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Review

The effectiveness of non-pharmacological interventions in older adults with depressive disorders: A systematic review

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ABSTRACT

Background: It is widely acknowledged that mental health disorders are common in older adults and that depression is one of the most serious threats to the mental health of older adults. Although best practice guidelines point out that moderate to severe depression should be approached with pharmacotherapy together with complementary therapies, the use of antidepressant drugs in older adults has various disadvantages, such as long response time, side effects, potential risk of dependency and tolerance, poor compliance rates and high probability of drug interactions. In addition, qualitative studies of depressed people with a chronic illness have indicated that both patients and healthcare professionals prefer a psychosocial treatment for depression over a pharmacological one.
Objective: This review aimed to identify and synthesize the best available evidence related to the effectiveness of non-pharmacological interventions for older adults with depressive disorders.
Design: Systematic review of studies with any experimental design considering non-pharmacological interventions for older adults with depressive disorders.
Data sources: An initial search of MEDLINE and CINAHL was undertaken, followed by a second search for published and unpublished studies, from January 2000 to March 2012, of major healthcare-related electronic databases. Studies in English, Spanish and Portuguese were included in the review.
Review methods: This review considered studies that included adult patients, aged over 65 years with any type of depressive disorder, regardless of comorbidities and any previous treatments, but excluded those with manic or psychotic episodes/symptoms. All studies that met the inclusion criteria were assessed for methodological quality by two independent reviewers using a standardized critical appraisal checklist for randomized and quasi-randomized controlled studies from the Joanna Briggs Institute. Data extraction was also conducted by two independent reviewers based on the Joanna Briggs Institute data extraction form for experimental studies.
Results: Twenty-three studies met the inclusion criteria. Of those, seventeen were excluded after critical appraisal of methodological quality and six were included in this review. These studies included 520 participants and described cognitive behavior therapy, competitive memory training, reminiscence group therapy, problem-adaptation therapy,

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and problem-solving therapy in home care. Evidence suggests that all these interventions reduce depressive symptoms.

Conclusions: According to evidence, non-pharmacological interventions had positive effects on improving patients' depression and may be useful in practice. However, due to the diversity of interventions and the low number of studies per intervention included in this systematic review, evidence is not strong enough to produce a best practice guideline.

What is already known about the topic?

- The World Health Organization indicates that resources to treat and prevent mental health disorders remain insufficient and are inefficiently utilized.
- Best practice guidelines point out that moderate to severe depression should be approached with pharmacotherapy together with complementary therapies. However, in older adults, pharmacotherapy has adverse side effects and high probability of interactions with drugs prescribed for comorbid conditions.
- Primary studies on non-pharmacological interventions, such as music therapy, massage, reminiscence therapy or physical exercise, showed reduction of depressive symptoms in older adults without any adverse side effects; however, this evidence has not been synthesized.

What this paper adds

- This is the first review systematically identifying and synthesizing the best available evidence about the effectiveness of non-pharmacological interventions for older adults with depressive disorders.
- The evidence suggests non-pharmacological interventions reduce depressive symptoms in older adults and may be useful in practice.

1. Background

The Survey of Health, Ageing and Retirement in Europe (SHARE) indicates that the prevalence of depression rises consistently with age (Directorate-General for Health and Consumers, 2008), with rates ranging in later life from 18% to 37% (Ladin, 2008). Indeed, older adults constitute the population that is highly vulnerable to developing depressive disorders (Fiske et al., 2009). According to some authors (Helvik et al., 2010), this vulnerability is associated with age-related structural and biochemical changes. Other authors (Forsman et al., 2011; Munk, 2007) have identified a greater exposure to risk factors such as physical/chronic illnesses, social isolation or loss of independence. Interestingly, it seems that depressive disorders in older adults, principally in those aged 85 years and more, are largely under-diagnosed (Munk, 2007; Stek et al., 2004). One of the possible explications for this disparity is that the presentations of depressive symptomatology characteristic to older and younger adults are different (Fiske et al., 2009). For example, older adults may report physical rather than emotional problems and present cognitive symptoms usually associated with the processes of dementia (Funnell, 2010). In this population, it is also common the development of the subsyndromal form of depression in which depressed mood and anhedonia are absent (Meeks et al., 2011; Munk, 2007). These particularities of late-life depression enhance the risk of diagnostic errors, especially in primary care settings (Licht-Strunk et al., 2009), showing that the study of this clinical condition should be separated according to life stages.

Both major depression and subsyndromal depression adversely affect the lives of older adults, being associated with impaired health-related quality of life, reduced functioning, disability and increased mortality rates (Helvik et al., 2010; Noel et al., 2004; Yang et al., 2015). Moreover, subsyndromal depression has been shown to increase the risk of progression into major depression and suicide (Meeks et al., 2011). For all these reasons, depression is recognized as one of the most serious threats to the mental health of older adults (Helvik et al., 2010). In addition, due to the worldwide growth of the elderly population, geriatric depression is certain to become a very serious global mental health issue. However, according to the World Health Organization (2011), resources to treat and prevent this clinical condition remain insufficient and are inefficiently utilized.

