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**Efficacy of psychosocial interventions on mental health outcomes:
umbrella review of evidence generated in low- and middle-income
countries**

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ABSTRACT

Background: The present umbrella review was conducted to evaluate the strength and credibility of evidence generated in low- and middle-income countries (LMICs) on the efficacy of psychosocial interventions for various mental health outcomes.

Methods Systematic literature searches were conducted in Medline, Embase, PsychINFO, CINAHL, Cochrane Library and Epistemonikos from January 2010 until May 2019 for meta-analyses of randomised studies conducted in LMICs. Strength of associations was assessed using quantitative umbrella review criteria, and credibility of evidence using the GRADE approach.

Findings A total of 123 primary studies from ten meta-analyses were included. The evidence on the efficacy of psychosocial interventions in adults with depression in humanitarian settings (standardised mean difference [SMD] 0.87, 95% confidence intervals [CI] 0.67 to 1.07; highly suggestive association, GRADE: moderate), and the evidence in adults with common mental disorders (SMD 0.49, 95% CI 0.36 to 0.62; highly suggestive association, GRADE: moderate), was supported by the most robust evidence. Highly suggestive strength of association was found for psychosocial interventions in adults with schizophrenia on functioning outcomes, in adults with depression, and in adults with PTSD in humanitarian settings. In children exposed to humanitarian settings, and in children with disruptive behaviour, psychosocial interventions were supported by suggestive evidence of efficacy.

Interpretation A relatively large amount of evidence suggests the benefit of psychosocial interventions on various mental health outcomes in LMICs. However, strength of associations and credibility of evidence were quite variable, depending on the target mental health condition, type of population and setting, and outcome of interest.

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Key-words: mental health; psychosocial interventions; meta-analysis; low- and middle-income countries

Panel – research in context

Evidence before this study

Psychosocial interventions play a key role in the treatment of mental health conditions, as they may improve symptoms, functioning, quality of life, and social inclusion. As most of the efficacy studies on these interventions have been conducted in high-income countries, generalisability and applicability of findings to poor-resource settings may be a challenge. For this reason, a growing number of randomised studies, and subsequently systematic reviews, have examined the efficacy of psychosocial interventions on mental health outcomes in low- and middle-income countries. However, the available evidence is controversial and fragmented into several reviews focusing on different populations, interventions and outcomes, which makes it difficult to appraise the whole evidence using a similar metric and methodological framework.

Added value of this study

Our results contribute new evidence to the literature in several ways. First, we showed that the strength and credibility of evidence generated in poor-resource settings on the efficacy of psychosocial interventions is quite variable, depending on the target mental health condition, type of population, and outcome of interest. Second, based on a robust methodological framework, a hierarchy of strength of associations and credibility of evidence was developed to assist policy makers and health care providers. Third, we showed that psychosocial interventions delivered by providers who are not mental health professionals are supported by highly suggestive evidence of efficacy. Fourth, for some target mental health conditions and outcome measures, effect sizes are of considerable magnitude, suggesting that clinically meaningful results might be obtained.

Implications of all the available evidence

In contrast with the generic view of absence of evidence in poor-resource settings, our results represent an important message for governmental and non-governmental organizations, and donors, willing to implement or fund evidence-based mental health programs in low- and middle-income countries. However, between-study heterogeneity, predictive intervals including the null value, and risk of small-study effects bias were the main limitations of the reviewed evidence. On clinical grounds, these results suggest that developing the capacity of non-specialist health care providers on delivering psychosocial interventions may be considered an implementation strategy supported by a robust amount of evidence generated in poor-resource settings, as well as in humanitarian settings. More generally, the results of this review may be used to inform innovative strategies to build the clinical skills and capabilities of practitioners working in poor-resource settings.

