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The effects of bibliotherapy on the mental well-being of informal caregivers of people with neurocognitive disorder: A systematic review and meta-analysis



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ABSTRACT

Background: The number of people with neurocognitive disorder is increasing, and the majority of them are cared for by informal caregivers in the community. Mental health problems are common among caregivers, however, professional support for them is often limited. Non-pharmacological self-help interventions, such as bibliotherapy, may improve mental well-being and has the potential for being integrated into clinical or social services.

Objectives: To explore what types of bibliotherapy have been used for improving the mental well-being of informal caregivers of people with neurocognitive disorders, and the effect on mental well-being outcomes.

Design: A systematic review and meta-analysis.

Review methods: Six databases were searched for relevant articles on July 1, 2019. Clinical trial registries and the reference lists of included studies were also searched. Both randomized controlled trials and quasi-experimental studies were included. The Cochrane Collaboration risk of bias tool for randomized controlled trials was used to assess the quality of studies. Review Manager 5.3 was used to analyze data, standardized mean difference (SMD) and 95% confidence interval (CI) were used to estimate the pooled treatment effect. Random effects models were used for meta-analyses. Funnel plot was not performed due to the limited number of studies. This systematic review was registered at PROSPERO (CRD42019129152). Results: Nine randomized controlled trials with 1036 informal caregivers were included. Most of the included studies had some aspects of bias. Three types of bibliotherapy were used. Bibliotherapy had a significant pooled medium to large effect on reducing depression at Z = 1.99 (SMD = -0.74, 95%CI = -1.47 to -0.01, p = .05), however, the heterogeneity was high ($I^2 = 94\%$). For the subgroups, only the video-based bibliotherapy significantly reduced depression at Z = 2.78 ($I^2 = 83\%$, SMD = -2.11, 95%CI = -3.6 to -0.62, p = .005). Bibliotherapy had a significant small to medium effect on caregiver's self-efficacy for dealing with problem behaviours at Z = 2.44 ($I^2 = 0$, SMD = 0.36, 95%CI = 0.05 to 0.67, p = .02), however, the effect on self-efficacy for obtaining respite was not significant ($I^2 = 0$, SMD = 0.17, 95%CI = -0.16 to 0.49, p=.32). The effect on decreasing state anxiety was significant at Z=2.30 ($I^2=22\%$, SMD = -0.22, 95% CI = -0.41 to -0.33, p = .02).

Conclusions: Bibliotherapy showed positive effects on reducing depression, improving self-efficacy for dealing with problem behaviors and reducing anxiety among informal caregivers. The effects on reducing depression should be viewed with caution due to high heterogeneity. The effects on other mental well-being outcomes are inconclusive due to limited number of studies and this underscores the need for further research.

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What is already known about the topic?

- The mental well-being of informal caregivers of people with neurocognitive disorder is of concern.
- Different kinds of bibliotherapy have been used with informal caregivers of people with neurocognitive disorders suggesting a potentially accessible, low cost intervention.
- Previous studies suggest that bibliotherapy might improve the well-being outcomes of informal caregivers. However, the strength of recommendation is inconclusive.

What this paper adds

- Three kinds of bibliotherapy, i.e., the written material based, video-based and web-based bibliotherapy, have been used among informal caregivers of people with neurocognitive disorders
- Bibliotherapy had significant pooled effects on improving depression, self-efficacy for dealing with problem behaviors, and state anxiety.
- Due to the limited number of studies, the pooled effect of bibliotherapy on other mental well-being outcomes was inconclusive, yet worth exploring. More rigorously designed large scale randomized controlled trials are needed.

1. Introduction

Neurocognitive disorder is a general term describing a spectrum of conditions that lead to an impairment of cognitive functions, including memory problems, difficulty in understanding, behavior change, and trouble with performing daily activities. Neurocognitive disorder is caused by physical or medical diseases rather than psychological illnesses. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders defines neurocognitive disorder into three types of syndromes: delirium, mild and major neurocognitive disorder (American Psychiatric Association, 2013). Specifically, neurocognitive disorder may be due to delirium caused by multiple reasons: traumatic brain injury, Alzheimer's disease, vascular disease, Lewy body disease, frontotemporal lobar degeneration, HIV infection, Huntington disease, Parkinson disease and Prion disease (Sachdev et al., 2014). For the majority of the time, individuals with neurocognitive disorder are cared for by informal caregivers within community/home settings (Chi et al., 2019). Although each type of neurocognitive disorder has its own features, the commonality of symptoms often lead to shared caregiving situations, feelings and experiences for the informal caregivers (Agronin, 2015).

Informal caregivers are non-professional caregivers who provide unpaid care for people with caregiving needs (Roth, Fredman, & Haley, 2015). They are the backbones of the health and social care system worldwide. With limited cognitive functions, people with neurocognitive disorder are dependent on their caregivers to survive. Caregiving for a person with a neurocognitive disorder can be a full-time job, ranging from personal care to behavioral symptoms management to decision making. In face of the complex neuropsychiatric symptoms of neurocognitive disorder, informal caregivers should be provided with training and support. However, the education and support from the health institutions does not always meet caregivers' needs (Wang, Cheung, & Leung, 2019). Due to the social stigma of neurocognitive disorder, some caregivers are reluctant to seek help and mental health problems have been found in almost half of them, such as depression and psychological distress (Borsje et al., 2016), and anxiety (Lou et al., 2015). A study has also found that worse caregiver mental well-being predicts greater patient mortality (Lwi, Ford, Casey, Miller, & Levenson, 2017). Therefore, interventions for improving the mental well-being of informal caregivers of neurocognitive disorder are essential for both the caregiver's and care-recipient's health.

Non-pharmacological interventions have been developed for informal caregivers of neurocognitive disorder. Several systematic reviews for informal caregivers have been published (Kwon, Ahn, Kim, & Park, 2017; Thompson et al., 2007). Psychoeducational approaches have been found to be most effective in reducing negative mental well-being outcomes (i.e., depression) and increasing positive well-being outcomes (i.e., caregiver satisfaction and subjective well-being). However, these effects were reported in interventional studies that involved active participation and behavior management skills-building (Pinquart & Sorensen, 2006). Psychotherapy has also been widely used, however, this tends to have domainspecific effects, such as reducing caregiving burden and improving subjective well-being (Pinquart & Sorensen, 2006). Respite care was not effective in reducing caregiver's depression and anxiety (Maayan, Soares-Weiser, & Lee, 2014). Support groups led by professionals were also shown to be effective in improving caregiver mental well-being (Piersol et al., 2017), but both the involvement of professionals and peers are required, which would limit the dissemination to caregivers who have limited access to professional and social support. A comprehensive review of several systematic reviews suggested that future interventions should be tailored, and especially should have the potential for being integrated into clinical or social service practices (Gitlin & Hodgson, 2015). In addition, apart from limited human resources in real life settings, caregivers also face financial burdens caused by the long-term care (Leszko, 2019). In this regard, pragmatic cost-effective self-help approaches which require minimum professional involvement have great potential in real life settings. Bibliotherapy is such an intervention.