Best practice guidelines point out that moderate to severe depression should be approached with pharmacotherapy together with complementary therapies (Jayasekara and Edu, 2001). However, the use of antidepressant drugs is not recommended to initiate the treatment of mild depression. Some of the disadvantages associated with psychopharmacotherapy, such as long response time, side effects, potential risk of dependency and tolerance, and poor compliance rates (Chan et al., 2011), appear to be more prominent among older adults. Furthermore, there is a greater probability of drug interaction (Funnell, 2010; Montgomery and Dennis, 2004), as older adults tend to be medicated for comorbidities (Centre for Reviews and Dissemination, 2007). For example, the effectiveness of antidepressant use in people medicated for dementia remains unproven, and best practice recommendations advise caution due to potential side effects (Stomski, 2011). Interestingly, qualitative studies of depressed people with a chronic illness have indicated that both patients and healthcare professionals prefer a psychosocial treatment for depression over a pharmacological one (The British Psychological Society, The Royal College of Psychiatrists, 2010). Also nursing

scholars have been arguing for the need of a change in the current focus of medical care, from a biomedical approach to a holistic one, suggesting that the integration of non-pharmacological nursing interventions in the care of older adults with major or subsyndromal depression may be one step toward this change in health care focus (Phaneuf, 2001).

The necessity to foster preventive measures for the development of depression among older adults, the challenges related with use of the pharmacotherapy in this population group, and also patients' and nurses' preferences for psychosocial treatment justify the need to study the effectiveness of non-pharmacological interventions for geriatric depression. According to results obtained in primary studies (Cooke et al., 2010; Lindwall et al., 2011; Song and Kim, 2006), music therapy, massage or physical exercise, among others, have shown to decrease depressive symptoms in older adults, without having any adverse side effects. However, this evidence has not been synthesized.

Recent systematic reviews and protocols have focused on nonpharmacological approaches to the treatment of depression in populations other than older adults (Pibernik-Okanovic et al., 2011; Rizzo et al., 2011). There is a Joanna Briggs Institute Evidence Summary regarding the effectiveness of complementary therapies in older adults but it is not specifically directed toward the treatment of depressive symptoms (McArthur, 2011).

Considering the importance of this health issue in a rapidly growing population and the privileged position of nurses to establish working relationships with patients from a broad range of settings, it is important to produce evidence that clarifies which interventions can successfully be used, how to use them and in which cases and contexts. Therefore, a systematic review on the effectiveness of non-pharmacological interventions to treat older adults with depressive symptoms is timely in order to generate best practice guidelines specifically directed to nurses who work in this area.

2. Methods

The full protocol is described on the PROSPERO database (registration number CRD42012002327). The review methodology followed The Joanna Briggs Institute systematic review procedures (The Joana Briggs Institute, 2014).

2.1. Aim

The aim of this study was to systematically review the effectiveness of non-pharmacological interventions for older adults with depressive disorders. More specifically, the review focused on the following questions:

(i) Are non-pharmacological interventions effective in reducing symptoms of older adults with depressive disorders?
(ii) Does the effectiveness of the interventions vary with the severity of depressive symptoms?
(iii) Is the effectiveness of the interventions affected by the presence or absence of simultaneous pharmacological treatment for depression?
(iv) How does the presence of comorbidities affect the effectiveness of the interventions for depressive disorders?

2.2. Inclusion and exclusion criteria

This review considered studies with any experimental design, including randomized controlled trials, non-randomized controlled trials, or other quasi-experimental studies, that focused on use of non-pharmacological interventions for older adults with depressive disorders. Inclusion criteria for the study sample were as follows: (a) older adults aged 65 years and more; (b) with any type of depressive disorders confirmed by any depression scale or by the ICD 10 or the DSM-IV-TR criteria; (iii) receiving pharmacological treatment (any dosage or duration) for depression or other illnesses. Comorbidities and any previous treatments were not considered for the purpose of inclusion process. Patients with manic or psychotic episodes/symptoms were excluded.

The primary outcomes of interest were: depressive symptomatology, measured by any depression scale, or changes in the severity of depressive symptoms, as assessed against diagnostic criteria (such as the ICD 10 or the DSM-IV-TR). Since reduction of depressive symptoms may improve autonomy levels in activities of daily living, cognitive function, health-related quality of life and associated variables, these secondary outcomes were also considered, and all results obtained by validated instruments were analyzed.

2.3. Search strategy

The search strategy aimed to identify published and unpublished studies from January 2000 to March 2012. This date range derives from a preliminary search in CINHAL and MEDLINE indicating absence of relevant studies related to non-pharmacological interventions in older adults with depressive disorders before 2000. Only English, Spanish and Portuguese language articles were included. A three-step search strategy was followed, with the initial phase consisting of an initial limited search of MEDLINE and CINAHL addressed to analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. Secondly, a more extensive search using all identified keywords and index terms was undertaken across all included databases. Thirdly, the reference lists of all identified reports and articles were searched for additional relevant studies.

Databases searched for published studies included: Academic Search Complete, CINAHL Plus, MEDLINE, Cochrane Central Register of Controlled Trials, LILACS, Embase, Scopus, Library, Information Science & Technology Abstracts, Nursing & Allied Health Collection: Comprehensive, MedicLatina, and Scielo – Scientific Electronic Library Online.

Databases searched for unpublished studies included: Agency for Healthcare Research and Quality, Grey Literature

Report from New York Academy of Medicine, Mednar, Scirus.com, National Library of Australia's Trove service, ProQuest – Nursing and Allied Health Source Dissertations, Banco de teses da CAPES (www.capes.gov.br), and Repositório Científico de Acesso Aberto de Portugal.

