplinary team.^{5,7,24} Although the educational, supportive, and self-care programs are named differently in studies, they are very similar in content.^{23,25,26} These interventions address the roles of caregivers, information about the disease and treatments, symptom management, prevention of infection, nutrition, and coping with stress.^{26,27}

Psychoeducation is an evidence-based therapeutic intervention for caregivers that provides information and support to better understand and cope with illness.²⁸ Psychoeducation for caregivers aims to promote psychological well-being, resolve existential issues, prepare for the ill relative's death, and the grief process.⁵ Overall, the content of these educational, supportive, self-care, and psychoeducational interventions is intended to increase the preparedness of caregivers in alignment with certain theoretical frameworks. Studies usually use the theoretical framework of Andershed and Ternstedt²⁹ for caregiving interventions for family members.⁵ This framework defines family caregivers' roles in palliative caregiving and focuses on knowing, being, and doing. Knowing is essential for family caregivers and is linked with an awareness of the patient's critical status and the roles of caregivers. Being is associated with the management of the caregiver's own emotion as well as the patient's. Doing consists of the practical aspects of caregiving. The overall aim of this theoretical framework is to promote preparedness for caregiving among family caregivers through interventions.²⁹

To the best of our knowledge, the literature contains a few intervention studies evaluating the preparedness to care among caregivers.^{5,24,26} A systematic review investigating the effects of nursing interventions on family caregivers of end-of-life patients emphasized that interventions applied to caregivers have a significant effect on increasing preparedness to care.³⁰ However, the effect of the interventions applied to caregivers and their preparedness to care is not clear due to some differences in the intervention content, duration, and sample characteristics. Future studies involving interventions for caregivers need to take into account content and duration of the intervention. It is essential to present interventions aimed at increasing the preparedness of caregivers from a holistic perspective.

This meta-analysis attempts to provide an overview of the effects of interventions on the preparedness of caregivers of cancer

patients. The objectives of this meta-analysis were as follows: (1) to summarize the interventions applied to the caregivers of cancer patients on their preparedness to care, (2) to reveal the effects of these different interventions on the preparedness to care, and (3) to determine the methodological quality and evidence level of the included studies. The results of this meta-analysis provide evidence-based recommendations for the interventions on the preparedness to care aimed for caregivers of cancer patients.

■ Methods

Study Design

A meta-analysis study design was adopted. This study was reported in accordance with the Preferred Reporting Items for Systematic Review and Meta-analyses guidelines. The Participants, Intervention, Comparison, and Outcome (PICO) strategy was applied to formulate the research questions.³¹ The family caregivers of the cancer patients formed the participants (P) of the present meta-analysis. The interventions (I) included all the educational, supportive, self-care, and psychoeducational interventions, and all the studies applying or not applying the comparison (C) strategy. Preparedness to care was accepted as the outcome (O) variable. According to this PICO strategy, the formulated research questions were as follows: “Are the interventions applied to the family caregivers effective on the preparedness to care?” and “If effective, what is the level of effectiveness of these interventions on the caregivers’ preparedness to care?”

Search Strategy

ScienceDirect, Scopus, Cochrane Central Register of Controlled Trials, Web of Science, MEDLINE, and PubMed were searched for relevant studies published between 2000 and 2020 years. The search strategy involved using the following MeSH terms and keywords for all the databases: (1) “Caregivers” OR “Carers” OR “Family caregivers” OR “Spouse caregivers,” AND (2) “Oncology” OR “Cancer” OR “Neoplasm” OR “Neoplasia” OR “Tumors” OR “Malignancy,” AND (3) “Preparedness.” The initial literature review for the present meta-analysis was performed between July 2020 and August 2020, and the search strategy was repeated during September 2020 to October 2020 to update the meta-analysis before publication (Supplemental Digital Content 1, <http://links.lww.com/CN/A39>).

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: (1) studies involving caregivers of cancer patients of any diagnosis and at any stage of cancer; (2) studies conducted with adults older than 18 years; (3) studies that reported the caregivers’ preparedness to care with no limitations in the assessment scales; (4) studies that included intervention for the preparedness to care such as educational, supportive, self-care, and psychoeducation; (5) studies published in English and between the years 2000 and 2020; and (6) studies with an experimental design (including randomized controlled

trials [RCTs], non-RCTs, and 1-group pretest-posttest design studies). The exclusion criteria were as follows: (1) studies designed as a review, case study, cross-sectional study, or qualitative study; (2) gray literature including studies published in non-peer-reviewed journals and those not controlled by commercial publishing organizations; (3) thesis, expert opinions, letters, and conference papers; and (4) unpublished studies. As the present review focused on the studies designed specifically for assessing the preparedness to care among the family caregivers of cancer patients, the scales that assessed quality of life, symptoms, or psychosocial status were not included.

Data Extraction

The Endnote X8 reference-management software package was used to aggregate citations from all databases in this review. After discarding the duplicate studies, the titles and abstracts of all the studies were screened according to the inclusion criteria by 2 investigators. Subsequently, all the full-text articles were reviewed independently by the 2 authors according to the inclusion and exclusion criteria. The data from the included studies were collected into a previously prepared data collection form, which included the following titles: first author, publication date, country, study design, type of patients, inclusion criteria, sample size, age of caregivers, gender of caregivers, intervention type, duration of intervention, intervention strategies, control strategies, training providers, scales, assessment times, and results. Any discrepancies in the extracted data were resolved through discussion.

Quality Appraisal

The levels of evidence were classified according to the evidence level hierarchy adopted by the Joanna Briggs Institute,^{32,33} which includes 7 levels from 1 to 7. Evidence level 1 includes a systematic review or meta-analysis of all the relevant RCTs. Evidence level 2 presents the results from a well-designed RCT. Evidence level 3 comprises the findings of well-designed non-RCTs. Evidence level 4 considers case-control or cohort studies. Evidence level 5 includes a meta-analysis of descriptive and qualitative studies. Evidence level 6 contains the results of qualitative or descriptive studies. Finally, evidence level 7 includes reports and/or opinions of the experts. The present meta-analysis included studies at evidence levels 2, 3, and 4. The methodological quality was assessed using the Quality Assessment Tool for Quantitative Studies of the Effective Public Health Practice Project and is used to assess intervention studies, including RCTs, non-RCTs, and pretest-posttest studies. This tool contains 6 items, including the design, selection bias, blinding, confounders, method of data collection, and withdrawal from the study. Each item on the tool is scored as “strong,” “moderate,” or “weak.” The global rating for each study is obtained. The studies with no weak scores indicate a strong methodological quality, the studies with 1 weak score indicate a moderate methodological quality, and the studies with 2 or more weak scores indicate poor methodological quality.^{34,35} The quality of the included studies was evaluated independently by the 2 authors, and a consensus was achieved through discussion.

