Psychosocial Interventions to Improve Psychological Distress of Informal Caregivers of Cancer Patients: A Meta-analysis of Randomized Controlled Trial

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Abstract: Objective: To evaluate the efficacy of psychosocial interventions designed to improve the psychological distress of informal caregivers of cancer patients compared with usual care. Methods: Nine relevant databases were searched from inception to November 2020. We included randomized controlled trials focused on comparing psychosocial interventions delivered to informal cancer caregivers with usual care. Study quality was evaluated with the Cochrane Risk of Bias Assessment Tool, and meta-analysis was performed using Review Manager statistical software. Results: Fifteen studies involving 1006 participants met the inclusion criteria, and several kinds of psychosocial interventions were applied to either cancer caregivers or patient-caregiver dyads. Compared to usual care, psychosocial interventions manifested positive, significant results in depression (SMD=-0.47, 95%CI -0.71 to -0.24, P<0.001) and anxiety (SMD=-0.50, 95%CI -0.91 to -0.09, P=0.02). And the psychosocial interventions have no significant effect on general psychological distress (SMD=-0.25, 95%CI -0.54 to 0.05, P=0.10) and subjective burden (SMD=-0.06, 95%CI -0.26 to 0.14, P=0.55) of cancer caregivers. Conclusion: Psychosocial interventions designed for cancer caregivers can effectively reduce depression and anxiety, while no significant results were found in general distress and subjective burden of cancer caregivers. More studies with stronger methodological designs and larger samples are still needed in the future.

Keywords: Cancer, Caregivers, Psychosocial Intervention, Meta-analysis

1. Introduction

Worldwide, cancer is the second-leading cause of death, and about 1 in 6 deaths is due to cancer [1]. It is estimated that the number of death from cancer is 9.6 million deaths in 2018, according to the World Health Organization (WHO) [1]. As a result, there is an increasing number of informal caregivers who have to take the responsibility of taking care of cancer patients. Informal caregivers are families, close friends, or important people, providing care and support without economic benefits [2]. It is reported that informal caregivers experience a high level of psychological distress [3-4], which is detrimental to the well-being of both the caregivers and the people living with cancer. Thus, a growing body of literature has focused on a range of psychosocial interventions aiming at reducing the psychological distress of cancer caregivers [5-7].

There are various types of psychosocial intervention, including cognitive behavior therapy (CBT), psychoeducation, mindfulness, counseling, etc. Previously published meta-analysis studies reveal that psychosocial interventions have beneficial effects on improving the quality of life of both the cancer patients and their families [8], mood, and problem-solving skills [9]. So far, however, no consistent conclusion has been drawn about the effectiveness of psychosocial interventions to improve the psychological distress of cancer caregivers, though a large body of randomized controlled studies has been conducted. The

purpose of the present study is to perform a meta-analysis of randomized controlled trials on the efficacy of psychosocial interventions aimed at improving the psychological distress of cancer caregivers.

2. Methods

2.1. Search Methods

Relevant electronic databases were searched to identify empirical studies published from inception to November 2020, including the Cochrane Library, PubMed, Embase, Web of Science, CINAHL, Scopus, CNKI, VIP, and Wan Fang database. The search strategy was to use medical subject headings and free terms together, including (psychosocial intervention OR cognitive behavior therapy OR psychotherapy OR psychoeducation OR mindfulness) AND (oncology OR cancer OR tumor OR carcinoma OR neoplasms) AND (caregiver* OR carer* OR family members OR relatives OR spouse). Additionally, reference lists of screened studies and pertinent reviews were examined to identify other relevant articles.

2.2. Eligibility Criteria

2.2.1. Participants

Participants were included if they were adults (≥18 years) and they provided care and support for cancer patients without any economic benefits.

2.2.2. Intervention

Studies were included if informal caregivers of cancer patients in the trial group received psychosocial interventions, including CBT (Cognitive Behavior Therapy), psychoeducation therapy, psychotherapy, mindfulness, etc. We also included psychosocial interventions delivered to caregiver-patient dyads. The interventions were conducted at the hospital or participants' homes.

2.2.3. Comparison

Studies were included if the control group participants were provided with usual care.

2.2.4. Outcomes

The outcomes included general psychological distress, anxiety, depression, and subjective burden.

2.2.5. Study Design

Only randomized controlled trials were included.