INTRODUCTION

Psychosocial interventions, broadly defined as non-pharmacological interventions focused on psychological or social factors, have an important role in the treatment of people with mental health conditions, as they may improve symptoms, functioning, quality of life, and social inclusion ¹. Psychosocial interventions also align with the principles of personal recovery, such as the attainment of a fulfilling and valued life ^{2;3}. However, most studies assessing the efficacy of these interventions have been conducted in high-income countries, raising an important issue of generalisability and applicability of findings to low- and middle-income countries (LMICs) ^{4;5}. While this aspect is theoretically relevant for any type of intervention, for psychosocial interventions there are several specific challenge, including the need for training, fidelity checks, supervision and monitoring, concerns about cultural and social acceptability, and considerations of feasibility related to differences in mental health infrastructures and resources.

Another important aspect is that psychosocial interventions are typically delivered by staff who are mental health professionals. In LMICs, however, the availability of mental health professionals may be extremely limited, and therefore for feasibility reasons mental health interventions may be delivered by non-specialist professionals, including nurses without psychiatric training, lay health workers, or peer support workers ^{6;7}. Clearly, the efficacy of psychosocial interventions delivered by these workers may be another challenging issue.

In recent years, a growing number of randomised studies, and subsequently systematic reviews (SRs), have examined the efficacy of psychosocial interventions on mental health outcomes in LMICs ^{8;9}. However, the available evidence is still controversial and fragmented into several reviews focusing on different populations, interventions and outcomes, which makes it difficult to appraise the whole evidence using a similar metric and methodological framework.

Furthermore, the quality of evidence, which is another challenging issue as it has an influence on the credibility of the risk estimates, has never been formally synthesized.

Against this background, the aim of this review of SRs was to quantify the efficacy of psychosocial interventions for people with mental health conditions in LMICs. Effect sizes for psychosocial interventions were quantified together with a formal assessment of the strength of associations and credibility of evidence using quantitative umbrella review criteria and the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach.

METHODS

Study design

We employed an umbrella review methodology to systematically review all available reviews on the topic. Umbrella review is a term applied to systematic overviews of SRs and meta-analyses¹⁰⁻¹². This review methodology was chosen as it may provide an overall picture of a broad healthcare area, and to highlight whether the evidence base is consistent or contradictory¹³. A review protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO), Registration Number CRD42019135711.

Types of systematic reviews included

SRs of randomised studies conducted in LMICs investigating the efficacy of psychosocial interventions for mental health conditions were included. SRs of promotion, prevention, and protection interventions were excluded. Psychosocial interventions included any non-pharmacological intervention focused on psychological or social factors, including, but not limited to, individual, family or group psychological therapies; education; training; or guidance

^{14;15}. Both interventions with one or multiple components were included. Mental health conditions included any mental health problem along a continuum from mild, time-limited psychological distress to chronic, progressive, and severely disabling conditions ¹⁶. Therefore, both SRs of studies that assessed the presence of a mental health condition using a structured psychiatric diagnostic interview and SRs of studies using validated or commonly used rating scales were included. SRs that used the World Bank country classifications to identified studies conducted in LMICs were included ¹⁷.

Only SRs with a quantitative synthesis of trial results (meta-analysis) were retained. Similarly, SRs without study-level effect sizes (ESs) and 95% confidence intervals (CIs) were excluded. When two SRs presented overlapping datasets on the same comparison, the SR with the largest number of component studies providing study-level ESs was retained for the main analysis, in agreement with umbrella review methodology ¹⁰.

Literature search, systematic review selection and data extraction

Medline, Embase, PsychINFO, CINAHL, Cochrane Library and Epistemonikos were searched from January 2010 until May 2019. The complete search strategy is provided in the appendix. The search was restricted to the last ten years to identify up-to-date systematic reviews. No language restrictions were applied. Electronic database searches were supplemented by a manual search of reference lists from relevant studies. The Preferred Reporting Items for Systematic Reviews and Meta-analyses reporting standards (PRISMA) was followed to document the process of SR selection ¹⁸.

The selection of potentially relevant SRs was made by carefully inspecting titles and abstracts. This was done by two reviewers independently (CB, MP). In case of discrepancies, a third review author (GiT) was involved, and consensus reached by discussion. When titles and abstracts did

not provide information on the inclusion and exclusion criteria, the full articles were obtained to verify eligibility. The full text of potentially included SRs were obtained and carefully appraised by at least two reviewers. The reference lists of included articles were analysed for additional items not retrieved by the database searches.