Bibliotherapy is a self-help non-pharmacological intervention requiring minimum involvement of professionals. Originally, it used guided reading of written materials to solve problems relevant to an individual's developmental or therapeutic needs (Riordan & Wilson, 1989). With the development of technology, other mediums have been utilized. The definition of bibliotherapy was therefore developed into "the use of written materials or computer programs, or the listening/viewing of audio/videotapes for the purpose of gaining understanding or solving problems relevant to a person's developmental or therapeutic needs" (Marrs, 1995, p. 846). The formats of audios, videos, computers, and websites have become increasingly popular in recent years (Xin, Chen, Jin, Cai, & Feng, 2017).

Although many forms of bibliotherapy exist, problem-focused approaches that utilize cognitive-behavioral techniques have received much empirical attention (Harwood & L'abate, 2010). Bibliotherapy has also been regarded as a pragmatic economical treatment that typifies a new way to deliver cognitive behavioral therapy in clinical settings (Hogdahl, Birgegard, & Bjorck, 2013). Alternative approaches are underpinned by the psychodynamic model for bibliotherapy, which is often used in creative forms of the intervention and includes three progressive stages: identification, catharsis and insight (Shrodes, 1949). By reading/listening/watching the designated materials, the clients are guided to identify their distorted thinking, have emotional release, and generate insights into their own situation. These stages promote greater awareness of realistic ways to reframe their experiences, and finally motivate them to develop positive feelings and attitudes (McKenna, Hevey, & Martin, 2010). During this process, the individuals' self-efficacy in managing and coping with specific challenges is also enhanced, resulting in improvements in their emotional well-being. Although the self-help approach in bibliotherapy has mainly adopted cognitive behavioral therapy techniques, it differs from the original face-to-face model in terms of being primarily self-administered, i.e., cognitive behavioral therapy is a process of collaboration between the therapist and the client to identify maladaptive beliefs, gather relevant information on beliefs and behaviors, and modify beliefs (Beck, 1979). Whereas,

bibliotherapy does not require intensive collaboration between the clients and therapists, the roles of therapists are auxiliary (Floyd, 2003).

Bibliotherapy was originally developed for treating depression, and has been used among informal caregivers in recent years (Chien, Thompson, Lubman, & McCann, 2016). The efficacy of bibliotherapy for informal caregivers has been evaluated by a range of different studies. It was demonstrated to be effective in improving the caregiving experiences of informal caregivers of people with psychosis (Chien, Thompson, et al., 2016), as well as the resilience of caregivers who care for a person with depression (McCann, Songprakun, & Stephenson, 2017). Studies using bibliotherapy for improving the mental well-being of informal caregivers of neurocognitive disorder have also been conducted. However, different kinds of bibliotherapy have been used with informal caregivers, the strength of evidence is unclear, and to date no systematic review has been published. Therefore, we conducted a systematic review and meta-analysis to determine what kinds of bibliotherapy have been used among informal caregivers of neurocognitive disorder, and calculate the effect size of bibliotherapy on the mental well-being of informal caregivers of people with neurocognitive disorder. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist was used to guide this systematic review (Moher, Liberati, Tetzlaff, & Altman, 2009).

2. Objectives

Review questions:

- What kinds of bibliotherapy interventions have been used for improving the mental well-being of informal caregivers of people with neurocognitive disorder?
- What are the effects of bibliotherapy on caregivers' mental well-being?

3. Methods

3.1. Registration

This systematic review was registered at PROSPERO (CRD42019129152).

3.2. Search strategies

A systematic literature search was conducted in CINAHL, Scopus, EMBASE, MEDLINE, PsycINFO, and Web of Science, covering all studies published from inception to July 1, 2019. The search strategy was supervised by a health librarian. Key words used included (informal OR unpaid OR spous* OR family) AND (carer* OR caregiver*) AND (neurocognitive disorder OR dementia OR Alzheimer's disease OR vascular disease OR traumatic brain injury OR Lewy body disease OR mild cognitive impairment OR delirium OR frontotemporal lobar degeneration OR HIV infection OR Huntington disease OR Parkinson disease OR Prion disease) AND (bibliotherap* OR "reading therap*" OR "therapeutic reading" OR manual OR workbook OR self-help OR "self help" OR poetry OR fiction OR literat* OR video* OR audio). To ensure the comprehensiveness of the search, and to avoid potential publication bias, clinical trial registry, i.e., the World Health Organization International Clinical Trials Registry Platform was also searched. The reference lists of included studies were searched for relevant studies, and the authors of included studies were contacted for additional information where required.

3.3. Inclusion and exclusion criteria

Randomized controlled trials and quasi-experimental studies (e.g., pre-test, post-test, and non-equivalent comparison group studies) that adopted individual bibliotherapy as a main intervention component for caregivers, and measured the effectiveness of it, and written in English were included. Conference papers with abstract only and information published in letters or books were excluded because they would not provide enough reliable data for analysis. For published papers with no full-text online, the full-text was requested by emailing the corresponding author. The other study inclusion criteria were outlined following the population, intervention, comparator, outcomes and setting (PICOS) format as follows:

3.3.1. Population

The study population consisted of informal caregivers aged 18 years or above who are responsible for assisting with activities of daily living and supporting the care-recipient with neurocognitive disorder. In order to ensure the comprehensiveness of literature retrieval and ascertain what kind of psychological well-being outcomes have been studied; no specific existing mental health problems were set as an inclusion criterion for the population. Study populations who were professional or paid caregivers, including nurses or domestic helpers were excluded.

3.3.2. Intervention

In this study, bibliotherapy is defined as a self-help intervention based on cognitive behavioral therapy techniques, which offers strategies in problem identification, enhances emotional release, enables insight generation, replace maladaptive thinking patterns with rational thinking, and stimulate problem solving (McKenna et al., 2010). Bibliotherapy interventions utilizing cognitive-behavioral techniques were included. Group interventions were excluded.

3.3.3. Comparators

Both studies with inactive control (usual care, wait list) and active controls as the control group were included.

3.3.4. Outcomes

Based on the therapeutic mechanism of bibliotherapy, clinically relevant measures were regarded as the main outcomes. Depression was assessed as primary outcomes because bibliotherapy was more likely to produce emotional experience (Silverberg, 2003) and depression is highly prevalent in caregivers of people with neurocognitive disorders. Whereas, other important outcomes relating to different types of emotional distress (i.e. stress, anxiety) or outcomes reflecting potential mechanisms responsible for improvements in distress (i.e. self-efficacy) were included as secondary outcomes. Studies were included if they assessed at least one of the aforementioned outcomes. Studies focusing on the outcomes of care recipients, but not caregivers were excluded.

3.3.5. *Setting*

Studies that recruited participants from all settings and with the intervention conducted in the home/community setting were included.

