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CULTURALLY ADAPTED PSYCHOTHERAPIES FOR DEPRESSED ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Evrim Anik[1*], Robert M. West[1], Alastair G. Cardno[1], Ghazala Mir[1]

1. Leeds Institute of Health Sciences, Faculty of Medicine and Health, University of Leeds, UK

Background. There is current debate about the effectiveness and generalizability of evidence-based psychological therapies in treatment of depression for diverse ethno-cultural groups. This has led to increasing interest in culturally adapted psychotherapies (CAPs).

Methods. Studies on CAPs for face-to-face treatment of depressed adults were identified using nine electronic database searches. Data on the process of adaptation was analysed using thematic analysis and treatment efficacy was assessed through meta-analysis of Randomized Controlled Trials.

Results. Fifteen studies were included in the review, of which eight were included in a meta-analysis. Cognitive Behavioural Therapy and Behavioural Activation were commonly selected approaches for CAPs, mainly based on their strong evidence base for effectiveness. Twelve studies reported the adaptation process that follows all or some phases recommended by the Medical Research Council Framework for developing complex interventions. A meta-analysis of 16 RCTs, which included eight studies from the current review and eight studies from an earlier review, (Chowdhary et al. (2014) demonstrated a statistically significant benefit in favour of CAPs, reducing symptom burden [standardized mean difference −0.63, 95% confidence interval −0.87 to −0.39]. Subgroup analysis showed a larger effect when the intervention was for the majority ethnic group in a population, rather than a minority group.

Limitations. Some studies did not report all relevant information, and in the subgroup analysis only three studies were of minority groups.

Conclusions. CAPs were confirmed to be more efficacious than control treatments. This supports the continued development and evaluation of culturally adapted psychotherapies for depression.

Key words. Cultural adaptation, depression, psychotherapy, efficacy

[*] CORRESPONDENCE TO: Evrim Anik, Leeds Institute of Health Sciences, University of Leeds, Worsley Building, 6 Clarendon Way, Leeds, LS2 9NL, UK.

Tel: +44 1133430877

Email: umean@leeds.ac.uk

1 Introduction

Worldwide, more than 300 million people suffer from depression (WHO, 2017), which can cause substantial impairment in social (Kupferberg et al., 2016) and occupational (Lam et al., 2013) functioning and significant personal and public health consequences (Mammen and Faulkner, 2013). According to the 2016 Global Burden of Disease study, the predominant mental health problem worldwide is depression, being the fifth-leading cause of years lived with disability worldwide (Vos et al., 2017). Effective interventions for depression alleviate patient suffering, increase economic productivity, and decrease healthcare expenses (Chisholm et al., 2016)

There are a number of effective biological and psychological treatments for depression. Antidepressant medication (such as selective serotonin reuptake inhibitors [SSRIs] and tricyclic antidepressants [TCAs]) are used as effective biological treatments (Arroll et al., 2005, Cipriani et al., 2018, Arroll et al., 2016). Evidence-based psychological treatments (EBPTs) include Interpersonal Therapy (IPT), Cognitive Behavioural Therapy (CBT), and Behavioural Activation (BA) Therapy (Cuijpers et al., 2013, WHO, 2017, Cuijpers et al., 2007, NICE, 2009).

There is a debate about the effectiveness and generalizability of EBPTs for different ethno-cultural groups (Marinez-Lora and Atkins, 2012, Chu and Leino, 2017) as culture impacts on the content and process of psychotherapy (Smith et al., 2011, Koç and Kafa, 2018). Cultural adaptation of psychotherapies can increase treatment engagement and effectiveness (such as Kanter et al., 2008, Kohn et al., 2002, Kalibatseva and Leong, 2014, Acarturk et al., 2018). Psychotherapies are mainly developed within Western cultures (Bernal and Rodriguez, 2012, Naeem et al., 2015), so that some aspects of therapies developed in a Western cultural contexts might not be relevant to non-Western societies (Kirmayer and Pedersen, 2014, Benish et al., 2011). It is important to maintain fidelity to effective components of EBPTs while adding or modifying cultural aspects, to improve their acceptability and effectiveness (Barrera et al., 2013, Chu and Leino, 2017). In this study cultural adaptation of a psychotherapy refers to 'the systematic modification of an evidence-based treatment or intervention protocol to consider language, culture, and context in such a way that it is compatible with the client's cultural patterns, meanings, and values' (Bernal et al., 2009, p.362). Simple translation may not be enough for cultural adaptation (Kalibatseva and Leong, 2014). Information about the process of cultural adaptation is useful for those wishing to adapt psychotherapies for depressed patients from diverse cultural backgrounds.

A number of systematic reviews have been conducted on culturally adapted treatments for mental illness (such as Hall et al., 2016, van Loon et al., 2013, Benish et al., 2011). Chowdhary et al. (2014) specifically targeted the treatment of depression, although some included studies

did not have depression as their primary outcome (Afuwape et al., 2010, Patel et al., 2003, Patel et al., 2011). Other studies included used collaborative care or a stepped care programme from which it was not possible to assess efficacy of a psychological treatment alone.

This systematic review seeks to assess the efficacy of face-to-face culturally adapted psychological treatments alone compared with control conditions. A growing number of studies since Chowdhary et al.'s (2014) review suggests it is important to assess any advances in cultural adaptation and also to conduct a meta-analysis on culturally adapted EBPTs specifically for depression. Thus, the aims of the current review were to synthesize literature from a wide range of databases on culturally adapted face-to-face psychotherapies for depressed adults to identify: (a) which populations were targeted, (b) which adaptation approaches were preferred and reasons for these preferences, (c) the process of adaptation and (d) the efficacy of the culturally adapted psychotherapies.

2 Methods

Cochrane and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed in this systematic review.

2.1 Protocol and registration

A protocol for the systematic review was registered through PROSPERO (registration number CRD42019116784).

2.2 Eligibility criteria

The PICOS framework was used to determine eligibility criteria (Pollock and Berge, 2017), which is presented in Table 1. Papers published since those considered by Chowdhary et al. (2014) were eligible for the review.

2.3 Exclusion Criteria

Papers in which the main focus was not depression were not included in the review. Studies discussing web or telephone-based psychotherapies were excluded as were studies related to adolescents as we focused on face to face psychotherapies for depressed adults. Single case reports were excluded due to a high risk of selection bias.

2.4 Information Sources

Studies were identified by searching databases and reference lists of eligible studies. Following guidance on searching for studies on religion by Wright et al. (2014), this search was conducted in ArabPsyNet, CINAHL (1981- present), ProQuest Dissertations and Theses (1743- present), EMBASE (1996- present), Global Health (1973- present), Health Management Information Consortium (1983- present), Medline (1996- present), PsycINFO

(2002- present), Sociological Abstracts (1952- present). No limits were applied to language for the database search. Where non-English studies were identified as eligible for full text screening authors were contacted for information on whether the studies could meet the inclusion criteria of this review.

2.5 Search Strategy

Search terms were based on four concepts: culture, ethnicity, depression and psychotherapy. The search terms related to each concept were identified by the first author (E.A.) and an information specialist at the University of Leeds, building on search terms used for a previous study on cultural adaptation by GM (Mir et al., 2015). Detailed search terms can be seen in Appendix 1. Appendix 2 includes search terms used for two databases separately as an example. Where possible, the following limitations for database searches were applied: publication after 2012 onwards and adult participants. The last search was done in 25th of August 2019.

2.6 Study Selection

Records identified through databases were downloaded to an EndNote Library and then duplicate studies were removed by E.A. The PRISMA flow diagram below (Figure 1) illustrates which steps were followed for the study selection. After de-duplication, E.A. screened all studies at each step and 10% of the abstracts were double screened by G.M. The reviewers discussed any uncertainty or disagreement related to study eligibility and were able to resolve these without the need for a third reviewer. Each of the eligible studies were screened by two authors.

2.7 Data extraction process

The full texts of the identified studies were read in detail to extract data. Data was extracted into two main tables: characteristics of studies and process of cultural adaptation of psychotherapies.

2.8 Risk of bias in individual studies

The quality of studies was assessed with tools appropriate for the study designs used in each study: the risk of bias assessment tool by Review Manager 5 (RevMan, 2014) for RCTs, ROBINS-I for non-randomized controlled studies and Newcastle-Ottawa Scale (NOS) for cohort studies. All the studies were assessed with the identified tools by E.A. and four studies were double assessed by other authors independently to reduce the level of subjectivity and also to ensure the tools were used in line with guidance. Disagreements were resolved by consensus between the reviewers. Appendix 3 represents results of the quality assessment of all included studies.

2.9 Synthesis of results

Narrative synthesis of the findings from the eligible studies was conducted by using thematic analysis (Braun and Clarke, 2006). Analysis was inductive at first and focused on preferred psychological approaches for cultural adaptation with reasons and which populations were targeted for the adaptation. Subsequent analysis was deductive and focused on the common elements in the process of cultural adaptation. This included predetermined themes, which were based on the Medical Research Council (MRC) framework for the development and evaluation of complex interventions (Craig et al., 2008). The framework recommends a phased development and evaluation process consisted of development, implementation, feasibility/piloting and evaluation. The development phase includes theoretical development and modelling and implementation includes formative research with key stakeholders. The process of adaptation was categorized under these phases.

Meta-analysis was performed using Review Manager 5 (2014). To deal with the different measures used in included studies standardized mean differences (SMDs) were used as appropriate. Studies were stratified in terms of different comparison/control groups and targeted population groups.