2.3. Data Extraction and Quality Assessment

The data extraction was performed by the main author. Relevant information was recorded, including the study characteristics (year, author, country, study design), the intervention (type, sample size, duration, content), the comparison (type, sample size, duration, content), and outcome variables (general psychological distress, anxiety, depression, subjective burden). Two researchers independently conducted the quality assessments using the Cochrane Risk of Bias Assessment Tool, and the disagreements were resolved by consensus.

2.4. Data Analysis

Review Manager statistical software was used for the statistical analyses. Effect sizes between the trial and control groups were calculated, basing on means, standard deviations, standardized mean difference, and sample sizes. The random-effects model was used because it is a more conservative approach to explain different sources of variation among articles [10]. The homogeneity statistic Q was calculated to determine whether there is a lack of homogeneity among studies, and a significant P value means heterogeneity. The I^2 statistic and its 95% CI were calculated to standardize the Q [11]. I^2 ranges from 0% to 100%, with large values (>50%) indicating heterogeneity.

3. Results

3.1. Study Characteristics

Initial retrieval identified a total of 1717 papers, of which 474 were duplicates (Figure 1). After evaluating titles and abstracts, 146 papers were obtained and examined in full text. Finally, fifteen papers met the eligibility criteria and were included in the quantitative synthesis. The baseline characteristics of the included literature were documented in Table 1. In total, 1006 cancer caregivers were included in the meta-analysis. In these studies, different types of psychosocial interventions were used, including psychoeducation [7, 12-14], cognitive behavior therapy [15-16], mindfulness therapy [15, 17], and other various kinds of psychosocial interventions [5, 15, 18-20]. Most of the interventions were carried out in the hospitals, and the intervention duration ranged widely from 3 weeks to 24 weeks.

Table 1. Characteristics of included studies.

Study	Sample Size (Trial/Control)	Setting	Intervention
Baucom, 2009, USA	14 (8/6)	Hospital	RE (Relation Enhancement)
Boriji, 2017, Irian	80 (40/40)	Hospital	CBT (Cognitive Behavioral Therapy)
Couper, 2015, Australia	62 (30/32)	Hospital	CECT (Cognitive Existential Couple Therapy)
Hoesktra-weebers, 1998, Netherlands	81 (39/42)	Hospital	Psychoeducational Intervention
Kubo, 2019, USA	31 (17/14)	Home	M-health Mindfulness
Laundenslager, 2015, Australia	101 (48/90)	Hospital	PEPRR (Psychoeducation, Paced Respiration and Relaxation)
Laundenslager, 2019, Australia	155 (75/80)	Hospital	PEPRR (Psychoeducation, Paced

Study	Sample Size (Trial/Control)	Setting	Intervention
			Respiration and Relaxation)
Manne, 2004, USA	60 (29/31)	Cancer Center	Psychoeducation
Marsland, 2012, USA	37 (23/14)	Outpatient clinic; Inpatient unit; Home	Stress Management Intervention
Melanie, 2017, Netherlands	35 (16, 19)		MBSR (Mindfulness-based Stress Reduction)
O'Toole, 2020, Denmark	80 (43/37)	Local University	ERT (Emotion Regulation Therapy)
Safarabadi-Farahani, 2016, Irian	65 (32/33)	Hospital; Home	BPI (Brief Psychosocial Intervention)
Shaw, 2016, Australia	128 (64/64)	Home	Family Connect Intervention
Toseland, 1995, USA	78 (40, 38)	Oncology center	Problem Solving Intervention
Wu, 2018, China	60 (30/30)	Hospital	CBT (Cognitive Behavioral Therapy)