Outcome

The effects of interventions on the preparedness to care of the caregivers of cancer patients were analyzed. All the included studies used the Preparedness for Caregiving Scale designed originally by Archbold et al.⁴ This scale assesses the caregiver's perception of their preparedness to manage the roles and stresses of caregiving. The scale contains 8 items, each of which is scored from 0 to 4. The total score, obtained by summing the individual scores for all the items, ranges from 0 to 32. A high score indicates greater feelings of preparedness to care. This scale has acceptable reliability when administered to the caregivers of cancer patients, as evidenced by the Cronbach's α coefficient of 0.72 reported previously.⁴ Henriksson et al.³⁶ reported a Cronbach's α coefficient of 0.90 for this scale in a sample of caregivers of patients receiving palliative care.

Data Synthesis

The outcomes were analyzed using the Comprehensive Meta-Analysis software version 3.0 (Biostat, Englewood, New Jersey). The Q statistic and I^2 statistics were used to evaluate heterogeneity. The I^2 statistics values were categorized into no (0%-25%), low (25%-50%), moderate (50%-75%), and high (75%-100%) heterogeneity. A fixed-effects model was used to present the studies in the case of $I^2 \leq 50\%$ and $P > .1$; otherwise, a random-effects model was applied. In addition, the τ^2 statistic was used to complement the assessment of heterogeneity and reveal the variance among the studies. The standardized mean difference (SMD) with a 95% confidence interval (CI) was used to report the effect size. Cohen's d was adopted as the measure of the effect size for each study and was weighted by the sample size of that study. These d values were then averaged to calculate the overall effect size. The d value was converted to a z value. Moreover, forest plots were prepared to visualize the effect size and the SMD with 95% CI. Publication bias was examined visually using funnel plots. An asymmetrical funnel plot represents a potential publication bias. The Egger regression test was applied to test the asymmetrical funnel plot. Subgroup analysis and meta-regression were performed to assess any potential moderating variables. The subgroup analysis and meta-regression were performed according to the sample size, age, gender, duration of the intervention, the training providers, intervention setting, and the type of intervention.

■ Results

Study Selection

A total of 1975 studies were obtained upon searching the databases, of which 1454 were duplicates. The titles and abstracts of the remaining studies were screened according to the inclusion and exclusion criteria, and 503 studies were excluded for not fulfilling the inclusion criteria. The full texts of the remaining 18 studies were reviewed according to the inclusion criteria, and 7 studies were excluded because these

did not evaluate the caregivers' preparedness to care. The remaining 11 studies were finally included in the present meta-analysis (Figure 1).

Study Characteristics

Most of the selected studies were from Australia ($n = 5$), whereas the remaining ones were conducted in the United States ($n = 4$), Sweden ($n = 1$), and the United Kingdom ($n = 1$). Four of the studies were designed as an RCT, whereas the remaining ones were designed as a 1-group pretest-posttest ($n = 5$) or non-RCT ($n = 2$). Approximately half of the studies ($n = 6$) included caregivers of cancer patients. Eight studies did not focus on a specific cancer type and included caregivers of patients with different cancer types, such as lung, breast, and colon cancer. Three studies focused on a specific cancer type, including 2 studies with caregivers of non-small-cell lung cancer patients^{26,37} and on 1 study with caregivers of high-grade glioma patients.²⁴ The sample size of the studies ranged from 31 enrolled^{23,24} to 354 enrolled,²⁶ which further decreased (ranging between 22 and 344) because of attrition during the intervention (Table 1).

Intervention

Eight of the studies invited the caregivers to the clinic for the training process, whereas 3 studies involved home visits for the education of caregivers.^{23,28,40} Telephone interviews were conducted in 3 studies to identify the requirements of the caregivers or to decide a suitable date for the home visit.^{24,28,40} The training sessions were conducted in groups in 3 of the studies,^{5,38,39} whereas interventions in the remaining 8 studies were based on individual sessions. The duration of the interventions in the studies varied from 3 days³⁹ to 12 weeks.^{24,37} Most of the studies ($n = 5$) included a psychoeducation program, whereas the other studies conducted an educational program ($n = 3$), a supportive program ($n = 2$), or self-care support for the caregivers ($n = 1$). The content of the interventions included symptom management, prevention of infection, maintenance of nutrition, and several emotional support topics for the patients, besides focusing on the important roles of caregivers in managing the care process, self-care of the caregivers, preparedness for their relative's death, and support services to assist the caregivers. Certain interventions also emphasized stress management among the caregivers and, therefore, trained the caregivers in deep breathing, progressive muscle relaxation, and pleasant imagery.^{7,28} In the 6 studies that included a control group, the control groups were provided with standard care, including information regarding emergency visits, palliative care services, and standardized training (Table 2).

Quality Appraisal

Four of the studies had the evidence level of 2 (indicating a well-designed RCT), whereas 2 studies^{26,37} had the evidence level of 3 (representing well-designed non-RCTs). The remaining studies