Initial English language keywords used were: "depres*", "old*", "elder*", "interven*", "nonpharmacologic*", and "nurs*". While searching for the Portuguese and Spanish databases, keywords used included: "idos*", "não farmacológic*", "enferm*", "anciano*", and "no farmacológic*". Full details of the search strategy are published elsewhere (Apóstolo et al., 2015).

2.4. Study selection

All selected studies were assessed for relevance to the review based on the title and abstract. Then, full texts analysis of the eligible studies was performed. Finally, studies with confirmed inclusion criteria were assessed for methodological quality using the standardized critical appraisal instrument from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument. The study selection process was conducted independently by two reviewers. Any disagreements were resolved through discussion, or with a third reviewer.

2.5. Data collection

Details regarding interventions, populations, study methods and significant outcomes to the review question and specific objectives, were extracted by one reviewer using the standardized data extraction tool from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument. The accuracy of extracted data was verified by the second reviewer. In the cases where some of these details were missing, study authors were contacted to provide the necessary information.

2.6. Data synthesis

Whenever possible, quantitative data were pooled in statistical meta-analysis using the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument. The weighted mean differences (for continuous data) and their 95% confidence intervals were then calculated. Heterogeneity was statistically assessed using the standard Chi-square (significance was set at $p \leq 0.05$). When statistical pooling was not possible, findings were summarized in narrative form.

3. Results

3.1. Study selection

Fig. 1 describes the flow of studies through the selection process. A total of 3925 records were obtained by searching 11 databases for published studies and 8 databases for unpublished studies. After removal of duplicates and irrelevant records, 49 full text articles were identified for eligibility assessment. Among these 49 records, 26 were excluded as full text analysis revealed they did not meet criteria for inclusion, and 17 were excluded after methodological quality appraisal. The remaining six publications met systematic review inclusion criteria and presented high methodological quality and were, therefore, considered in this review.

3.2. Study characteristics

Five studies were randomized clinical trials (Ekkers et al., 2011; Gellis and Bruce, 2010; Gellis et al., 2008; Kiosses et al., 2010; Serfaty et al., 2009) and one was a quasi-experimental study with purposive sampling (Su et al., 2012). They were conducted from 2008 to 2012 in the United Kingdom (Serfaty et al., 2009), the Netherlands (Ekkers et al., 2011), Taiwan (Su et al., 2012), and the United States (Gellis and Bruce, 2010; Gellis et al., 2008; Kiosses et al., 2010). Characteristics of the included studies are presented in Table 1.

3.2.1. Participants

The reviewed studies reported results from a total of 520 older adults. The smallest study sample was composed of 30 participants, and the largest of 204. The age range was stated on only three articles (Gellis et al., 2008; Kiosses et al., 2010; Su et al., 2012), and varied from 65 to 101. The overall sample of the six studies had more women than men. Four studies (Ekkers et al., 2011; Kiosses et al., 2010; Serfaty et al., 2009; Su et al., 2012) had a total of 120 men and 290 women. The remaining two studies (Gellis and Bruce, 2010; Gellis et al., 2008) presented gender data in percentage; however, in both cases there were more women than men. All six studies showed similarity at baseline between the experimental and control groups in terms of the demographic characteristics of the population and the presence of depression.

3.2.2. Interventions

Reported non-pharmacological interventions consisted of cognitive behavior therapy (Serfaty et al., 2009), competitive memory training (Ekkers et al., 2011), reminiscence group therapy (Su et al., 2012), problem-adaptation therapy (Kiosses et al., 2010), and problem-solving therapy in home care (Gellis and Bruce, 2010; Gellis et al., 2008). Interventions used in the control condition were: treatment-as-usual (Ekkers et al., 2011; Gellis et al., 2008; Serfaty et al., 2009), usual care plus education (Gellis and Bruce, 2010), talking control (Serfaty et al., 2009), supportive therapy (Kiosses et al., 2010), and individual supportive interviews (Su et al., 2012). In all studies, except of Serfaty et al. (2009), control condition included one type of treatment. In the study of Serfaty et al. (2009), two control conditions were constituted.

3.2.3. Outcomes

The assessment of the primary outcome of interest, depressive symptomatology, was based on different instruments. Serfaty et al. (2009) used Beck Depression Inventory-II, Kiosses et al. (2010) used 24 item Hamilton Depression Rating Scale, and Su et al. (2012) used 15-item