Table 1. *Continued.*

Study	Comparison	Duration	Outcome And Outcome Measure
Baucom, 2009, USA	Usual Care	12 weeks	Psychological Distress (BSI)
Boriji, 2017, Irian	Usual Care	12 weeks	Depression (DASS); Anxiety (DASS)
Couper, 2015, Australia	Usual Care	10 weeks	Psychological Distress (MHI)
Hoesktra-weebers, 1998, Netherlands	Usual Care	24 weeks	Psychological Distress (CHQ)
Kubo, 2019, USA	Usual Care	8 weeks	Psychological Distress (Distress Thermometer)
Laundenslager, 2015, Australia	Usual Care	3 weeks	Depression (CES-D); Anxiety (STAI-State); Subjective burden (CRA); Psychological Distress (CG-Distress)
Laundenslager, 2019, Australia	Usual Care	14 weeks	Distress (CG-distress); Depression (CES-D); Anxiety (STAI-State); Subjective Burden (CRA)
Manne, 2004, USA	Usual Care	6 weeks	Psychological Distress (MHI)
Marsland, 2012, USA	Usual Care	12~18 weeks	Depression (BDI); Anxiety (STAI)
Melanie, 2017, Netherlands	Usual Care	8 weeks	Psychological distress (HADS)
O'Toole, 2020, Denmark	Usual Care	8 weeks	Psychological Distress (HADS)
Safarabadi-Farahani, 2016, Irian	Usual Care	5 weeks	Emotional Burden (CQOLC)
Shaw, 2016, Australia	Usual Care	10 weeks	Psychological Distress (Distress Thermometer)
Toseland, 1995, USA	Usual Care	6 weeks	Depression (CES-D); Anxiety (STAI); Subjective Burden (ZBI)
Wu, 2018, China	Usual Care	12 weeks	Depression (HAMD); Anxiety (HAMA)

BSI: Brief Symptom Inventory; DASS: the 21-item Depression Anxiety Stress Scales; MHI: Mental Health Inventory; CHQ: General Health Questionaire; CESD: Center for Epidemiologic Studies Depression; STAI-State: State-Trait Anxiety Inventory-State; CRA: caregiver reaction assessment; BDI: Beck Depression Inventory; STAI: State-Trait Anxiety Inventory; HADS: Hospital Anxiety and Depression Scale; CQOLC: The Caregiver Quality of Life Index-Cancer; ZBI: the Zarit Burden Inventory; HAMD: Hamilton Depression Scale; HAMA: Hamilton Anxiety Scale.
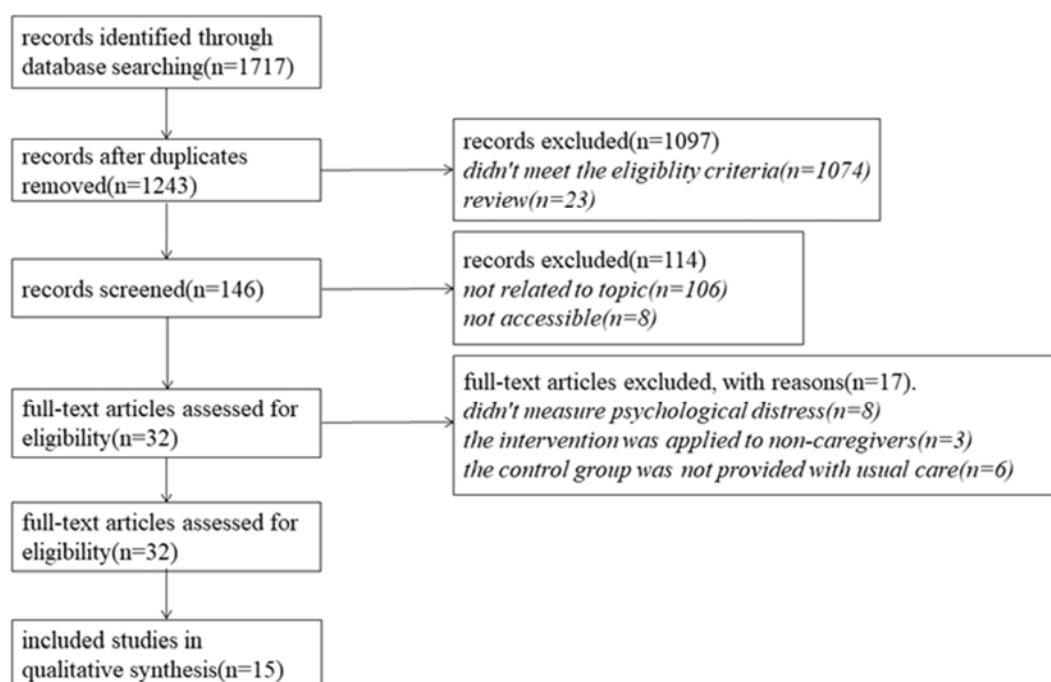

Figure 1. *Flow diagram of trial selection.*

Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

3.2. Quality Assessment

The included randomized controlled trials were all graded B for quality (Figure 2). Due to the particularity of psychosocial interventions, both the implementation of blinding of the participants and outcome assessment was impossible, so the

performance bias and detection bias of all studies were assessed as high risks. Among the included fifteen RCTs, only 10 studies reported the methods for generating the random sequence [5-7, 12-15, 17, 18], and 6 studies describe the adequate method to conceal allocation [6, 7, 12, 13, 15, 18]. Nine studies [5-7, 13, 15, 17-19, 21] reported shedding and withdrawing, of which seven studies [5-7, 13, 15, 17, 21] applied the intent-to-treat analysis.