The I^2 test (Higgins and Thompson, 2002) was used to measure statistical heterogeneity across studies. If a substantial heterogeneity was observed, that is $I^2 > 50\%$, a random-effects model would be used for meta-analysis.

The reasons behind choosing a psychotherapy was explored to inform researchers who aim to adapt a psychotherapy in the future. Only face to face talking therapies that mainly adapted for depressed adults were eligible to be included in the current review.

3 Results

3.1 Study Selection and Characteristics

After adding additional records through hand searches and removing duplicates, 1381 potential studies were identified. The PRISMA flow diagram (Figure 1) shows results of the study selection from this starting point. Fourteen published studies were included in the review (Bennett et al., 2014, Chowdhary et al., 2016, Choy and Lou, 2016, Hwang et al., 2015, Leung et al., 2013, Naeem et al., 2015, Ward and Brown, 2015, Kanter et al., 2015, Jesse et al., 2015, Ebrahimi et al., 2013, Armento et al., 2012, Aguilera et al., 2018, Gureje et al., 2019, Oladeji et al., 2015) and one unpublished PhD thesis (Roland, 2014).

The characteristics of included studies are presented in Table 2. Of the 15 studies included, ten were RCTs (Chowdhary et al., 2016, Choy and Lou, 2016, Hwang et al., 2015, Naeem et al., 2015, Kanter et al., 2015, Jesse et al., 2015, Ebrahimi et al., 2013, Armento et al., 2012,

Gureje et al., 2019, Oladeji et al., 2015) and five non-RCTs (Bennett et al., 2014, Leung et al., 2013, Roland, 2014, Ward and Brown, 2015, Aguilera et al., 2018).

3.2 Populations targeted for cultural adaptation

Jesse et al. (2015) and Leung et al. (2013) culturally adapted psychotherapy for low income pregnant women (in the USA) and Chinese pregnant women (in Hong Kong) respectively. Choy and Lou (2016) adapted treatment for Chinese people in Hong Kong whereas Hwang et al. (2015) adapted treatment for Chinese populations in the USA. Each group of people targeted for cultural adaptation in two different studies were African Americans (Roland, 2014, Ward and Brown, 2015), Latin Americans (Aguilera et al., 2018, Kanter et al., 2015), and also Yoruba speakers in Nigeria (Gureje et al., 2019, Oladeji et al., 2015). Each group of people targeted in just one study were Maori (Bennett et al., 2014), Indian (Chowdhary et al., 2016), Persian speaking (Ebrahimi et al., 2013), Pakistani (Naeem et al., 2015). Armento et al. (2012) culturally adapted BA for diverse group of people, although the vast majority were Christian. Around half of the studies (7 out of 15) were conducted in the USA. The rest were conducted in New Zealand, Hong Kong, India, Iran, Nigeria and Pakistan. The results showed that although many studies were conducted in the USA, diverse groups of people were targeted to develop culturally adapted psychotherapies. Seven out of 15 studies involved minority groups, which used to refer to a group that is different racially, politically, etc., from majority groups.

3.3 Preferred approaches for cultural adaptation with reasons

Behavioural Activation was selected in five studies (Chowdhary et al., 2016, Kanter et al., 2015, Armento et al., 2012, Gureje et al., 2019, Oladeji et al., 2015), while CBT was selected in eight studies (Bennett et al., 2014, Hwang et al., 2015, Leung et al., 2013, Naeem et al., 2015, Roland, 2014, Ward and Brown, 2015, Jesse et al., 2015, Aguilera et al., 2018) for cultural adaptation. Gureje et al. (2019) and Oladeji et al. (2015) also selected BA in addition to Problem Solving Therapy (PST) for cultural adaptation. One of the included studies was based on Instrumental Reminiscence Intervention (IRI) (Choy and Lou, 2016), and another study included cognitive, behavioural, and emotive-spiritual methods to develop a culturally adapted psychotherapy for the treatment of depression (Ebrahimi et al., 2013). Five studies used group-based psychotherapy (Choy and Lou, 2016, Leung et al., 2013, Ward and Brown, 2015, Jesse et al., 2015, Aguilera et al., 2018), whereas the other included studies used individual-based psychotherapy.

Although some studies (such as Hwang et al., 2015, Ward and Brown, 2015) did not justify why they chose a specific approach as a theoretical basis for cultural adaptation of the treatment that they developed, others provided some reasons for their preferences, even though these were not always explicitly justified. The reasons to select BA for cultural adaptation were mainly based on its effectiveness (Chowdhary et al., 2016), time limitations

(Armento et al., 2012), its feasibility of delivery by lay counsellors (Chowdhary et al., 2016), ease of training (Kanter et al., 2015), being present-focused (Kanter et al., 2015), being recommended in the literature (Kanter et al., 2015), and being recommended by an international expert group as the theoretical basis for the treatment, because BA was deemed to be the best fit, considering the culture and context (Chowdhary et al., 2016).

The reasons to prefer CBT for cultural adaptation were mainly based on its effectiveness (Bennett et al., 2014, Hwang et al., 2015, Leung et al., 2013, Naeem et al., 2015, Roland, 2014, Ebrahimi et al., 2013, Aguilera et al., 2018), and also recommendations from literature (Bennett et al., 2014), including that it can be delivered by a social worker and a paraprofessional health care provider for low-income and minority women, and might be easier to deliver than Interpersonal Psychotherapy (Jesse et al., 2015), and is recommended as a treatment option in National Treatment Guidelines in the US and UK (Naeem et al., 2015). Another reason cited by Bennett et al. (2014) to select CBT was that a large proportion of psychologists are trained in and prefer to use CBT, thus 'having clinicians *adapt* their current practice when working with Maori as a consequence of findings from this study was considered a more realistic and less disruptive prospect than having clinicians adopt alternative models of therapy'. Aguilera et al. (2018) mentioned rare availability of CBT in low income and public sector settings and even when CBT was available, it was usually not delivered in clinical trials.

IRI was chosen by Choy and Lou (2016) for two reasons: firstly, it was developed in the context of an integration of reminiscence and cognitive models of depression, which are well-established forms of psychotherapy; and secondly, it is a pragmatic approach that can help old people. PST was chosen by and Gureje et al. (2019), Oladeji et al. (2015) as it is effective, feasible and acceptable to patients, and feasible to be delivered by lay workers.

3.4 Process of cultural adaptation

Table 3illustrates information related to the application of the Medical Research Council framework for the development and evaluation of complex interventions (see; Methods) in the included studies. Six studies (40%) systematically followed all four stages of the framework in the adaptation process (Chowdhary et al., 2016, Choy and Lou, 2016, Naeem et al., 2015, Jesse et al., 2015, Kanter et al., 2015, Gureje et al., 2019). The other included studies either did not explain the treatment development process in sufficient detail or did not cover all the stages of the process. Some reasons for the adaptation were to increase the engagement of patients with treatment; the acceptability of a treatment/to reduce stigma; to maximise treatment gains; and to address the lack of qualified therapists.

The use of a modelling stage was reported in 12 (80%) studies. This comprised the choice of a psychotherapeutic approach, such as BA, commonly through empirical evidence collected

from a literature review and via consultations with local advisors, such as experts in mental health. It also involved the use of a theoretical framework such as the Psychotherapy Adaptation and Modification Framework (Hwang et al., 2015) to guide the adaptation, the translation of a manual, the simplification of vocabulary within the manual, the selection of culturally appropriate tasks and the integration of religion/spirituality into treatment. The formative phase using qualitative or mixed methods to guide further refinements in the preliminary adapted version of the psychotherapy was presented in 12 (80%) studies. This involved mainly data gathered through consultation with mental health workers, focus group discussions with key stakeholders, interviews with patients, and the results of previous pilot studies.

A piloting phase was reported in seven (46.6%) studies (Chowdhary et al., 2016, Choy and Lou, 2016, Naeem et al., 2015, Ward and Brown, 2015, Kanter et al., 2015, Jesse et al., 2015, Oladeji et al., 2015). Reports drew on qualitative and quantitative data through clinical case series and pilot studies. These data guided further refinements of the adapted treatments to increase acceptability and feasibility. The results of the piloting phase provided an initial assessment of the benefits and harms of the treatments. The evaluation phase was reported in 10 (62.5%) studies. This phase involved RCT and non-RCT studies, the results of which are presented in the next section.

3.5 Efficacy of the adapted psychotherapies

The depression score, the primary outcome, was measured most commonly by Beck Depression Inventory-II (BDI-II; n=7), Patient Health Questionnaire (PHQ-9, n=4), and Hamilton Depression Rating Scale (HAM-D; n=5); other scales are illustrated in Table 2 above. The duration of follow-up ranged from two weeks after the intervention to twelve months from baseline. All studies that explored the acceptability/feasibility of the culturally adapted treatment reported that the treatment was deemed to be acceptable/feasible (Chowdhary et al., 2016, Leung et al., 2013, Ward and Brown, 2015, Oladeji et al., 2015). All quantitative data results reported improvements in depression with culturally adapted psychotherapy. This benefit was either related to significantly greater improvements in favour of the treatment group in some studies (such as Choy and Lou, 2016, Armento et al., 2012), or significant overall improvements from baseline at post-treatment/ follow-up within the group in other studies (such as Bennett et al., 2014, Ward and Brown, 2015).

