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Review article

Social interventions: An effective approach to reduce adult depression?

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ABSTRACT

Background: Social interventions that aim to facilitate bonds and interaction among individuals could reduce depression at a population level; yet, the scope and effectiveness of these interventions remain unclear. This systematic review classifies and reports on social interventions that have been implemented to target depression in adults.

Methods: Search terms related to 'intervention', 'depression', and 'social' were entered into databases, including: The Cochrane Database of Systematic Reviews, MEDLINE, Embase, PsycInfo, CINAHL, and TRoPHI. Inclusion criteria included: (1) depression was an intervention outcome, (2) depression was not attributable to concomitant illnesses or circumstances (e.g., chronic illness or exposure to natural disasters), (3) the intervention facilitated social interaction, (4) the intervention targeted adults (18–64), (5) the sample was community-based, (6) the study was available in English, and (7) within-group or between-group comparison group information was available.

Results: Of the 24 studies meeting the inclusion criteria, 17 reported reductions in depressive symptoms. Social interventions often incorporated multiple strategies to improve depressive symptoms, including: peer support (n = 17), skill building (n = 11), group-based activities (n = 11), psycho-education (n = 9), psychotherapy (n = 5), exercise (n = 5), and links to community resources (n = 3).

Limitations: Findings of this review may not be generalizable to specific population subgroups with depression, including those who have chronic illnesses or postpartum depression.

Conclusions: Various types of social interventions can be effective in reducing adult depression. Social interventions can be tailored to diverse groups, are feasible in resource-scarce communities, and have the potential to reduce population-level depression due to their group formats.

1. Introduction

Depression affects an estimated 350 million people worldwide (Marcus et al., 2012). Given its enormous impact, the United Nations (United Nations, 2016) and World Health Organization (World Health Organization, 2013) have identified mental health promotion as a global priority. They have also deemed the social determinants of health that are modifiable in nature, as key factors by which to promote mental health at a population level (World Health Organization, 2013, 2014). Such recommendations are based on decades of research demonstrating that features of individuals' social environments can be harmful or conducive to one's mental health. Social isolation, detrimental social ties, and living in socioeconomically disadvantaged neighbourhoods are examples of risk factors inherent in the social environment that can increase someone's likelihood of depression (World Health Organization, 2014; World Federation of Mental Health, 2012; Bassett and Moore, 2013; Santini et al., 2015). Since these risk factors exist within social networks and community structures, they can impact the spread of mental illness at a population level (Bruce et al., 2002). It has, therefore, been suggested that public health interventions intervene upon the reciprocal relationships between social networks and communities, and the risk factors within them (Bruce et al., 2002).

The overwhelming majority of interventions for depression to date have been focused on the individual (McLaughlin, 2012). Such approaches fail to account for the broader social structures that are known to contribute to adult depression (McLaughlin, 2012; Bruhn, 2009). In recognizing the importance of intervening on the socio-relational aspects of individuals' environments, interventions that are "social" in nature have emerged, but an unclear picture remains as to the types of interventions that have been conducted. This review addresses this uncertainty by compiling the available evidence and characterizing the types of social interventions that have been conducted to address depression in general adult populations.

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1.1. Defining "social"

The term "social intervention" has not been clearly defined in the public health literature. This term though, is aptly suited for the class of interventions examined in this review, since it allows for the comparison of interventions that are based upon the shared rationale that improving the social environment is critical for reducing adult depressive symptoms. For the purpose of this manuscript, the term "social intervention" will be defined as an intervention that promotes interpersonal-level interaction, by targeting social capital and social support within groups or communities. This definition emerges from established models and frameworks - most notably, The Social Ecological Model (Stokols, 1996) and the Social Determinants of Mental Health framework by Lund et al. (2013).

The social ecological model is particularly useful to consider when defining "social intervention" because it recognizes that in addition to individual-level characteristics (e.g. biological and psychological factors), interpersonal (e.g. social networks), organizational (e.g. schools and workplaces), community (e.g. community groups and sites), and public policy level (e.g. policies and laws) factors also influence health (Glanz and Bishop, 2010). The interpersonal level of the social ecological model may be especially pertinent to intervene upon when addressing depression, since symptoms have been shown to spread throughout social networks (Rosenquist et al., 2011). Interventions aimed at reducing depression through interpersonal initiatives would be advantageous for reducing depression in general adult populations since they have the capacity to reach broader groups than individual-level interventions, and thus have the potential to impact populations through community-based initiatives (Lund et al., 2013).

Other frameworks have also recognized the importance of considering interpersonal environments in the promotion of mental health (World Health Organization, 2014; Lund et al., 2013). Lund et al. (2013) developed a framework that outlined six classes of social determinants of mental health, each divided further into proximal and distal characteristics. One of the six classes in the Social Determinants of Mental Health Framework is termed "social". This social category includes constructs inherent within social networks at the individual and community-levels - classified as proximal and distal, respectively. Distal characteristics include neighbourhood disorder and community social capital, whereas proximal factors include individual social capital and social support (Lund et al., 2013). This framework theorizes that interventions that address these social determinants of mental health have the potential to positively impact the mental wellbeing of populations.

Social interventions in the current study will include interventions that target the interpersonal level of the social ecological model, and actively engage individuals with their broader social networks by fostering social support and social capital within groups and communities. Thus, they aim to promote mental health in the general adult population by addressing the "social" social determinants of health. Social interventions, for example, may aim to increase participation in local community groups, create new ties between strangers through social skills groups, improve social support among existing friends, or promote community cohesion and reduce neighbourhood disorder through the creation of neighbourhood coalitions. Social interventions may also take a multi-level approach by incorporating initiatives that target more than one level of the social ecological model. For example, a community-level intervention may include activities that foster interpersonal interaction between community members, and thereby take a multi-level approach to mental health promotion. These multi-level interventions may show the most promise in reducing adult depression, given their potential to intervene on multiple risk factors within an individual's environment.

1.2. The current review

Emerging mental health literature suggests that interventions aimed at reducing adult depression should address the social determinants of mental health - and particularly those determinants that reside within the structures of social networks and communities. Social interventions are on the rise but the scope and effectiveness of these interventions are unknown. The primary objective of this systematic review is to characterize the social interventions that have been conducted to reduce depression in adults, and report on their effectiveness in seeing reductions in depressive symptoms. Research questions include: (1) what are the characteristics of social interventions that have been conducted to reduce depression in adults? (Characteristics include key intervention components, target audience, setting, and delivery mode) and, (2) which of these interventions have been effective in reducing depressive symptoms? It is hoped that the answers to these questions will have direct implications for population-health efforts aimed at combating adult depression.

2. Methods

2.1. Electronic searches

The following electronic databases were used to retrieve studies in October 2014: The Cochrane Database of Systematic Reviews, MEDLINE, Embase, PsycInfo, CINAHL, and The Trials Register of Promoting Health Interventions (TRoPHI). The first reviewer conducted the initial searches in October 2014. Search terms included (1) intervention OR program OR therapy OR treatment AND (2) depress* OR mental OR mood OR affective AND (3) group OR social OR support OR community OR participation OR cohesion OR neighbourhood OR integration OR participation OR peer. Boolean (AND/OR) searches were used in each database, except TRoPHI, which contains a series of drop-down menus through which to filter results. Limits were placed on searches so that they returned journal articles that were available in English, and published from January 1995- October 2014.

2.2. Selection of studies

2.2.1. Study design and participants

Randomized controlled and non-randomized studies were selected for review. Interventions were included only if there was a comparison or control group included in the design (between or within-group comparisons were acceptable). The target population of interest was adults from the general population. Studies looking exclusively at older adults (i.e., 65 or older), children, or adolescents (i.e., under 18) were excluded due to the differential effects that the social environment has on health in persons of these age groups. Studies using samples drawn from a population whose depression was attributable to concomitant conditions (e.g., chronic conditions, addictions, dual diagnoses, transplant, psychotic disorders, perinatal depression) or work-related stress (e.g., military personnel or caregivers) were excluded since this review aimed to focus on the general adult population. Lastly, samples from non-community settings (e.g., hospital patients, psychiatric facility patients) and samples that were community-based, but had recently experienced an environmental incident that altered the social environment or health of the community (e.g., natural disaster) were excluded.

2.2.2. Interventions

Social interventions whose primary aim was to reduce depressive symptoms were included. As described earlier, social interventions included interpersonal-level interventions that actively engaged individuals with their broader social networks by fostering social support or social capital within groups or communities. Partner- and family-based interventions were not included in this particular definition, because the social interventions referred to in the current study aimed to

promote relationships with those in the broader social network structure or community, and thereby, outside of the home environment. This distinction was made for the following reasons. First, individuals with depression often become disconnected with ties outside of the household such as friends and neighbours, (Chan et al., 2011; Poradowska-Trzos et al., 2009) and thus, interventions that promote relations with these ties may have different social implications than those that target family and marital relationships. Other research has also recognized the potentially different roles that familial versus non-familial network ties may have on mental health (Chan et al., 2011; Fiori et al., 2006). Further, interventions that promote relationships with broader networks may have clearer population health implications than those that focus on the closed or dyadic networks of spouses.

Social interventions in this systematic review included interventions that engaged groups of individuals with others in their broader social networks. An important criterion for being considered a social intervention in this review was that the intervention must include an interactive component to facilitate bonding and/or interaction with others. Studies that took place in a group setting were excluded if they did not include in their intervention description either interactive activities, group participation, or discussions between members. For example, a psychoeducation class that encourages discussion between participants to share stories and ideas would be considered a social intervention for the purposes of this review. A psychoeducation class that is described as purely instructional would not be considered a social intervention, since it could be surmised that individuals could potentially attend the class, listen to the content, and leave without engaging with other attendees as part of the intervention. In the current study, social interventions promote social interaction at the interpersonal or community levels – they are not individual-level interventions within a group setting. Thus, interventions included in this review were those that had an explicit goal to link individuals with other people.

2.3. Primary outcome

Since depression was the primary outcome of interest, studies must have measured depression, or depressive symptoms, as a primary outcome. Included studies may have measured depression using screening interviews (World Mental Health Composite International Diagnostic Interview), clinician-derived diagnoses, validated self-reported instruments (Beck Depression Inventory, Center for Epidemiologic Studies Depression Scale), and standardized diagnostic criteria (Diagnostic and Statistical Manual of Mental Disorders). A previous review used the same criteria for measuring and defining depression (Furlan et al., 2011).

2.4. Data collection and analysis

The first and second reviewers conducted a three-level review process, which began in October 2014 and ended April 2015. In Level 1, the reviewers independently assessed titles and abstracts of studies to determine if each met the Level 1 inclusion criteria (Table 1). Any studies that met all inclusion criteria, or had the potential to meet all criteria upon reading the full article, advanced to Level 2. In Level 2, reviewers independently assessed the full text of each article to ensure that it continued to meet the Level 1 criteria and that it also met the additional Level 2 criteria (Table 1). Articles that met all criteria proceeded to Level 3. The reference sections for articles in Level 2 were hand searched for other studies that may have met inclusion criteria. All studies that met inclusion criteria underwent data extraction, which was completed independently by two reviewers, and compiled by reviewer 1 (author E. Nagy). A pilot was conducted before undergoing Levels 1 and 2, and data extraction, to ensure that both reviewers were similar in their evaluations. The reviewers conferred on a decision when discrepancies in assessment occurred. Reviewer 1 conducted the risk of bias assessments, however author S. Moore assessed a subsample to validate these judgments.