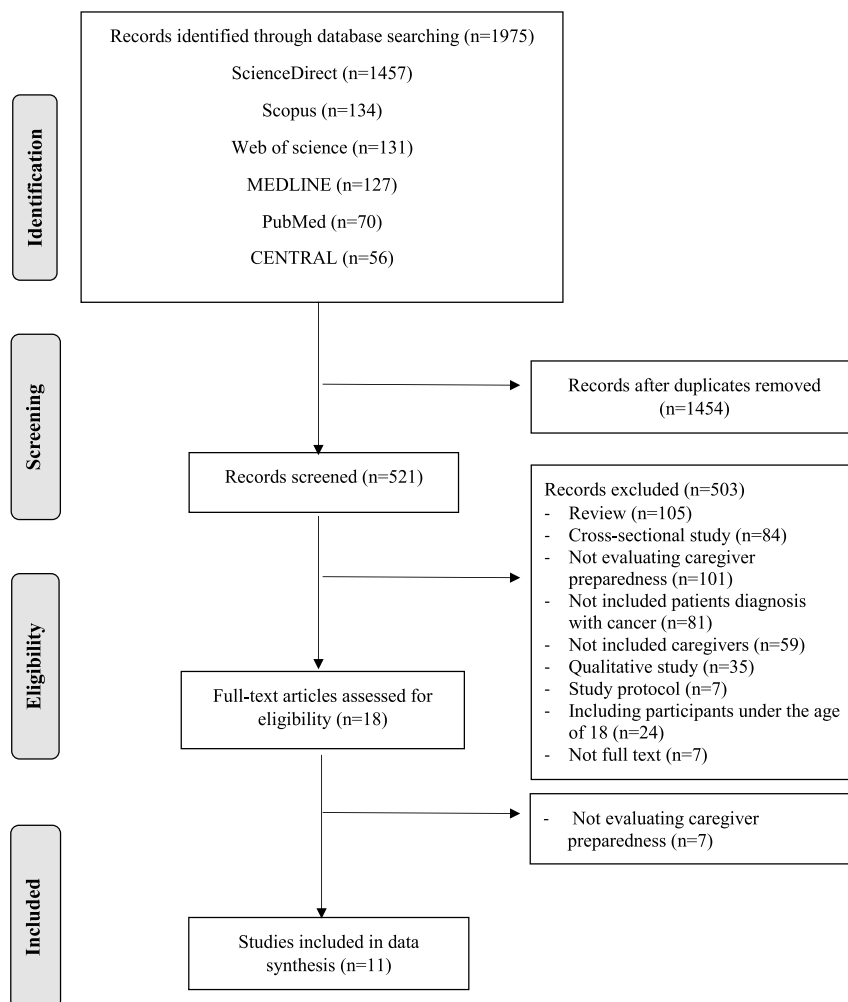


Figure 1 ■ Study flow diagram.

(n = 5) had an evidence level of 4 (representing cohort or case-control studies). The methodological quality of the included 11 studies was assessed, and the global rating of only 2 studies^{7,40} was evaluated as “strong,” whereas 5 studies were rated as “moderate.” The remaining 4 studies^{23–25,39} were rated as “weak” due to not limiting confounders, no blinding, and high dropout rates. In all included studies, a detailed explanation regarding the study was provided to the caregiver participants, which minimized selection bias. The assessment of the design of the studies revealed that 4 studies were of strong quality and 7 studies were of moderate quality. Whereas 8 of the selected studies reported that the confounding factors, such as age, gender, economic status, and duration of caregiving, which could affect the study outcomes, were limited, the remaining 3 studies did not provide any such information.^{23–25} Moreover, 2 of the studies involved blinding the data collectors,^{7,40} whereas no blinding was performed in the remaining 9 studies. In all the studies, data were collected and scored using scales that were valid and reliable. In terms of withdrawals and dropouts, 3 studies were evaluated as having a strong quality^{5,24,26} and 7 studies had a moderate quality. One study³⁹ was determined to be of weak quality due to high rates of withdrawals and dropouts (Table 3).

Risk of Bias

The Egger regression test revealed no publication bias in the included studies (intercept = 1.57, $t = 1.13$, $P = .32$). However, the funnel plot presented a slight asymmetry among these studies (Figure 2). Various factors might have caused this asymmetry, including heterogeneity, sample size, age, gender, and duration of intervention. This asymmetry was further investigated using subgroup analysis and meta-regression.

Outcomes

The assessment times of the studies varied, with most of the studies (n = 9) measuring the caregivers’ preparedness to care in 3-time segments and the remaining 2 studies assessing the preparedness in 2-time segments. A meta-analysis of the results on the preparedness to care was presented separately for the pretest/posttest-design studies (n = 5) and controlled studies (n = 6) based on the study design. Five pretest/posttest-design studies involving 297 caregivers were analyzed using a fixed-effects model as the studies presented low heterogeneity ($Q = 7.342$, $P = .119$, $I^2 = 45.518\%$). The meta-analysis of the

Table 1 • Characteristics of Reviewed Studies

Study (Year)	Country	Study Design	Type of Patients	Inclusion Criteria	Sample	Age, Mean (SD), y	Gender
1. Hudson et al ²⁸ (2005)	Australia	A randomized controlled trial	Palliative care patients	- Aged at least 18 y - Not having an intellectual or psychiatric illness that would preclude completion of study - Caregivers who speak English	Intervention, 54/20 Control, 52/25	60.7 (13.9)	Female, 65.1% Male, 34.9%
2. Hudson et al ³⁸ (2009)	Australia	A 1-group pretest-posttest design	Palliative care patients with advanced cancer	- Aged at least 18 y - Not having a pronounced psychological distress - Caregivers who speak and understand English	156/96	59	Female, 70% Male, 30%
3. Hudson et al ³⁹ (2012)	Australia	A 1-group pretest-posttest design	Palliative care patients	- Aged at least 18 y - Caregivers who speak and read English	245/126	57.1 (14.7)	Female, 66.7% Male, 33.3%
4. Potter et al ²⁵ (2012)	United States	A 1-group pretest-posttest design	All types of cancer	- Aged at least 18 y - Caregivers who speak and understand English - Having a DVD player in the home	38/22	57.3 (14.7)	Female, 55.3% Male, 44.7%
5. Hudson et al ⁴⁰ (2013)	Australia	A randomized controlled trial	Advanced cancer patients receiving home-based palliative care	- Aged at least 18 y - Caregivers who speak and understand English - Not having emotional distress precluding them from completing questionnaires	Intervention, 150/80 Control, 148/81	59.0 (13.9)	Female, 70% Male, 30%
6. Luker et al ²³ (2015)	United Kingdom	A 1-group pretest-posttest design	End-of-life patients receiving palliative care	- Aged at least 18 y - Resided with the patient	- Aged at least 18 y - Resided with the patient	31/24	62 Female, 74% Male, 26%
7. Sun et al ²⁶ (2015)	United States	A nonrandomized controlled trial	Patients with non-small-cell lung cancer	- Aged at least 21 y	Intervention, 197/191 Control, 157/153	57.3 (13.7)	Female, 64.1% Male, 37.9%
8. Hendrix et al ⁷ (2016)	United States	A randomized controlled trial	All types of cancer under hospice care	- Aged at least 18 y - Expected to care for patients after discharge - Willing to spend at least 2 h in the hospital for the training - Caregivers who speak and read English	Intervention, 66/38 Control, 64/38	55.3 (13.2)	Female, 83.3% Male, 16.7%
9. Holm et al ⁵ (2016)	Sweden	A randomized control trial	Palliative care patients	- Aged at least 18 y - Caregivers who speak and read Swedish	Intervention, 98/89 Control, 96/88	61.5 (13.8)	Female, 66.4% Male, 33.6%
10. Nguyen et al ³⁷ (2018)	United States	A nonrandomized controlled trial	Patients with non-small-cell lung cancer	- Aged at least 18 y - Closely involved in their care of the patient	Intervention, 60/39 Control, 62/40	63.4 (11.9)	Female, 59.8% Male, 40.2%
11. Philip et al ²⁴ (2019)	Australia	A 1-group pretest-posttest design	Patients with high-grade glioma	- Aged at least 18 y - Willing to participate in the study	31/29	55.7 (12.9)	Female, 58.1% Male, 41.9%