Some included studies did not report the change in depression score from baseline to the end of the treatment, thus the post-test scores from RCTs were used in the meta-analysis. The meta-analysis was restricted to RCTs, because of this use of post-treatment depression scores; it was assumed that the pre-treatment depression scores of patients would be similar across the treatment and control groups in RCT studies and therefore it was not necessary to

control for pre-intervention scores. Seven studies were not included in the meta-analysis, since three studies did not have a control group (Bennett et al., 2014, Aguilera et al., 2018, Ward and Brown, 2015), and two were not RCTs (Leung et al., 2013, Roland, 2014). Although two other studies were RCTs (Gureje et al., 2019, Oladeji et al., 2015), these were not included as they used a stepped care treatment in which it was not possible to understand the effect of culturally adapted treatment compared to control condition without considering the effects of other steps in the treatment settings such as usage of antidepressants.

Studies that were included in Chowdhary et al. (2014)'s meta-analysis were assessed in terms of eligibility for our meta-analysis. Eight out of 16 studies from their meta-analysis were assessed as eligible to be included into the current meta-analysis, resulting in a total of 16 studies with 2068 participants (Armento et al., 2012, Chowdhary et al., 2016, Choy and Lou, 2016, Ebrahimi et al., 2013, Hwang et al., 2015, Jesse et al., 2015, Kanter et al., 2015, Naeem et al., 2015, Bolton et al., 2003, Grote et al., 2009, Hamdan-Mansour et al., 2009, Miranda et al., 2003, Naeem et al., 2011, Rahman et al., 2008, Wong, 2008, Beeber et al., 2010). A subgroup analysis was performed through stratification of studies in terms of four different control group conditions used: evidence based psychotherapy, antidepressants, treatment as usual/enhanced usual care and waiting list/no treatment. The pooled weighted SMD showed a statistically significant effect in favour of culturally adapted psychotherapies (CAPs) over the different kinds of control conditions [SMD= -0.63, 95% confidence interval (CI) -0.87 to -0.39], with a significant heterogeneity (Chi^2=82.53, df =15, p< 0.001, I^2= 82%) (Figure 2*).* The test for subgroup differences did not show a statistically significant effect (p=0.13), meaning that the control condition used does not statistically significantly modify the effect of CAPs. There were, however, notable trends, with effect estimates ranging from -0.95 (95% CI -1.28 to -0.62) for waiting list/no treatment to -0.30 (95% CI -0.76 to 0.16) for evidence based psychotherapy. The number of studies and patients in each subgroup need to be considered when these results are interpreted.

Random effects were used because of the substantial heterogeneity (I^2>50%). These RCTs give consistent results with high heterogeneity, and all have the effect in the same direction: favouring culturally adapted therapy except (Miranda et al., 2003) when medication was used in the control group.

When the studies included in the meta-analysis (apart from, Grote et al. (2009), Miranda et al. (2003), Jesse et al. (2015), Armento et al. (2012) which did not target a specific cultural group as we know from the literature if a CAP targets a specific cultural group, it is four times more effective than a CAP provided to groups consisting of clients from different cultural backgrounds (Griner and Smith, 2006) were stratified by target population as either an ethnic minority or majority group, the test for subgroup differences showed a statistically significant

subgroup effect (p= 0.04), meaning that the type of targeted population significantly modifies the effect of CAPs (Figure 3). The treatment effect favours CAPs over different kind of control conditions for both minority and majority groups targeted. The treatment effect however is greater for majority ethnic groups (SMD= 0.82, 95% CI [-1.04 to -0.59], p< 0.0001 with a significant heterogeneity (Chi^2=23.52, df =8, p= 0.003, I^2= 66%) than minority groups (SMD= 0.39, 95% CI [-0.72 to -0.05], p= 0.002 without any significant heterogeneity (Chi^2=1.37, df =3, p< 0.51, I^2= 0%)). A smaller number of studies and patients contributed data to the minority groups (3 studies, 141 patients) than to the majority subgroups (9 studies, 1553 patients).

4 Discussion and conclusion

The current study sought to systematically review literature on culturally adapted face-to-face psychotherapies for the treatment of depressed adults in a range of global contexts. Among studies published from January 2012 to August 2019, 15 studies were retrieved that were eligible for inclusion in this review. This suggests increased recent interest in cultural adaptation of psychotherapies for depressed adults from diverse cultural backgrounds, since a previous review covering the period 1981 - 2012 only identified 20 studies (Chowdhary et al., 2014). A recent meta-analysis of 78 studies confirms this increased interest in developing culturally adapted treatments (Hall et al., 2016).

Almost half of the studies (7/15) targeted minority groups who live in Western countries, and most of these studies were conducted in the US. The remaining studies, which were conducted in non-Western countries, targeted people from Pakistan, India, Hong Kong, Nigeria and Iran. Chowdhary et al. (2014)'s review results covered similar populations, although studies targeting people from Chile, the UK, Uganda and Jordan were included in that review, and studies targeting people from Iran and Nigeria were not.

Our review results also revealed that CBT was the most commonly selected approach for cultural adaptation, as found in other studies (Chowdhary et al. (2014);Hall et al. (2016), however, Behavioural Activation was also a commonly chosen treatment for the adaptation. The reasons for these preferences were mainly based on their proven effectiveness, being recommended in the literature, and being expedient for time-limited investigations. These results align with existing mental health policy documents globally and in the UK. For example both CBT and BA are recommended as effective treatments for depression by WHO (2017), and NICE (2009). NICE guidelines for depression additionally recommend the delivery of IPT, which was not an approach adopted by studies included in the current review, although three studies included in Chowdhary et al.'s (2014) review did adapt IPT. The absence of IPT from global health policy is a possible explanation for this decline in adapted approaches for this therapy.

Twelve (80%) of the studies reviewed described the process of cultural adaptation, which appears to be heavily influenced by the Medical Research Council framework for development of complex interventions (Craig et al., 2008). Common approaches involved the selection of an evidence-based psychotherapy, consultations with mental health workers, focus group discussions with key stakeholders to inform the adaptation, assessment of the acceptability and feasibility of the adaptation through qualitative and quantitative techniques, piloting studies for further refinements in the adaptation, and evaluation of implementation by RCTs. Furthermore, a formative research phase used in all these thirteen studies indicated a marked increase in use of the MRC framework from two-thirds of studies reporting this phase prior to 2014.

The feasibility or acceptability of the adapted treatments was reported in all the studies that aimed to assess this (Chowdhary et al., 2016, Leung et al., 2013, Ward and Brown, 2015). All the quantitative results that were reported showed improvements in depressive symptoms, and some studies (such as Choy and Lou, 2016, Armento et al., 2012) reported significantly greater improvements in favour of the adapted treatment compared to control condition. The results confirmed that CAPs are beneficial and acceptable.

The meta-analysis of 16 studies showed a statistically significant effect in favour of culturally adapted psychotherapies for the treatment of depressed adults over the different kinds of control conditions (SMD= -0.63). This result is consistent with previous studies: Chowdhary et al. (2014) reported SMD= -0.72 and Hall et al. (2016) reported g=0.67. These findings comprise further evidence for an increased range of people in favour of CAPs for the treatment of depressed adults.

When the studies were stratified by the types of control conditions, the subgroup analysis showed the largest effect size in the studies that compared CAPs with waiting list/ no treatment control groups (SMD= -0.95), with medium effect sizes in the studies when the comparison group was medication (SMD= -0.54) or enhanced usual care/treatment as usual (SMD= -0.59). It showed the smallest effect sizes when CAPs are compared with an evidence based psychotherapy (SMD= -0.30). It is not unexpected to find the largest effect size when comparing an intervention group with a waiting list/no treatment group as opposed to comparing it with other kind of control conditions constituting treatment as usual. The finding that study designs involving comparison with an evidence based psychotherapy resulted in smaller effects is similar with the results of the previous meta-analyses. There is some existing evidence that quicker results can be obtained from CAPs (Hook et al., 2010) and this is an area for potential further exploration across diverse populations.

When included studies were stratified by the population targeted - as either an ethnic minority or majority group - the test for subgroup differences showed a statistically significant subgroup effect (p= 0.04), indicating that the type of targeted population significantly modifies the effect of CAPs. The treatment effect favours CAPs over different kind of control conditions for both minority and majority groups targeted. The treatment effect however is greater for majority ethnic groups (SMD= 0.82) than minority groups (SMD= 0.39). Although this result needs to be considered cautiously, as the number of studies and patients contributing data to minority groups are less than for studies of majority groups, it can be supported by a recent meta-analysis on culturally adapted healthcare interventions for depression in low socio-economic status populations (Rojas-García et al., 2015). Results from that study indicate that interventions adapted for minorities with low socio-economic status were significantly less effective. Thus, further investigation is needed to understand whether this finding can be generalised. Investigation of factors contributing to these differences might help to understand why efficacy of CAPs for minority groups are less than for majority groups. One potential explanation is that therapists delivering CAPS to minority ethnic clients are likely to have limited knowledge of their clients' cultural values and to work in contexts that involve discriminatory stereotyping, with consequences for therapist confidence and comfort in delivering CAPS (Mir et al 2015).

It is important to consider the limitations of this review when interpreting the results. The review is limited to studies published in English and seven non-English language studies were omitted from the review for this reason. The review is also limited by incomplete data of a core element for assessment of the risk of bias in two of the included studies (see Table 5 in Appendix 3). Thus, the results of our meta-analysis should be considered cautiously. Although, it is important to explore the effect of CAPs compared to an evidence based psychotherapy for the treatment of depression, this issue cannot be explored in depth in this study as only two of the included studies used an evidenced based psychotherapy as a comparison group. This issue is consistent with the conclusion of a recent review of meta-analyses on culturally adapted mental health interventions which states that even though culturally adapted psychotherapies work better compared to treatment as usual, there were not enough data to claim that CAPs work better than an active treatment as the number of studies that were used an active treatment as comparison group were limited (Rathod et al., 2018). Thus, more studies are required to explore efficacy of CAPs compared directly to an evidence based psychotherapy. Although there was a statistically significant subgroup effect when the studies were stratified by the targeted population, only three studies were of minority groups so this result needs to be interpreted cautiously. This suggests that it might be useful to investigate what can be done to improve efficacy of CAPs for minority groups.