Table 1
Inclusion criteria for studies in levels 1 and 2 of the systematic review.

Level 1 Criteria: Review of titles and abstracts
1. Depression is a main outcome of the intervention.
2. Depression is not attributable to concomitant medical conditions or circumstance.
3. The intervention targets interpersonal or community level relations by actively encouraging social interaction between individuals and others from the community.
4. The intervention is targeted towards adults (i.e. 18–64 years).
5. The sample is community-based.
Level 2 Criteria: Full text review
1. Level 1 criteria continue to be met after reading the full article.
2. The study is available in English.
3. Comparison information is present between or within groups.

Two critical appraisal tools were used due to the differing study designs included in the review. Cochrane Collaboration's tool for assessing risk of bias in randomized trials (Higgins et al., 2011) was used for randomized field experiments and the JBI Critical Appraisal Checklist for Descriptive/Case Series tool (The Joanna Briggs Institute, 2011) was used for interventions with a pre-post study design. In the former, the manuscripts were assessed against five potential risks for bias and were appraised using 'low risk' or 'high risk', or 'unclear' if there was insufficient information to make an assessment. The latter was assessed against 10 potential risks for bias, and were scored with 'yes', 'no', or 'unclear' for each criteria.

3. Results

3.1. Search results

Results from Level 1 and Level 2 search procedures can be found in Fig. 1. After conducting searches and removing duplicates (n = 5342 before duplicates; duplicates = 1390), 3952 titles and abstracts were reviewed against Level 1 criteria. The Level 1 search resulted in 79 titles and abstracts that met screening criteria. The full text of these articles were then retrieved and examined against Level 2 criteria. The reference sections of these articles were also searched for studies that may have been missed during database searches. The reference sections of the Level 2 articles produced a further four studies to be reviewed that met inclusion criteria. Of the manuscripts screened for Level 2 inclusion criteria (n = 83), 59 did not meet the inclusion criteria. This left 24 studies that met all inclusion criteria.

3.2. Study characteristics

An overview of each study and its characteristics related to study design, target population and measure of depressive symptoms is shown in Table 2. Thirteen studies included in this review used a randomized controlled or randomized field study design, and the remaining 11 used a pre-post intervention design. Seven studies were conducted in the United States, and the remaining took place in the United Kingdom (n = 5), Canada (n = 2), Japan (n = 2), The Netherlands (n = 2), Mexico (n = 1), Norway (n = 1), Australia (n = 1), Sweden (n = 1), Finland (n = 1), and South Africa (n = 1). Populations targeted in the included interventions included: adults in the workforce (n = 6), women with depression (n = 5), adult women from the community (n = 2), low income women (n = 2), adults with depression (n = 4), adults from the community (n = 2), adults with elevated psychological distress (n = 1), low income adults (n = 1), and young, sedentary males (n = 1). Four of these studies targeted adults from specific cultural backgrounds, including Latino, African American, and Pakistani. There was representation from various adult age groups in the included studies, with participants ranging from 16 to 77. Studies also greatly varied in sample size, ranging from a sample size of 14 (Lipman et al., 2011) to a sample

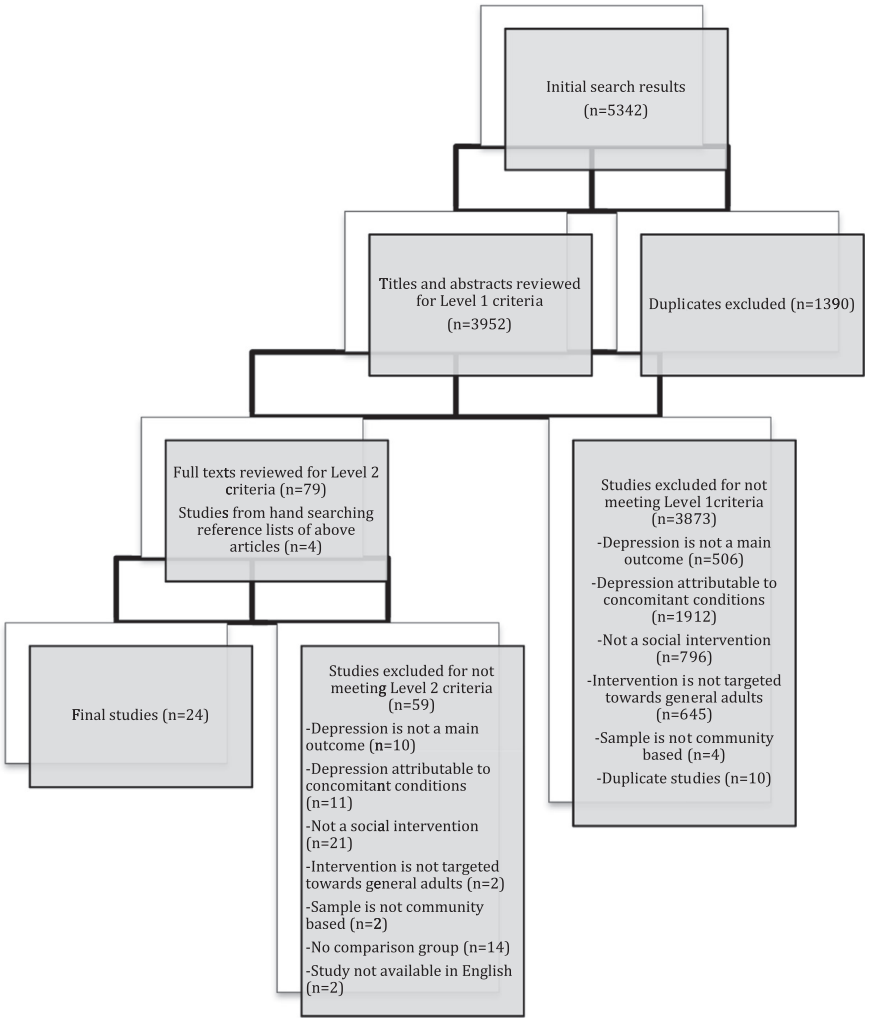

Fig. 1. Process of finalizing studies for the systematic review.

size of 718 (Vuori et al., 2012) participants. Most studies (n = 20) measured depressive symptoms using self-reported screening instruments, such as the Beck Depression Inventory (BDI), or Center for Epidemiologic Studies Depression (CES-D) scale, however four studies used diagnostic tools to assess a diagnosis of depression.

3.3. Intervention characteristics

3.3.1. Intervention classification

Descriptions of each intervention can be found in Table 3. The social interventions included in this review were diverse in terms of their type, target population and delivery setting, however each specified a reduction in depressive symptoms as its primary intervention goal. Interventions tended to focus on one of seven different approaches to reducing depressive symptoms, with most (n = 22/24) using a combination of approaches. These included: (1) peer support (e.g. sharing and empathizing with others) (n = 17), (2) skill building (e.g. coping skills, action planning skills) (n = 11), (3) group-based activities (e.g. team-building activities, community clubs, outings within the community) (n = 11), (4) psycho-education (e.g. group-based education on contributors to stress, depressive symptoms, and mental well-being) (n = 9), (5) psychotherapy (e.g. cognitive behavioural therapy and interpersonal therapy) (n = 5), (6) exercise (e.g. walking groups, football teams, yoga) (n = 5), and (7) links to community resources (e.g. linking participants with various supports and resources in the community) (n = 3).

3.3.2. Mode of intervention delivery

There were also a number of different intervention delivery settings: (1) community organizations (e.g. community development centre, church hall, football club, school) (n = 13), (2) workplaces (n = 3), (3) outdoor green spaces (n = 2), (4) participants' homes (n = 2), (5) health or mental health centres (n = 2), (6) online (n = 2), (7) telephone (n = 1), and (8) an out-of-town retreat (n = 1). Four studies did not specify the specific setting, and some studies were conducted in multiple settings (Vuori et al., 2012; Edelblute et al., 2014; van der Waerden et al., 2013; Steensma et al., 2007). The majority of interventions took place over the course of several weeks, however their duration ranged from 3.5 days to more than 12 months. Individuals who delivered the interventions included trainers, peers, trained community members, mental health providers, and researchers.

3.3.3. Intervention effect on depression

Seventeen of the 24 interventions showed significant reductions in depressive symptoms over the course of the study period (Vuori et al., 2012; Edelblute et al., 2014; Steensma et al., 2007; Ali et al., 2010; Bright et al., 1999; Thorsen Gonzalez et al., 2010; Griffiths et al., 2012; Lipman and Boyle, 2005; Tran et al., 2014; Travis et al., 2010; Veach et al., 2003; Harris et al., 1999; Marselle et al., 2014; Chaudhry et al., 2009; McGale et al., 2011; Michael et al., 2008; Petersen et al., 2012) (see Table 2 for main findings). Since the majority of studies (n = 22) used a combination of approaches to address depressive symptoms, the studies did not assess which approaches contributed more or less to intervention effectiveness. However, among those studies that saw a

Table 2
Study characteristics and main findings of interventions included in the final review.

Study, publication year (study year)	Study design and sample size	Population and study location	Depression measure/ criteria	Findings
Ali et al. 2010 (not specified)	Pre-post intervention. Pre: 79 Post: 73.	Low income adults, aged 27–77, who were enrolled in a "Project Enterprise" program. New York, USA	Major Depressive Disorder assessed with the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID)	These data show that 40.5% of those clients who were depressed at Time 1 were no longer depressed at Time 2. There were no participants who were not depressed at Time 1 that were at Time 2.
Bright et al. 1999 (not specified)	Randomized intervention. Pre: 98 Post: 68 (attrition = 30.61%).	Depressed adults from the general population, aged 21–72. Memphis, USA.	Beck Depression Inventory (BDI). Participants classified as improved if their score decreased by 6+ points, and non-depressed scores were under10-point cutoff.	Considerable clinical improvement was found among the majority of participants (60%), with no differences in improvement observed as a function of treatment condition or therapist status.
Edelblute et al. 2014 (2011)	Pre-post pilot of intervention. Baseline data: 60; Participated in Sessions: 49; Follow-up: 39.	Women over age 18 years, in Juventino Rosas recruited by Promotoras. Juventino Rosas, Guanajuato, Mexico.	CES-D. For Latina populations, moderate depressive symptoms include scores from 16 to 23; severe depressive symptoms include scores of 24+. A change of 5+ was considered clinically meaningful.	At baseline, approximately 70% of participants were depressed. There was a decrease of 2.4 points in CES-D score for all participants ($p = 0.23$). Participants with moderate depressive symptoms ($n = 8$) experienced 3.9 fewer symptoms at follow-up, although this did not reach statistical significance ($p = 0.10$). For those with high depressive symptoms ($n = 19$), the reduction in depressive symptoms was 5.6 ($p = 0.09$).
Gater et al. 2010 (Recruited in 2004–2005)	Clustered RCT. Pre: 123 (Social intervention group = 39; Combined group = 42; Antidepressant group = 42). Post: 90 (Social intervention group = 31; Combined group = 31; Antidepressant group = 28).	British Pakistani women between ages 16–65 with depression. England, UK.	The Hamilton Rating Scale for Depression (HRSD was used at baseline and follow-up with scores ranging from 0 to 48.	Depressive symptoms were reduced in the social intervention and combined treatment groups compared to those in the antidepressant group, however results were not statistically significant.
Gonzalez et al. 2010 (2008 and 2009).	Single-group, within-subjects design with two samples in two successive years. Pre: 46 Post: 41.	Adults with depression aged 25–65. Norway	BDI scores 15 or over.	The average BDI score for both samples was 25.4 at baseline (T2) and was significantly lower at 3-months' follow-up (score of 20.9). BDI change from T2-T6 (3 months follow-up) $F = 13.76$, $p = 0.001$. Depressive symptoms got incrementally lower as the intervention went along, especially in the first 4 weeks, and there were no differences between T4 and T5 measures, but both were significantly lower than baseline and previous measurement points.
Griffiths et al. 2012 (Recruited between August 2008 and May 2009)	RCT. Pre: 311 Post: 232, 6 month follow-up: 209, 12 month follow-up: 176.	Adults aged 18–65 with elevated psychological distress. Australia.	CES-D	There was a significantly greater reduction in caseness between baseline and post-intervention for the ITP and ITP + ISG conditions than the Control condition. There was no difference in the pre-post-test changes for the Control and ISG groups. At 6 and 12 months there was a greater reduction in caseness since baseline for the ISG and ISG + ITP conditions compared to the Control group. There was no significant difference in reduction in caseness since baseline for the ITP compared to the Control condition at 6 or 12 month follow-up. Endpoint OR predicting depression caseness: ITP endpoint $OR = 0.19$, $p < 0.05$; ISG endpoint $OR = 0.27$, $p > 0.05$ NS, ITP + ISG endpoint, $OR = 0.12$, $p < 0.05$. OR's for 6 and 12 month follow-up not shown.
Lipman et al. 2011 (2009–2010)	Pre-post intervention, comparison of two pilot tests. Pre: 14 Post: 14.	Poor lone mothers aged 24–42, of 3–9 year olds. Hamilton, ON, Canada	CES-D, scores over 16 indicated depression.	Low mood pre- to post- mean scores (with standard deviations) combined for both groups ($n = 14$) were 26.2 (12.2) to 22.5 (12.3). These results were not significant and post-group mood scores remained above the threshold for probable clinical depression.
Lipman et al. 2005 (2000–2003)	RCT. Pre: 116 (Intervention group: 59; Control group: 57) Post: 101 (Intervention group 53; Control group:48).	Low income single mothers (mean age = 32 years) with young children. Hamilton, ON, Canada.	CES-D	At the first follow-up assessment, mothers in the intervention group showed significant improvements in mood (24.1 to 17.0; $\beta = -6.55$) compared with the mothers in the control group. At the third follow-up