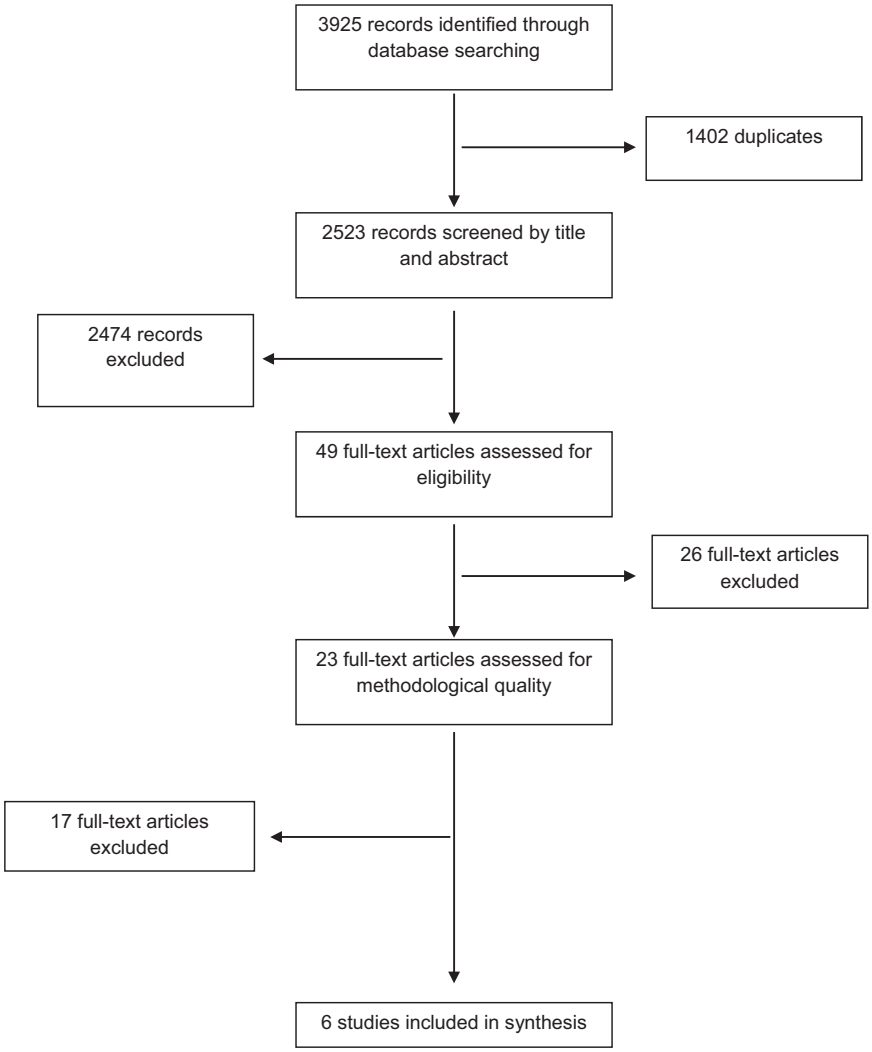

Fig. 1. Flowchart for the search and study selection process.

Geriatric Depression Scale. In the study of Ekkers et al. (2011) two instruments assessing depressive symptoms were used: 30-item Geriatric Depression Scale and Quick Inventory of Depressive Symptomatology-Self Report. Also Gellis and Bruce (2010), and Gellis et al. (2008) made depressive symptomatology assessment based on two different tools. Both used 17-item Hamilton Depression Rating Scale. In the study of Gellis and Bruce (2010) Beck Depression Inventory was applied, and in the study of Gellis et al. (2008) the 15-item Geriatric Depression Scale.

The secondary outcomes assessed by the reviewed studies included quality of life, rumination and cognitive functioning. The evaluation of quality of life was based on EuroQol, being conducted in the study of Serfaty et al. (2009). Rumination issues were approached by Ekkers et al. (2011) through the Ruminative Response Scale and Rumination on Sadness Scale. Su et al. (2012) assessed cognitive functioning using the Mini-Mental State Examination.

3.3. Quality appraisal

To be included in the review, studies had to provide "yes" answers to six questions (five mandatory and one more) in the standardized critical appraisal instrument from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument. The mandatory questions were chosen in order to avoid potential detection bias and decrease selection bias. Thus, those assessing outcomes had to be blind to the treatment allocation, the outcomes had to be measured in a reliable way and in the same way for all groups, and the control and the treatment groups had to be comparable at entry. Additionally, the reviewers verified whether the statistical analyses were used in the appropriate way. Apart from these five questions, all studies received positive appraisal concerning the evaluation of whether the groups were treated identically other than for the named interventions.

Table 1
Characteristics of included studies.

Study ID	Type of study	Setting	Population	Intervention	Outcomes
Ekkers et al. (2011), Netherlands	RCT	Four ambulatory departments of Parnassia, a large mental health institute specialized in treating older adults	Depressed older adult outpatients ($n = 93$)	- **COMET** (seven 90-minutes sessions): consisted of protocol that mainly focuses on strategies to manage rumination; - **TAU**: consisted of pharmacotherapy, accompanied or not by psychotherapy conducted by a psychologist, or supportive and structuring treatment conducted by nurses specialized in psychosocial and psychiatric care;	- Depressive symptoms - Rumination
Gellis and Bruce (2010), USA	RCT	Academically-affiliated acute home health care agency which served urban, suburban, and rural settings	Older adults, aged ≥65 years, with cardiovascular diseases ($n = 38$)	- **PST-HC** (six 60-minutes sessions): addressed to instruct the patients in the use of three types of problem-solving coping skills to assist in their daily living and in the control of depression symptoms; - **UC + E** (six sessions): nurse case manager home visits including educational sessions on cardiovascular diseases and a depression brochure; and brief check in;	- Depressive symptoms
Gellis et al. (2008), USA	RCT	Academic-affiliated, hospital-based home health care agency	Acute home care patients aged ≥65 years ($n = 62$)	- **PST-HC** (six 60-minutes sessions): home delivered intervention focused on (a) education about signs and symptoms of depression; (b) developing effective daily coping strategies; (c) increasing daily pleasurable activities; (d) improving problem-solving skills for problems identified by the patient; (e) reviewing medication adherence; (f) using homework forms; and (g) using community services; - **TAU** (six weeks): standard acute home health care services including medical treatment and a referral for medication assessment and involving the services of nursing, physical therapy, occupational therapy, and social work for a maximum of 60 days. Patients were also given educational literature on facts about depression and its treatment and were encouraged to review the material with the home care social worker during a scheduled home visit. Each TAU participant was contacted weekly by telephone to assess the need for crisis management or a mental health referral outside the protocol.	- Depressive symptoms
Kiosses et al. (2010), USA	RCT	Weill Cornell – Advanced Center for Interventions and Services Research (ACISR) – New York	Community older adults with major depression, cognitive impairment, and disability ($n = 30$)	- **PATH** (12-weeks): home-delivered intervention focused on the patients' ecosystem and addressed to reduce patients' depression and disability by facilitating problem solving and adaptive functioning. - **ST** (12-weeks) home-delivered intervention consisted of the nonspecific therapeutic factors present in all therapies such as empathic listening, reflection, emotional processing, and encouragement;	- Depressive symptoms