Table 2 • Intervention Strategies and Results of Reviewed Studies

Study (Year)	Duration of Intervention		Intervention Strategies	Control Strategies	Training Providers	Scales	Assessment	
	Intervention	Intervention					Times	Results
1. Hudson et al ²⁸ (2005)	A psychoeducation program	4 wk	<ul style="list-style-type: none"> - The intervention consisted of 2 home visits and a phone call between the 2 visits. - The caregivers were given a caregiver guidebook and audiotape by the nurse. - The caregiver guidebook provided written information related to important aspects of caring for a dying person. - The audiotape included self-care strategies and a structured relaxation exercise for stress management. 	The control group received standard care including access to 24-h phone from nurses and information about emergency visits.	The palliative care nurse	PCS	- Baseline - 5 wk - 8 wk after patient death	No intervention effects were determined in terms of preparedness to care.
2. Hudson et al ³⁸ (2009)	A group psychoeducation program	3 wk	<ul style="list-style-type: none"> - The main content of the Caregivers Group Education Program (CGEP) was based on a psychoeducation intervention. - The CGEP performed in 3 sessions (1.5 h each) over a 3-wk period. - The sessions focused on the important role of caregivers, strategies for self-care (caregiver's well-being) and symptom management, and strategies for caring for a person when death is approaching and an overview of bereavement supports for the family caregivers. - Carers received the caregiver guidebook designed specifically for preparing family caregivers. 	—	An interdisciplinary team including social workers and nurses working in home-based palliative care services	PCS	- Baseline - 3 wk - 5 wk	The intervention had a statistically significant positive effect on preparedness.

(continues)

Table 2 • Intervention Strategies and Results of Reviewed Studies, Continued

Study (Year)	Intervention	Duration of Intervention	Intervention Strategies	Control Strategies	Training Providers	Scales	Assessment	
							Times	Results
3. Hudson et al ²⁹ (2012)	A group psychoeducation program	3 d	<ul style="list-style-type: none"> - The intervention involved 5 special topics: what is palliative care, the typical role of family caregivers, support services available to assist caregivers, preparing for the future, and self-care strategies for caregivers. - At the end of the program, family caregivers were invited to meet individually with relevant members of the multidisciplinary team to discuss their needs. - Each education session was of 1.5-h duration. 	—	An interdisciplinary team	PCS	- Baseline - 3 d	There were statistically significant improvements in caregivers' sense of preparedness ($P < .001$; effect size, 0.43).
4. Porter et al ²⁵ (2012)	An educational program for fall prevention skills	4 wk	<ul style="list-style-type: none"> - The DVD program design and content were developed using Schumacher and colleagues' "Transactional Model of Cancer Family Caregiving Skill." - The content addressed the information dealing with the symptoms of illness and treatments that place cancer patients at risk for falling. - The program prepared caregivers to make decisions and performs processes of care pertinent to fall prevention. - The family caregivers had 4 wk to view the DVD in their home. 	—	Nurses	PCS	- Baseline - 4 wk - 12 wk	Family caregivers did not significantly increase their perceptions of preparedness after viewing the DVD. However, there was an overall increase in the average preparedness score from a mean score of 2.91 to one of 3.12.

(continues)

Table 2 • Intervention Strategies and Results of Reviewed Studies, Continued

Study (Year)	Intervention	Duration of Intervention	Intervention Strategies	Control Strategies	Training Providers	Scales	Assessment	
							Times	Results
5. Hudson et al ⁴⁰ (2013)	A psychoeducation program	4 wk	<ul style="list-style-type: none"> - The intervention was delivered over 4 wk. - Nurses assessed the needs of caregivers by phone and consisted of the care plan. - Caregivers were given the family caregiver guidebook to promote psychological well-being. - The family caregivers were prepared for their relative's death and the grief process with a home visit. 	Standard care	Family caregiver support nurses who assisted the local palliative care service to assess caregiver needs, establish a care plan, and provide additional caregiver support.	PCS	<ul style="list-style-type: none"> - Baseline - 5 wk - 8 wk 	The intervention provided significant improvements in participants' levels of preparedness.
6. Luker et al ²³ (2015)	A supportive program	4 wk	<ul style="list-style-type: none"> - The researcher had introduced and explained the booklet to the caregivers at the first home visit. - Caregivers used the booklet for at least a month. - The booklet contained practical information that was accessible and readable by caregivers. - The booklet included the following topics: pain, common bladder problems, common bowel problems, loss of appetite, nausea and vomiting, breathlessness, pressure sores, mobility, equipment, personal care, emotional aspects, support for caregivers, nearing death, and bereavement. 	—	An interdisciplinary team including nurses and general practitioners	PCS	<ul style="list-style-type: none"> - Baseline - 4/6 wk 	There were no statistically significant improvements in the preparedness of caregivers.