3.4. Data screening, extraction and analysis

The titles and abstracts were screened by the first author and double checked by the corresponding author. Relevant articles proceeded to the full-text review stage, were reviewed with the inclusion and exclusion criteria by two independent reviewers (the

first and last authors). The reviewers reached consensus on the final included full-texts via discussion and re-reading of the articles if necessary. A data extraction sheet specifically designed for this systematic review was used. Extracted data included the research design, country, sample, intervention, comparison, outcome measures, main findings, intervention attendance rates and study attrition rates.

3.5. Risk of bias

Two reviewers used the Cochrane Collaboration risk of bias tools for RCTs (Higgins et al., 2011) to assess the quality of studies independently. This tool appraises the risk of bias from seven aspects: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other bias. Each one was rated as "low risk", "unclear risk", or "high risk" accordingly. Any discrepancies between the two reviewers were discussed with a third reviewer to reach consensus. The assessment of study quality was performed in order to contextualize and summarize the risk of bias within and across studies, rather than to determine eligibility for study inclusion in the review.

3.6. Data analysis

Review Manager 5.3 was used to analyze the extracted data. For the continuous data, standardized mean difference (SMD) was used rather than the mean difference (MD), because SMD manifests better generalizability and external applicability so that it can be applied to similar populations and SMD is also less vulnerable to over- or underestimation (Takeshima et al., 2014). Therefore, to better ease the comparisons for all outcomes in the review, SMD (Hedges' adjusted g) and 95% confidence intervals (CI) were used to estimate the pooled treatment effect of continuous outcomes, regardless of the specific outcome instrument used. As different kinds of bibliotherapy as well as the different dosages were used among studies, it was impossible to assume the studies to be clinically homogenous, therefore, random effects models were used for meta-analyse.

Chi-square and I-squared (I^2) statistic were used to assess the statistical heterogeneity of the studies included for meta-analysis. P<0.05 was considered as suggestion of heterogeneity, while $I^2 \geq 50\%$ was taken as substantial heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003). The magnitude of standardized mean difference (SMD) ≥ 0.8 was regarded as large, =0.5 was regarded as medium, =0.2 was regarded as small (Egger, Davey-Smith, & Altman, 2008). Z score was calculated for overall effect size of pooled outcomes. For the outcomes which had at least two studies per subgroup, subgroup analysis was conducted to explore the heterogeneity and to compare the effects of different kinds of bibliotherapy. R software was used to calculate the pooled mean and standard deviation for the caregiver age.

4. Results

4.1. Search results

A total of 481 results were identified from the search. Four hundred and seven articles remained after removing the duplicates. After title and abstract screening, 35 papers proceeded to full-text review. Finally, nine articles remained after full-text review. We also searched the World Health Organization International Clinical Trials Registry Platform with the search strategy of this systematic review, eight records for seven trials were found. Among the seven trials, five did not meet the inclusion criteria of this study. For the two trials meeting the inclusion criteria, both are still recruiting

(recruiting started in January (Bruno, 2017) and April 2019 (Salinas, 2018) respectively) with no results published. Therefore, nine studies were included for qualitative synthesis. Among the nine studies, six of them explored same outcomes of interest. Therefore, meta-analysis was conducted for these results (Fig. 1).

4.2. Characteristics of the included studies

Overall, the nine articles included 1036 informal caregivers of neurocognitive disorder. The type of relationship includes both family members and non-family member caregivers, in terms of friends, neighbors, or people with the same religion, etc. The characteristics of informal caregivers were: informal caregivers of persons with dementia (8 studies) and older adults with neurocognitive disorder (Alzheimer's disease or other progressive neurocognitive disorder) (1 study). As the study by Beauchamp, Irvine, Seeley, and Johnson (2005) did not provide information on the mean age for the participants, the average age of caregivers in the other studies is 61.67 \pm 12.12. The age range was also not provided in the original papers, except Blom et al.'s (2015) study (ranged from 26 to 87). The studies were conducted in the US (7 studies), The Netherlands (1 study) and France (1 study). The types of bibliotherapy included web-based bibliotherapy (4 studies), video-based bibliotherapy (4 studies) and bibliotherapy based on written material (1 study). Dosages ranged from 3 to 12 sessions, lasting from 1 month to 5~6 months. The outcome measures include stress (3 studies), caregiver distress related to dementia related behavioural symptoms (4 studies), self-efficacy (6 studies), depression (8 studies), anxiety (5 studies), positive affect (2 studies), negative affect (2 studies), anger (3 studies), and strain (1 study). Only three studies had follow-ups beyond post intervention, one of them was 3 months (Cristancho-Lacroix et al., 2015), two others were 6 months (Steffen & Gant, 2016; Williams et al., 2010). The other studies measured outcomes immediately post intervention. Comparisons included both inactive control (usual care, wait list) and active control (education DVD).

The overall attrition rates of included studies ranged from 7.8% to 30.6%. The attrition rates of the bibliotherapy groups ranged from 10% to 39.6%. In terms of the different types of bibliotherapy, the attrition rate of the bibliotherapy based on written material was 18.6% (Burgio, Stevens, Guy, Roth, & Haley, 2003). The attrition rates of the video-based bibliotherapy ranged from 10% to 23.5% (Gallagher-Thompson et al., 2010; Gant, Steffen, & Lauderdale, 2007; Steffen, 2000; Steffen & Gant, 2016; Williams et al., 2010). The attrition rates of web-based bibliotherapy ranged from 32% to 39.6% (Blom et al., 2015; Cristancho-Lacroix et al., 2015). As Beauchamp et al. (2005) did not report the number of participants allocated in each group, the attrition rate was not calculated due to the lack of data (Table 1).

4.3. Risk of bias of the included studies

All of the studies used a randomized controlled trial design, however, only five of them (Blom et al., 2015; Cristancho-Lacroix et al., 2015; Steffen, 2000; Steffen & Gant, 2016; Williams et al., 2010) mentioned how the randomization was done or the randomization strategies for ensuring theoretically comparable groups. The other four studies (Beauchamp et al., 2005; Burgio et al., 2003; Gallagher-Thompson et al., 2010; Gant et al., 2007) were rated as unclear risk of bias due to insufficient information. Only three studies (Blom et al., 2015; Gallagher-Thompson et al., 2010; Steffen & Gant, 2016) mentioned about the allocation concealment in terms of separate individuals setting up the randomization and enrollment, which were rated as low risk of bias. The others were rated as having an unclear risk of bias for allocation concealment. It is difficult for psychosocial interventions to blind participants,

Table 1 Characteristics of included studies and their main findings (n = 9).