In conclusion, this systematic review extends and updates the literature on culturally adapted face-to-face talking therapies for the treatment of depression globally. In addition to assessing efficacy, we explored the reasons behind selection of specific psychotherapies over others, thus offering a rationale for preferences. The results demonstrate that minority groups in Western countries were targeted for cultural adaptation by the same number of studies as those on majority populations in non-Western countries, so developing and testing CAPs for depression is a growing area in general. CBT and BA are commonly selected approaches for CAPs, mainly based on their effectiveness, and adaptation processes used have been systematic and potentially can be replicated. Our findings confirm that CAPs are generally more efficacious than control conditions. This suggests that psychotherapies should be culturally adapted to enable more extensive improvements in depression care and to help reduce its global health burden.

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Declarations of interest

None.

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THE PRISMA FLOW DIAGRAM

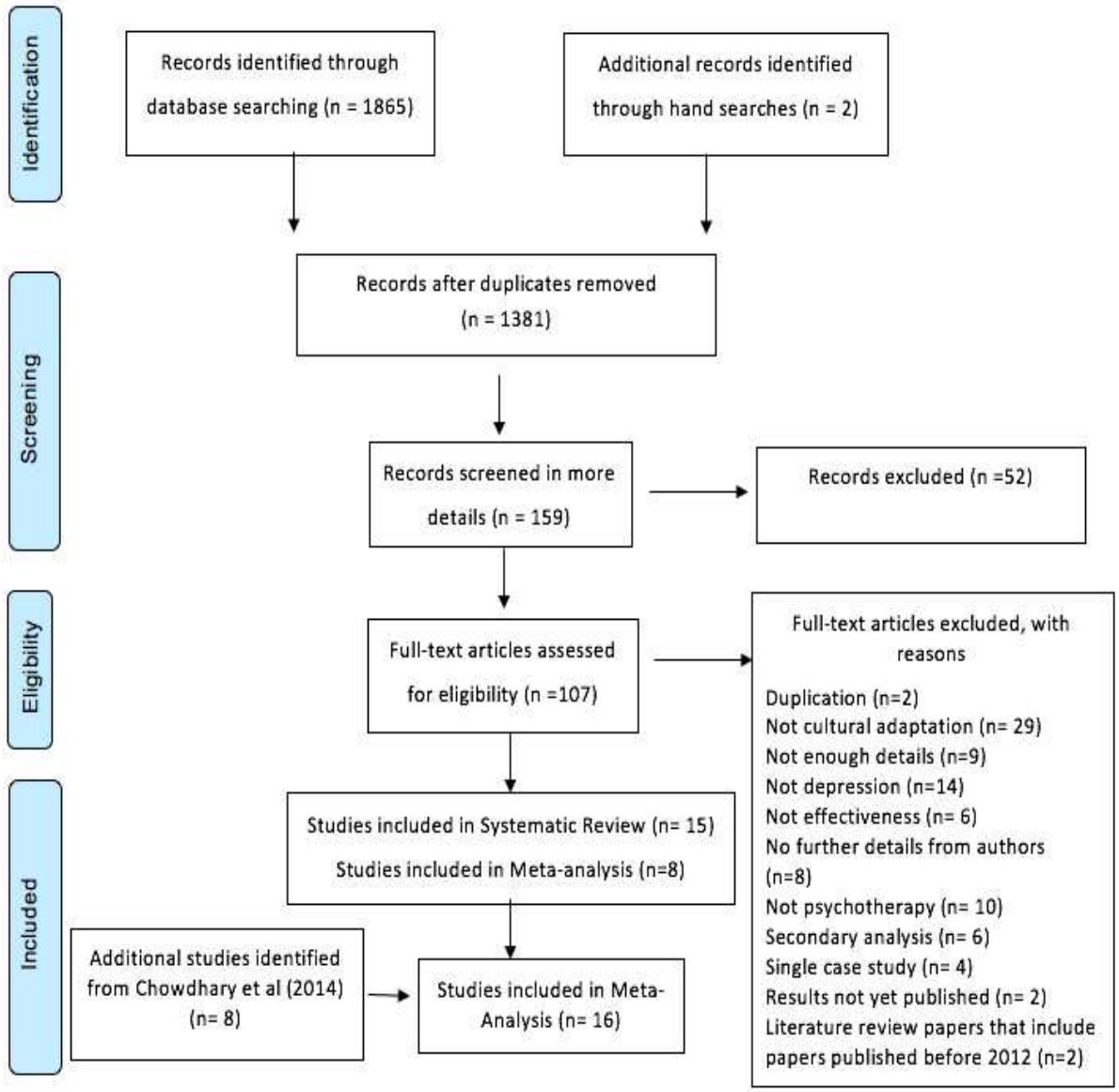


Figure 1 PRISMA flow diagram

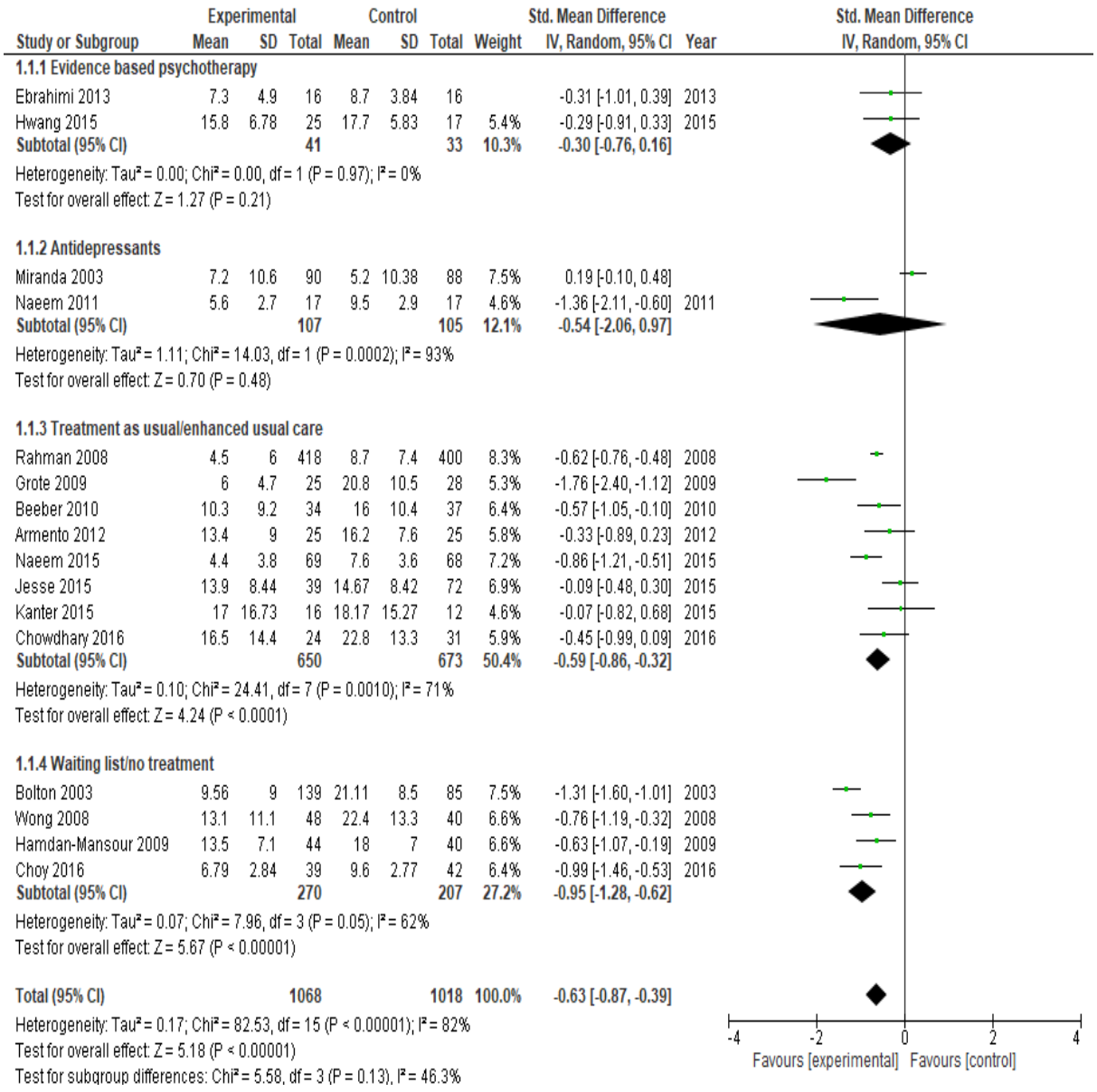


Figure 2 Effect of culturally adapted psychotherapies compared to evidence based psychotherapy, medication, treatment as usual or enhanced usual care, and waiting list or not treatment groups