(continues)

Table 2 • Intervention Strategies and Results of Reviewed Studies, Continued

Study (Year)	Duration of Intervention		Intervention Strategies	Control Strategies	Training Providers	Scales	Assessment	
	Intervention	Intervention					Times	Results
7. Sun et al ²⁶ (2015)	A self-care support for caregivers	7 wk	<ul style="list-style-type: none"> - The study's conceptual framework included adult teaching principles of the National Comprehensive Cancer Network Guidelines for Distress Screening. - The caregivers also received 4 educational sessions with content categorized by the 4 quality of life domains including physical, psychological, social, and spiritual well-being. - The teaching sessions averaged 28 min, and a guideline was given to caregivers. - Content for caregivers also included a personalized self-care plan. 	The caregivers and patients received standard care including all supportive and palliative care services while on the study.	An interdisciplinary team including nurses, palliative medicine clinicians, thoracic surgeons, medical oncologists, a geriatric oncologist, a pulmonologist, a social worker, a chaplain, a dietitian, and a physical therapist	PCS	<ul style="list-style-type: none"> - Baseline - 7 wk - 12 wk 	No significant difference was observed between groups for caregiver skills preparedness.
8. Hendrix et al ⁷ (2016)	An educational program	4 wk	<ul style="list-style-type: none"> - The nurse provided training in symptom management strategies including prevention of infection, management of fatigue, pain control, and maintenance of nutrition. - The nurse also provided technical care skills if warranted (eg, care of a central catheter). - The skills training for stress management for caregivers focused on deep breathing, progressive muscle relaxation, and pleasant imagery. - Training lasted 1-2 h, and if desired, caregivers could spread this out over 2 sessions. 	Caregivers received standardized training about local community resources, home health, hospice, and palliative care.	The nurse interventionist trained to deliver both arms of the intervention	PCS	<ul style="list-style-type: none"> - Baseline - 2 wk - 4 wk 	The intervention group had a greater increase in preparation for caregiving at the posttraining assessment compared with the control group.

(continues)

Table 2 • Intervention Strategies and Results of Reviewed Studies, Continued

Study (Year)	Duration of Intervention		Intervention Strategies	Control Strategies	Training Providers	Scales	Assessment	
	Intervention	Intervention					Times	Results
9. Holm et al ⁵ (2016)	A group psychoeducation program	3 wk	<ul style="list-style-type: none"> - The guideline was developed based on the theoretical framework of Andershed and Ternstedt relating to the principal knowledge seeking and support needs of family caregivers. - The intervention program was delivered in a group format including 3 sessions, covering 2 h once a week over 3 wk. - The intervention included the following: palliative diagnoses and symptom relief, daily care and nutrition problems, and support and existential issues. 	The control group received standard support.	An interdisciplinary team including a physician, a nurse, and a social worker/priest	PCS	<ul style="list-style-type: none"> - Baseline - 3 wk - 8 wk 	The intervention group had significantly increased their preparedness for caregiving compared with the control group.
10. Nguyen et al ³⁷ (2018)	An educational program	12 wk	<ul style="list-style-type: none"> - The interdisciplinary care plans were created for patients and caregivers. - The patients and caregivers were followed for any additional support services by the nurses. - The first patient session covered physical and psychological issues, and the second session included social and spiritual issues. - A third teaching session was held with the caregivers alone. 	Standard care	The clinic palliative care registered nurses	PCS	<ul style="list-style-type: none"> - Baseline - 4 wk - 12 wk 	Caregivers in the intervention group had improvements in preparedness compared with the control group.

(continues)

Table 2 • Intervention Strategies and Results of Reviewed Studies, Continued

Study (Year)	Intervention	Duration of Intervention	Intervention Strategies	Control Strategies	Training Providers	Scales	Assessment	
							Results	Times
11. Philip et al ²⁴ (2019)	A supportive care	12 wk	<ul style="list-style-type: none"> - Patients were provided with a material that included generic information about high-grade gliomas, treatment options available, places to access further resources, and information including recommended websites. - The researchers regularly screened patients and caregivers for needs via phone calls. - Emotional support was provided for patients and caregivers. - Coordination of care relevant to the patient's supportive care, treatment planning, and follow-up was overseen by the cancer care coordinators; family caregivers were included in consultations and discussions where information was given. 	—	Oncology nurses	PCS	- Baseline - 2 wk - 12 wk	

Abbreviation: PCS, Preparedness for Caregiving Scale.

**Table 3 • The Evidence Level and Methodological Qualities of Studies**

Study (Year)	Evidence Level ^a	Methodological Quality ^b						Global Rating
		Selection Bias	Study Design	Confounders	Blinding	Data Collection Method	Withdrawals and Dropouts	
1. Hudson et al ²⁸ (2005)	Level 2	Strong	Strong	Strong	Weak	Strong	Moderate	Moderate
2. Hudson et al ³⁸ (2009)	Level 4	Strong	Moderate	Strong	Weak	Strong	Moderate	Moderate
3. Hudson et al ³⁹ (2012)	Level 4	Strong	Moderate	Strong	Weak	Strong	Weak	Weak
4. Potter et al ²⁵ (2012)	Level 4	Strong	Moderate	Weak	Weak	Strong	Moderate	Weak
5. Hudson et al ⁴⁰ (2013)	Level 2	Strong	Strong	Strong	Strong	Strong	Moderate	Strong
6. Luker et al ²³ (2015)	Level 4	Strong	Moderate	Weak	Weak	Strong	Moderate	Weak
7. Sun et al ²⁶ (2015)	Level 3	Strong	Moderate	Strong	Weak	Strong	Strong	Moderate
8. Hendrix et al ⁷ (2016)	Level 2	Strong	Strong	Strong	Strong	Strong	Moderate	Strong
9. Holm et al ⁵ (2016)	Level 2	Strong	Strong	Strong	Weak	Strong	Strong	Moderate
10. Nguyen et al ³⁷ (2018)	Level 3	Strong	Moderate	Strong	Weak	Strong	Moderate	Moderate
11. Philip et al ²⁴ (2019)	Level 4	Strong	Moderate	Weak	Weak	Strong	Strong	Weak

^aThe evidence level hierarchy adopted by the Joanna Briggs Institute.