Table 1 (*Continued*)

Study ID	Type of study	Setting	Population	Intervention	Outcomes
Serfaty et al. (2009), UK	RCT	North Central Thames General Practice Research Network, North London	People aged ≥65 years, with primary diagnosis of depressive disorder ($n = 204$)	- **CBT** (12 sessions): exploration of patients' beliefs about the negative effects of physical ill health and their perceptions of themselves toward their age; - **TC**: participants discussed neutral topics such as hobbies, sports, and current affairs. No advice or problem solving was given, and there was little focus on emotional issues; - **TAU**: consisted of medication, routine support or referral to other services;	- Depressive symptoms - Quality of life
Su et al. (2012), Taiwan	Quasi-experimental design with purposive sampling	Leprosy sanatorium	Long-term institutionalized older leprosy patients ($n = 93$)	- **REM** (seventy-two 2-hour sessions, delivered three times per week): intervention focused on several themes, including "knowing each other", "childhood and family", "previous employment and making a living", "leprosy episode", "social isolation and stigmatization", "lifestyle in the sanatorium", and others. - **ISI:** One-to-one simple supportive interview once a week during the same period.	- Depressive symptoms - Cognitive functioning

CBT: cognitive behavior therapy; COMET: competitive memory training; ISI: individual supportive interviews; PATH: problem-adaptation therapy; PST-HC: problem-solving therapy in home care; RCT: randomized controlled trial; REM: reminiscence group therapy; ST: supportive therapy; TAU: treatment-as-usual; TC: talking control; UC + E: usual care plus education.

Regarding methodological limitations, in all reviewed studies participant blinding to treatment allocation was unclear or not addressed. However, due to the nature of the proposed interventions, the practical difficulties of participant blinding were acknowledged. Furthermore, the study developed by Su et al. (2012) was based on purposive sampling. In the remaining five studies, the information related to true randomization was unclear. In the studies of Gellis et al. (2008) and Su et al. (2012) the outcomes of people who withdrew were not described nor included in the analysis. Finally, in these last two studies, as well as in the study of Kiosses et al. (2010), clear information about concealing the allocation to treatment group from the allocator was missing.

3.4. Synthesis of results

Because the included studies examined different non-pharmacological interventions, pooling data for meta-analysis was possible for only two studies reporting the effectiveness of problem-solving therapy in home care (Gellis and Bruce, 2010; Gellis et al., 2008). The data from other studies is presented in a narrative summary.

3.4.1. The effectiveness of non-pharmacological interventions in older adults with depressive symptoms

All non-pharmacological interventions analyzed in this review were shown to be effective for reducing depressive symptoms in older adults. The effects of these interventions on the outcomes of interest are presented below, separately for each intervention.

3.4.1.1. Cognitive behavior therapy. The effectiveness of cognitive behavior therapy was analyzed in one study, conducted by Serfaty et al. (2009). Cognitive behavior therapy was carried out in association with treatment as usual. Its effects on depressive symptoms were compared with two control conditions: (i) treatment as usual plus talking control and (ii) treatment as usual. The intention-to-treat analysis showed that cognitive behavior therapy is an effective treatment for depression when compared to treatment as usual (reduction of −3.07; 95% CI: −5.73 to −0.42) or treatment as usual plus talking control (reduction of −3.65; 95% CI: −6.18 to −1.12) (the authors did not provide statistical tests and p values). The positive effects of cognitive behavior therapy were maintained, but not enhanced, at the follow-up (10th month).

The authors of the study also examined quality of life. According to evidence, no significant changes occurred regarding this variable.