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Table 2 *(continued)*

Study, publication year (study year)	Study design and sample size	Population and study location	Depression measure/ criteria	Findings
				assessment, the mood score of mothers in the intervention group were 17.8, however these results were not statistically significant. Improvements in mood from baseline to first follow-up: b = –6.55 [standard error (SE) 2.27]; p < 0.01; standardized effect = 0.55.
Tran et al. 2014 (not specified)	Pre–post one-group study design. Pre: 58 Post: 32.	Latina women aged 18 and older in the community. North Carolina, USA.	Spanish version of CESD. Scores of 22+ indicate possible clinically relevant depressive symptoms; scores of 16–21 indicate moderate depressive symptoms.	There were significant changes in the levels of depressive symptoms, with an 8-point decrease from mean at posttest. 50% reduction in depressive symptoms at follow-up p < 0.01
Travis et al. 2010 (not specified)	Pre–post one-group study design. Pre: 54 (27 pairs). Post: 32 (16 pairs).	Patients with persistent depressive symptoms (mean age = 52). Michigan, USA.	BDI-II	From baseline to study completion improvements in depressive symptoms as rated by the BDI-II were observed. BDI mean change score of – 4.2 (95% CI: 7.6, 0.8; p¼0.02).
Uchiyama et al. 2013 (2009–2010)	Cluster randomized controlled trial. Pre: 401 Post: 319.	Nurses (mean age = 32), Japan.	Mental health status was measured using the Japanese version of the CES-D.	The limited change in CES-D score indicated that no significant intervention effect was observed for mental health status. Intervention group t = 1.56, p = 0.122; Control group t = 1.11, p = 0.268.
Van der Waerden et al. 2013 (2005–2008)	RCT. Pre: 161 Post: 149 (EP condition pre:57, post:55; E condition pre:51, post:46; C Condition pre:53 post:48).	Low-SES womenaged 20–55 years, with depressive symptoms or elevated stress. The Netherlands.	CES-D. Scores ranging from 16 to 26 are considered indicative of mild depression and scores of 27 or more indicate a high risk of major depression.	Women in the EP and E, but not the control, conditions showed significant improvements in depressive symptom scores at post-test. For the E condition, the change to baseline scores was significant at 6 and 12 month follow-up (p < 0.01). However, this change in depressive symptom scores was not significantly different between the EP, E and control conditions at any measurement time-points. Pre-post mean CESD scores for each condition: Psychoeducation (Pre = 24.9, Post = 21.3, p < 0.05), Exercise (Pre = 25.7, Post = 20.4, p < 0.05), Control (Pre = 23.2 Post = 20.5) Post-intervention effect sizes by study condition, with CES-D outcome: Exercise and psychoeducation versus exercise only = 0.08 (95% CI = 0.31–0.47); Psychoeducation versus control group = 0.07 (95% CI = 0.3–20.46); Exercise versus control group = 0.00 (95% CI = 0.41–0.40).
Veach et al. 2003 (1992–1996)	Pre-post intervention. Pre: 95 Post: 83.	Senior managers employed by a US governmental agency with worldwide offices (mean age = 46.2)	Zung depression scale	Significant improvement in Zung depression score was observed from baseline to post-intervention. Baseline mean score 42.3 (10.0); 10 months mean score 39.7 (9.6).
Marselle et al. 2014 (not specified)	Longitudinal study, statistically matched intervention and non-intervention groups. Pre: 1991 (group walkers: 1258, nongroup walkers 733), Post: 1516 (group walkers = 1081, nongroup walkers = 435).	General adult population aged 18 and over (majority over age 55)	10-item Major Depressive Inventory	Controlling for other significant predictors, group walks in nature were significantly associated with lower depression. At Time 2, the mean depression score was 6.53 (SD = 5.70) in the nature group walkers compared to 9.78 (SD = 7.96) in the non-group walkers; *t*-test = t(1514) = 8.47*** Effect size r = 0.21.
Harris et al. 1999 (not specified)	RCT. Pre intervention group: 43 Pre control group: 43; Post: unclear due to different levels of participation.	Women with chronic depression (most aged 20–40 years). London, England.	An adapted version of PSE-10 was used to date onset and offset of episodes of depression and anxiety, and assess severity of symptoms. The threshold for 'caseness' was defined by PSE depressed mood and at least 4/10 core symptoms.	Overall 'remission' (including partial remission to 'borderline case' level) occurred in 65% (28,143) of the befriended group and 39% (17,143) of the controls (x2 = 4.66, d.f. = l, P < O.OS). All reached the minimum duration criterion of two months' remission.
Peterson et al. 2008 (2002–2004)	RCT. Pre: 151 (Intervention group 64; control group 87). Post: 110 (Intervention group = 47; control group 63).	Healthcare workers with high levels of exhaustion (approximate mean age = 50). Sweden.	The Hospital Anxiety and Depression Scale (HAD). Cut-off scores for depression are 8–10 for doubtful cases and 11 or more for definite cases.	AT 12 months follow-up, the mean HAD-depression score was 6.06 in the intervention group, and 7.13 in the control group, p = ns.

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Table 2 *(continued)*

Study, publication year (study year)	Study design and sample size	Population and study location	Depression measure/ criteria	Findings
Vuori et al. 2012 (2006–2008)	Randomly assigned field experiment. Pre: 718, T2 = 570 T3 = 613.	Employees of public and private institutions, ages 31–64. Finland.	13-item Beck Depression Inventory	Depressive symptoms decreased significantly in the intervention group compared to the comparison group at post-intervention and seven months follow-up. Looking at time 1–7 month follow up: Coeff = 0.04**, SE = 0.02, d = −0.17 (intervention was 0 and experimental was 1 when entered into model). Depressive symptoms decreased significantly in the intervention group compared to the comparison group (1.279 vs. 1.326 at time 3).
Ludman et al. 2007 (2003–2005)	RCT. Pre: 124 Post: 124 (26 assigned to each of the four groups).	Adults over 18 years with chronic or persistent depression (mean age = 50.2 years). Washington State, USA.	At baseline: assessed with depression and mania modules of the SCID. Each assessment included current depression module of the SCID, and the 20-item SCL depression scale.	The sample was too small to reliably detect small or moderate differences in clinical outcomes, but various measures consistently favored the care management plus professionally led group; the professionally led group had the lowest rate of major depression at 12 months (20%).
Chaudhry et al. 2009 (2003)	pre-post intervention. Pre: 18 Post: 9.	Depressed women of Pakistani family origin living in the UK (mean age = 54.1 years). Manchester, UK.	The Urdu versions of the Self Reporting Questionnaire (SRQ) and the Schedule for Clinical Assessment in Neuropsychiatry (SCAN) interview.	Post-intervention there was a significant reduction in mean SRQ score. The baseline SRQ score of 15 (SD = 3.08) came down to a mean SRQ score of 11.7 (SD = 5.95).
McGale et al. 2011 (not specified)	RCT. 104, but 18% did not begin intervention. The final sample size = 84.	Young, sedentary males, aged 18–40 years. UK.	BDI-II. A total BDI-II score of 13 or less is within the minimal range of symptom severity, a total score ranging between 14 and 28 is considered mild/ moderate and between 29 and 63 is considered indicative of severe depression.	Results indicated a significant decrease for IE $t(60) = -3.79$, $p < 0.01$ and BTN $t(60) = -4.95$, $p < 0.01$ conditions on depression scores over time. Percentage change in BDI-II scores from pre- to post-intervention: control condition = 1% increase; IE condition = 52% decrease; BTN condition = 45% decrease over the 10-week intervention period. Significant group difference scores were found at the 8-week follow-up between control and BTN conditions (mean BDI scores of 10.94 vs. 4.32).
Michael et al. 2008 (not specified)	Pre-post intervention. Pre: 170 Post: 113.	African American and Latino community members (adults; ages unknown). Multnomah County, Oregon, USA.	Depressive symptom index	A statistically significant decrease in depressive symptoms was observed between baseline and assessment at 8 months. Depressive symptoms index difference from T1 to T2 (mean = −0.10; SD = 0.34; $t = -2.98$; df = 112, $p < 0.05$)
Petersen et al. 2012 (not specified)	Non-randomized intervention with control group. Pre: 60 (Intervention: 30; Control: 30) Post: 42 (Intervention: 20; Control: 22).	Women with depressive symptoms, 18 years and over. Hlabisa sub-district, northern KwaZulu-Natal, South Africa.	BDI	The IPT intervention led to a significant reduction in depressive symptoms as measured by the BDI in the intervention participants compared to the controls over a 12 and 24-week period.
Shimazu et al. 2003 (not specified)	Non-randomized intervention with control group. Pre: 24 (Intervention: 12; Control: 12) Post: 16 (Intervention: 8; Control: 8).	Public school teachers (mean age = 44 years). Japan.	Depression subset of the Brief Job Stress Questionnaire (BJSQ)	No significant intervention effect for depression. Mean depression score for intervention group pre:11.3, post: 12.6; mean depression score for control group pre: 11.3, post: 11.9. This may be attributed to the small sample size
Steensma et al. 2007 (not specified)	One-group-pretest-posttest design. Pre: 20 Post: 20.	Adults who worked or had worked in the service sector, ages 37–50. The Netherlands.	BDI	At T1, the mean BDI-score was 17.35, indicating a borderline clinical depression level. At t4, the mean BDI score was 4.80, a normal level of "depression." This reduction is statistically significant ($t = 6.721$, $p < 0.000$)

Table 3
Classification and description of each intervention included in the final review.