Study	Design	Country	Sample	Intervention	Comparison	Outcomes and Measures	Main findings	Attrition rate
Beauchamp, Irvine, Seeley, and Johnson (2005)	2-arm RCT	US	299 employed family caregivers of people with dementia	Web based bibliotherapy Main Components: text material and videos that model positive caregiving strategies, i.e., Being a Caregiver, Coping With Emotions, and Common Difficulties. Dosage: 3 modules lasting for 30 days, able to partake repeatedly	Inactive control: Waitlist control	Stress (Primary Appraisal): two initial screening questions Self-Efficacy (Secondary Appraisal): six self-efficacy questions regarding areas of caregiving Ways of coping: RWC Caregiver strain: CSI Positive aspects of caregiving: PAC Depression: CES-D State anxiety: STAI-10	There were significant improvements in depression, anxiety, level and frequency of stress, caregiver strain, self-efficacy, and intention to seek help, as well as perceptions of positive aspects of caregiving.	• Overall: 9% • Bibliotherapy Not mentioned
Blom, Zarit, Groot Zwaaftink, Cuijpers, and Pot (2015)	2-arm RCT	The Nether- lands	245 family caregivers of people with dementia	Web based bibliotherapy Main Components: (a) coping with behavioral problems (problem solving); (b) relaxation; (c) arranging help from others; (d) changing non-helping thoughts into helping thoughts (cognitive restructuring); and (e) communication with others (assertiveness training). Dosage: 8 sessions and a booster session during 5 to 6 months	Inactive control: Digital newsletter that did not overlap with the intervention contents	• Depressive symptoms: CES-D • State anxiety: HADS-A	 Caregivers in the experimental group showed significantly lower symptoms of depression (p = .034) and anxiety (p = .007) post intervention Effect sizes were moderate for symptoms of anxiety (.48) and small for depressive symptoms (.26). 	• Overall: 28.6% • Bibliotherapy group: 39.6%
Burgio, Stevens, Guy, Roth, and Haley (2003)	2-arm RCT	US	118 family caregivers of individuals with Alzheimer's disease and related disorders	Skills Training Condition A group workshop followed by 16 in-home treatment sessions over a 12-month period	Written material bibliotherapy: Main Components: general information on dementia and dementia caregiving, caregiver's voiced concern about a specific problem (on demand). Dosage: 2 (77%) to 3 (23%) sessions	CG appraisal of problem behaviors: RMBPC Positive aspects of caregiving: PAC Social support: LSNI Depressive symptoms: CES-D State anxiety: STAI-10 Desire to Institutionalize: A seven-item scale created by Morycz, 1985	Both groups reported decreasing levels of problem behaviors and appraisals of behavioral bother, and increased satisfaction with leisure activities over time. On appraisal of distress related to behavior problems, White caregivers showed more improvement in the minimal support control condition, and African American Caregivers showed the greatest improvements in the skills training condition.	• Overall: 15.7% • Bibliotherapy group: 18.6%

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Table 1 (Continued).

Study	Design	Country	Sample	Intervention	Comparison	Outcomes and Measures	Main findings	Attrition rate
Cristancho-Lacroix et al. (2015)	2-arm RCT	France	49 informal caregivers of a person with Alzheimer's disease	Web based bibliotherapy & usual care Main Components: (a) caregiver stress; (b) understanding the disease; (c) maintaining the loved ones' autonomy; (d) understanding their reactions; (e) coping with behavioral and emotional troubles; (f) communicating with loved ones; (g) improving their daily lives; (h) avoiding falls; (i) pharmacological and nonpharmacological interventions; (j) social and financial support; (k) about the future; and (l) in a nutshell. Dosage: 12 weekly thematic sessions	care	 Perceived stress: PSS-14 Self-efficacy: RSCS Caregiver appraisal of problem behaviors: RMBPC Subjective burden: ZBI Depressive symptoms: BDI-II Self-perceived health: NHP 	 Intention-to-treat analysis did not show significant differences in self-perceived stress between the experimental and control groups (P = .98). The experimental group significantly improved their knowledge of the illness (d = .79, P = .008) from baseline to month 3. 	• Overall: 30.6% • Bibliotherapy group: 32%
Gallagher- Thompson et al. (2010)	2-arm RCT	US	70 caregivers of people with dementia	Video based bibliotherapy Main Components: (a) education about dementia and caregiving stress, appraisal, and coping; (b) techniques for managing troublesome and disruptive behaviors of the care-recipient; (c) how to deal with one's own negative feelings and thoughts associated with caregiving; (d) developing skills to improve communication with other family members and professionals in the health care system; (e) behavioral activation techniques to increase pleasurable events in the daily lives of the caregiver and the care-recipient; and (f) end-of-life issues. Dosage: 6 sessions extending over a 12- to 16-week interval & an average of 3 times' non-problem solving phone calls	Active control: Education DVD	 Depressive symptoms: CES-D Positive affect: Positive affect subscale of the CES-D Caregiver appraisal of problem behaviors: RMBPC 	For CGs in the intervention group, level of negative depressive symptoms did not change, but positive affect was higher, and patient behaviors were appraised as less stressful and bothersome.	• Overall: 7.9% • Bibliotherapy group: 10%
Gant, Steffen, and Lauderdale (2007)	2-arm RCT	US	32 male family dementia caregivers	Video based bibliotherapy Main Components: (a) behavioral activation, (b) behavioral management, (c) stress reduction through relaxation training. Dosage: 10 sessions & 12 weekly telephone coach	Written material bibliotherapy Main Components: a 37-page booklet Basic Dementia Care Guide which included information on dementia and suggestions for dealing with a variety of caregiving challenges Dosage: Not mentioned & approximately 7 biweekly check-in-calls	 Self-efficacy: RSCS Positive & negative affect: PANAS 	 Results did not support the greater efficacy of the video condition in reducing psychosocial distress (eg, negative affect, upset and annoyance following behavior problems) or increasing positive affect or caregiving self-efficacy. There was a statistically significant effect for postintervention improvement in conditions. 	• Overall: 12.5% • Bibliotherapy group: 23.5%

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Table 1 (Continued).

Study	Design	Country	Sample	Intervention	Comparison	Outcomes and Measures	Main findings	Attrition rate
Steffen (2000)	3-arm RCT	US	33 women and men caring for a relative with dementia	Video based bibliotherapy IG1: home-based viewing with weekly telephone sessions IG2: class-based viewing led by a trained facilitator (not bibliotherapy) Main Components: instruction and homework assignments on (a) awareness training; (b) tension-reduction strategies; (c) cognitive change strategies; and (d) assertion training. Dosage: 8 weekly sessions & 8 weekly telephone coach		 Anger intensity: CAI Depression: BDI Self-efficacy: RSCS 	Compared to the control condition, caregivers in both of the treatment conditions had lower post treatment levels of anger and depression, and higher ratings of caregiving self-efficacy.	• Overall: 15% • Bibliotherap group: 20%
Steffen and Gant (2016)	2-arm RCT	US	74 women caring for an older adult with a neurocognitive disorder	Video based bibliotherapy Main Components: (a) behavioral activation for both the caregiver and care recipient; (b) management of disruptive behaviors; (c) relaxation during caregiving situations; and (d) caregiving self-efficacy. Dosage: 10 weekly sessions & weekly telephone coach	Inactive control: a basic education and support condition act as usual care	Depressive symptoms: BDI-II Negative affect: PANAS State anxiety and hostility: MAACL-R Self-efficacy: RSCS Caregiver appraisal of problem behaviors: RMBPC	At post-treatment, depressive symptoms, upset following disruptive behaviors, and negative mood states were statistically lower in the intervention group than in the control group. Caregiving self-efficacy scores for obtaining respite and for managing patient behavioral disturbances were significantly higher in the intervention group. Effect sizes were moderate but not maintained at the 6-month follow-up.	• Overall: 14.9% • Bibliotherapy group: 18.2%

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Table 1 (Continued).