3.4.1.2. Competitive memory training. Competitive memory training effects were examined in only one study, developed by Ekkers et al. (2011). The authors used treatment as usual as the control condition. The outcomes of interest were depressive symptoms and rumination. The evidence obtained showed that competitive memory training has a positive effect on depressive symptoms [Geriatric Depression Scale-30: $F = 7.3$; $p = 0.01$; effect size Cohen's $d = 0.54$; Quick Inventory of Depressive Symptomatology-Self Report: $F = 17.5$; $p < 0.000$; effect size Cohen's $d = 0.66$]. In relation to rumination, the significant positive changes were observed with Rumination on

Sadness Scale ($F = 6.6$; $p = 0.005$; effect size Cohen's $d = 0.58$), but not with Ruminative Response Scale ($F = 3.3$; $p = 0.098$). The authors also used the intention-to-treat analysis based on multiple imputations technique. In respect of the Geriatric Depressive Scale-30 and Ruminative Sadness Scale, the results of this analysis revealed similar effect sizes when compared with the intention-to-treat last observation carried forward technique. With the Quick Inventory of Depressive Symptomatology-Self Report, the effect size was higher (Cohen's $d = 0.9$) when the intention-to-treat multiple imputation technique was used.

3.4.1.3. Reminiscence group therapy. The effectiveness of reminiscence group therapy was studied by Su et al. (2012), being compared to effectiveness of individual supportive interviews. The outcomes of interest were depressive symptoms and cognitive function, measured at baseline and after implementation of the non-pharmacological treatment. In the post-intervention assessment the participants included in the reminiscence group therapy group showed a significant decrease in the depressive score ($z = -2.28$; $p = 0.02$). In the individual supportive interviews group no significant change was observed ($z = -1.22$; $p = 0.22$). The Mini-Mental State Examination indicators of cognitive functioning remained steady in both groups [reminiscence group therapy: $z = -0.45$; $p = 0.66$; individual supportive interviews: $z = -1.00$; $p = 0.32$].

3.4.1.4. Problem-adaptation therapy. Kiosses et al. (2010) examined the efficacy of problem-adaptation therapy versus supportive therapy. Problem-adaptation therapy was developed based on problem solving therapy (D'Zurilla and Nezu, 2010). Both interventions were home-delivered. Depressive symptoms were assessed at baseline, during the intervention (at week 6) and after its conclusion (at week 12). Statistical analysis of the obtained results revealed that problem-adaptation therapy is more effective for decreasing of depressive symptoms than supportive therapy [significant treatment × time interaction ($F = 5.11$, $p = 0.0307$)].

3.4.1.5. Problem-solving therapy in home care. Problem-solving therapy in home care was addressed in two of the reviewed studies (Gellis and Bruce, 2010; Gellis et al., 2008). Gellis and Bruce (2010) compared this intervention with usual care plus education, and Gellis et al. (2008) with treatment as usual. In both studies an improvement in depressive symptomatology after problem-solving therapy in home care was observed. More specifically, according to evidence obtained by Gellis and Bruce (2010) older adults who received problem-solving therapy in home care showed a significant reduction in depressive symptoms. These positive changes were observed independently of the tool used in the assessment [Beck Depression Inventory: significant treatment × time interaction ($F = 7.91$; $p = 0.008$); Hamilton Depression Rating Scale-17: significant treatment × time interaction ($F = 6.83$; $p = 0.006$)]. In comparison, Gellis et al. (2008) reported that problem-solving therapy in home care is more effective than treatment as usual. Its positive effects are observable both on the Hamilton Depression Rating Scale-17 score [significant treatment × time interaction ($F = 18.34$; $p < 0.001$)] and on the Geriatric Depression Scale-15 score [significant treatment × time interaction ($F = 15.34$; $p < 0.001$)]. Furthermore, these positive changes were maintained three and six months after the end of the treatment. In addition, the quality of life was assessed but problem-solving therapy in home care showed to have no effects on this outcome [significant treatment × time interaction ($F = 1.08$; $p > 0.05$)].

The Hamilton Depression Rating Scale-17 scores obtained in these two studies were pooled in a meta-analysis. Homogeneity was achieved (heterogeneity Chi-squared = 2.83, $p = 0.09$). The meta-analysis results indicated that the reduction of the Hamilton Depression Rating Scale-17 score was statistically significant ($z = 11.19$; $p < 0.0001$), with its value being equal to 10.23 (CI: −12.03, −8.44). As can be seen in Fig. 2, the study conducted by Gellis et al. (2008) had much more weight (88.81%) than the study developed by Gellis and Bruce (2010) (11.19%), presenting little variance with narrower CIs and contributing more to the overall analysis.

3.4.2. The effectiveness of the interventions related to the severity of depressive symptoms

Only one study examined the effectiveness of non-pharmacological interventions for older adults in relation to the severity of depressive symptoms (Su et al., 2012). The authors of this study revealed that the subjects with higher pre-intervention Geriatric Depression Scale-15 score had a higher negative difference in post-intervention Geriatric Depression Scale-15 score (Pearson's $r = -0.492$; $p < 0.001$).

3.4.3. The effectiveness of the interventions related to the presence or absence of simultaneous pharmacological treatment for depression

There were no studies presenting results regarding the effectiveness of the interventions in relation to the presence or absence of simultaneous pharmacological treatment for depression.

3.4.4. The effectiveness of the interventions for depressive disorders related to the presence of comorbidities

Only two studies examined the effectiveness of non-pharmacological interventions for depressive disorders in relation to the presence of comorbid clinical conditions (Kiosses et al., 2010; Su et al., 2012). Both focused on cognitive impairment measured by the Mini-Mental State Examination, revealing that its severity does not correlate significantly with positive changes observed in measurements of depression after treatment. Statistical results obtained by Su et al. (2012) were as follows: Pearson's $r = -0.208$, $p = 0.152$. Kiosses et al. (2010) did not provide statistical data supporting this finding.