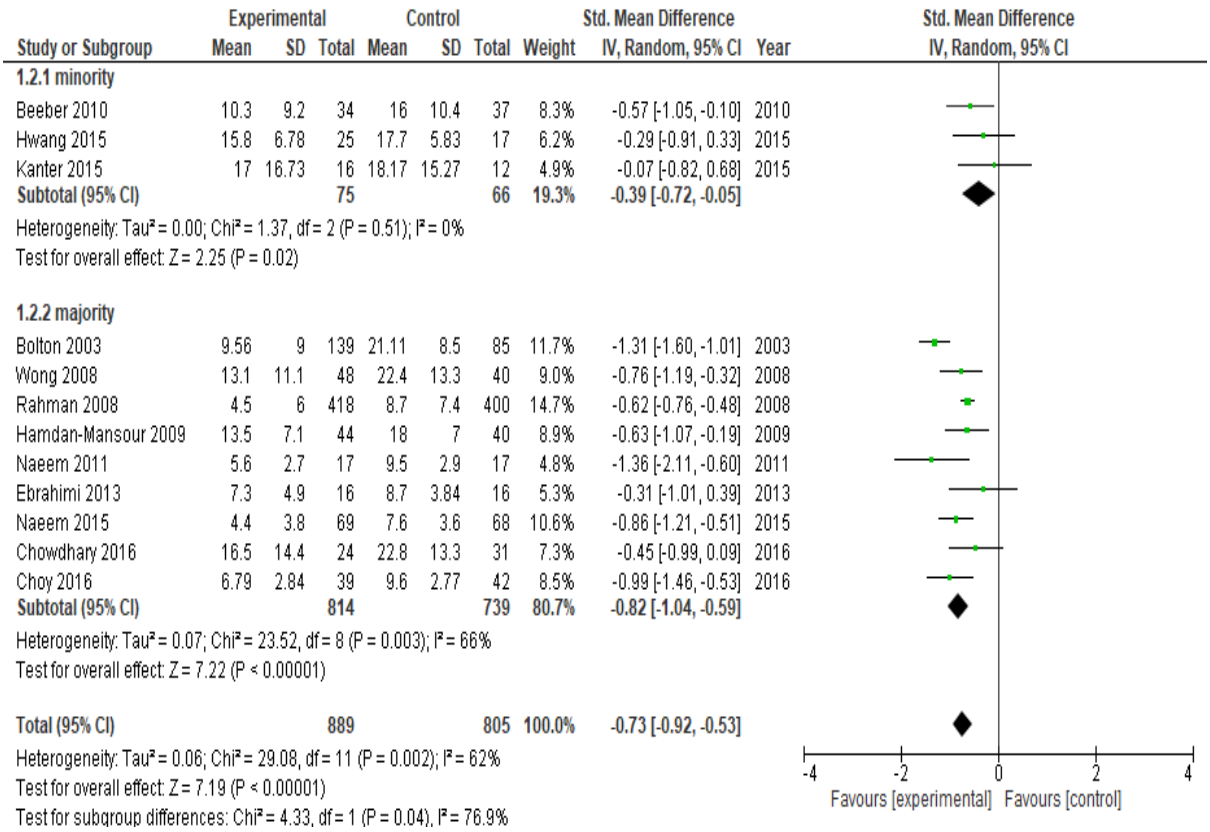


Figure 3 Minority vs majority ethnic groups

Table 1 Eligibility Criteria

Population	***Intervention***	***Comparator***	***Outcome***	***Study design***
Depressed Adults	Any culturally adapted/sensitive psychotherapy (talking therapy) to treat depression	No criteria to have a comparator group and all treatment methods as comparator can be included	Outcome is specified as efficacy	All study designs can be included except single case reports

Table 2 Characteristic of included studies

1. Aguilera et al. (2018) US					
Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
CBT	Group format, 16 weekly, hour and a half sessions	Safety-net hospital	None	One group pretest-posttest design	Four clinicians in total. The groups let by two therapists at a time: a licensed clinical psychologist and/ or a licensed clinical social worker with expertise in CBT and in treating low-income Latino/a patients
Population		*Outcome measure*		*Results*	
79 women, 17 men. All of them Latino/a and emigrated from a Latin American country		PHQ-9, at the beginning of most sessions Attendance rate Homework completion		Session attendance: Mean (M)=6.67 Homework completion rate was 23% (SD= 30%) Patients' level of depressive symptoms significantly decreased over the course of therapy (B = -.15, SE = .03, z =--4.84, p <.001).	
2. Armento et al. (2012) US					
Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
BA	Individual format, single session of Behavioural Activation of Religious Behaviour (BARB)		Supportive Therapy (ST): as BARB sessions lasted for an hour. Participants were strongly encouraged to discuss thoughts and feelings openly, and the therapist focused on summarization, reflection, and actively listening.	Random allocation	One advanced female doctoral student in clinical psychology trained in BARP and Behavioural Activation Treatment for Depression
Population		*Outcome measure*		*Results*	
50 students, 31 females and 19 males. 25 in control group (CG) and 25 in intervention group (IG). 2 atheist, 47 Christian and 1 Jewish. 88% Caucasian, 8% African American, 2% Latino and 2% African Indian or Alaskan Native		BDI-II Pre-post and 1 month follow-up		Mean (SD) from BDI-II scores at baseline: IG: 20.4 (9.7); CG: 18.5 (5.9) Post treatment: IG: 13.4 (9.0); CG: 16.2 (7.6) At 1-month follow-up: IG: 11.7 (8.2); CG: 14.8 (9.6) Two participants (pp) dropped out at follow-up, both in BARB (overall attrition = 4%)	

3. Bennett et al. (2014) New Zealand

Class of psychotherapy	Treatment details	Treatment setting	Comparison group	Study design	Therapists qualification and training
CBT	Individual format: approximately 1 hour for each of 12 session	Community mental health service	None	One group pretest-posttest design	Psychiatrists and care managers

Population	*Outcome measure*	*Results*
5 male and 11 female adults Maori	BDI-II At baseline, 1 month post-treatment and 6-month follow-up	BDI-II: baseline → post-treatment -3.414** BDI-II: baseline → 6-month follow-up -3.466** For these tests **p < 0.001 (Wilcoxon statistics). 2 pp dropped out at post-treatment test, and only one at follow-up test.

4. Chowdhary et al. (2016) India

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
Healthy Activity Programme (HAP): BA as the core psychological framework. with added emphasis on strategies such as problem-solving and activation of social networks	A. 9 month case series	Primary health centre	None	Clinical case series	4 mental health specialist, one experienced therapist and 19 lay counsellors
	B. Individual format, 6-8 session with weekly/fortnightly intervals over 5 months (modified HAP)	8 primary health centre	Enhanced Usual Care (screening results and WHO Mental Health Gap Action Programme (mhGAP) treatment guidelines to the primary health centre doctor)	Pilot RCT	HAP was delivered by eight counsellors

A

Population	*Outcome measure*	*Results*
271 patients (30 treated by specialists)	PHQ-9 In-depth interviews with 30 patients and 7 focus group discussions with counsellors	49% dropped out. Dose response reduction in PHQ-9 sores. Most interviewed patients (n = 19/30) agreed that they found the treatment to be useful and that the counsellor helped them to address their problems.

B

Population	*Outcome measure*	*Results*
20 Female and 11 Male in control group (CG): 18 female and 6 male in intervention group (IG)	BDI II at baseline and 2 months post-enrolment	BDI-II at two months M (SD) IG: 16.5 (14.4) CG: 22.8 (13.3). 6 (33%) participants in IG dropped out

5. Choy and Lou (2016) Hong Kong

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
Instrumental Reminiscence Intervention-Hong Kong	Group format (7-8 patients); weekly; six 90-minute intervention sessions and two follow-up sessions (two weeks and 6 weeks after the sixth session)	Local elderly community centres	Wait List	RCT	8 hours training for therapists and observers. Social worker (as key therapist) and an observer who had training in either social work or psychology

Population	*Outcome measure*	*Results*
82 patients in IG; 68 patients in CG Chinese	Chinese version of GDS-15. Pre-post and 2 and 6 weeks after the treatment (as 2 follow-up tests). IG who attended four or more sessions were included for analysis.	Mean (SD) of GDS scores at pre-test: IG: 9.78 (1.53) (n=46); CG: 9.56 (1.54) (n=68) Post-test: IG: 6.79 (2.84) (n=39); CG: 9.60 (2.77) (n=42) 1st follow-up: IG: 7.30 (3.98) (n=40);CG: 8.58 (2.67) (n=31) 2nd follow-up: IG: 7.45 (3.29) (n=39); CG: 8.42 (3.18) (n=33)

6. Ebrahimi et al. (2013) Iran

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
Spiritual (Islamic approach) integrated psychotherapy (SIPT)	Individual format 8 weekly sessions of 45 minutes	No info	Waiting list (WL) CBT Medical Intervention (MI)	RCT	No info

Population	*Outcome measure*	*Results*
SIPT=16, CBT=16, Medical intervention (MI)=15, Waiting list (WL)=15 Persian speaking	BDI-II in four stages before the intervention (T1), 4 weeks after starting (T2), after ending the therapy (T3) and three months later (T4)	Mean (SD) of BDI-II scores at: T1, T2, T3, T4 MI: 30.2 (1.53), 2.93 (7.14), 15.2 (8.68), 19.13 (8.9) CBT: 29.06 (9.9), 17.37(6.97), 8.7 (3.84), 10.25 (4.61) SIPT: 28.35 (7.98), 16.75 (5.61), 7.3 (4.9), 8.13 (5.11) WL: 29.6 (8.37), 27.46 (10.16), 28.6 (8.3), 27.13 (8.13)

7. Gureje et al. (2019) Nigeria

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
Problem Solving Therapy + BA – based stepped care management programme	Individual format, 12-22 sessions depend on individual's PHQ-9 scores, they also used medication with psychotherapy when PHQ-9 score is more than 15	Primary care clinics	Usual care enhanced with the WHO Mental Health Gap Action Programme intervention guide (mhGAP-IG) that includes either an unstructured psychotherapy or medication	Cluster- RCT	None physician, lay health workers. These providers received 6 days of training on problem-solving therapy and on use of the mhGAP-IG to identify and treat depression. Supervision through phone when needed.