Study	Design	Country	Sample	Intervention	Comparison	Outcomes and Measures	Main findings	Attrition rate
Williams et al. (2010)	2-arm RCT	US	116 Alzheimer's Disease or related dementia caregivers	Video based bibliotherapy Main Components: (a) Increasing awareness of and objectivity in distressing situations; (b) Evaluating one's reactions to those situations to decide whether to try to change one's reactions or to take actions to try to change the situations; (c) Changing one's reaction to distressing situations; (d) Using assertion to get others to change their behavior; (e) Problem solving to change distressing situations; (f) Saying No to reduce exposure to distressing situations; (g) Speaking clearly so others really listen; (h) Listening skills to make sure you hear what others are saying; (i) Empathizing to increase understanding of others' behavior; (j) Increasing the positives in your interactions with others. Dosage: 10 modules during 5 weeks (2 modules/week) & weekly telephone coach		Perceived Stress: PSS Anxiety: STAI Anger: STAXI Depressive Symptoms: CES-D Hostility: CMHS Self-efficacy: CGSE Sleep: PSQI	Participants in the intervention group showed significantly greater improvements in depressive symptoms, trait anxiety, perceived stress, and average systolic and diastolic blood pressure that were maintained over the six-month follow up period.	• Overall: 7.8% • Bibliotherapy group: 11.9%

Note: BDI: Beck Depression Inventory; BDI-II: Beck Depression Inventory; CAI: Caregiver anger interview; CES-D: the Center for Epidemiologic Studies—Depression; CGSE: the Revised Scale for Caregiving Self-Efficacy; CMHS: the MMPI-based Cook-Medley Hostility Scale; CSI: three subscales from the Caregiver Strain Instrument; HADS-A: The 7 item anxiety subscale of the Hospital Anxiety and Depression Scale; LSNI: Lubben Social Network Index; MAACL-R: the short version of the Multiple Affect Adjective Check List-Revised (MAACL-R) Anxiety and Hostility subscales; NHP: the French version of the Nottingham Health Profile; PAC: positive aspects of caregiving inventory; PANAS: the Positive and Negative Affect Scale; PSQI: the Pittsburgh Sleep Quality Index; PSS: the perceived stress scale; PSS-14: the 14-item Perceived Stress Scale; RMBPS: Revised memory and behavior problem checklist; RSCS: Revised Scale for Caregiving Self-Efficacy; RWC: two specific subscales of the Revised Ways of Coping; STAI: the State-Trait Anxiety Inventory; STAI-10: 10-item subscale of the State-Trait Anx

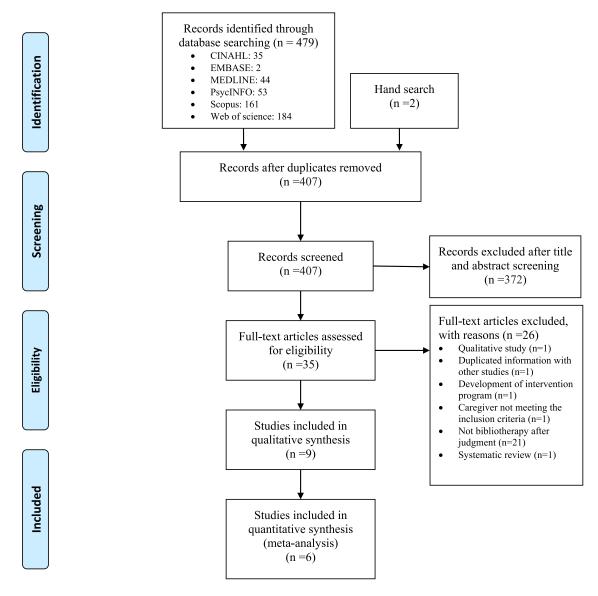


Fig. 1. PRISMA Flow Diagram.

especially when the comparison is usual care. Two of the studies (Beauchamp et al., 2005; Cristancho-Lacroix et al., 2015) did not blind participants, thus were rated as high risk of bias in this area. Only two studies (Blom et al., 2015; Gallagher-Thompson et al., 2010) blinded the participants and key study personnel, and they were rated as low risk of bias. The other studies were ranked as unclear risk of bias due to insufficient information to permit the judgment of low or high risk. Four studies (Burgio et al., 2003; Gallagher-Thompson et al., 2010; Gant et al., 2007; Steffen & Gant, 2016) blinded the outcome assessment, which were rated as low risk of bias, the others were rated as having an unclear risk of bias due to the insufficient information provided. Only two studies (Beauchamp et al., 2005; Burgio et al., 2003) did not report attrition, which were rated as unclear risk of bias for incomplete outcome data, the others reported reasons for missing data or strategies in handling missing data. Only one study (Cristancho-Lacroix et al., 2015) has a protocol published and was therefore rated as having a low risk of bias in selective reporting. the others were rated as unclear as it was impossible to check that all a-priori outcomes were reported. Only two studies (Burgio

et al., 2003; Steffen, 2000) mentioned strategies in avoiding or minimizing bias, however, there was still insufficient information on whether an important risk of bias exists, so all the studies were raked as unclear risk of bias in the assessment of other bias. (Fig. 2). As there were fewer than 10 studies in the meta-analysis, conducting a funnel plot or Egger's regression asymmetry test were generally not recommended to evaluate potential publication bias (Sterne, Egger, & Moher, 2008; Sterne et al., 2011).

4.4. Effects of bibliotherapy

One study (Burgio et al., 2003) only reported the results in subgroups (i.e., White and African American ethnicity), the subgroups were combined into a single group, and the sample size, mean and standard difference were calculated accordingly (Higgins & Green, 2011). For the study in which more than one comparison group was used (Steffen, 2000), the comparison group which was most similar to that in other studies was selected for analysis (Bahar-Fuchs, Clare, & Woods, 2013). As only three studies measured follow-ups beyond post-intervention, i.e., 3 month

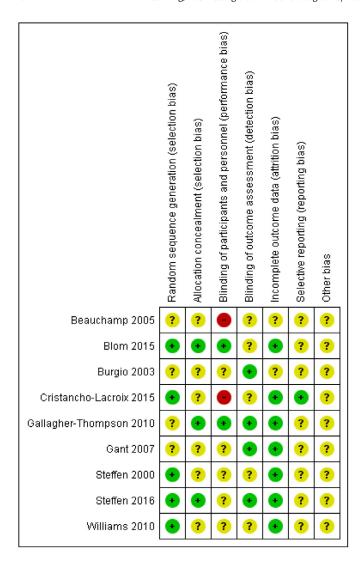


Fig. 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

follow-up (Cristancho-Lacroix et al., 2015) and 6 month follow-up (Steffen & Gant, 2016; Williams et al., 2010), only data collected immediately post intervention were analyzed for the effect size.