^bThe Quality Assessment Tool for Quantitative Studies.

pretest/posttest-design studies revealed an increase in the caregivers' preparedness to care after the interventions (SMD = 0.310; 95% CI, 0.192–0.427; $Z = 5.178$, $P < .001$). Furthermore, 6 controlled studies involving 457 patients in the intervention group and 425 individuals in the control group were analyzed, again using a fixed-effects model because these also presented low heterogeneity ($Q = 6.442$, $P = .266$, $I^2 = 22.379\%$). The controlled studies also presented an improvement in the preparedness to care in the intervention group compared with the control group (SMD = 0.176; 95% CI, 0.043–0.309; $Z = 2.601$, $P < .05$) (Figure 3).

The 6 studies having the control group were examined separately based on whether there was randomization among the groups. These studies were categorized as RCTs ($n = 4$) and non-RCTs ($n = 2$). Because the 4 RCT studies^{5,7,28,40} presented no level of heterogeneity, a fixed-effects model was applied ($Q = 1.338$, $P = .720$, $I^2 = 0.000\%$). There was a statistically significant difference in the caregivers' preparedness to care between

the intervention group and the control group (SMD = 0.238; 95% CI, 0.054–0.422; $Z = 2.541$, $P < .05$). On the contrary, the 2 non-RCT studies^{26,37} presented a high level of heterogeneity, and therefore, a random-effects model was applied ($Q = 4.187$, $P = .041$, $I^2 = 76.119\%$). No significant difference was observed between the intervention group and the control group (SMD = 0.108; 95% CI, -0.084 to -0.301; $Z = 1.106$, $P > .05$) (Figure 3).

Subgroup Analysis

All studies were subjected to subgroup analyses. The sample size factor was divided into 2 subgroups of less than 100 participants and greater than or equal to 100 participants, and preparedness to care was reported to improve in both the subgroups with less than 100 participants (SMD = 0.262; 95% CI, 0.127–0.396; $Z = 3.820$, $P < .001$) and greater than or equal to 100 participants (SMD = 0.244; 95% CI, 0.128–0.359; $Z = 4.120$, $P < .001$). The age factor was assessed in 2 subgroups of 60 years or younger

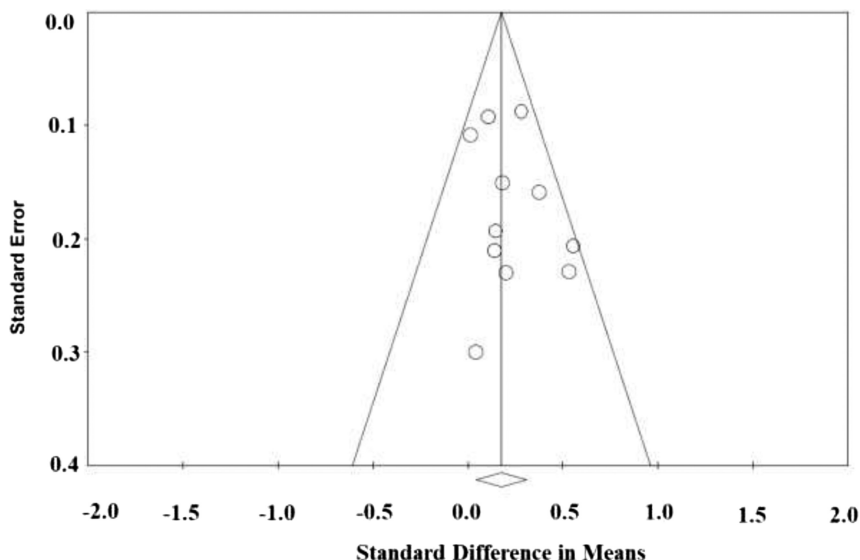


Figure 2 ■ Funnel plot for publication bias.

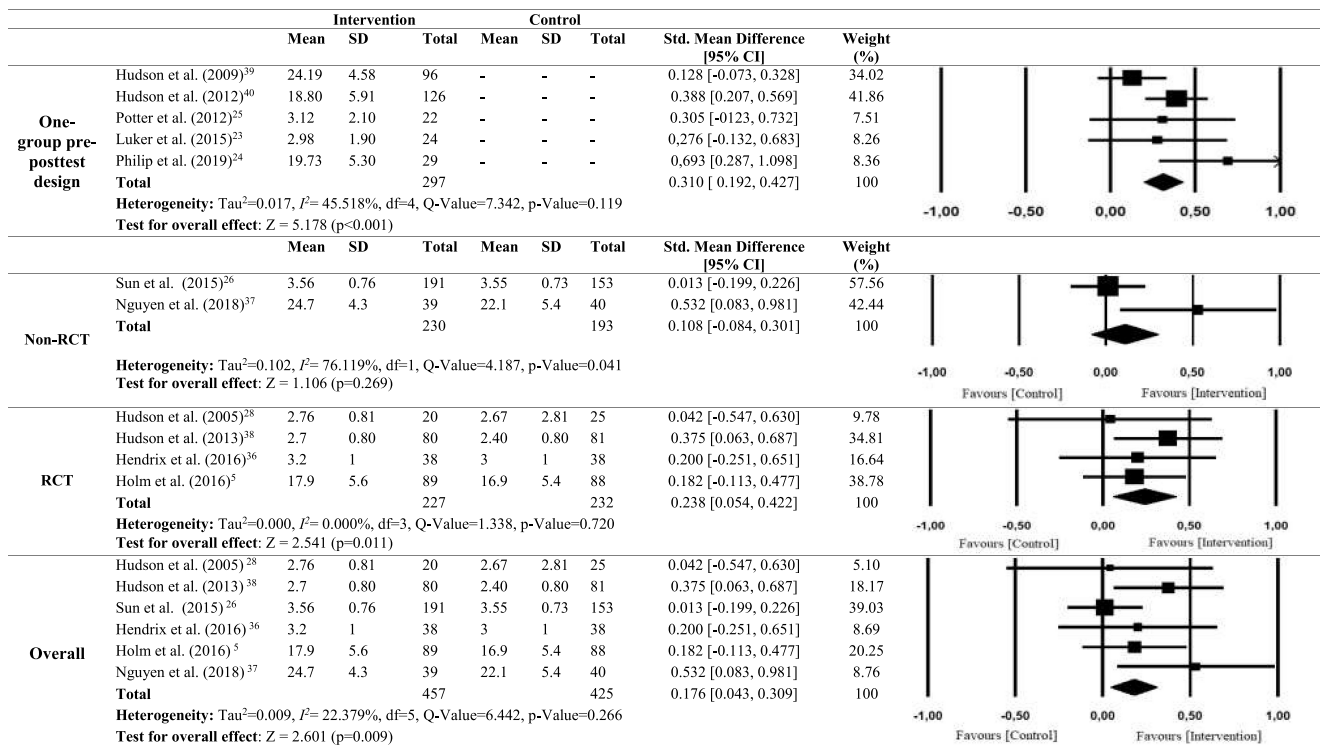


Figure 3 ■ Forest plot for preparedness to care in the studies.