3.3. Meta-analysis

3.3.1. General Psychological Distress

Ten studies involving 690 participants assessed the outcome of general psychological distress (Figure 3.). Owing to the use of different measurement scales, the standardized mean difference (SMD) was selected. Significant heterogeneity was found between these studies (I^2=69, P=0.0005). The pooled results showed that the effect of the psychosocial intervention was not significant (SMD=-0.25, 95%CI -0.54 to 0.05, P=0.10).

3.3.2. Depression

Among the included articles, six trials with 511 caregivers reported the depression outcome (Figure 4.). There was no heterogeneity among the 6 articles (I^2=40, P=0.14). The difference between the intervention groups and the control groups was significant (SMD=-0.47, 95%CI -0.71 to -0.24, P<0.00001), indicating that psychosocial interventions had a positive effect on reducing the depression level of cancer caregivers.

3.3.3. Anxiety

Six of the fifteen included studies measured indicators of anxiety, with 511 subjects overall (Figure 5). We found significant heterogeneity across the six articles (I^2=80, P<0.001). The results, as shown in figure 5, suggesting that the psychosocial intervention was an effective strategy for eliminating the anxiety level of participants (SMD=-0.50, 95%CI -0.91 to -0.09, P=0.02).

3.3.4. Subjective Burden

Four articles assessed the subjective burden variable, including 396 participants (Figure 6). No heterogeneity was identified among the four trials (I^2=0, P=0.54). It was found that there was no significant difference between psychosocial groups and usual care groups (SMD=-0.06, 95%CI -0.26 to 0.14, P=0.55).

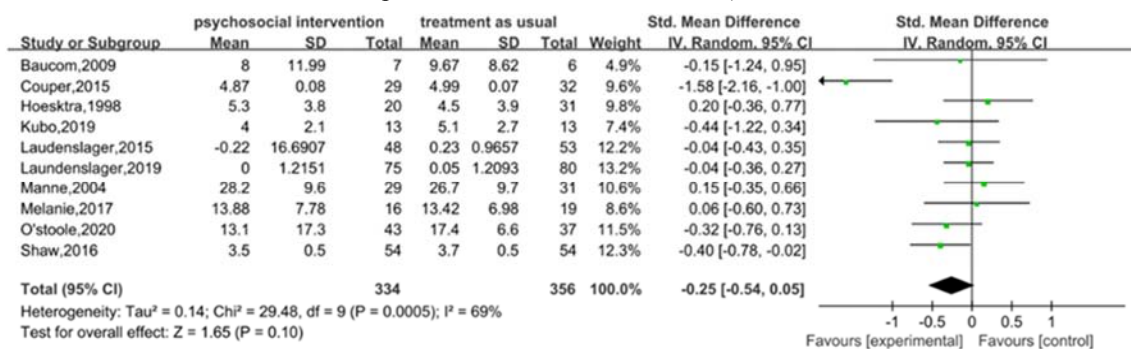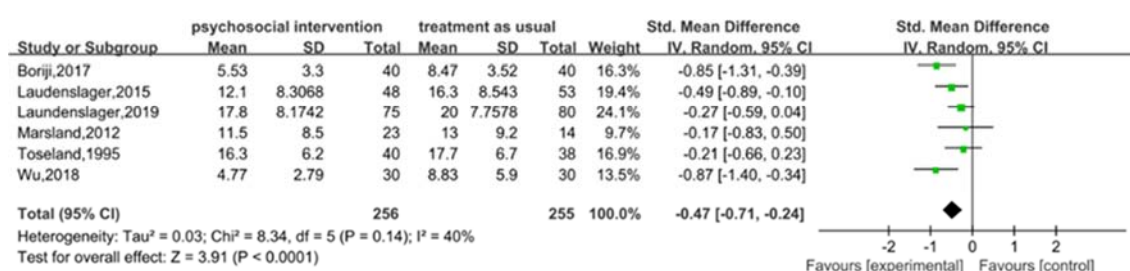*Figure 3. Forest plots effects of psychosocial intervention on psychological distress.*