Population	*Outcome measure*	*Results*
Yoruba speaking IG= 631 patients CG= 547 patients	PHQ-9 at baseline (T1), 3 months (T2), 6 months (T3) and 12 months (T4)	Mean (SD) of PHQ-9 scores at T1, T2, T3 and T4 IG: 13.7 (2.6), 4.7 (4.5), 3.8 (4.1), 3.6 (4.2), 3.6 (4.2) CG: 13.5 (2.6), 4.8 (4.2), 4.3 (4.5), 3.9 (4.4), 3.5 (3.9)

8. Hwang et al. (2015) US

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
Culturally adapted CBT (CA-CBT)	Individual format, 12 weekly sessions	Mental health clinics	CBT	RCT	Chinese-American therapists, 12 hours of training for both group followed by weekly group supervision

Population	*Outcome measure*	*Results*
23 patients in CG; 27 patients in IG Chinese-American adults	Hamilton Depression Scale (HAM-D) at baseline, session 4,8 and 12th sessions	HAM-D scores. Mean at baseline, sessions 4, 8, and 12 IG: 26.4, 22.9, 19.3, 15.8. CG: 23.4, 21, 19.6, 17.7. Six patients in CG and two patients in IG dropped out

9. Jesse et al. (2015) US

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
CBT	Group format, 2 hours once a week, 6 weeks	Local health department and affiliated regional perinatal centre prenatal care setting	TAU (prenatal care primarily and offered regularly scheduled child birth education classes)	RCT	Facilitators were Master's prepared licensed clinical social worker and other licensed mental health professionals (2 African-American and a Caucasian); resource moms (2 African-American)

Population	*Outcome measure*	*Results*
146 African-American, Caucasian or Hispanic rural low-income pregnant women: 72 IG; 74 CG; 2 to 6 women in each group; 21 group; Mixed race and ethnicity; non-English speaking Hispanic women met separately	BD-II, At baseline (T1), post-treatment (T2) and one month follow-up (T3)	Mean (SD) BDI-II scores at T1, T2 and T3 *For low moderate risk group* IG: 12.25 (1.48), 7.25 (1.31) and 6.58(1.20) CG: 10.51(0.63), 9.93(0.72) and 9.00 (0.91) *For high risk group* IG: 23.48 (1.51), 16.93 (1.56) and 16.22(2.02). CG: 23.57(1.53), 19.69 (1.49) and 17.15 (1.77). 25 patients in IG and 2 in CG dropped out before intervention began. 5 patients in IG dropped out after receiving 1 or 2 sessions.

10. Kanter et al. (2015) US

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
BA	Individual format, 12 sessions, generally scheduled weekly for 50 minutes	Community mental health clinic	TAU (12 sessions of generally scheduled weekly 50 minutes. Therapists provided their typical treatment for depression).	RCT	Eight bilingual mental health practitioners; random allocation 1:1 to each group; 16 hours training for IG; both group of therapists met with each other for weekly for one hour consultations to review study cases

Population	*Outcome measure*	*Results*
21 Latinos in IG and 22 in CG; monolingual Spanish speakers	Spanish version of HRSD and BDI-II at pre-post and before each session	IG performed well with respect to treatment engagement and retention. Follow-up tests revealed a significant decrease in HRSD scores for IG clients who attended 9-12 sessions, t (8) = 5.97, p b .001, d = 1.99. For clients who only attended 0-4 sessions, the effect size favoured CG, but for clients who attended 5-8 and 9-12 sessions, effect sizes favoured IG, with large effects. Five IG clients and 10 CG clients did not provide post-treatment data.

11. Leung et al. (2013) Hong Kong

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
CBT	Group format; six weekly sessions of 2h duration	Antenatal clinic	Only mentioned control group, no detail	Quasi-experimental design	Nurse; nothing about training

Population	*Outcome measure*	*Results*
47 IG, 50 CG pregnant women who scored greater than 10 in EPDS.	Data were collected at recruitment as baseline (T1) and the within a week after the intervention (T2); Chinese version of EPDS was used.	Repeated measures analysis of covariance showed significant group differences favoured the IG on EPDS ($F1, 95 = 5.02$, $P = 0.02$). Post-intervention evaluation showed very positive feedback from IG

12. Naeem et al. (2015) Pakistan

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
CBT + TAU	Individual format, 6 sessions + one additional session for the family		TAU (prescription of medication and regular hospital visits)	RCT	Psychology graduates with two years' experience in a mental health system; 5 days training in the use of manual; supervision at a weekly interval for 6 months before trial started

Population	*Outcome measure*	*Results*
69 patients in IG, 68 patients in CG; Pakistani people	Primary outcome: Hospital Anxiety and Depression-Depression Subscale (HADS-D), at baseline (T1), at 3 months (T2) and 9 months after baseline (T3)	Mean (SD) of HADS-D at T1, T2 and T3 respectively for treatment group: 15.3 (3.4); 4.4 (3.8); 1.5 (2.0) for control group: 15.1 (3.9); 7.6 (3.6); 5.0 (4.0). 3 patients in IG and 5 patients in CG dropped out.

13. Oladeji et al. (2015) Nigeria

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
Problem Solving Therapy + BA – based stepped care management programme	Individual format, 12-22 sessions depend on individual's PHQ-9 scores, they also used medication with psychotherapy when PHQ-9 score is more than 15	6 Primary health care centre	Usual care enhanced with the WHO Mental Health Gap Action Programme intervention guide (mhGAP-IG) that includes either an unstructured psychotherapy or medication	Cluster RCT	Primary health care workers .IG had 3+3 day training on intervention and also identification of depression. CG received 2 day training on identification and standard treatment of depression. A team of supervisors support the therapists during the course of treatment.

Population	*Outcome measure*	*Results*
IG: 165 patients and CG: 69 patients who are fluent in Yoruba language	PHQ-9 at baseline (T1), at 3 months (T2) and 6 months (T3) follow-up	Mean (SD) at T1 and T3 IG: 11.3 (3.5), 4.1 (4.4) CG: 11.3 (3.5), 5.5 (5.2)

14. Roland (2014) US

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
CBT	The format of treatment is not explicitly reported, 6 sessions	Mental health agency	CBT	Quasi-experimental design	A licensed clinical therapist

Population	*Outcome measure*	*Results*
128 African-American women 65 women in IG 63 women in CG	BDI-II , pre-post test	Pre-post test BDI-II scores' Mean (SD) For IG: 39.81 (12.78); 17.36 (14.36) For CG: 56.19 (3.44); 54.32 (3.52)

15. Ward and Brown (2015) US

Class of psychotherapy	*Treatment details*	*Treatment setting*	*Comparison group*	*Study design*	*Therapists qualification and training*
CBT	Group format, over 12 week session and a 3 month booster session, lasts 2.5 hours Pilot 1 and Pilot 2	Local health clinics	None	One group pre-test and post-test design	Clinicians with 20 hours training on adapted therapy

Pilot 1

Population	*Outcome measure*	*Results*
18 women; African-American; 60+ years (2 groups)	CES-D; Ham-D; At baseline, week 6, 12 and at follow-up (week 24 or 3 months post-intervention) 1. Recruitment and retention tracking 2. Attendance Log 3.QOL 4. CSI 5. PHO	73% retained over the 6 months of the course. All women who completed study reported being very satisfied (M=90.1 and SD= 14.5). Depression scores on the CES-D decreased significantly from baseline (*M* = 24.1, *SD* =11.22) to week 6 (*M* =19.0, *SD* = 11.9) p < .019; baseline to week 12 (*M* =18.8, *SD* = 12.2), and from baseline to the 3-month follow-up (*M* = 17.5, *SD* = 11.36 *p* < 0.027

Pilot 2

Population	*Outcome measure*	*Results*
40 African-American women and men	CES-D at baseline, week 6, 12 and at follow-up (week 24 or 3 months post-intervention)	87 % were retained. Depression symptoms decreased significantly from baseline (*M* = 26.9, SD = 9.6) to week 6 (*M* = 17.7, *SD* = 8.0) p < .000, with a mean difference of 9.0, indicating a significant change from moderate to mild depression. Also, significant decreases were evident from baseline (*M* = 26.9, *SD* = 9.6) to week 12 (*M* = 16.5, *SD* = 1.5), with a mean difference of 10.3, and the 3-month follow-up (*M* = 15.3, *SD* = 7.3) *p* < 0.00.