Study, publication year (study year)	Intervention Classification	Intervention Description	Where, and by whom, the intervention was delivered	Frequency of sessions, duration of intervention and length of follow-up
Ali et al. 2010 (not specified)	Peer Support, Skill Building & Links to Community Resources	Project Enterprise is a non-profit community development institution that provides peer support and microloans to low income individuals. Clients receive skill and leadership training and meet in small peer groups to encourage each other, be accountable for loan payback, and discuss progress and challenges.	Project enterprise centres and group members' homes. Delivered by combination of trainers and peer-led program.	Biweekly large group meetings and more regular peer group meetings. A 9-week training program was followed by a 3-month entrepreneurial venture. Follow-up: Approximately 6 months between time 1 and time 2.
Bright et al. 1999 (not specified)	Psychotherapy & Peer Support	Compared group cognitive-behavioural therapy (CBT) and mutual support group therapy (MSG). The CBT condition focused on identifying, disputing, and correcting distorted thinking and dysfunctional beliefs. The MSG condition emphasized equal leadership between members, and involved information sharing through group rounds, sharing of ideas, expression of emotion, and informal brainstorming about shared problems. The goal was to develop interpersonal insight, disclosure skills, and advice sharing. Within each condition, professionals or paraprofessionals conducted sessions (4 options: CBT + professional, CBT + para, MSG + prof, MSG + para). A total of 14 groups (7 in each condition) were offered across a 16-month period	Community mental health centre based in the Department of Psychology at University of Memphis. Delivered by professional and paraprofessionals	Patients in both conditions attended a 90 min sessions weekly. 10 weeks duration. Follow-up: Post intervention (at ten weeks). Also followed up at 6 months - results not reported.
Edelblute et al. 2014 (2011)	Peer Support, Skill Building & Psycho-education	The MESA intervention took a train-the-trainer approach to improve depression through peer support, coping techniques, and mental health education. The goals were to provide a social support network, educate women about depression and stress, and teach healthy coping skills (e.g., relaxation techniques). Groups ranged from 3 to 12 people.	Setting not specified. Delivered by 7 trained Promotoras (lay health advisors).	Weekly session for 5 weeks. Follow-up: Post-intervention assessment at 5 weeks
Gater et al. 2010 (Recruited in 2004–2005)	Peer Support, Group-based Activities & Links to Community Resources	Women attended facilitated groups which aimed to address social difficulties, isolation and poor access to primary care by developing informal networks that engage women in social contacts and link them with appropriate treatment. Participants designed their own program by choosing from a list of indoor and outdoor activities at the first session, and also received psychoeducation sessions about depression.	Groups took place in a culturally acceptable community centre with provision of childcare facilities. Delivered by trained facilitators (multilingual graduate women).	Weekly session for 10 weeks. Follow-up: Assessments at baseline, 3 months (completion of the intervention) and 6 months post-intervention (9 months after baseline).
Gonzalez et al. 2010 (2008 and 2009).	Group-based Activities	Therapeutic horticulture uses plant-related activities to improve well-being. The 12-week TH intervention included ordinary and easy gardening activities that were done in groups, but also allowed for alone time. The groups included 3–7 participants. The intervention was repeated with different samples in two successive years.	Urban farm. Delivered by farmer in conjunction with researchers, but participants spent most time with each other.	Two sessions a week for 12 weeks. Mean attendance was 18.4 for 24 sessions. Follow-up: Beyond baseline, measurement points were after 4 weeks, 8 weeks, 12 weeks (end of intervention), and at 3-months' follow up
Griffiths et al. 2012 (Recruited between August 2008 and May 2009)	Psycho-education & Peer Support	Internet training program (ITP) condition: comprised of an automated online psychological intervention application that included cognitive behaviour therapy, interpersonal therapy, applied relaxation, and physical activity. Internet support group (ISG) condition: WellBeing Board. The ISG was a closed, moderated bulletin board that contained forums each week related to feeling better, well-being or general discussion. Participants were asked to log in to the board at least twice weekly to read new messages posted by other members and to contribute at least four posts. ISG + ITP	Online. Mostly no facilitator (although researchers would post weekly topics in some conditions).	One module per week for 12 weeks. Follow-up: Assessments at post-intervention, and 6- and 12-month follow up.

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Table 3 *(continued)*

Study, publication year (study year)	Intervention Classification	Intervention Description	Where, and by whom, the intervention was delivered	Frequency of sessions, duration of intervention and length of follow-up
		condition: WellBeing Board plus e-couch.		
Lipman et al. 2011 (2009–2010)	Psychotherapy, Peer Support & Psycho-education	Intervention included group-based support and education through videoconferencing and a group chat. Content of group discussions included: child themes (e.g., normal and deviant development and behaviour, behaviour management, child welfare) and maternal themes (e.g., social isolation, financial stress, coping, relationships). Leaders used group processes, cognitive behavioural techniques, and conducted structured group counseling as well as clinical consultations. Mean attendance was 18.4 for 24 sessions.	Online. Delivered by two trained leaders.	1.5 h a week for 10 weeks. Follow-up: Post intervention (at ten weeks)
Lipman et al. 2005 (2000–2003)	Psychotherapy, Peer Support & Psycho-education	Mothers participated in a 10-week program of group sessions that provided social support and education. Content covered 2 thematic areas: child-related (e.g., child development and behaviour, school involvement, child welfare agencies) and maternal (e.g., social isolation, stress and coping, personal care and development, relationships, grief, economic disadvantage). Leaders used CBT and group processes to create a therapeutic environment, and provided structured group counseling. Participants received weekly phone reminders and bus tickets/taxi fare for transportation. Activities were available for children while mothers participated, and all were given food.	Community location (public housing project, church hall, etc). Delivered by two trained leaders.	1.5 h per week for 10 weeks. Follow-up: The first follow-up assessment occurred at the end of the intervention period. The second and third follow-up visits occurred at a mean of 13.7 and 20.2 months after baseline respectively.
Tran et al. 2014 (not specified)	Peer Support, Skill Building & Psycho-education	The intervention took a community-based participatory approach by training promotoras to serve as lay health educators in mental health and coping skills, using a linguistically and culturally tailored curriculum for recently immigrated Latinas in their social network. Promotoras identified up to three women (compañeras) in the community with whom to share their mental health promotion resources and information on a regular basis with the goal of preventing and reducing negative mental health outcomes. Conducted in Spanish.	Community (home or other community setting). Delivered by Promotoras trained by clinical social workers.	At least three sessions. Duration and follow-up: unclear.
Travis et al. 2010 (not specified)	Peer Support & Skill Building	Participants were partnered with another patient, provided with basic communication skills training, and asked to call their partner at least once a week using a telephone platform that recorded call initiation, frequency and duration. Peer interactions in this study were guided only by the provision of optional discussion topics that were designed to facilitate productive conversations within the pair. After weeks 6 and 12, participants attended in-person meetings with study staff so that they could have face-to-face contact with their peer.	Telephone-based, but met at weeks 6 and 12. Was peer-led but a clinical social worker was available if issues were encountered	Contact at least once a week encouraged but participants completing the study averaged 10.3 calls, with a mean call length of 26.8 min. Duration of 12 weeks. Follow-up: Assessments were carried out at 6 weeks and 12 weeks.
Uchiyama et al. 2013 (2009–2010)	Group-based Activities & Skill Building	A participatory program for improving psychosocial work environment was implemented. The intervention was unit based, focused on active employee participation, and based on action planning to improve the work environment. All members in the intervention units were expected to participate in a series of activities designed to improve the work environment; several activities related to improving workplace relationships and communication. The units were allocated to 11	Workplace (hospital). Researchers trained key nurses, who then implemented intervention themselves.	Frequency unclear, however occurred over 6 months. Workplace (hospital). Researchers trained key nurses, who then implemented intervention themselves Assessments carried out immediately after the 6-month intervention.

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Table 3 *(continued)*

Study, publication year (study year)	Intervention Classification	Intervention Description	Where, and by whom, the intervention was delivered	Frequency of sessions, duration of intervention and length of follow-up
		intervention units and 13 control units.		
Van der Waerden et al. 2013 (2005–2008)	Psycho-education, Group-based Activities & Exercise	Participants were randomly allocated to combined exercise/psycho-education (EP), exercise only (E), or waiting list control condition (WLC). The Exercise without Worries (EWW) course was a combined exercise regimen and CBT-approach that linked psycho-educative topics with body focused exercise in a group format. Psycho-education addressed constructive thinking, social skills, self-esteem, and pleasant activities. The exercise component employed stretching, strength exercises, flexibility, body focused exercise and relaxation. Social support was encouraged.	Setting not specified. Delivered by two trainers, a psychologist or mental health provider and an exercise professional.	Two-hour session each week for 2 months. Follow-up: Further measurements in the EP and E conditions were a posttest directly after the 8-week intervention, and 2 months, 6 months and 12 months follow-up.
Veach et al. 2003 (1992–1996)	Peer Support, Skill Building, Group-based Activities & Exercise	Full programming began with early morning mind-body exercise, and then specific stress and coping topics were introduced through an interactive seminar style and small breakout groups. Topics included: wellness/ lifestyle medicine, family of origin, stress response, brain/body interactions, nourishment, social support, life satisfactions, work stresses, solutions and implementation strategies. Afternoon sessions were conducted in a challenge or ropes course format. Sessions aimed to foster communication, instill trust among members, and experience the benefits of group support and leadership. Evening sessions encompassed one-on-one sessions to discuss individual issues in confidence and small group relaxation training.	Held at four sites across the U.S., varying from isolated retreat sites to conference centres. Delivered by study authors.	3.5 full days from 07:00 to 21:30 h (35 h total). A total of eight workshops averaging 12 participants per workshop were offered from 1992 through 1996. Follow-up: 10 months following the workshop.
Marselle et al. 2014 (not specified)	Group-based Activities & Exercise	Walking for Health (WfH) is one of the largest public health interventions for physical activity in the UK and has the potential to address population public health through improved physical, mental, emotional, and social well-being. This study evaluated the effect of WfH on the mental well-being of individuals who did and did not attend group walks in nature.	Various outdoor locations; natural and seminatural places, farmland, urban green space, coastal area. Details of program deliverer not specified.	Must have attended at least one session to be included in analyses. Follow-up: Ongoing, but measures captured pre and post a 13 week period. Follow-up: 13 weeks after T1.
Harris et al. 1999 (not specified)	Peer Support & Group-based Activities	Each participant was matched with a female volunteer befriender, recruited through the local press, churches and health centres. Befriending was defined as meeting and talking with the depressed woman for a minimum of one hour/week, and acting as her 'friend', listening and 'being there' for her. The training encouraged volunteers to accompany their be friendees on trips, broaden their range of activities, offer practical support with ongoing difficulties and create the 'fresh start' experiences often found to precede remission.	Various community locations. Delivered by volunteer befrienders.	Minimum 1 h each week over 12 months. Follow-up: Assessments carried out at end of year-long intervention.
Peterson et al. 2008 (2002–2004)	Peer Support	The peer-support group was intended to be a working group, and not a therapeutic group, to provide opportunity to: (1) discuss and reflect with colleagues, focusing on work-related stress and burnout, (2) mutual support and sharing of experiences between colleagues, (3) work with individual goals for change to find out alternative ways to handle perceived stressful situations.	At work. Group leaders included physicians, social workers or physiotherapists with previous group leader experience.	Weekly 2-h session for 10 sessions and a follow up meeting after 4 weeks. Participants were encouraged to continue meeting after the intervention. Follow-up: Follow-up questionnaires were administered at three times: post-interventon, 7 months, and 12 months.
Vuori et al. 2012 (2006–2008)	Skill Building & Peer Support	Those in the intervention group were invited to group workshops. The group training was designed to endorse the following career management skills: (a) identifying and communicating one's skills and abilities, (b)	Workplace. Delivered by trained trainers from human resources, management and occupational health services in the organizations.	5 half-day sessions over one week. Follow-up: Baseline, post and 7 month follow up.