and older than 60 years, and studies in both subgroups were reported to have an increase in the level of preparedness to care ($P < .05$). The gender factor was divided into 2 subgroups of less than 70% female and greater than or equal to 70% female, and preparedness to care increased significantly in these 2 subgroups ($P < .05$). The duration of intervention was also divided into 2 subgroups (≤ 6 and > 6 weeks) because of the variation (3 days to 12 weeks) across the studies, and preparedness to care increased significantly in these 2 subgroups ($P < .05$). The training providers factor was categorized into nurse and interdisciplinary team subgroups. Interventions facilitated by nurses (SMD = 0.389; 95% CI, 0.220–0.559; $Z = 4.490$, $P < .001$) and interdisciplinary teams (SMD = 0.251; 95% CI, 0.164–0.339; $Z = 3.850$, $P < .001$) were effective at significantly improving preparedness to care. The intervention setting was divided into 2 subgroups of home visit and clinic, and preparedness to care improved in both the home visit (SMD = 0.294; 95% CI, 0.066–0.522; $Z = 2.520$, $P < .05$) and clinic (SMD = 0.251; 95% CI, 0.164–0.339; $Z = 5.030$, $P < .001$) subgroups. The type of intervention was assessed in 2 subgroups of psychoeducation and other interventions. Interventions implemented as psychoeducation (SMD = 0.264; 95% CI, 0.152–0.375; $Z = 4.630$, $P < .001$) and the other interventions (SMD = 0.231; 95% CI, 0.089–0.373; $Z = 3.190$, $P < .05$) were effective at significantly increasing preparedness to care (Table 4).

Meta-regression

Meta-regression was used for exploring the effect of study characteristics on preparedness to care post intervention. Gender significantly affected the level of preparedness to care after the interventions ($t = 2.540$, $P = .047$). The studies ($n = 4$) with

greater than 70% female in the sample presented a statistically significant positive impact exerted on the caregivers' preparedness to care (SMD = 0.351; 95% CI, 0.264–0.439; $Z = 0.492$, $P < .001$). In addition, the training providers influenced the preparedness to care in the interventions applied to the family caregivers ($t = 2.770$, $P = .022$). The caregivers who completed the nurse-led interventions ($n = 6$) experienced greater preparedness to care (SMD = 0.389; 95% CI, 0.220–0.559; $Z = 4.490$, $P < .001$). According to the meta-regression results, sample size, age, duration of intervention, intervention setting, and the type of intervention did not affect preparedness to care ($P > .05$) (Table 4).

Discussion

The present meta-analysis is the first to report the results from 11 studies that investigated the effects of interventions on the preparedness to care among the caregivers through a span of the past 20 years. The present meta-analysis indicated that interventions, including self-care support, psychosocial education, and support education, exerted a beneficial impact on the preparedness to care among the caregivers of cancer patients. In parallel with this finding, the systematic review by Becqué et al.,³⁰ which examined 9 studies investigating the effects of nursing interventions applied to the family caregivers of end-of-life patients, reported an increase in the levels of preparedness among the caregivers after the interventions. Several previous reports have emphasized the important role of interventions, including self-care support for caregivers, psychosocial education, and support education, in effectively preparing the caregivers for the caregiving process.^{5,24,37} The results of the present meta-analysis and the other recent

Table 4 • Subgroups Analysis and Meta-regression of Studies

	Subgroup Analysis								Meta-regression			
	Subgroups	No. Studies	Std Mean Difference	Standard Error	Lower Limit	Upper Limit	Z	P	Coefficient	95% CI	t	P
Sample size	<100	7	0.262	0.133	0.127	0.396	3.820	<.001	0.358	-0.110 to 0.827	1.73	.118
	≥100	4	0.244	0.087	0.128	0.359	4.120	<.001				
Age	≤60 y	7	0.251	0.104	0.164	0.339	5.010	<.001	0.275	-0.171 to 0.722	1.40	.196
	>60 y	4	0.257	0.106	0.058	0.455	2.530	.011				
Gender	Female < 70%	7	0.274	0.069	0.165	0.383	3.800	<.001	0.446	0.017–0.789	2.540	.047
	Female ≥ 70%	4	0.351	0.123	0.264	0.439	4.920	<.001				
Duration of intervention	≤6 wk	8	0.263	0.044	0.162	0.365	5.080	<.001	0.196	-0.265 to 0.658	0.960	.361
	>6 wk	3	0.251	0.216	0.164	0.389	2.430	.015				
The training providers	Nurse	6	0.389	0.116	0.220	0.559	4.490	<.001	0.577	0.105–1.049	2.770	.022
	Interdisciplinary team	5	0.251	0.068	0.164	0.339	3.850	<.001				
Intervention setting	Home visit	3	0.294	0.094	0.066	0.522	2.520	.012	0.292	-0.377 to 0.962	0.990	.350
	Clinic	8	0.251	0.256	0.164	0.339	5.030	<.001				
The type of intervention	Psychoeducation	5	0.264	0.106	0.152	0.375	4.630	<.001	0.212	-0.254 to 0.679	1.030	.330
	Other interventions ^a	6	0.231	0.088	0.089	0.373	3.190	.001				

Abbreviations: CI, confidence interval; Std, standard.

^aIncluding educational, supportive, and self-care programs.

studies^{41,42} indicate that it is possible to prepare family caregivers for their caregiving roles and reduce their unfulfilled requirements using education and counseling interventions.