Notes:
Treatment details include modality (individual/group), no. of sessions, frequency, duration.
US: United States, BA: Behavioural Activation, CG: Control group, IG: Intervention Group, BDI-II: Beck Depression Inventory-II, M: Mean, SD: Standard deviation, pp: participants, CBT: Cognitive Behavioural Therapy, RCT: randomized controlled trial, PHQ-9: Patient Health Questionnaire, GDS-15: Geriatric Depression Scale-15, HAM-D: Hamilton Depression Rating Scale, HRSD: Hamilton Rating Scale for Depression, TAU: Treatment as Usual, EPDS: Edinburgh Post-natal Depression Scale, HADS-D: Hospital Anxiety and Depression Scale-Depression Subscale, CES-D: Centre for Epidemiologic Studies Depression Scale, CSI: Client Satisfaction Inventory, QOL: Quality of Life, PHO: Physical Health Outcome

*Table 3 Process of cultural adaptation of psychological treatment (PT) for depressive disorders, based on Medical Research Council (MRC) Framework, for studies considering psychotherapy adaptation **

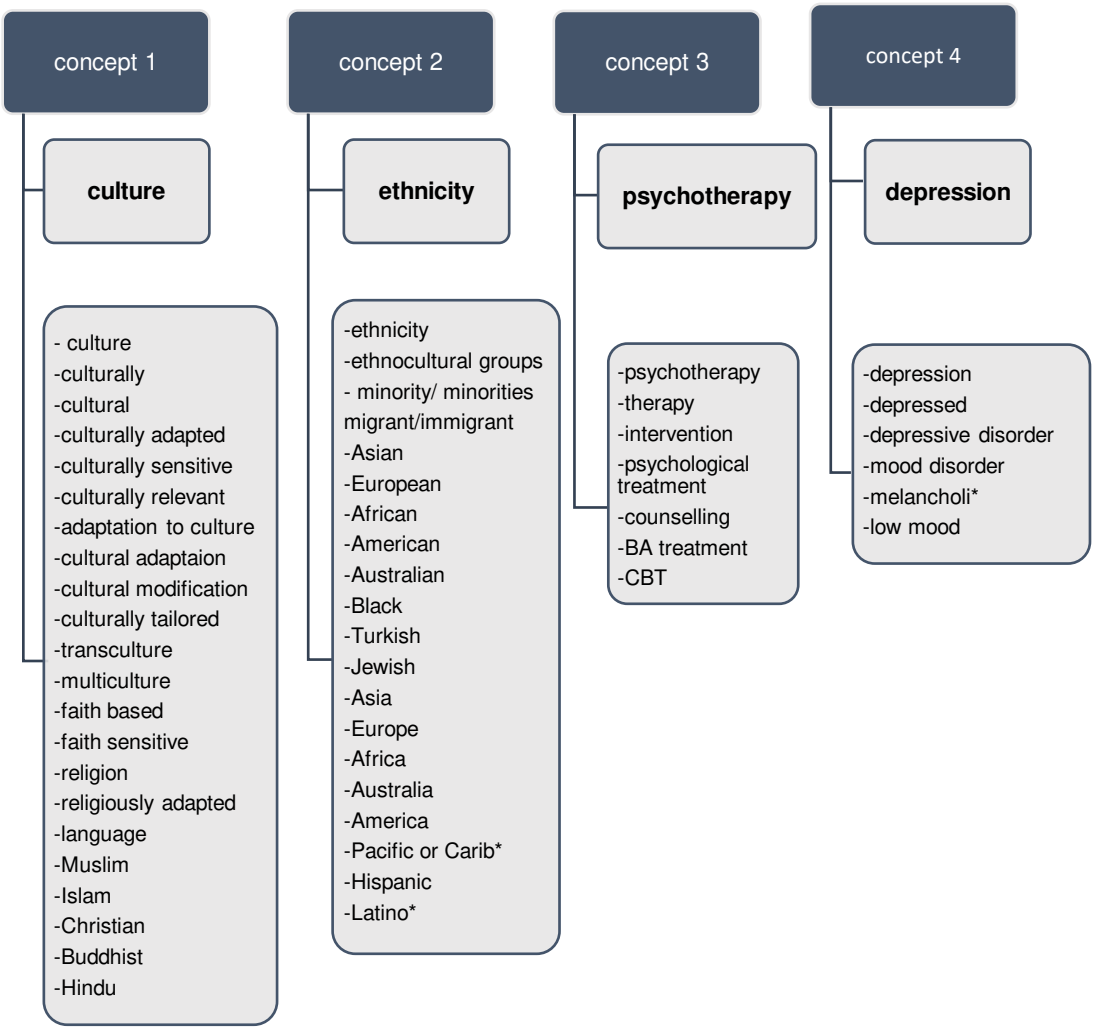
Modelling/theoretical development	Formative research	Piloting
(Author, date), Method used for evaluation of efficacy		
(Aguilera et al., 2018), none		
Literature review. Therapist-client ethnic match, vocabulary of CBT simplified; attention to religious activities; recognising when passivity was helpful/harmful; recognising limitations of poverty and social context while scheduling activities	The cultural considerations recommended by researchers were applied to improve engagement in CBT with Latinos.	implementation study
(Bennett et al., 2014), within-subject design		
Culturally relevant and CBT literature in consultation with an advisory panel (AP), consisting of experienced consultant-level clinical psychologists of Māori (n=4) and non-Māori (n=3) descent	The advice of mental health consumers and elders with advanced cultural knowledge was sought.	None
(Chowdhary et al., 2016), pilot RCT		
Global and regional systematic review of effectiveness of psychological interventions for depression in primary care. Systematic review of explanatory models of depression in South Asia, and qualitative research of explanatory models of depression in study settings.	Distillation of strategies from empirically supported treatments, survey with mental health experts and lay counsellors, treatment development workshops with national and international experts. The clinical case series guided treatment modification.	Clinical case series
(Choy and Lou, 2016), longitudinal RCT		
A critical literature review about reminiscence intervention and CBT for depression was conducted. The intervention protocol was then modified and translated from the intervention manual developed by Watt and Cappeliez (1995; cited in Choy and Lou, 2016).	Professional advice was sought from two local experts on developing and conducting reminiscence therapy and CBT within the Chinese population. Learning from the experience of the pilot study, four major adaptations were made that contributed to a culturally sensitive IRI protocol with innovations.	Pilot study (n=5 participants)
(Ebrahimi et al., 2013), RCT		
The content and process of spirituality integrated psychotherapeutic intervention included theoretical model, intervention strategies and implementation guideline, which was extracted from religious (Islamic) sources in the first phase of the study.	Religious and psychological experts were interviewed in Iran and their viewpoints were collected until data saturation, followed by analysis and conceptualization. Religious sources, including written and electronic sources, were searched with regard to questions and goals and under the supervision of experts of religious sciences, considering the interview data.	None
(Gureje et al., 2019, Oladeji et al., 2015), RCT		
The Yoruba translations were done by panels of bilingual experts using standard protocols of iterative back translation. Adaptation of the interventions to the local language and cultural context were done by preserving their core elements. Local terminology was used. The label `mental disorder` in definition of depression was avoided to use for reducing stigma. More culturally appropriate tasks were used in the activity scheduling and PST.	The process of adaption involved an initial series of meetings and focus group discussions with health care providers experienced in working in primary care and with knowledge of the local culture, beliefs and practices, to discuss the chosen interventions, as well as in-depth interviews with patients. Insight gained from these interactions informed adaptation in terms of appropriate language and local terminologies that would be more acceptable in the cultural context	Pilot RCT study (see details in Table 2 under Oladeji et al., 2015)
(Hwang et al., 2015) RCT		
An integrative top-down and bottom-up approach called the Psychotherapy Adaptation and Modification Framework (PAMF) and the Formative Method for Adapting Psychotherapy (FMAP) were used to develop culturally adapted CBT. Two sets of 4-hour focus groups (14 total) were conducted with therapists at ethnic-focused community mental health clinics. Interviews were also conducted with Buddhist monks and nuns, spiritual and religious Taoist masters, and Traditional Chinese Medicine practitioners to understand Chinese notions of mental illness.	After the PI wrote the culturally adapted manual, another set of 4-hour therapist focus groups was conducted to further improve the manual.	None
(Jesse et al., 2015), RCT		
Literature review, Beck's cognitive behavioural model, and Jesse's bio-psychosocial-spiritual theory provided the theoretical framework for the intervention.	Psycho-educational and pregnancy-specific information included in the manual was based on the first author's clinical experiences as a nurse-midwife providing care for rural, minority and low-income women. The research team developed and tested the Insight-Plus workbook, in a pilot with five African-American and Caucasian pregnant women at risk of depression at the local health department. Feedback from them helped to edit the workbook.	Pilot study with 17 women at risk of antepartum depression (Jesse et al., 2010)

(Kanter et al., 2015), RCT		
Literature review	Some experiences during treatment development suggested necessary alterations at the level of technique, such as a simplified treatment rationale, and less reliance on written homework assignments. Pilot case reports and other studies informed the evaluation of the current manual.	Case report (Santiago-Rivera et al., 2008), Case study (Kanter et al., 2008), Open trial (Kanter et al., 2010)
(Naeem et al., 2015), RCT		
Field observations, experience of therapy and clinical experience	Interviews with clinical psychologists (n=6) and depressed people (n=9). Focus group with university students (n=34).	Piloting in primary care settings
(Ward and Brown, 2015), None		
The ecological validity framework (Bernal et al., 1995) guided the adaptation.	They conducted a series of descriptive research studies examining-African Americans' beliefs about mental illness, perceptions of stigma, and experiences in counselling, and treatment preferences. They reviewed literature on African-American history and culture to identify an Afrocentric paradigm to incorporate into the OHDC.	Pilot 1: 18 African-American women. Pilot 2: 40 African-American women and men

BA, behavioural activation; CBT, cognitive behaviour therapy; IRI, Instrumental Reminiscence Intervention; OHDC, Oh Happy Day Class; PI, principal investigator; PST, problem solving therapy; RCT, randomized controlled trial.
*Only thirteen out of 16 studies included in this table because three studies did not explain the process of adaptation.