From each included SR, two investigators (CB and MP) independently extracted information on first author, year of publication, outcomes, number of included studies, and reported summary meta-analytic estimates. The following information was extracted from each primary study: year of publication, population (adults, children and adolescents), mental health condition, type of psychosocial intervention, outcomes, type of professionals delivering the intervention, sample size, study-specific standardized mean differences (SMDs) with the corresponding 95% CI.

Reporting quality of included systematic reviews

The quality of included SRs was independently assessed by two reviewers (DP, CG) using AMSTAR-2 (A Measurement Tool to Assess Systematic Reviews), a 16-point assessment tool of the methodological quality of SRs ¹⁹. AMSTAR-2 has good inter-rater agreement, test-retest reliability, and content validity (appendix) ¹⁹.

Statistical analysis

Summary SMDs with 95% CI were re-estimated using common metric and random-effects models because we were expecting high heterogeneity ²⁰. In order to produce a pragmatic measure of the efficacy of psychosocial interventions, numbers-needed-to-be-treated (NNT) were calculated using the formulae provided by Furukawa and colleagues ²¹. We also estimated the 95% prediction interval (PI) for the summary random-effects estimates ²². PIs further account for heterogeneity between studies and specify the uncertainty for the effect that would be expected in a new study examining that same research question ²². Heterogeneity was

evaluated with Cochran's Q statistic ²³ (statistically significant for p-value < 0.10) and quantified with the I² metric ²⁴. Egger's test was used to evaluate potential publication and small-study effects biases ^{25;26}. In particular, a p-value ≤ 0.10 in the regression asymmetry test with a more conservative effect in the largest study was considered evidence for small-study effects bias.

We further evaluated the excess significance, which is a test that examines whether the observed number of studies (O) with statistically significant results (positive studies, p<0.05) in each meta-analysis is larger than their expected number (E) ²⁷. For each meta-analysis, E was calculated as the sum of the statistical power estimates for each study in the meta-analysis. The power of each study was calculated by an algorithm using a non-central t distribution ²⁸. The estimated power depends on the plausible SMD. As the true SMD for any meta-analysis is unknown, we assumed that the most plausible effect is given by the largest study. Excess significance for each meta-analysis was claimed at p-value ≤ 0.10 level ²⁷.

Based on these calculations, we classified the strength of each association as "convincing", "highly suggestive", "suggestive", or "weak" (appendix) ^{12;29;30}. Specifically, meta-analyses were free from biases (convincing, Class I) if they met the following criteria: p-value < 10⁻⁶ based on random effects meta-analysis; >1000 participants; low or moderate between-study heterogeneity (I² < 50%); 95% PI that excluded the null value; no evidence of small-study effects and excess significance. Highly suggestive association (Class II) criteria required >1000 participants, highly significant summary associations (p-value < 10⁻⁶ by random-effects) and 95% PI not including the null value. Suggestive evidence (Class III) criteria required only >1000 participants and p-value ≤ 0.001 by random-effects. Weak association (Class IV) criteria required only p-value ≤ 0.05. Associations were considered non-significant if p > 0.05. Statistical analyses and power calculations were performed using Stata version 12.0 (Stata Corp, College Station, TX, USA). P values were all two-tailed.

In addition to these quantitative criteria, the overall credibility in the estimates was qualitatively assessed by two reviewers (CB, MP) using the GRADE method (appendix)³¹⁻³⁴. GRADE allows to rate the credibility of estimate for each outcome and supplies a tabular overview of findings easily understandable for intervention participants, policy makers, research planners, guideline developers, and other interested stakeholders³⁴. Summary of Findings tables were developed using the GRADEProGDT app.