The results of the interventions applied to family caregivers for increasing their preparedness to care are reported to be affected by the study characteristics.^{1,3} The results of the present meta-analysis revealed that the level of preparedness to care was not affected by sample size. According to the related literature, the study results are related to the sociodemographic characteristics of the participants and the intervention contents rather than the sample size.^{43,44} Considering the sociodemographic characteristics of the participants, the present meta-analysis indicated that the level of preparedness to care increased with an increase in the number of female participants. In parallel with this finding, Henriksson and Årestedt,³ who examined the preparedness for caregiving among family caregivers of patients in palliative care and the related influencing factors, highlighted that the female gender was significantly associated with a higher level of preparedness. The literature from all over the world emphasizes that women are the principal providers of informal care to the older adults and individuals with chronic conditions.^{45,46} In comparison with men, women are reported to be more prepared to assist in the tasks related to patient care management and personal care, including bathing, dressing, and managing incontinence.^{46,47} Studies demonstrate that female caregivers, in addition to managing the personal care of the patient, provide emotional and social support to the patients.^{45,47} The patients reported feeling better after the emotional support provided to them, which further motivated the female caregivers to provide care.⁴⁵ On the whole, female caregivers exhibit greater altruism and a sense of responsibility toward the patients, and therefore, it is not surprising that the interventions in the studies were more effective when a greater number of female caregivers were included who could conveniently adapt to the

caregiving roles. However, the present meta-analysis demonstrated that the level of preparedness to care in the intervention studies was not affected by age. Older caregivers were not ready to care for another person if experiencing health problems and if perceiving the caregiving process as a burden.⁴⁸ Similarly, young caregivers reported not feeling ready for the caregiving process either, because of childcare, their jobs, economic burden, and social activity requests.⁴⁹ Therefore, caregivers of all age groups have difficulties in simultaneously carrying out their daily work and their caregiver roles, thus requiring training to feel prepared for this process.

When the intervention strategies were considered, the results of this meta-analysis revealed that the level of caregiver preparedness did not change according to the intervention duration, type, and setting. Previous studies document that all caregiver interventions enhanced caregiver knowledge and thus prepared the family caregivers for the care process.⁵⁰ Although the types of interventions differ, their main purpose in these studies remains the same, which may have caused similar results. Available literature indicates that the content of the intervention is critical, not the setting and duration of the intervention.⁴⁴ Examining the content of the studies revealed that the studies generally included the roles of caregivers, information about the disease and treatments, symptom management, prevention of infection, nutrition, and stress management.

The present meta-analysis revealed that nurse-led intervention studies were more effective in improving the caregivers' preparedness compared with the interventions conducted by an interdisciplinary team. Hagedoorn et al⁵¹ also reported that nurses, in particular, should communicate better with the family caregivers to provide the most appropriate care to the patients after discharge from the hospital and increase the caregivers' preparedness to care. Similarly, Grant and Ferrell,⁵² who examined the implications of the role of nurses on family caregivers, emphasized that professional nurses may provide the best-coordinated

education and support to caregivers. The literature describes nurses as the “resource person” who imparts practical knowledge necessary for the care, in addition to emotional support to the family caregivers for continuing their primary caregiving roles. In particular, the nurses who have frequent communication with the family caregivers are able to coordinate care guidance with the requirements of the patients and evaluate the caregivers closely in terms of their knowledge, attitude, behavior, and capacity level.^{27,51} In addition, compared with other health professionals, professional nurses are more aware of the problems encountered by the caregivers during the caregiving process.⁵² Because the nurses conduct patient care together with the family caregivers, they closely monitor whether the caregivers integrate the imparted information into care.^{53,54} It is important to remember that the nurses who adopt patient- and family-centered care play an active role in imparting training and counseling to the family caregivers. Furthermore, the results of the present review and meta-analysis revealed that only a few of the included studies had strong quality in terms of study design, selection bias, blinding, randomization, data collection method, and withdrawals from the study. The reason inferred for the weak quality of the studies was that most of the studies did not use blinding methods, did not limit the confounders, and had high rates of withdrawals and dropouts. Including blinding procedures and limiting the confounders are important for minimizing the risk of bias and maximizing the validity of results.⁵⁵

Strengths and Limitations

The present meta-analysis had some limitations. First is that the studies in languages other than English were not included. Second, although different types of interventions with varied content were included, it is unclear whether this variability in approach and content had a marked effect on the outcomes. Third, the present meta-analysis excluded unpublished studies, and therefore, it remains unknown whether the results were influenced by publication bias. In regard to the strengths of the present meta-analysis, the literature search was conducted in a widespread and inclusive manner, to the maximum extent possible, using several electronic databases. In addition, the methodological qualities and evidence levels of the included studies were presented in detail. The significant contribution of this study to the literature is that this is the first meta-analysis that analyzed the effects of the interventions applied to the family caregivers of cancer patients on their preparedness to care.

Implications for Practice

There is a strong consensus that family caregivers are central to the care of cancer patients. Therefore, the preparation of family caregivers for the care process is important for the future of oncology. This meta-analysis has provided evidence that interventions have beneficial effects on preparedness to care among the caregivers of cancer patients. Particularly, the nursing interventions have an essential role in improving the preparedness of the caregivers of cancer patients. Nurses should prepare a training program for the caregivers, which would include the components of stress

management, psychosocial support, symptom management, and execution of the care process. In addition, training programs for family caregivers should be incorporated in oncology clinics as a routine, and the caregivers should be informed about the care process with educational booklets or brochures prepared by hospitals. The male caregivers should be closely followed by healthcare professionals to reinforce and support their caregiving efforts.

Conclusion

The results of this meta-analysis highlighted that interventions such as educational, supportive, self-care, and psycho-educational programs applied to the family caregivers of cancer patients improve their level of preparedness to care.

Professional nurses, with their education and counseling roles, contribute significantly to improving the caregivers' preparedness to care. However, the interventions do not seem to satisfactorily increase the levels of preparedness to care among the male family caregivers. Moreover, studies with a higher methodological quality are warranted to better assess the effects of the interventions applied to the family caregivers of cancer patients on their preparedness to care. Future studies should structure the contents of the intervention for preparedness to care among caregivers and focus more on providing education and counseling to the male caregivers to better prepare them for care.

ACKNOWLEDGMENT

The authors also express their thanks to Education, Practice and Research Center in Nursing of University for their collaboration and great support.

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