4. Discussion

This systematic review was based on five randomized controlled trials and one quasi-experimental study,

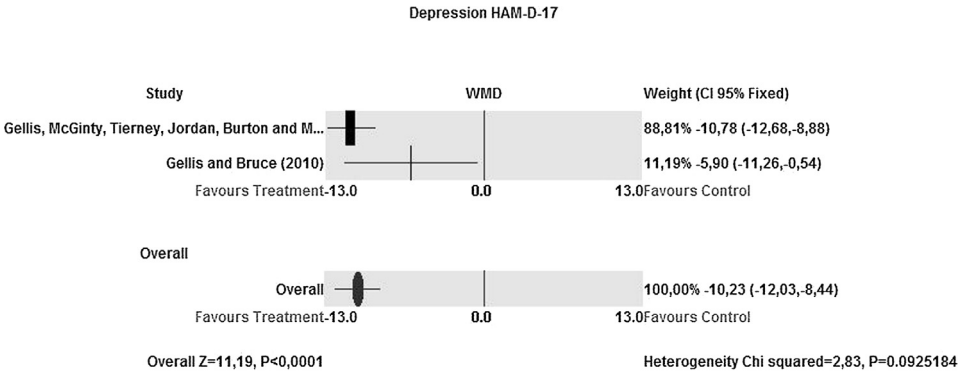

Fig. 2. Forest plot of problem-solving therapy for home care in older adults on depression symptomatology, assessed by 17-item Hamilton Rating Scale for Depression. WMD: weight mean difference.

including 520 older adults, predominantly female and aged from 65 to 101 years. The findings from this review indicated that non-pharmacological interventions, such as cognitive behavior therapy, competitive memory training, reminiscence group therapy, problem-adaptation therapy, and problem-solving therapy in home care, decrease depressive symptomatology, being more effective than treatment as usual, treatment as usual plus talking control, individual supportive interviews, supportive therapy or usual care plus education. However, where secondary outcomes are concerned, i.e. quality of life (Gellis et al., 2008; Serfaty et al., 2009) and cognitive function (Su et al., 2012), the interventions did not provide any changes. It is important to highlight that none of the reviewed studies examined whether the effectiveness of non-pharmacological interventions is affected by the presence or absence of simultaneous pharmacological treatment for depression. In most cases, information about variability of the effectiveness in relation to severity of depressive symptoms was also missing. There was only one study (Su et al., 2012) that provided this kind of data, showing that the reminiscence group therapy had more pronounced effects in those subjects that had been more depressed at baseline. Another limitation was related with paucity of data about the influence of comorbid conditions on the effectiveness of non-pharmacological interventions. The unique comorbid condition examined in the reviewed studies was cognitive impairment (Kiosses et al., 2010; Su et al., 2012). Both studies that had focused on this condition revealed that the baseline level of cognitive functioning (as assessed by Mini-Mental State Examination) did not correlate with post-intervention levels of depressive symptoms. According to Su et al. (2012), further investigation on this topic is needed.

The generalizability of these findings is somewhat limited for various reasons. Firstly, the samples of the reviewed studies ranged from 30 to 204 participants and included participants with different clinical conditions, such as community older adults with non-specified clinical conditions (Kiosses et al., 2010; Serfaty et al., 2009), outpatients with non-specified clinical conditions (Ekkers et al., 2011), older adults with cardiovascular diseases (Gellis and Bruce, 2010), acute home care patients (Gellis et al., 2008) or long-term institutionalized leprosy patients (Su et al., 2012). Dissimilarities were also found in relation to measuring tools used to assess the outcomes of interest. Depending on the study, the presence and the severity of depressive symptoms were assessed through the Geriatric Depression Scale-15, Geriatric Depression Scale-30 Beck Depression Inventory, Hamilton Depression Rating Scale-17, Hamilton Depression Rating Scale-24, and Quick Inventory of Depressive Symptomatology-Self Report. Furthermore, reported intervention protocols differed significantly, being based on different therapeutic programs and varying at the level of frequency and durability. For example, the therapeutic programs were based on principles of cognitive behavioral therapy, problem solving therapy or reminiscence therapy.

Cognitive behavioral therapy was founded on the assumptions that the processing of information by depressed individuals occurs in a schematic way, being characterized by a negative cognitive triad, in which views of the self, the world and the future are distorted, and that the cause of depressive symptoms is related to automatic, repetitive and idiosyncratic negative thoughts, generated by dysfunctional beliefs (Beck et al., 1987). In this perspective, the principal goal of cognitive therapy is to correct the patient's tendency to make inaccurate references related to specific events, and to replace the patient's presumed distorted appraisals of life events with more realistic and adaptive appraisals.

Problem solving therapy focuses on training in constructive problem-solving attitudes and skills. It aims to enhance psychological and behavioral functioning in order to prevent relapses and the development of new clinical problems, as well as to maximize quality of life (D'Zurilla and Nezu, 2010). This therapy is based on the assumption that problem solving functions as a mediator or a moderator that influences the relationship between stressful life events and wellbeing. Thus, it is effective in reducing negative emotions and increasing positive emotions.