RESULTS

Description of included systematic reviews

The systematic search yielded 3,393 records. After duplicate removal and inspection of titles and abstracts, 100 full-text articles were assessed for eligibility. Of these, 90 were excluded for the reasons reported in the appendix, and ten SRs, including 123 primary studies and 20,417 participants, met the umbrella review inclusion criteria (Figure 1)^{2;7;14;15;35-40}. From the included SRs we extracted information on 19 meta-analyses comparing psychosocial interventions with inactive controls (Table 1). In terms of populations, psychosocial interventions were studied in adults with schizophrenia, depression, common mental disorders (CMDs), perinatal CMDs, post-traumatic stress disorder (PTSD), anxiety, and in children with disruptive behaviour, PTSD, anxiety, depression and psychological distress without a diagnosis. In seven meta-analyses studies were conducted in humanitarian settings, and three included studies conducted in refugee populations. In terms of outcomes, psychotic, depressive, anxiety, PTSD and conduct symptoms were considered, with two comparisons focussing on functioning in adults with schizophrenia and depression (Table 1).

Of the ten systematic reviews identified, three included only studies of psychosocial interventions delivered by non-specialist health care providers ^{7;38;40}, and seven pooled together studies of psychosocial interventions delivered by non-specialist health care providers with studies involving both types of providers, usually non-specialists in different forms of collaboration with specialist health care providers.

Quality assessment of the included systematic reviews

Of the ten SRs, three were of high quality according to the AMSTAR-2 scoring system ^{7;39;40}, one was of moderate quality ¹⁵, and six received a low or critically low quality rating ^{2;14;35-38} (appendix). AMSTAR-2 detected that in five reviews a study protocol was not available, and study selection criteria were unclear. In addition, the source of funding for the studies included in the reviews was reported for one review only (appendix).

Summary effect sizes

Re-analysis of the 19 meta-analyses assessing the efficacy of psychosocial interventions is shown in Figure 2 and in the appendix. A total of 15 meta-analyses reported a nominally ($p \leq 0.05$) statistically significant summary effect using random-effects models, however only for the meta-analyses in adults with PTSD, depression, and anxiety in humanitarian settings the PIs excluded the null value (Table 1). Significant heterogeneity (I^2 above 50%) was observed in all comparisons, with the exception of the meta-analysis on the efficacy of psychosocial interventions in adults with PTSD in the general population, and with anxiety in humanitarian settings (Table 1). Risk of small-study effects bias was observed in eight comparisons, while excess of significance bias was undetected. However, this test has limited power when there are few studies, as happened for some comparisons (Table 1).

Umbrella review criteria and GRADE

None of the 19 meta-analyses had convincing strength of association according to quantitative umbrella review criteria, and none scored high with GRADE. However, strength of association was highly suggestive for five meta-analyses, suggestive for four, and weak for six (Figure 2). According to GRADE, the credibility of evidence was moderate for eight meta-analyses, low for nine, and very low for two (Figure 2 and appendix).

Based on umbrella review criteria and GRADE, a ranking of the 19 meta-analyses by strength of association and credibility of evidence is presented in Table 2. The evidence on the efficacy of psychosocial interventions in adults with depression in humanitarian settings, and in adults with CMDs, was supported by the most robust evidence, followed by the evidence on the efficacy of psychosocial interventions in adults with schizophrenia on functioning outcomes, by the evidence in adults with depression in the general population, and by the evidence in adults with PTSD in humanitarian settings (Table 2). NNT for these psychosocial interventions ranged between 2.5 and 5.4 (Table 2). The evidence on the efficacy of psychosocial interventions in women during the perinatal period was supported by suggestive evidence (Table 2).

In children, suggestive strength of association supported the efficacy of psychosocial interventions delivered in humanitarian settings, and of psychosocial interventions for conduct problems in children with disruptive behaviour (Table 2). NNT for these psychological interventions ranged between 7.1 and 8.0 (Table 2). All other psychosocial interventions were supported by weak evidence, with four comparisons failing to show any association (Table 2).