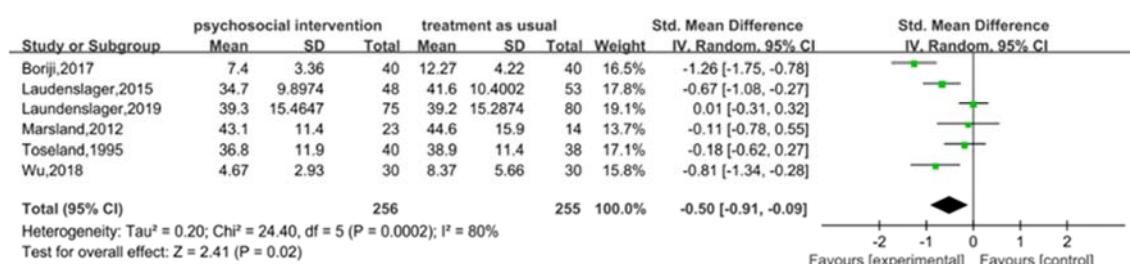**Figure 4.** *Forest plots effects of psychosocial intervention on depression.*

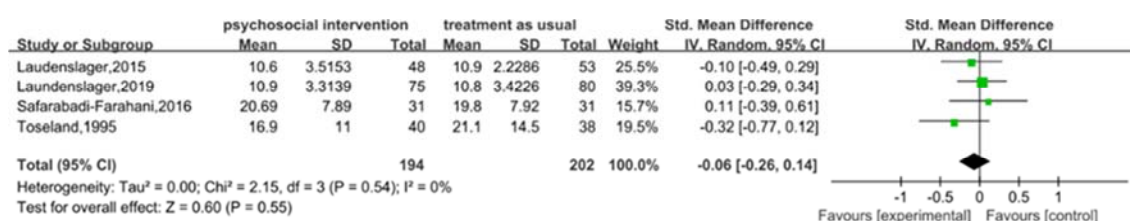**Figure 5.** *Forest plots effects of psychosocial intervention on anxiety.*

Figure 6. *Forest plots effects of psychosocial intervention on subjective burden.*

4. Discussion

With the increasing number of people diagnosed with cancer globally, more and more caregivers have to take the responsibility of providing care to cancer patients [22]. As revealed by meta-analysis, the levels of psychological distress in cancer caregivers are high [23, 24], which is detrimental both to the well-being of cancer caregivers and cancer patients. Researchers have conducted various types of psychosocial interventions to improve the mental health of cancer caregivers [25, 26], yet there is a dearth of related data.

Overall, this meta-analysis revealed that psychosocial interventions could reduce the level of depression and anxiety effectively among cancer caregivers, comparing with the usual care. The results are in accord with other meta-analysis studies indicating that psychosocial interventions for depression or anxiety are effective [27-29]. The purposes of psychosocial interventions are to help participants identify their dysfunctional behavior, teach them about cope strategies, thus maintain their well-being [13, 30]. By proving psychoeducation interventions and psychological therapies, the level of depression, and anxiety of participants decreased.

However, we did not find any significant difference in the scores of general psychological distress and subjective burden between the two groups. A possible explanation for this might be the fact that the majority of participants were not severely distressed, thus the results showed no significant difference across the intervention groups and the control groups [14]. Another possible explanation is that distress declined over time for participants in both groups, and these group differences would be hard to detect by measurements [14].

Some limitations in this paper need to be mentioned. Firstly, some publications were missed because the literature search was limited to studies published in English or Chinese. Secondly, the bulk of trials was conducted in developed countries [5-7], lacking in evidence from developing countries. Thirdly, only six trials adequately described the process of randomization and allocation concealment, which might cause selection bias and assessment bias. Finally, clinical heterogeneity was inevitable due to the small sample size in several studies [6, 17, 18, 31], the disparity between the interventions [6, 20, 30], and the variety among the outcome measures [6, 15, 18].

5. Conclusion

The present study was designed to examine the effect of psychosocial interventions on reducing the level of psychological distress among cancer caregivers. Our study found that psychosocial interventions are effective for improving depression and anxiety in cancer caregivers. Future research should restrict the inclusion criteria concerning distress level, and implement interventions

tailored to the cancer caregivers' needs. Besides, more studies with stronger methodological designs and larger samples are still needed.

Conflict of Interest

The authors declared no potential conflicts of interest.

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