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Table 3 *(continued)*

Study, publication year (study year)	Intervention Classification	Intervention Description	Where, and by whom, the intervention was delivered	Frequency of sessions, duration of intervention and length of follow-up
		identifying and using one's social network and solving conflicts in social relationships, (c) developing assertiveness at work, (d) developing stress management skills, and (e) building commitment to one's personal work-related plan for the near future. In total, 34 workshops were conducted, with the size of groups varying between 8 and 15 participants.		
Ludman et al. 2007 (2003–2005)	Peer Support, Psychotherapy & Skill Building	Four groups: continued usual behavioural health care, usual care plus telephone monitoring and care management by a care manager, usual care plus care management plus a peer-led chronic-disease self-management group program, or usual care plus care management plus a professionally led depression psychotherapy group. Peer-led chronic-disease self-management program includes these core components: disease-related goal setting and problem solving, cognitive symptom management, communication skills, medication management, development of a patient-physician partnership, and use of community resources. The program incorporates strategies that are based on self-efficacy theory and evidence that positive role models increase patients' confidence for disease management.	Not specified. Delivered by trained peer leaders with previous history of depression for peer group condition.	Frequency varied over 12 month period. Follow-up: Outcomes in intent-to-treat analyses were assessed at three, six, nine, and 12 months.
Chaudhry et al. 2009 (2003)	Group-based Activities, Peer Support, Psycho-education & Exercise	A social group intervention that aimed to facilitate the development of informal networks and social engagement, and decrease severity of depressive symptoms by providing social support, stimulation, education on mental and physical health needs and a break from distressing environments. A 10-item list of preferred group activities was made during the first session; this included a session on psycho education, three sessions were dedicated to activities (personal grooming, exercise, and yoga) while four outdoor sessions were planned for visits to Manchester museum, science museum and local shopping malls.	Local Pakistani community centre. Delivered by a facilitator.	10 weekly sessions. Follow-up: Assessments carried out immediately after the 10-week intervention.
McGale et al. 2011 (not specified)	Exercise, Group-Based Activities, Skill Building & Psycho-education	This RCT pilot compared the effectiveness of an integrated team sport/psychosocial intervention (BTN) with an individual exercise (IE) condition and control condition. A team-based exercise condition facilitated social support and delivery of CBT strategies through group discussion and activities. The BTN intervention involved participants playing football and employing CBT techniques to address a weekly theme. Themes included: relaxation, teamwork, identifying personal positive strengths, goal setting, problem solving, resilience, avoiding harmful situations, self-care behaviour, and communication. Social skill building was facilitated both during and after each session. Each group comprised 5–12 men.	Community (football pitch). Delivered by a Football coach and a researcher.	max 20 55-min sessions over 10 weeks. Follow-up: Measurements took place during the intervention, at post-intervention and at 8-weeks follow-up.
Michael et al. 2008 (not specified)	Group-based Activities & Links to Community Resources	Working with community, Community Health Workers designed interventions to address the identified priorities. Specific projects varied widely, and included development of a business incubator, a public safety committee, a girls' leadership group, a diabetes support	Various community locations. CHWs were chosen from each partner community and participated in 80-h of initial and 80-h of ongoing training to promote health in their own communities. They did not necessarily lead the activities.	Varied frequency over unspecified time period. Follow-up: 8 months.

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Table 3 *(continued)*

Study, publication year (study year)	Intervention Classification	Intervention Description	Where, and by whom, the intervention was delivered	Frequency of sessions, duration of intervention and length of follow-up
		and education group, a homework club, and an environmental health project that employed photovoice methodology. Other projects initiated and completed by the CHWs in partnership with other community members include: an Aztec dance class; a soccer team for Latina women; a series of popular education classes about gang violence for Latino community members; a chronic pain support group at an African American faith community; a peace campaign with African American youth, in response to recent shootings of African Americans and Latinos; and "Escuchando y Creando" ("Listening and Creating"), a group designed to identify and address health issues in a predominantly Latino neighbourhood.		
Petersen et al. 2012 (not specified)	Psychotherapy & Peer Support	The participants in the treatment group were assigned to four different therapy groups who received the Interpersonal Therapy (IPT) group-based intervention. The non-treatment group received enhanced normal standard of care. Group-based IPT dealt with four interpersonal problem areas: grief (especially associated with multiple losses due to HIV/AIDS), interpersonal conflicts (particularly involving abuse), life transitions (specifically finding out and living with and HIV status), and financial stress.	Primary health clinics. IPT group-based intervention delivered by two trained CHWs, supervised by a mental health counsellor.	23 participants attended 8–12 group sessions over 12 weeks. Follow-up: Post evaluation upon completion of the 12-week intervention and 24 week follow-up post baseline.
Shimazu et al. 2003 (not specified)	Peer Support & Skill Building	A group stress management program for teachers that focused on their coping skills and social support. The intervention combined cognitive-behavioural training and relaxation training. The cognitive-behavioural approach was adopted from Stress Inoculation Training (SIT) that consists of three overlapping phases: conceptualization, skill acquisition and rehearsal, and application and follow-through.	Conference room of junior high school. Delivered by two clinical psychologists.	Five 2-h sessions, every 2–4 weeks for 10+ weeks. Follow-up: One week after final session.
Steensma et al. 2007 (not specified)	Psycho-education, Group-based Activities, Skill Building & Peer Support	The Resilience Reintegration program is similar to the JOBS intervention. The reintegration training includes the following components: insight classes, medication, bioenergies. In total, 34 workshops were conducted, with the size of groups varying between 8 and 15 participants.(relaxation and self-expression), yoga, sounds exercises, assignments, nature exercises, rest and relating. These elements are delivered in four partly overlapping stages. About once every two weeks a special intervision day is planned to exchange experiences, to learn from each other, and to give social support to each other.	Not specified.	Included: five days of group training, five days of group sessions throughout, and intervision days throughout. Unclear whether other activities also took place over 26 weeks. Follow-up: Measured outcomes at baseline, at week 7, at week 13, and week 26.

reduction in depressive symptoms, twelve included a peer support component, eight incorporated a skill-building component, eight involved group-based activities, seven incorporated psycho-education, four included an exercise component, three included a form of psychotherapy, and two linked participants to community resources.

Seven studies found no significant reduction in depressive symptoms over the course of the study period (Lipman et al., 2011; van der Waerden et al., 2013; Gater et al., 2010; Ludman et al., 2007; Uchiyama et al., 2013; Peterson et al., 2008; Shimazu et al., 2003). The main approaches took by those studies included: peer support (n =5), skill building (n =3), group-based activities (n =3), psychotherapy (n =2), psycho-education (n =2), links to community resource (n =1), and exercise (n =1). There were no apparent differences in approach in the effective versus non-effective social interventions; it may have been the target audiences and/or limitations of these studies, rather than their approaches that made these seven studies non-effective in reducing depressive symptoms. Four of the seven studies reported that the interventions were likely inadequately powered to detect changes in symptoms due to small sample sizes (Lipman et al., 2011; Gater et al., 2010; Ludman et al., 2007; Shimazu et al., 2003). The remaining three studies offered explanations as to why no main effects were found. Namely, Van der Warden (van der Waerden et al., 2013) found no significant reductions in depressive symptoms in intervention groups compared to the control group at follow-up among their sample of low-SES women, but did find moderation effects by baseline depressive symptoms and educational level, suggesting potential intervention benefits for certain subgroups of disadvantaged women. Peterson et al. (2008) found no reductions in depressive symptoms over the course of their workplace social intervention but did find decreases in depression between baseline measurements in February and the pretreatment measurement period in September, and suggested that the time of year in which the data was collected may have had an impact on the study's findings due to seasonal fluctuations in symptoms. Lastly, Uchiyama et al. (2013) found no difference between the intervention and control group in terms of depressive symptoms over a six-month period in their workplace intervention. It is potentially noteworthy that three of the seven studies finding no intervention effects on depression were conducted within the workplace. Only one study conducted within a workplace found significant reductions in depression (Vuori et al., 2012).

3.3.4. Assessment of risk of bias

Studies were individually appraised for their risk of bias; the results of which can be seen in Tables 4, 5. The majority of indicators for randomized controlled trials (see Table 4 for results) had a low risk of bias; however several indicators received an “unclear” rating due to inadequate information in the manuscript to make a clear judgment. Indicators that received high risk of bias ratings were those in which the sample sizes were particularly small and those that identified the generalizability of study results as a potential issue.

Greater variability in the risk of bias was seen among the non-randomized study designs (see Table 5 for results). Only one study was based on a random or pseudo-random sampling design. Four of the thirteen studies did not clearly identify the inclusion criteria for their sample. Twelve of thirteen studies did not control for confounders during analyses; however some did compare groups on baseline characteristics to examine group differences. No studies used objective measures to assess the outcome; instead, they relied on self-report and most often used reliable and valid instruments. Three of thirteen studies provided information about comparison groups, however most did not as they used pre-post measures of the same sample in their intervention, so did not have a separate comparison group. Four interventions conducted sufficient follow-ups after the intervention ended, however, most measured outcomes immediately following the intervention, and so even in the cases of longer-term interventions, it is unclear whether follow-up time was adequate. Nine studies did not report differences in outcomes between those who completed the intervention compared to those who did not, however, some did report differences in other study variables or on baseline scores in an effort to characterize potential differences. There was insufficient information for four studies regarding the reliability of the approach used to measure outcomes. Finally, most studies conducted appropriate statistical analyses, however three studies provided insufficient detail on the models used to make a judgment.

4. Discussion

Among the social interventions included in this review, 70.8% found that depressive symptoms were reduced among the participating adults from the general population. The remaining found no reduction in depressive symptoms; one of these did not include face-to-face interaction with participants (Lipman et al., 2011), and four reported concerns about adequate power to detect significant differences in effect sizes. Overall, the social interventions identified through this review were highly varied in terms of (a) strategies used to engage individuals socially, (b) duration and intensity, and (c) delivery settings and formats. Findings suggest that there is not one type of social intervention that could work to reduce adult depression, but instead, there is the potential for social interventions to use different strategies to foster interpersonal interaction and improve mental wellbeing among adults.

Almost all studies incorporated multiple approaches to facilitate social interaction among participants. A peer approach that incorporated information sharing and empathizing with others was the most common approach used, and linking individuals to resources within the community was the least. Most interventions took place within a community or urban setting, however some group-based activities took place outside in nature, such as group walks (Marselle et al., 2014), horticultural activities (Thorsen Gonzalez et al., 2010), and trust-building tasks at remote retreats (Veach et al., 2003). Individuals delivering the interventions also varied, with some using researchers themselves to deliver the intervention, others using more sustainable approaches, by training community health workers and peers within the community, and others using a combination of these approaches. Most interventions involved face to face contact, however some of the social interventions used other delivery modes such as the internet (Griffiths et al., 2012) and telephone (Travis et al., 2010). Target populations also varied between studies, and findings indicated that social interventions can be effective in diverse cultural and ethnic groups (Edelblute et al., 2014; Tran et al., 2014; Chaudhry et al., 2009; Michael et al., 2008; Gater et al., 2010).