Appendices

Appendix 1 Concepts of search terms



Appendix 2 Search terms used

The search was conducted in ArabPsyNet, CINAHL (1981- present), ProQuest Dissertations and Theses (1743- present), EMBASE (1996- present), Global Health (1973- present), Health Management Information Consortium (1983- present), Medline (1996- present), PsycINFO (2002- present) and Sociological Abstracts (1952- present). The search terms were used in two different databases illustrated below as an example:

Table 1: EMBASE

Database: Embase <1996 to 2018 Week 31>
Search Strategy:
----
1 exp cultural anthropology/ (39336)
2 culture.tw. (493758)
3 exp transcultural care/ (3994)
4 (cultur* adj4 (adapt* or sensitive or appropriate or relevan* or modif* or tailored)).tw. (29804)
5 transcultur*.tw. (1746)
6 multicultur*.tw. (3227)
7 (faith adj4 (adapt* or sensitive or appropriate or relevan* or modif* or tailored)).tw. (70)
8 (religio* adj4 (adapt* or sensitive or appropriate or relevan* or modif* or tailored)).tw. (375)
9 "religio* sensitiv*".tw. (36)
10 "religion based".tw. (50)
11 "religio* adapt*".tw. (4)
12 exp religion/ (50348)
13 Islam.tw. (1139)
14 muslim.tw. (3536)
15 Christian*.tw. (6564)
16 Buddhi*.tw. (1460)
17 Hindu*.tw. (1783)
18 (Judaism or Jewish).tw. (7387)
19 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 (604811)
20 exp ethnic group/ (105403)
21 ethnicity.tw. (78536)
22 exp minority group/ (10948)
23 minorit*.tw. (68406)
24 ethnocultural group*.tw. (95)
25 exp ancestry group/ (239173)
26 Asia*.tw. (170767)
27 Europe*.tw. (403620)
28 Africa*.tw. (217723)
29 America*.tw. (1135919)
30 Australia*.tw. (142958)
31 Caribbean.tw. (12790)
32 "Hispanic americans".tw. (679)
33 Latino*.tw. (12728)
34 Blacks.tw. (16583)
35 Turkey.tw. (39062)
36 Turkish.tw. (22617)
37 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 (2171678)
38 19 or 37 (2690893)
39 exp depression/ (355000)
40 depress*.tw. (417916)
41 "low mood".tw. (1009)
42 melancholia.tw. (814)
43 39 or 40 or 41 or 42 (540717)
44 38 and 43 (72140)
45 exp psychotherapy/ (166764)
46 psychotherapy.tw. (28180)
47 CBT.tw. (13015)
48 exp counseling/ (123097)
49 (psycholog* adj3 (therap* or treatment* or intervention*)).tw. (20454)
50 (Cognit* adj2 (therap* or treatment* or intervention*)).tw. (33607)
51 (Behav* adj2 (therap* or treatment* or intervention*)).tw. (49070)
52 45 or 46 or 47 or 48 or 49 or 50 or 51 (318322)
53 44 and 52 (7511)
54 effectiv*.tw. (1877240)
55 53 and 54 (2124)
56 limit 55 to (human and yr="2012 -Current" and adult <18 to 64 years>) (556)

Table 2: Ovid Medline

Database: Ovid MEDLINE(R) <1996 to July Week 3 2018>
Search Strategy:
---

1 exp culture/ (104696)
2 culture.tw. (331370)
3 exp Culturally Competent Care/ (774)
4 (cultur* adj4 (adapt* or sensitive or appropriate or relevan* or modif* or tailored)).tw. (19920)
5 transcultur*.tw. (1213)
6 multicultur*.tw. (2175)
7 (faith adj4 (adapt* or sensitive or appropriate or relevan* or modif* or tailored)).tw. (50)
8 (religio* adj4 (adapt* or sensitive or appropriate or relevan* or modif* or tailored)).tw. (237)
9 "religio* sensitiv*".tw. (20)
10 "religion based".tw. (32)
11 "religio* adapt*".tw. (3)
12 exp "religion and psychology"/ (11541)
13 exp Religion/ (35982)
14 Islam.tw. (640)
15 Muslim.tw. (2254)
16 Christian*.tw. (4124)
17 Buddhi*.tw. (808)
18 Hindu*.tw. (907)
19 (Judaism or Jewish).tw. (5161)
20 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 (472235)
21 ethnicity.tw. (45277)
22 exp Minority Groups/ (9304)
23 minorit*.tw. (43089)
24 ethnocultural group*.tw. (77)
25 exp Continental Population Groups/ (151352)
26 Asia*.tw. (90615)
27 europe*.tw. (187550)
28 Africa*.tw. (141655)
29 America*.tw. (245929)
30 australia*.tw. (87360)
31 caribbean.tw. (8589)
32 "Hispanic americans".tw. (484)
33 Latino*.tw. (8198)
34 blacks.tw. (10996)
35 turkey.tw. (22270)
36 turkish.tw. (11661)
37 exp Ethnic Groups/ (98021)
38 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 (826070)
39 20 or 38 (1239875)
40 exp Depressive Disorder/ (73284)
41 depress*.tw. (261018)
42 exp DEPRESSION/ (77971)
43 "low mood".tw. (465)
44 melancholia.tw. (628)
45 40 or 41 or 42 or 43 or 44 (283847)
46 39 and 45 (30242)
47 exp PSYCHOTHERAPY/ (98772)
48 psychotherapy.tw. (14994)
49 CBT.tw. (6988)
50 exp Counseling/ (26430)
51 (psycholog* adj3 (therap* or treatment* or intervention*)).tw. (10657)
52 (Cognit* adj2 (therap* or treatment* or intervention*)).tw. (18812)
53 (Behav* adj2 (therap* or treatment* or intervention*)).tw. (29445)
54 47 or 48 or 49 or 50 or 51 or 52 or 53 (148705)
55 46 and 54 (2511)
56 effectiv*.tw. (1161349)
57 55 and 56 (826)
58 limit 57 to (humans and yr="2012 -Current" and "all adult (19 plus years)") (324)

Appendix 3 Tables for the quality assessment of included studies

Table 3 Risk of bias summary: Review authors' judgements about each risk of bias item for each included uncontrolled study based on the Newcastle-Ottowa Scale

	Score (max 6)	***Selection 1***	***Selection2***	***Selection3***	***Selection4***	***Comparability 1***	***Outcome 1***	***Outcome 2***	***Outcome 3***
Aguilera et al. (2018)	**4**	b*	NA	a*	a*	NA	b*	b	d
Bennett et al. (2014)	**5**	a*	NA	a*	a*	NA	c	a*	b*
Ward and Brown (2015)	**5**	b*	NA	a*	a*	NA	c	a*	b*

NA= not assessed; *= one point for each star

Table 4 Risk of bias summary: review authors' judgements based on the ROBINS I Scale about each risk of bias item for each included non-RCT study

	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcome	Bias in selection of the reported result	Overall bias
Leung et al. (2013)	L	L	M	NI	M	M	M	M
Roland (2014)	S	L	M	L	S	S	S	S

L: Low, M: Moderate. S: Serious, NI: No information

Table 5 CASP for the qualitative study used.

Study: Mir 2015 Question/ Answer	Yes	Can't tell	No
1. Was there a clear statement of the aims of the research?	✓		
2. Is a qualitative methodology appropriate?	✓		
3. Was the research design appropriate to address the aims of the research?	✓		
4. Was the recruitment strategy appropriate to the aims of the research?	✓		
5. Was the data collected in a way that addressed the research issue?		✓	
6. Has the relationship between researcher and participants been adequately considered?			✓
7. Have ethical issues been taken into consideration?	✓		
8. Was the data analysis sufficiently rigorous?	✓		
9. Is there a clear statement of findings?		✓	

10. Will the research help locally (How valuable is the research)?	✓		

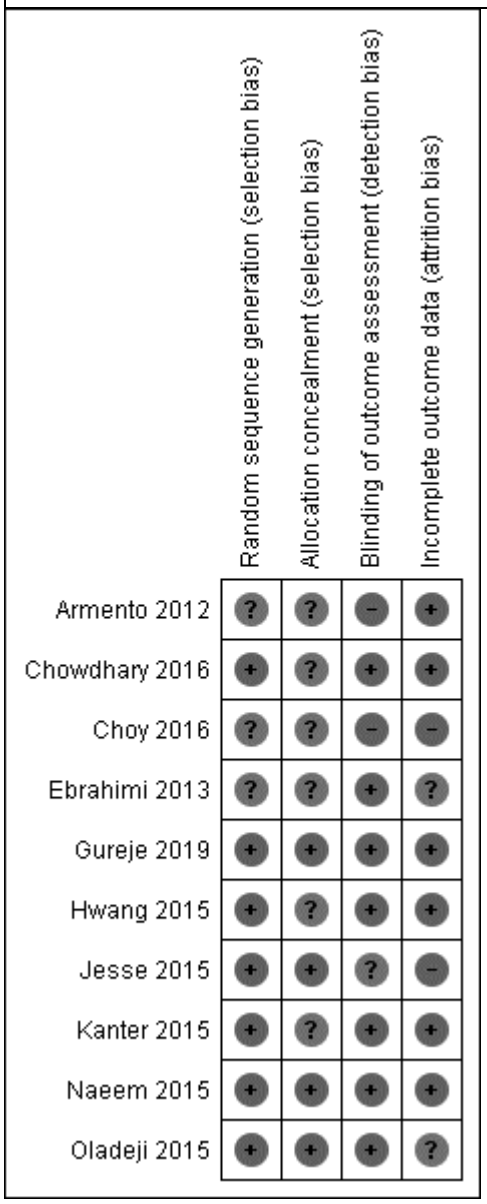


Figure 1 Risk of bias summary: Review authors' judgements about each risk of bias item for each included RCT study.