Reminiscence therapy is mainly focused on storytelling, through relating experiences, facts or actions that seek to evoke meaningful memories from the past (O'leary and Barry, 1998). Working with these memories may contribute to the enhancement of life satisfaction, self-esteem,

positive mood, happiness, wellbeing and socialization. Other positive effects of reminiscence therapy are related with improvement of communication and expression, which adds to this intervention a psychosocial dimension (Meléndez Moral et al., 2014).

These differences in the therapeutic programs used as non-pharmacological interventions limited significantly the process of synthesis of the findings obtained. On the other hand, the existence of this variability can be seen as an advantage, since it shows that depressive disorders in older adults can be approached through different treatments that focus on cognition, emotions and/or behavioral skills. Another advantage of this variability in therapeutic programs is the possibility of their implementation by trained specialists from different professional areas. For example, in three of reviewed studies the interventions were delivered by clinical social workers and occupational therapists.

Other non-pharmacological interventions in older adults with depressive disorders have been described in the literature and are as follows: transcutaneous electrical acupoint stimulation (Chang et al., 2010), therapeutic life review (Mastel-Smith et al., 2006), garden walking (McCaffrey et al., 2010), group work programs (Okumiya et al., 2005), life review therapy (Serrano et al., 2012), exercise programs (Shin et al., 2009), strength training programs (Sims et al., 2006), hope intervention (Wilson et al., 2010), self-worth therapy (Tsai et al., 2008) and integrative psychotherapy (Nickel et al., 2006). However, the studies reporting the effectiveness of these interventions did not present sufficient methodological quality to warrant their inclusion in this review.

4.1. Implications for practice and research

The non-pharmacological interventions considered in this systematic review showed to be effective in decreasing depressive symptomatology in older adults, thus demonstrating their usefulness for clinical practice. However, additional high quality randomized controlled trails (using CONSORT guidelines) are needed to strengthen the current evidence base. In future studies, the sample size, power analysis and effect size ought to be calculated, in order to better assess the methodological quality of the research and to make the findings and conclusions more generalizable. Moreover, high quality randomized controlled trails reporting the effectiveness of other non-pharmacological interventions, such as transcutaneous electrical acupoint stimulation, therapeutic life review, garden walking, group work programs, life review therapy, exercise programs, strength training programs, hope intervention, self-worth therapy and integrative psychotherapy, would be an asset, since those described until now present various methodological weaknesses.

There is little evidence about the variability of the effectiveness of non-pharmacological interventions according to the presence of comorbid clinical conditions and simultaneous pharmacological treatment. Thus, future studies ought to investigate these potential predictor variables. In addition, it would be interesting to examine whether the severity of depressive symptomatology influences the interventions' results, with the purpose of identifying those populations that are more prone and less prone to benefit from such interventions.

Finally, further reviews ought to consider studies that use one single nonpharmacological intervention, since the amount and diversity of existing treatments make it difficult to synthesize findings about their effectiveness.

4.2. Limitations

The key issues of concern about the methodological quality of the included studies were the unclear information about the methods of random assignment and the allocation concealment. These two weaknesses are of the utmost importance, since they can lead to allocation bias and thus affect the internal validity of the study.

Another limitation was the lack of data related to power analysis and effect sizes that provide information about the impact of the intervention. This information could explain how much difference the intervention had made. Moreover, the majority of studies did not report the mean differences between baseline and post-interventions scores and in two studies (Kiosses et al., 2010; Serfaty et al., 2009) data related to statistical tests and p values was missing. Only one study calculated the sample size (Ekkers et al., 2011). In this study, 76 patients per condition were required, assuming an attrition rate of 15%. However, the intervention group was composed by only 53 older adults, and control group by 40. The existence of this small sample size may have resulted in an underestimation of treatment effectiveness.

In four studies (Ekkers et al., 2011; Kiosses et al., 2010; Serfaty et al., 2009; Su et al., 2012) the heterogeneity of interventions did not allow to proceed with meta-analysis; hence a pooled estimate of effects could not be obtained. The data from two other studies (Gellis and Bruce, 2010; Gellis et al., 2008) was subjected to meta-analysis. It is important to highlight that the results of this meta-analysis were affected predominantly by only one study (Gellis et al., 2008), as its weight was of 88.81%.

In this review, we searched only for articles published in English, Portuguese and Spanish and only articles in English were included. Thus, another limitation is that there might have been articles published in other languages with important results for this review. Furthermore, the search strategy was completed on March 2012, thus this systematic review does not include the studies of possible interest published after this date.

5. Conclusion

This review sought to synthesize the best available evidence regarding the effectiveness of non-pharmacological interventions for older adults with depressive disorders. Depression in old age is often seen as a normal consequence of aging arising from psychosocial adversity, chronic illnesses and disabilities. As was demonstrated in this review, non-pharmacological interventions can reduce significantly depressive symptoms, minimizing the risk of adverse outcomes related to this clinical condition. However, they seem to have no effects on quality of life or cognitive functioning. Due to the diversity of interventions and the low

number of studies per intervention included in this systematic review, the obtained evidence is quite helpful but cannot be considered strong, thus requiring future studies.

Furthermore, there are few results on the effectiveness of nonpharmacological interventions considering the presence or absence of simultaneous pharmacological treatment for depression, the presence of comorbidities, and the severity of symptoms. This limitation has also been mentioned by the authors of the included studies. Therefore, it is recommended that future studies should include these variables in their protocols.

Notes

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