Lastly, interventions varied in terms of the level at which social interaction took place. For example, the majority were group-based interventions; however, a minority fostered social interaction through dyadic relationships, and others included interactions at a broader, community level. Case examples of interventions that employed these different levels of social interaction are provided below.

4.1. Case examples of social interventions for depression

4.1.1. Dyad-level social intervention

A social intervention that focused on fostering dyadic relationships was conducted in Michigan, USA, and included 27 pairs of participants with persistent depression (Travis et al., 2010). This particular intervention was mostly telephone based, and after being provided with basic communication skills training, participants were asked to call and talk to their partner at least once a week. After 6 and 12 weeks of conversation, participants met with their partners face to face. Results indicated a reduction in depressive symptoms among participants. Participants valued the mutual support and understanding that was fostered through this peer support model.

Table 4
Critical appraisal of studies with randomized control trial study designs.

Author	Title	Sequence generation assessment	Allocation concealment	Blinding of participants, personnel, and outcome assessors	Incomplete outcome data	Selective outcome reporting	Other source of bias
Bright et al. 1999	Professional and paraprofessional group treatments for depression: a comparison of cognitive-behavioural and mutual support interventions.	Unclear. It is stated that participants were blocked for gender and BDI score and were randomly assigned to conditions, but the process of determining the random assignment was not described.	Unclear. It is unclear whether participants and investigators could foresee assignment because no concealment of allocation method was described.	Unclear. There was no mention of blinding of the participants or investigators. The same therapist pairs participated in both conditions.	Low risk. There was a 30.61% dropout rate, however no significant differences in attrition were found between treatment conditions. Those who dropped out were more likely to be from larger groups, and were more likely to be women.	Low risk. The study focused primarily on depression, as is evident by the inclusion criteria of the study. Depression was likely the main outcome of interest, and the results are reported in this paper.	Low risk. Also compared characteristics of participants in different treatment conditions and found no difference between groups on variables examined.
Gater et al. 2010	Social intervention for British Pakistani women with depression: Randomised controlled trial.	Low risk. Randomization was conducted using a randomization website.	Low risk. Allocation was done through randomization website and so would have been concealed from researchers.	Low risk. Researchers blinded to allocation measured outcomes.	Low risk. There was some loss to follow up however the dropout rate was relatively equal across conditions.	Unclear. Insufficient information to permit judgment.	High risk. Because of the clustered sampling design, the sample size may have been too small to assess differences.
Griffiths et al. 2012	The effectiveness of an online support group for members of the community with depression: a randomised controlled trial.	Low risk. Randomization was conducted using a randomization website.	Low risk. Participants and personnel could not foresee assignment because a web-based randomization procedure was used after stratifying groups into blocks for the four conditions.	Unclear. Participants nor personnel were aware of the condition at the time of randomization, but were aware of conditions thereafter. The potential impact on the study's self-reported outcome is unclear.	High risk. Attrition was high in this study across conditions. Of the 311 participants who provided consent, the following proportion of participants either did not complete surveys or had insufficient outcome data: 17 (5.5%) at baseline, 85 (27.3%) post-test, 109 (39%) at 6 months, and 141 (45.3%) at 12 months. The authors reported that CES-D completers and non-completers were similar in most baseline clinical and sociodemographic characteristics. Those with 12 month scores in the control group however were more likely to have reported lower CESD scores at baseline.	Low risk. The protocol and manuscript clearly state that depression is the main outcome of interest.	High risk. Those in the interpersonal therapy condition with completed CESD scores at post, 6, and 12 months were more likely to have indicated at baseline that they previously had sought help for depression. Those in the Internet support group condition reported similar trends, except only at post and 6 months. Men were more likely to drop out of the Internet Training program condition at each measurement point and from the Internet support group condition at 12 months. Those with higher education were less likely to drop out of the Internet Training Program condition. Those who completed the CESD at 6 months in the Internet support group condition were more likely to be unemployed. That some participants were more likely to drop out of the study than others may have affected the generalizability of results.
Lipman et al. 2005	Social support and education groups for single mothers: A randomized controlled trial of a community-based program.	Low risk. A random number table was used to randomize participants to conditions in blocks of four.	Low risk. Sealed opaque envelopes were used to conceal allocation.	Low risk. Interviewers were blinded to mothers' allocation.	High risk. Missing data at long term follow up is higher in the control group than the intervention group.	Unclear. Insufficient information to permit judgment.	Unclear. Insufficient information to permit judgment.
Uchiyama et al.	Effect on mental health of a participatory intervention to	Unclear. Information about sequence	Low risk. Randomization was	Unclear. The study did not mention	Low risk. The dropout rate was 20.4%.	Low risk. The authors specify that a	–

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Table 4 *(continued)*

Author	Title	Sequence generation assessment	Allocation concealment	Blinding of participants, personnel, and outcome assessors	Incomplete outcome data	Selective outcome reporting	Other source of bias
2013	improve psychosocial work environment: a cluster randomized controlled trial among nurses.	generation was not provided; the text states only that participants were randomized.	conducted after stratification by hospital and department nature by a person who was not part of the intervention or evaluation.	whether the participants or study personnel were blinded to the conditions.	There were no statistical differences in sociodemographic characteristics between groups. There were no significant differences in baseline mental health status between participants and non participants, and those who were excluded from analyses.	main outcome of interest was mental health status, and included these results, despite the fact that the association was not significant.	
Van der Waerden et al. 2013	A randomized controlled trial of combined exercise and psycho-education for low-SES women: Short- and long-term outcomes in the reduction of stress and depressive symptoms.	Low risk. Participants were randomized to one of three conditions using a randomization list.	Low risk. Participants were assigned to conditions using a randomization list and therefore investigators or participants would unlikely be able to foresee assignment.	Low risk. Until the first session, all participants, including those in the control group were blinded to their condition.	Low risk. Twelve participants discontinued their participation before baselines assessment. Those who dropped out did not differ from those who completed all assessments. Five participants dropped out in the control condition, a further five in the exercise condition, and two from the exercise and psycho-education condition.	Low risk. The two main outcomes appeared to represent the intervention well and so it is unlikely that other important outcomes were not reported. Moreover, the intervention effects were not significant, further supporting the likelihood that the outcomes were not reported selectively.	High risk. The sample size was smaller than what was predicted as adequate through apriori power calculations. This may have contributed to the lack of significant differences across conditions.
Harris et al. 1999	Befriending as an intervention for chronic depression among women in an inner city 1: Randomized Controlled Trial.	Low risk. Participants were allocated to the befriending or control group using a sealed envelope system.	Unclear. Participant information was contained within sealed envelopes, however there was no mention of whether the envelopes were opaque or sequentially numbered.	Low risk. No blinding was conducted but in addressing this, the authors suggest that the risk of bias is minimized because remitted or depressed status was based on consensus from a panel of raters.	Low risk. No missing outcome data is reported.	Low risk. The primary inclusion criteria was depression status, and since it is also the main outcome reported, it is unlikely that other major outcomes have failed to be reported.	High risk. Generalizability may be low since a high proportion of eligibile participants expressed disinterest in participating.
Peterson et al. 2008	Reflecting peer-support groups in the prevention of stress and burnout: randomized controlled trial.	Low risk. Participants were stratified by region and randomized using computer software.	Unclear. Allocation was conducted randomly using SAS software by a statistician - however details of allocation concealment were not specified.	Unclear. There was no mention of blinding in this study's procedures.	Low risk. Those who dropped out were similar in exhaustion levels when compared to those who remained in the study. A higher dropout rate was seen among controls compared to those in the treatment condition.	Unclear. Insufficient information to permit judgment.	Unclear. Insufficient information to permit judgment.
Vuori et al. 2012	Effects of resource-building group intervention on career management and mental health in work organizations: Randomized controlled field trial.	Low risk. Researchers shuffled sealed envelopes.	Unclear. Participant information was contained within sealed envelopes, however there was no mention of whether the envelopes were opaque or sequentially numbered.	High risk. Participants were not blinded to their condition and the authors discuss that those who received the less intensive intervention may have different in motivation levels. The authors do describe however that this would likely have little bias over the longer term follow up results.	Low risk. Differences were found between those who participated and those who did not in certain characteristics but not the outcome. Differences were controlled during analyses, and statistical procedures were used to account for these differences.	Unclear. Insufficient information to permit judgment.	Unclear. Insufficient information to permit judgment.
Ludman et al. 2007	A Pilot Study of Telephone Care Management and Structured Disease Self-	Low risk. Computer-generated block randomization was used to	Low risk. Allocation was conducted randomly by a computer.	Low risk. Outcomes were assessed by interviewers who were blind	Low risk. Among the few participants who dropped out, there were not	Low risk. The primary inclusion criteria was recurrent	High risk.

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Table 4 *(continued)*

Author	Title	Sequence generation assessment	Allocation concealment	Blinding of participants, personnel, and outcome assessors	Incomplete outcome data	Selective outcome reporting	Other source of bias
	Management Groups for Chronic Depression.	assign participants to one of four conditions.		to the treatment condition.	significant differences in participation across treatment groups.	depression status, and since it is also the main outcome reported, it is unlikely that other major outcomes have failed to be reported.	
McGale et al. 2011	Exploring the effectiveness of an integrated exercise/CBT intervention for young men's mental health.	Low risk. A random number table was used to allocate participants.	Low risk. Since a random number table was used, it is unlikely that researchers could have foreseen assignment.	High risk. participants were not blinded to the e condition, which may influence outcome.	Low risk. Drop-out was similar across groups.	Unclear. Although the study lists mental health as a primary outcome of the intervention, it is unclear if all main outcomes are reported.	High risk.

4.1.2. Group-level social intervention

A social intervention that involved group-level social interaction was conducted in Memphis, USA, and included 98 adults with depressive symptoms from the general population (Bright et al., 1999). Participants were randomly assigned to cognitive behavioural group therapy or a mutual support group. The mutual support group is considered the "social intervention" in this instance because it included an interactive component within the group setting. The group placed importance on shared leadership between members, and included information and idea sharing, expression of emotion, and brainstorming about shared problems. The goal was to improve communication and coping skills through these processes. Clinical improvements in depression were observed among 60% of the participants, with no differences found by treatment condition, indicating the comparable effectiveness of mutual support groups to group-based cognitive behavioural therapy. Findings indicate the potential benefits associated with paraprofessional-led peer support groups in improving depressive symptoms.

4.1.3. Community-level social intervention

An example of a social intervention that included a diverse set of group-based activities and linkages to community resources to foster social interaction at a community level, was a community-based participatory research intervention. This particular intervention aimed to increase social capital to address health disparities in Latino and African American communities over an eight month period (Michael et al., 2008). Projects were varied and included a women's soccer team, Aztec dance class, popular education classes about gang violence, chronic pain support groups, and a group designed to address health needs of the community (Michael et al., 2008). In addition to finding reductions in depressive symptoms, significant improvements were also found for community social capital, social support, and self-rated health (Michael et al., 2008). The study provides important implications for the potential of social interventions to reach high-portions of the population - vulnerable ones in particular - and indicates that building upon current community resources may allow for sustainable interventions to decrease depression (Michael et al., 2008).