Re-analysis of the 19 meta-analyses by type of psychosocial intervention is presented in Table 3 and Appendix. The evidence on the efficacy of cognitive behavioural therapy in adults with depression, and the evidence on the efficacy of interpersonal therapy in adults with CMDs, was supported by the most robust evidence, followed by the evidence on the efficacy of other psychological interventions and multicomponent collaborative care (Table 3). Suggestive

strength of association supported the efficacy of psychoeducation and parenting education programmes for women with CMDs in the perinatal period, while in adults with PTSD in humanitarian settings cognitive behavioural therapy was supported by highly suggestive strength of association (Table 3).

In children, suggestive evidence was found for group-based focused psychosocial interventions delivered in humanitarian settings. All other interventions were supported by weak strength of association or failed to show any association (Table 3).

DISCUSSION

The present umbrella review included 19 meta-analyses of studies conducted in LMICs assessing the efficacy of psychosocial interventions on a range of mental health outcomes. Overall, available experimental evidence suggests that psychosocial interventions may have a clinically relevant effect, although strength of associations and credibility of evidence were quite variable. We found that between-study heterogeneity, PIs including the null value, and risk of small-study effects bias were the main reasons for bringing down the overall confidence in the evidence.

In adults, highly suggestive evidence supported psychosocial interventions in schizophrenia, depression, CMDs considered as a group, and in adults with depression and PTSD in humanitarian settings. The credibility of evidence ranged from moderate to low, indicating that the credibility in the estimate for some comparisons was not optimal. In children, psychosocial interventions were supported by at least suggestive evidence in conduct disorders and on PTSD outcomes among children in humanitarian settings. Interestingly, in most of these comparisons, both in adults and children, effect sizes were of considerable magnitude, with low corresponding NNT values, indicating that, in addition to statistical significance, clinically meaningful results might be obtained. This finding expands previous data showing that community-based

psychosocial interventions may have a strong effect on symptom severity and functioning in schizophrenia and depression ², and that psychological interventions are effective in depression and in persons with CMDs in LMICs ^{36;38}; it should be highlighted, however, that based on umbrella review and GRADE criteria none of these effect sizes reached the maximum of the ratings in terms of strength of association, and in terms of evidence credibility.

The findings of the present review may have important policy and practice implications. From a policy point of view, the availability of a significant body of experimental evidence generated in LMICs is a major finding and should be emphasised to contrast the generic view of absence of evidence in poor-resource settings ^{8;41}. This umbrella review showed that for psychosocial interventions the amount of evidence generated in LMICs is relatively large and viable for implementation initiatives. We argue that this message is of paramount relevance for governmental and non-governmental organizations, and donors, willing to implement or fund mental health programs in LMICs.

These results may also be used to inform clinical practice. Of course, linking evidence with practice remains a challenging issue ^{9;38;42-48}, but the evidence from this review may give some practical suggestions. For example, as most interventions were delivered by non-specialist health care providers, alone or in collaboration with specialist providers, developing the capacity of non-specialist providers on delivering psychosocial interventions can be considered an implementation strategy supported by a robust amount of evidence generated in LMICs ^{7;38;49}. This approach may be crucial to ensure that such interventions are sustainable, ethical and of sufficient quality ^{50;51}. Depending on local culture and traditions, programmes aimed at fostering task-shifting initiatives between non-specialist mental health providers and informal community care providers might be developed to improve pathways to mental health care ^{52;53}. A second suggestion is the possibility of being more responsive to the broad mental health needs of

populations affected by humanitarian crises in LMICs, as we were able to show that psychosocial interventions for adults with depression and PTSD, and for children in humanitarian settings, are supported by at least suggestive evidence. Clearly, further research needs to confirm whether evidence-based psychosocial interventions can be safely and sustainably implemented in contexts where stressors are ongoing, as we acknowledge that most of the included studies were conducted in the aftermath of humanitarian crises ⁵⁴. A third suggestion may be the inclusion in mental health programs of psychosocial interventions for women in the perinatal period, as epidemiological data have shown that one in three to five women from LMICs experiences symptoms of perinatal depression ⁵⁵⁻⁵⁸, and we found suggestive evidence of efficacy for these interventions.