4.4.1. Effects of bibliotherapy on depression

Eight studies measured the effect of bibliotherapy on reducing depression. However, as two studies (Burgio et al., 2003; Gallagher-Thompson et al., 2010) used an active control, among which the control conditions differed, they were not included in the meta-analysis. Among the six studies using inactive control, one study (Williams et al., 2010) did not report data at post-intervention, therefore, only five studies were included in meta-analysis, two kinds of bibliotherapy were used (video and web based); therefore, subgroup analysis was conducted to explore the effects of each kind.

The overall effect for the two types of bibliotherapy was significant at Z = 1.99 (random effect model, SMD = -0.74, 95%CI = -1.47 to -0.01, p = 0.05). Subgroup analysis showed there was high heterogeneity among the subgroups ($I^2 = 94\%$, p<0.001), and there was significant effect difference between them (p = 0.008). However, when considered separately, only the video based bibliotherapy significantly reduced depression at Z = 2.78 (random effect model, SMD = -2.11, 95%CI = -3.6 to -0.62, p = 0.005), however, the heterogeneity was high ($I^2 = 83\%$, p = 0.02). (Fig. 3)

For the two studies using an active control, individual between group effect sizes were calculated for each. The effect of bibliotherapy on depression was not significant when compared with a skills training condition (Hedges' $g=0.153,\,P=0.4042,\,95\%CI=1.810$ to 2.115) (Burgio et al., 2003), or education DVD (Hedges' $g=-0.3333,\,P=0.1662,\,95\%CI=-2.531$ to 1.864) (Gallagher-Thompson et al., 2010).

4.4.2. Effects of bibliotherapy on self-efficacy

Six studies tested the effect of bibliotherapy on self-efficacy as compared with inactive control. Four of the studies (Cristancho-Lacroix et al., 2015; Gant et al., 2007; Steffen, 2000; Steffen & Gant, 2016) used revised scale for caregiving self-efficacy (RSCS) as the measurement, and only reported the results of subscales (selfefficacy for obtaining respite, self-efficacy for dealing with problem behaviours, and self-efficacy for controlling thoughts). Steffen (2000) only reported the subscale of self-efficacy for dealing with problem behaviours, and Steffen and Gant (2016) only measured the subscales of self-efficacy for obtaining respite and self-efficacy for dealing with problem behaviours. Therefore, a meta-analysis was conducted for each subscale. Beauchamp et al.'s (2005) study did not use RSCS as the measurement and only reported the total score of six self-efficacy questions regarding areas of caregiving, we calculated the Hedges' g (Hedges' g = 0.283, 95%CI = -0.596 to 1.162). Williams et al. (2010) reported that there was no significant effect, with no data reported, so it was not feasible to calculate the

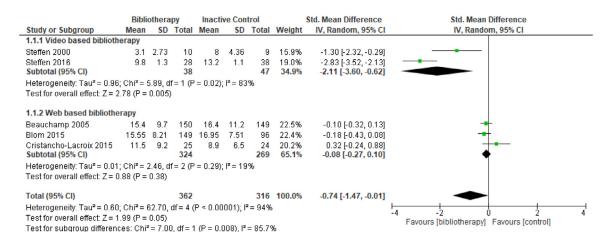


Fig. 3. Effects of bibliotherapy versus inactive control on depression post intervention.

	Bibliotherapy		Control			Std. Mean Difference	Std. Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Beauchamp 2005	14.7	5.6	150	15.6	6.4	149	47.2%	-0.15 [-0.38, 0.08]	-
Blom 2015	6.68	3.2	149	7.3	3.41	96	39.6%	-0.19 [-0.45, 0.07]	-■
Steffen 2016	3.5	2.2	28	5	2.7	38	13.2%	-0.59 [-1.09, -0.09]	
Total (95% CI)			327			283	100.0%	-0.22 [-0.41, -0.03]	•
Heterogeneity: Tau² =				-5 -1 1 1 2					
Test for overall effect: Z = 2.30 (P = 0.02)									Favours [bibliotherapy] Favours [control]

Fig. 4. Effects of bibliotherapy versus inactive control on state anxiety post intervention.

effect size. Subgroup analysis was not applicable due to the limited number of studies on intervention subgroup (Deeks, Higgins, & Altman, 2008).

4.4.2.1. Effect of bibliotherapy on self-efficacy for obtaining respite. There was low heterogeneity among the three studies (Cristancho-Lacroix et al., 2015; Gant et al., 2007; Steffen & Gant, 2016) measuring self-efficacy for obtaining respite ($I^2=0\%$). The overall effect of bibliotherapy on caregiver's self-efficacy for obtaining respite was not significant, Z=1.00, P=0.32 (random effect model, SMD = 0.17, 95%CI = -0.16 to 0.49).

4.4.2.2. Effects of bibliotherapy on self-efficacy for dealing with problem behaviours. The heterogeneity among the four studies (Cristancho-Lacroix et al., 2015; Gant et al., 2007; Steffen, 2000; Steffen & Gant, 2016) measuring self-efficacy for dealing with problem behaviours was low ($I^2=0\%$). The overall effect of bibliotherapy on caregiver's self-efficacy for dealing with problem behaviours was significant, Z=2.44, P=0.02 (random effect model, SMD = 0.36, 95%CI = 0.05 to 0.67).

4.4.2.3. Effects of bibliotherapy on self-efficacy for controlling upsetting thoughts. Only two studies tested the effect of bibliotherapy on controlling upsetting thoughts, both of which used inactive control groups. The effect of web-based bibliotherapy on self-efficacy for controlling upsetting thoughts was not significant, Hedges' g = -0.174, P = 0.5366, 95%CI = -5.079 to 4.730 (Cristancho-Lacroix et al., 2015). The effect of video-based bibliotherapy on self-efficacy for controlling upsetting thoughts was also not significant, Hedges' g = -0.456, P = 0.1982, 95%CI = -6.236 to 5.324 (Gant et al., 2007).

4.4.3. Effects of bibliotherapy on stress

Three studies tested the effects of bibliotherapy on stress as compared with inactive control (Beauchamp et al., 2005; Cristancho-Lacroix et al., 2015; Williams et al., 2010). The sample size ranged from 49 to 299. Three different instruments were used (two initial screening questions were used as measurement in Beauchamp et al.'s (2005) study, the 14-item version and 10-item version of Perceived Stress Scale in Cristancho-Lacroix et al.'s (2015) and William et al.'s (2010) study respectively). Williams et al. (2010) did not report the mean and standard deviation, so it was not applicable to calculate the pooled effect size due to the limited number of studies. Both the other two studies used webbased bibliotherapy, the effect was not significant for both (Hedges' g = -0.127, P = 0.2732, 95%CI = -0.841 to 0.587, (Beauchamp et al., 2005); Hedges' g = -0.012, P = 0.9644, 95%CI = -2.218 to 2.193 (Cristancho-Lacroix et al., 2015)).