4.2. Implications of social interventions for depression

Social interventions show much promise in their potential to reduce depression in individuals, groups and communities. With depression as the leading cause of disease burden worldwide, this implication is an important one. Additional reasons to consider conducting social interventions to improve mental wellbeing in communities include:

1. **Social interventions can be practical and feasible under circumstances where resources are limited.**
   Facilitators of the interventions often included paraprofessionals, trained community members, and peers (who received little to no training). In low-resource settings and circumstances, Edelblute et al. (2014) recommend the use of lay health providers to lead group-based activities. Another study's authors recommend the use of mutual peer support, which not only has advantages in terms of mental health, but also alleviates the need to train peer mentors to deliver programs (Travis et al., 2010). In terms of setting, Thorsen Gonzalez et al. (2010) conferred that social interventions are feasible, and are easily incorporated into inpatient and outpatient nursing practices. As evidenced from the varied settings in which social interventions took place, it may be possible to find settings and activities for social interventions, which are low cost and in some instances, free.
2. **Social interventions have the potential to reach vulnerable groups within the general adult population.**
   Some studies identified the potential for social interventions to be designed in a manner that encourages participation from hard to reach populations. Considerations in program design included

Table 5
Critical appraisal of studies with pre-post study design.

Authors	Study title	Was the study based on a random or pseudo-random sample?	Were the criteria for inclusion in the sample clearly defined?	Were confounding factors identified and strategies to deal with them stated?	Were outcomes assessed using objective criteria?	If comparisons are being made, was there sufficient descriptions of the groups?	Was follow up carried out over a sufficient time period?	Were the outcomes of people who withdrew described and included in the analysis?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?
Ali et al. 2010	Recovery from depression among clients transitioning out of poverty.	No.	Yes. Almost all clients from Project Enterprise participated. A small number dropped out and there was no mention of whether these individuals differed from the sample.	No. There was no mention of confounding factors or dealing with them in analyses.	No. Research assistants interviewed each participant using a valid diagnostic instrument, however outcomes were self-reported.	No. There was no control group since this was a pre-post design, however the authors report that the recovery rates in this study are higher than spontaneous recovery rates typically seen in the general population.	Unclear. The follow-up data was measured 6 months after the start of the program, however the duration of the program itself lasted over 5 months (9 week and 3 month components, followed by a meeting).	No.	Yes. Trained research assistants measured the main outcome using a diagnostic assessment.	Yes.
Edelblute et al. 2014	Promotoras Across the Border: A Pilot Study Addressing Depression in Mexican Women Impacted by Migration.	No. A convenience sample was used.	Yes. Interested participants were included and only those with very high levels of depression were excluded.	No. The sample size was too small to control for potential confounders. Results were however, stratified by different participant characteristics.	No. The outcome was measured by study staff, who administered the CES-D during participant interviews.	No. No comparison was made with a separate group since it was a pre-post design.	Unclear. The follow-up was done at study completion so longer effects are unknown.	Unclear. The outcome of these individuals were unknown however analyses indicated that they did not differ from participants in the main study variables.	Unclear. The intervention outcomes were measured by study staff however the details of this were not explained.	Yes. Regression analyses that controlled for confounding characteristics were not used due to low sample size - bivariate regressions were conducted instead.
Gonzalez et al. 2010	A prospective study of group cohesiveness in therapeutic horticulture for clinical depression.	No. A convenience sample was used.	Yes. Inclusion and exclusion criteria were clearly defined.	No. Confounders were not discussed, however the data from the two samples were pooled to investigate potential differences between cohorts.	No. Outcomes were assessed through self-report, although the measurement tools used were valid.	No. There was no control group.	Unclear. There were multiple points of measurement and a three month follow-up. Longer term effects are unknown	Unclear. Very few participants dropped out of the study, however whether they differed from those who participated in the study was not measured.	Yes. Although data was mainly collected through self-report, data was collected at multiple time points, enhancing reliability of the measures taken.	Yes. All statistical analyses conducted seemed appropriate and comprehensive.
Lipman et al. 2011	Providing web-based mental health services to at-risk women.	No. A convenience sample was used.	Yes. Inclusion criteria were clearly defined.	No. Confounders were neither discussed nor controlled for during analyses.	No. There may be bias because outcomes were assessed with self-report. The CESD however, is shown to be a reliable and valid tool.	No. There was no control group.	Unclear. Follow-up occurred at the end of the intervention, and so longer term effects are unknown.	Yes. Outcome data was available for all those who participated in baseline measurement.	Yes. CES-D scores were self-reported at each occasion, and follow-up interviews were conducted by a trained researcher.	Yes.
Tran et al. 2014	Results From a Pilot Promotora Program to Reduce Depression and Stress Among Immigrant Latinas.	No. Promotoras each chose up to three people to participate.	Yes. Inclusion criteria are clearly defined. Since participants were recruited by the promotoras, there is a possibility of selection bias.	Unclear. Socio-demographic characteristics were measured but it was not mentioned whether these characteristics were included in the linear regression as	No. There may be bias because outcomes were assessed with self-report. The CESD however, is shown to be a reliable and valid tool.	No. There was no control group; participants within the study from different geographic regions however were similar in their sociodemographic characteristics.	Unclear. The time between baseline and follow-up is not mentioned.	No. Only 55% of participants with baseline data had follow-up scores. The differences between the participants who completed the study and those who did not are not reported.	Yes. Promotoras were trained to interview participants, however the authors mention that because the interviewers knew the participants, bias	Unclear. Statistical analyses seemed appropriate, however there was limited detail regarding the linear regression and whether or not confounders were controlled.

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Table 5 *(continued)*

Authors	Study title	Was the study based on a random or pseudo-random sample?	Were the criteria for inclusion in the sample clearly defined?	Were confounding factors identified and strategies to deal with them stated?	Were outcomes assessed using objective criteria?	If comparisons are being made, was there sufficient descriptions of the groups?	Was follow up carried out over a sufficient time period?	Were the outcomes of people who withdrew described and included in the analysis?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?
				potential confounders.					to the null may have been introduced.	
Travis et al. 2010	Telephone-based mutual peer support for depression: a pilot study.	No. Participants were selected based on predefined inclusion criteria.	Yes. Inclusion criteria were clearly defined and participants were selected for participation based on these criteria.	No. Confounders were neither discussed nor controlled for during analyses.	No. There may be bias because outcomes were assessed with self-report. The CESD however, is shown to be a reliable and valid tool.	No. There was no control group. Completers were compared with non completers however, and no differences were found in the outcome, but some differences were found in other individual-level characteristics.	Unclear. Follow-up data was collected after the 12 week intervention. Longer term effects are unknown.	Yes. Baseline scores of completers and non-completers were compared on main study variables. Completers were more likely to be male, VA patients, and older, however they did not differ on main study outcomes.	Unclear. It is unclear whether the outcome was measured using a survey or interview and there is insufficient information regarding the personnel who collected the data.	Unclear. Statistical analyses seemed appropriate, however there was limited detail regarding why paired *t*-tests were selected and why potential confounders were not controlled.
Veach et al. 2003	Effectiveness of an intensive stress intervention workshop for senior managers.	No. Participants self-selected into the study or were encouraged to participate.	Unclear. Participants included senior managers employed by a US government agency, but limited inclusion criteria were specified beyond this.	No. Confounders are not discussed in the manuscript.	No. The outcome was assessed with self-report using the Zung depression scale.	Yes. Differences between groups who attended the intervention at different sites were compared and there were no major differenes on sociodemographic characteristics.	Yes. Follow-up occurred ten months after the workshop.	Unclear. There were no differences in sociodemographic characteristics between completers and non completers, but no information was provided regarding the outcome.	Yes. Data was collected using self-report at each occasion; while interviewer bias is eliminated, other biases associated with self-report may be present.	Yes. Results were analyzed appropriately.
Marselle et al. 2014	Examining Group Walks in Nature and Multiple Aspects of Well-Being: A Large-Scale Study.	No. Participants were selected from the Walking for Health group.	Yes. Inclusion criteria were clearly defined.	Yes. Confounders were measured and controlled for during analysis.	No. There may be bias because outcomes were assessed with self-report. The 10 item Major Depressive Inventory was used to assess symptoms.	Yes. The participants and non-participant groups were compared on major study variables. Participants were matched between groups.	Unclear. Follow-up occurred 13 weeks after T1.	No. Differences between those who had missing data and those who remained in the analyses are not reported.	Yes. Data was collected using online questionnaires, which is likely a reliable way to deliver the questionnaires.	Yes. Results were analyzed appropriately and comprehensively.
Chaudhry et al. 2009	Development and pilot testing of a social intervention for depressed women of Pakistani family origin in the UK.	No. The sample were recruited from an ongoing study based on specific inclusion criteria.	Yes. Inclusion criteria were clearly specified. The sample may differ from those who were not participating in the ongoing study.	No. Confounders were neither discussed nor controlled for during analyses.	No. Outcomes were assessed using self-report, however the questionnaire used to measure depressive symptoms have been previously validated in that population.	No. There was no control group.	Unclear. Post measures were taken after the ten week intervention. Longer term effects are unknown.	Yes. All of those who began the study completed it. Some participants did not begin the study and were excluded from analyses. Reasons for non-participation were described.	Unclear. Limited detail is provided in terms of how measurement was conducted.	Yes. Appropriate analyses were used given the small sample size.
Michael et al. 2008	Findings from a community-based participatory prevention research intervention	Yes. Participants were recruited through various ways - one of which was to randomly select	No. Inclusion criteria were not reported.	No. Confounding factors were neither discussed nor controlled for during analysis.	No since outcomes were self-reported.	No. There was no control group.	Yes. Follow-up assessments occurred 8 months after baseline which allows for long-term follow	No. Baseline scores of completers and non-completers were compared on socio-demographic variables and social capital (no	Yes. Data was collected using self-report at each occasion; while interviewer bias is eliminated, other	Unclear. Since information on demographic characteristics were included, it is unclear why multivariate

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Table 5 *(continued)*

Authors	Study title	Was the study based on a random or pseudo-random sample?	Were the criteria for inclusion in the sample clearly defined?	Were confounding factors identified and strategies to deal with them stated?	Were outcomes assessed using objective criteria?	If comparisons are being made, was there sufficient descriptions of the groups?	Was follow up carried out over a sufficient time period?	Were the outcomes of people who withdrew described and included in the analysis?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?
	designed to increase social capital in Latino and African American communities.	potential participants from a list of community members.					up.	differences observed), but not depression.	biases associated with self-report may be present.	regression was not conducted.
Petersen et al. 2012	The Feasibility of Adapted Group-Based Interpersonal Therapy (IPT) for the Treatment of Depression by Community Health Workers Within the Context of Task Shifting in South Africa.	No. Purposive sampling was used.	Yes. Participants eligible for study depended on specific inclusion criteria.	No, however pre-assessment scores on the BDI indicated that participants did not differ on levels of depression at baseline between groups.	No. Outcomes were self-reported in an interview.	Yes. Eligibility criteria was the same for both groups, and outcome scores for each group were measured at baseline and follow-up. More information on group allocation should have been provided.	Yes. The last follow-up measure was conducted after 24 weeks.	No. Outcomes of those who withdrew were not described, although retention was good (77%).	Unclear. Outcomes were measured by an interviewer at baseline but it is unclear whether the same interviewer conducted follow-up assessments.	Yes.
Shimazu et al. 2003	Effects of stress management program for teachers in Japan: A pilot study.	No. Participants were assigned to condition by school.	No. Inclusion criteria were not reported.	No, confounding factors were not controlled during analyses. However the intervention and control group were compared on some demographic variables and no differences between groups were found.	No. Outcomes were self-reported.	Unclear. Groups were compared on only a few demographic characteristics. Since participants were assigned to condition by school, it is unclear whether school-level differences could have influenced results.	Unclear. The follow-up took place one week after the 10 + week intervention.	No. Outcomes of those who withdrew were not described nor included in analyses.	Yes. Data was collected using self-report at each occasion; while interviewer bias is eliminated, other biases associated with self-report may be present.	Yes.
Steensma et al. 2007	Research note: effects of resilience training on the reduction of stress and depression among Dutch workers.	No.	No. Inclusion criteria were not reported.	No. Confounding factors were not controlled during analysis.	No. Outcomes were self-reported.	No. There was no control group.	Yes. Outcomes were measured at weeks 7, 13, 26	Yes. No participants were reported to withdraw.	Yes. Data was collected using self-report at each occasion; while interviewer bias is eliminated, other biases associated with self-report may be present.	Yes.