The main limitations of this umbrella review are those of the SRs included which, in turn, suffer from the limitations of the primary studies. The most frequently reported review shortcomings, detected by AMSTAR-2, were lack of a review protocol describing review methods prior to the conduct of the review, lack of a thorough discussion of between-study heterogeneity, and lack of information on funding. According to umbrella review and GRADE criteria, publication bias could not be excluded for some comparisons, and issues in properly masking outcome assessment were detected. The inclusion of non-English literature remains another challenging issue. These limitations contributed to decrease the strength of associations and credibility of evidence.

Additional limitations refer to the umbrella review methodology, as this approach is based on statistical re-analysis of meta-analyses. By definition, therefore, umbrella reviews include only SRs that applied a quantitative approach to data presentation, while SRs providing qualitative descriptions of the included studies, without applying meta-analytic techniques, were excluded. For example, recent SRs that assessed the efficacy of psychosocial interventions in reducing

intimate partner violence, or in reducing psychological distress in people with HIV, were excluded as no meta-analysis was carried out^{59;60}. It should be noted, however, that lack of a meta-analytical approach is typically motivated by lack of sufficient and homogeneous experimental evidence, so for example for intimate partner violence or HIV the base of evidence may not reach the minimum clinical and methodological requirements needed to be meta-analysed. Another limitation is that we did not analyse whether the efficacy of psychosocial interventions is moderated by length of follow-up, type of inactive control condition, type of provider, or by other clinical-, social- or context-related variables^{61;62}. This was not feasible due to the nature of primary data. In terms of interventions, stratifying the analysis by type of psychosocial intervention inevitably decreased the power of analysis, but provided interesting clinical insights. For example, cognitive behavioural interventions for depression and PTSD, and interpersonal therapy for adults with CMDs, were supported by the most robust evidence, while there were very few evaluations of interventions with important social components. In terms of outcomes, in addition to symptomatic improvement, only for two comparisons we were able to re-analyse functional outcomes, and this is surprising in view of current emphasis on general well-being, functioning and quality of life in studies involving persons with mental disorders⁶³. Besides, no meta-analyses were found on rare but important pragmatic outcomes such as for example overall mortality, suicide or deliberate self-harm⁶⁴⁻⁶⁶. A final general limitation is that we did not consider promotion, prevention or protection interventions^{67;68}.

In view of the variability in the strength of associations and credibility of the evidence, action is required to support further research efforts in LMICs in diverse settings. There have been a number of capacity-building initiatives to improve capacity of LMIC research centres to conduct high quality trials. These efforts need to be sustained and expanded to ensure rigorous evidence generation can take place, led from LMIC partners to address research questions that are relevant to low-resource settings^{69;70}. In terms of populations, this review suggests a need for

further studies involving children and adolescents, especially in humanitarian settings, and adults and children with a migrant background. A focus on mental health problems along a continuum from mild psychological distress to severely disabling conditions, as suggested by the Lancet Commission on global mental health and sustainable development ¹⁶, seems an appropriate and feasible approach, although we note a lack of evidence for specific diagnostic conditions, for example bipolar disorder. In terms of interventions, considering the number and diversity of available psychosocial interventions, future research efforts should be directed to ascertain which delivery modality may be more feasible and sustainable, assessing for example whether brief, basic, group and non-specialist-delivered versions of existing evidence-based psychosocial interventions may be considered as an affordable and scalable alternative ^{65;71-74}. In terms of outcomes, it would be extremely relevant to assess the long-term effectiveness of these interventions, including functional and quality of life measures, as these have been seldom considered by the studies included in this umbrella review. More generally, research activity needs to be more sensitive to questions and concerns arising from implementation activities, and implementation activities would need to optimise the uptake of research findings into practice.

Given the pressing need of providing persons with mental health conditions with evidence-based answers, and in view of the data on the efficacy of psychosocial interventions in adults and children, we argue that these forms of interventions should be made routinely available to distressed adults and children in LMICs, recognising that the feasibility and sustainability of psychosocial interventions, especially in the long-term, may be an important challenge ⁷⁵⁻⁷⁸. In general, as psychosocial interventions are valued by service users as a complement to pharmacological treatment ⁷⁹, their involvement in this implementation process may further contribute to mental health system strengthening.