4.4.4. Effects of bibliotherapy on anxiety

4.4.4.1. Effects of bibliotherapy on state anxiety. Five studies measured state anxiety. Burgio et al. (2003) used bibliotherapy as the control, the intervention group was a skills training condition. We converted bibliotherapy as the intervention and assumed the skills training was an active control for ease of data analysis. As Burgio's

(2003) study used active control, it was not included in the meta-analysis. The effect size of this study was Hedges' g=0.358 (P=0.053), 95%CI = -1.000 to 1.716, which demonstrated no statistical difference between bibliotherapy and a skill training condition in decreasing state anxiety. Williams et al. (2010) did not report the mean and standard deviation, so it was also not included in the meta-analysis. The heterogeneity of the three studies included in meta-analysis was low ($I^2=22\%$), the overall effect of bibliotherapy on state anxiety was significant at Z=2.30, P=0.02 (random effect model, SMD = -0.22, 95% CI = -0.41 to -0.33) (Fig. 4). Summary of pooled effects are in the Supplementary Table

4.4.4.2. Effects of bibliotherapy on trait anxiety. Only one study tested the effect of bibliotherapy on trait anxiety as compared with inactive control (Williams et al., 2010), however, as no post-intervention data was reported, the effect size was not estimable.

5. Discussion

5.1. Quality of included studies

The quality of included studies is generally low. The main areas of potential bias are related to insufficient details on allocation concealment, difficulty in blinding of participants and personnel for non-pharmacological interventions, as well as unclear selective reporting and other bias due to no registered clinical trial or published protocol. Therefore, the findings of non-significant effects of bibliotherapy should be interpreted with caution. Future high quality RCTs are needed to generate scientific evidence of bibliotherapy.

5.2. Attrition rates of included studies

The overall attrition rates of the included studies are comparable with the attrition rates of traditional cognitive behavioral therapy (average weighted attrition rate = 26.2%) (Fernandez, Salem, Swift, & Ramtahal, 2015). The attrition rates of the web-based bibliotherapy studies were higher than 30% (ranged from 32% to 39.6%). One of the possible reasons for high attrition and poor adherence was lack of personal contact (Todkill & Powell, 2013). Minimal telephone contact with a therapist seems to be vital to encourage participants to complete the intervention (Newman, Erickson, Przeworski, & Dzus, 2003). Another possible barrier to compliance to web-based intervention was the lack of skills using the internet or lack of motivation (Peels et al., 2012). Venkatesh and team's (2003) Unified Theory of Acceptance and Use of Technology indicated that the effort, expectancy and performance of users explained variations in the intention to use technology, therefore, whether caregiver's efforts match gains maybe another factor influencing their involvement in web-based bibliotherapy. However, when compared with other technology-based interventions, the attrition rate of web-based bibliotherapy was similar (Heynsbergh, Heckel, Botti, & Livingston, 2018).

5.3. Effects of bibliotherapy on mental well-being outcomes

This systematic review showed that bibliotherapy had moderate to large pooled effects on depression, small to moderate pooled effects on state anxiety and self-efficacy for dealing with problem behaviors, and non-significant pooled effects on self-efficacy for obtaining respite in informal caregivers of neurocognitive disorder. The pooled effect on other mental well-being outcomes were inconclusive due to the limited number of studies. However, the effect sizes of individual studies were calculated, indicating a large effect in reducing anger; a medium to large effects in reducing negative affect and distress caused by dementia related behavioural symptoms, and improving positive affect.

5.3.1. Effect of bibliotherapy on depression reduction

Our systematic review found that, in comparison with inactive control, bibliotherapy had a moderate to large pooled effect in reducing depression (SMD = -0.74). Another systematic review on children and adolescents also found that bibliotherapy had a moderate effect (SMD = -0.52) on depression (Yuan et al., 2018). However, both systematic reviews had high heterogeneity, indicating that individual studies with different intervention components, delivery mode, duration, and outcome measures may have different results. In consideration of the substantial heterogeneity in the current review, subgroup analysis was conducted, and the results suggested a statistically significant subgroup effect (p = 0.008), meaning that the mode of bibliotherapy significantly modifies the effect of bibliotherapy as compared with inactive control groups, and video-based bibliotherapy worked better than web-based bibliotherapy. However, there is still unexplained heterogeneity between the trials within the video-based bibliotherapy subgroups $(I^2 = 83\%)$. Therefore, even though a high pooled effect size has been identified (SMD = -2.11), the individual trial results seem inconsistent in the video-based subgroup.

Bibliotherapy has been shown to have long term sustained effects in controlling the depressive symptoms of patients with depression (Gualano et al., 2017), however this systematic review was not able to examine the long-term effects due to the lack of follow-up data. For individual studies, the medium-term effect of video-based bibliotherapy was sustained at moderate to large levels at 6 month's follow-up (Steffen & Gant, 2016; Williams et al., 2010) and the effect of web-based bibliotherapy was sustained at small to medium effect level at 3 month's follow-up (Cristancho-Lacroix et al., 2015). Therefore, the effect of bibliotherapy on reducing depression may be sustained over the medium term.

When compared with active control interventions, the effect of bibliotherapy was not significant. It is common that interventional studies with different control group designs yield different effect estimates (Karlsson & Bergmark, 2015). Researchers have also argued that although using active control groups is appropriate, informative and valuable in many situations, it often cannot provide reliable evidence of the effectiveness of a new therapy (Temple & Ellenberg, 2000). In this review, although there was no strong evidence supporting that video-based bibliotherapy has a better effect than commercial education DVD (Gallagher-Thompson et al., 2010), bibliotherapy based on written materials was shown to be comparable with skill training conditions, including group workshops followed by 8 home delivered face-to-face treatments and 2 therapeutic phone calls during 12 months (Burgio et al., 2003). Both studies demonstrate the potential of self-help treatments for informal caregivers in reducing depression. As the number of studies were insufficient for meta-analysis, more studies are needed in the future.

5.3.2. Effect of bibliotherapy on improving caregiver self-efficacy

Among all the subscales of self-efficacy, the pooled effect of bibliotherapy was only significant at a small to moderate level in improving self-efficacy for dealing with problem behaviors. The sustained effect was examined for individual studies, which indicated a small effect (Hedges' g = 0.4141) of video-based bibliotherapy at 6 month's follow-up (Steffen & Gant, 2016), and a sustained small effect (Hedges' g = 0.1550) of web-based bibliotherapy at 3 month's follow-up (Cristancho-Lacroix et al., 2015). As the sample size of intervention groups ranged from 10~28, the small effect size and non-significant results may also be caused by small sample sizes of the included studies. Other published systematic reviews also found that psychosocial interventions in general were effective in enhancing dementia caregivers' self-efficacy, however, compared with the course mode individual-based interventions, the distancecontact-intervention was not prominent (Tang & Chan, 2016). In addition, this earlier review also demonstrated that involving the care-recipient in the intervention could improve the quality of the intervention (Tang & Chan, 2016). Course mode bibliotherapy involving both the caregiver and care-recipient may be explored for improving caregiver self-efficacy in the future.