choosing culturally sensitive approaches, settings and leaders, and reducing barriers like transportation, location and fees. Hard to reach populations in the studies in this review included low income groups (Lipman et al., 2011; van der Waerden et al., 2013; Ali et al., 2010), ethnic minorities, (Michael et al., 2008; Gater et al., 2010) and those with persistent depression (Harris et al., 1999) or current symptoms (Vuori et al., 2012; Griffiths et al., 2012). These populations can sometimes be socially isolated and have low access to primary care (Harris et al., 1999; Chaudhry et al., 2009). A small number of the interventions included in this review were targeted toward specific cultural groups, and were tailored to include culturally sensitive material and culturally relevant activities. Given that rates of depression can be higher within certain cultural groups, it is promising that social interventions may be one avenue by which to address mental health concerns in these populations. In Canada, for example, future work should investigate the effectiveness of social interventions for mental health of Indigenous peoples.

Other populations that may typically be hard to reach through traditional approaches to managing depression include men. McGale et al. (2011) conducted a social intervention in a group of men, and tailored the setting and activities so as to reduce stigma around the topic of managing mental illness. In that intervention, depression was reduced among the men who participated. Other studies found that those with greater risk for depression, including younger adults (Vuori et al., 2012), adults with increased exhaustion (Vuori et al., 2012), and women with low socioeconomic status and education levels (van der Waerden et al., 2013) also experienced decreased depressive symptoms as a result of social interventions. Thus, when tailored appropriately, and designed in a manner that suits the needs of the target population, social interventions could be a viable strategy to reduce depression in hard to reach and vulnerable groups from the general population.

3. **Social interventions can have several advantages in addition to improving one's mental health.**

Several secondary benefits emerged from participating in social interventions. Study authors measured secondary outcomes in several cases and provided qualitative feedback in others. Secondary benefits to participation included increases in social support, (Steensma et al., 2007; Tran et al., 2014; Petersen et al., 2012; Shimazu et al., 2003) self-esteem, (Lipman and Boyle, 2005) self-confidence, (Lipman et al., 2011) mental health knowledge, (Lipman et al., 2011) coping skills, (Tran et al., 2014) social capital, (Michael et al., 2008) self-rated health, (Michael et al., 2008) interpersonal skills, (Petersen et al., 2012) positive cognitions, (Petersen et al., 2012) social activity, (Thorsen Gonzalez et al., 2010) and decreases in social isolation (Lipman et al., 2011).

Participants often viewed the social component of these interventions as valuable and meaningful. In an intervention conducted by Thorsen Gonzalez et al. (2010) the social component of the intervention was rated as important by the majority of participants. Qualitative feedback from participants in another study indicated that the relationships developed between the participants and facilitators was the most important contributor to the effectiveness of the groups, and that group interactions elevated moods and self-confidence (Chaudhry et al., 2009). Another study, which included a hard to reach sample, did not find reductions in depressive symptoms over the intervention period, but did report higher levels of satisfaction with the social intervention compared to a group that received antidepressants (Gater et al., 2010).

Participants reported benefitting from the social interventions by being able to share advice and helping one another through common experiences (Travis et al., 2010). Interventions allowed participants to create meaningful network connections and opportunities for peer support, that were sustained after interventions had ended. Veach et al. (2003); Ludman et al. (2007) The potential for sustainability has powerful implications since new network connections may be capable of fostering mental wellness on a long-term basis, and after an intervention has ended. Since depression can spread throughout social networks (Rosenquist et al., 2011), there may also be the potential for intervention effects to positively benefit those in participants' close networks, for example, their closest friends and family. The included studies did not investigate this possible effect; further research should examine the extent of possible spillover effects of social interventions.

4.2.1. Mechanisms

As evidenced by this review, although social interventions for depression differ in design, and target different aspects of the socio-relational environment, they share the recognition that improvements in the social environment may reduce adult depression. Mechanisms theoretically proposed to link the social environment with mental health have included the social psychological processes of social influence, social comparison, social control, role-based meaning, self-esteem, sense of control, belonging and companionship, and perceived availability of support. Thoits (2011)

A small number of the studies included in this review conducted ancillary analyses to examine the underlying mechanisms by which the intervention may have led to fewer depressive symptoms. Steensma et al. (2007) indicated that after participants received resilience training, they experienced higher resiliency scores, followed by a sharp reduction in depression. It was reported that the explanatory mechanism in the reduction of depressive symptoms was the higher level of resilience experienced by participants (Steensma et al., 2007). Petersen et al. (2012) conducted a process evaluation and found that improved individual coping was facilitated by more positive cognitions, strengthened interpersonal skills, and enhanced social support. The authors found that the group intervention improved capacity to cope with stressful situations at an interpersonal level through the provision of health enhancing social support—including emotional, instrumental, appraisal and advisory types of support (Petersen et al., 2012). Other studies found that social support did not increase as a result of the social intervention, (Lipman and Boyle, 2005; Marselle et al., 2014; McGale et al., 2011) despite finding decreases in depressive symptoms, indicating that there may be other mechanisms at play in improving mental wellbeing. As others have suggested, (Bruhn, 2009) there are likely a combination of mechanisms that ultimately impact a person's mental health. As a result, interventions that are particularly comprehensive and target several mechanisms may be more effective in reducing adult depression (Bruhn, 2009).

4.2.2. Areas of further study

Further research is needed to identify the mechanisms that link the social components of social interventions with reductions in depressive symptoms. Since various types of social interventions led to reductions in depressive symptoms in the current review, it is warranted that future interventions replicate some of the interventions, and ideally, aim to reduce risks of bias inherent in some of the studies' designs. For example, interventions would benefit from controlling for known confounders, and include larger samples so that results are adequately powered to detect differences. Further research is needed on the role of the intervention setting in improving intervention effectiveness – especially those interventions that take place in workplaces. There are several possible explanations as to why interventions at individuals' workplaces were not usually effective. First, these interventions were geared towards improving the work environment and individual's skills related to their careers, not necessarily towards promoting mental health for personal gain. Second, since interventions took place at work, employees could have been expected to participate by their employers, and therefore may have not participated on a voluntary basis. Finally, the setting may have impacted the effectiveness of the intervention; a setting potentially associated with work and stress may not be the best choice for a wellness intervention. A study that targeted managers, but took place in remote settings away from their workplaces did indeed see

reductions in depressive symptoms (Veach et al., 2003).

More work is needed to determine the optimal duration of interventions. The interventions included in this review varied in duration. McGale et al. (2011) found that depressive symptoms were reduced in just five weeks in an intervention that included group exercise, however a study by Gater et al. (2010) that incorporated group support and activities indicated that participants found a ten-week intervention to be too short to impact depressive symptoms. Lipman and Boyle (2005) found that participants had decreased symptoms post-intervention, but no longer at third follow up, which took place 20 months after baseline. The opposite relationship was found in another study. Griffiths et al. (2012) found that an internet support group did not reduce depressive symptoms on a short term basis, but did over a long term basis. Other studies found sustainable effects over the short and long term (Vuori et al., 2012; Steensma et al., 2007; Thorsen Gonzalez et al., 2010; Petersen et al., 2012). This variability should be kept in mind when designing interventions, and an approach that combines different strategies may be of benefit so that the intervention sees reduction in depressive symptoms on both short and long term bases.

Lastly, this study was focused on depression in general adult populations, yet there is much potential for social interventions to positively impact the mental health of subgroups in the population, such as older adults, and mothers in the perinatal period. There is also the potential for social interventions to positively impact mental health outcomes beyond depression, since social relationships and social environments can impact a wide range of mental health conditions. For example, further work could examine the effectiveness of social interventions in reducing symptoms related to post-traumatic stress disorder or anxiety disorders. The impact could also be investigated in those with comorbid conditions (e.g., post-traumatic stress disorder and depression).

4.2.3. Limitations

This review was the first of its kind to gather and classify social interventions for adult depression; however, there are limitations to this review that should be considered when interpreting its findings. A meta-analysis was not conducted within this review due to the variability in study design and intervention type. Studies were so diverse and interdisciplinary in nature that results were not comparable statistically. Meta-analyses should be conducted once a greater number of similar interventions have been conducted. For example, a meta-analysis may be conducted on social interventions that are activity-based, or that are focused on enhancing social support once a greater number of these interventions have been published.

There was a high level of variability between studies regarding the timing of post-intervention measurement of depression, and many interventions did not include long-term follow-up measurements to examine if intervention effects were sustainable. Many of the interventions – about two-thirds - measured depressive status at post-intervention or within weeks after the intervention was completed. Fewer included longer-term follow-up, but those that did measured effects up to a year after the intervention was completed. Future interventions should consider follow-ups that are longer term, to examine how long and to what extent, intervention effects are sustained.

The results of this review may not be generalizable to some subgroups of the adult population. Some populations - for example, those experiencing depression associated with being in the perinatal period or having a concomitant condition - were excluded from this review. The intent of this systematic review was to examine interventions conducted in groups from the general adult population; however, due to the increased risk of depression among some of the groups excluded from this review, further investigation into social interventions within these populations are warranted.

The majority of the included studies found a positive effect in reducing depressive symptoms; however, publication bias cannot be overlooked when interpreting the overall results. It is plausible that interventions finding no effect on depressive symptoms may not have been published, and therefore would have been missed in this review. It also is likely that social interventions have been conducted, but not evaluated for its effects on depression. For example, community-based programs that promote social interaction may exist and may be benefitting participants' mental health; however, evaluation of these programs may not be common. In instances where social interventions have been evaluated, it is also possible that intervention effects on depressive symptoms have been overlooked or not been a focus. In those instances, depressive symptoms would not have been measured, thus missing an opportunity to examine the intervention's effects on mental health. The importance of evaluating social programs is increasingly being recognized, however further evaluations, and ones that opt to measure depressive symptoms are needed.

4.2.4. Conclusion

The findings of this systematic review indicate that social interventions for depression can be effective in reducing depressive symptoms within the general adult population. The types of interventions that have been effective are varied in nature, and often incorporate multiple strategies to foster social interaction. This diversity may be advantageous in the sense that there is likely some built-in flexibility within social interventions; thus, future interventions may use these studies as examples, but be designed in a manner that fits the needs of the area's target population. Since social interventions can foster social interaction at interpersonal, network and community levels of the socio-ecological model, they theoretically have the potential to reduce depression at a population level. Given the magnitude and scope of disease burden caused by major depressive disorder, interventions that can work towards reducing symptoms at a population level should be of upmost priority.

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