5.3.3. Effect of bibliotherapy on reducing stress

Both web-based and video-based bibliotherapy have been used for stress reduction among informal caregivers of neurocognitive disorder, however, as the number of studies were insufficient for performing meta-analysis it was impossible to calculate the pooled effect. More studies can be conducted to explore the effect of bibliotherapy on reducing stress among informal caregivers of neurocognitive disorder.

From the two studies included in the current review, there is no strong evidence showing the effect of web-based bibliotherapy on stress reduction. Bibliotherapy has been shown to be effective in reducing stress for employees at medical centers (Sharma et al., 2014), older adults (Cho & Chang, 2010) and college students (Hazlett-Stevens & Oren, 2017). This may be because the main stressor for informal caregivers of neurocognitive disorder is the progressively degenerating functional status of care-recipients. therefore their stress may be stronger and more persistent than other populations. Mindfulness-based stress reduction bibliotherapy has been found effective in reducing stress among adults (Wimberley, Mintz, & Suh, 2015), and as mindfulness has also been tested to be effective in reducing stress among dementia caregivers (Kor, Liu, & Chien, 2019), it is suggested that incorporating mindfulness into bibliotherapy may also be effective for reducing stress of informal caregivers of neurocognitive disorder. Future studies can be conducted in this area.

5.3.4. Effect of bibliotherapy on reducing anxiety

State anxiety is an individual's transitory emotional state linked to a stimuli of a specific situation, while trait anxiety refers to an individual's predisposition to respond to stimuli (Endler & Kocovski, 2001). From this meta-analysis, bibliotherapy had a small to medium pooled effect on state anxiety as compared with inactive control. It is also not inferior when compared with skill training workshop. The mechanism may be because state anxiety is related to an individual's interpretation of what is happening (Pacheco-Unguetti, Acosta, Callejas, & Lupiáñez, 2010), while bibliotherapy can help the clients change their interpretation of their situation by insight generation. However, as only three studies were included in the meta-analysis, conclusions about the overall efficacy of the interventions on improving anxiety should be viewed as being tentative (Valentine, Pigott, & Rothstein, 2010). In this review, only Steffen and Grant's (2016) study reported the follow-up results of state anxiety, unfortunately, the effect was not sustained

at follow-up (Hedges' g=0.0757). Unlike the findings in Steffen and Grant (2016) study, a study on patients with anxiety and related disorders showed that bibliotherapy could effectively reduce the anxiety with a large effect size, and the large effect could be maintained at 3 month's follow-up (Wootton et al., 2018). Therefore, more studies on the sustained effects of bibliotherapy on reducing caregiver's anxiety are needed.

Only one study focused on trait anxiety, the pooled effect was not estimable. As trait anxiety is related to the attitudes and strategies, and bibliotherapy has been proved to be effective in improving the caregiving attitude among caregivers of people with psychosis (McCann et al., 2013), it may also be effective among informal caregivers of neurocognitive disorder.

5.4. Implications for research and practice

From this systematic review, most of the studies involved dementia caregivers, and there was a lack of studies on caregivers of other subtypes of neurocognitive disorder. Most of the studies used video-based or web-based bibliotherapy, which could be disseminated to larger numbers of caregivers regardless of where they reside, however, the high attrition rate of web-based interventions also needs consideration in future studies. As the majority of caregivers are spousal caregivers of older people (Richardson, Lee, Berg-Weger, & Grossberg, 2013), their acceptability and grasp of technology needs to be taken into consideration. A number of important factors have been shown to influence older adults' acceptance of technology, e.g., age, gender, education, self-efficacy of using technology and facilitating conditions (Chen & Chan, 2014), future studies using video or web-based bibliotherapy may take these factors into consideration in their study design. For the caregivers who may find technology unacceptable, printed forms of bibliotherapy may be a good alternative. In addition, the majority of included studies were not of high quality and the sample size of most studies was small. To generate scientific evidence for bibliotherapy, more large scale and high-quality RCTs are needed in the future, particularly those that are theoretically derived.

Studies have shown that the caregivers can refer back to the bibliotherapy materials as many times as they like, therefore the effects can be sustained (Chien, Yip, Liu, & McMaster, 2016). However, as only three included studies reported follow up data, with different outcomes at different time points, the sustained effect of bibliotherapy on each discrete aspect of mental well-being outcome needs to be explored in the future studies.

Unlike the traditional group intervention, bibliotherapy does not require a specific time and place for caregivers to participate, it also requires minimum involvement of professionals, which is inexpensive and resource-saving. Therefore, it has potential for dissemination into the community settings, especially for areas where resources for informal caregivers are limited. Community nurses could disseminate the bibliotherapy materials to informal caregivers and encourage self-help with guided reading/watching. As the guided reading/watching are normally conducted by a telephone coach, nurses could also facilitate the telephone follow-up in community health care settings.

5.5. Limitations

This systematic review has a number of limitations that should be considered when interpreting the findings. Firstly, substantial heterogeneity exists in the included studies of this systematic review. Although we separately calculated the effect sizes of studies using active and inactive controls, and did subgroup analysis for different subtypes of bibliotherapy if applicable, substantial heterogeneity still exists in some aspects, specifically in terms of different contents in bibliotherapy material, different dosages, and dif-

ferent measurement scales. Due to the commonality of caregiving experiences, this systematic review did not limit the population into a specific type of neurocognitive disorder, this may also introduce clinical heterogeneity to a certain extent. The statistical heterogeneity of the effects on depression may also decrease the likelihood of drawing correct inferences. Secondly, the number of studies was not sufficient for doing a funnel plot or Egger's regression asymmetry test, so there maybe some undiscovered publication bias, which may also distort the results of this systematic review. In addition, as the clinical trial registry was found for only one study, there may be some unreported non-significant findings that have not been identified. Thirdly, only articles written in English language were searched, there may be some language and publication bias, which may have resulted in excluding some important studies reported in other languages. Fourthly, as all the mental well-being outcomes were assessed with subjective instruments, there may be some reporting bias. Fifthly, the literature search was conducted in July 2019, some additional papers may have been published after the search date. Finally, as there are a lack of high quality RCTs identified, the level of evidence is relatively weak and thus recommendations for practice are tentative.

6. Conclusion

This systematic review has demonstrated that bibliotherapy has positive effects on reducing depression, improving self-efficacy for dealing with problem behaviors and reducing state anxiety among informal caregivers of individuals with neurocognitive disorder as compared with inactive control. The effect on reducing depression and improving self-efficacy may also be sustained over 3-6 months. However, as the heterogeneity among studies on depression reduction were high, and the number of studies on state anxiety was small, the results should be viewed with some caution. When compared with an active control, the effect of bibliotherapy was not found to be inferior to group skill training conditions, thus it may provide a resource-saving and easily implemented intervention for supporting informal caregivers. The effects of bibliotherapy on other mental well-being outcomes are inconclusive due to the limited number of studies. As the quality of included studies was relatively poor, higher quality studies with rigorous designs are needed, indicating a fertile area for future research.

Declaration of Competing Interest

None

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Supplementary materials

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