Contributors

CB and MP designed the study. CB drafted the manuscript. CG, MN, GO, DP, FT, and GiT contributed to the database preparation and double check. CB, MP and GO did data analyses. CG and DP assessed the quality of meta-analyses using AMSTAR-2. JA, CA, JE, OG, CH, MJ, CL, WT, VP, and GT critically revised the manuscript. All authors commented on and approved the draft and final manuscripts.

Declaration of interests

We declare no competing interests.

Data sharing

All data included in this umbrella review were extracted from publicly available systematic reviews.

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Figure 1. PRISMA flow-diagram

Figure 2. Re-analysis of the efficacy of psychosocial interventions in low- and middle-income countries, with strength of association and certainty of evidence
(SMD = standardised mean difference; CI = confidence interval)

Table 1. Characteristics, quantitative synthesis and umbrella review criteria of the 19 meta-analyses comparing psychosocial interventions and inactive controls

Population	Outcome	Meta-analysis	Studies (participants)	Significance threshold reached (random-effects)	I^2	Predictive Interval	Random-effects SMD (95% CI) of the largest study	Egger's test P-value	Significant studies		
									Observed	Expected	P-value
Adults with schizophrenia	Symptoms	Asher 2017 ²	7 (862)	0.005	94.7	-1.44 to 3.33	0.22 (-0.04 to 0.48)	0.043	5	5.33	0.68
Adults with schizophrenia	Social functioning	De Silva 2013 ³⁵	10 (1671)	2.902e ⁻⁶	89.7	-0.42 to 2.10	0.24 (0.10 to 0.38)	0.013	10	8.31	0.23
Adults with depression	Symptoms	Cuijpers 2018 ³⁶	35 (4668)	2.172e ⁻²⁶	89.7	-0.03 to 2.22	0.62 (0.48 to 0.76)	0.009	31	28.38	0.39
Adults with depression	Social functioning	De Silva 2013 ³⁵	12 (4098)	3.639e ⁻⁵	89.5	-0.35 to 1.28	0.06 (-0.05 to 0.16)	0.004	5	6.47	0.41
Adults with PTSD	Symptoms	van Ginneken 2013 ⁷	3 (223)	0.025	22.1	-2.26 to 2.98	0.28 (-0.17 to 0.73)	0.183	1.09	1	1.00
Adults with CMDs	Symptoms	Singla 2017 ³⁸	24 (6703)	8.173e ⁻¹³	83.2	-0.13 to 1.11	0.72 (0.58 to 0.87)	0.020	16	15.23	0.83
Adults with perinatal CMDs	Symptoms	Rahman 2013 ³⁷	14 (16591)	1.931e ⁻⁵	79.9	-0.27 to 1.04	0.62 (0.44 to 0.80)	0.991	8	9.39	0.41
Adults with PTSD in humanitarian settings	Symptoms	Purgato 2018a ³⁹	16 (1272)	8.623e ⁻¹⁴	77.8	0.02 to 2.11	0.79 (0.54 to 1.04)	0.051	14	12.68	0.55
Adults with depression in humanitarian settings	Symptoms	Purgato 2018a ³⁹	14 (1254)	1.515e ⁻¹⁷	55.0	0.26 to 1.47	0.90 (0.65 to 1.15)	0.550	12	10.69	0.54
Adults with anxiety in	Symptoms	Purgato 2018a ³⁹	5 (694)	3.270e ⁻⁹	48.1	0.03 to 1.44	0.48 (0.24 to 0.72)	0.086	5	4.57	1.00

humanitarian settings											
Children with disruptive behavior	Conduct problems	Burkey 2018 ¹⁴	26 (6400)	4.366e ⁻⁸	76.9	-0.24 to 0.99	0.11 (-0.08 to 0.30)	0.001	15	15.46	0.84
Children with PTSD or depression	Symptoms	van Ginneken 2013 ⁷	3 (298)	0.003	78.7	-6.24 to 8.02	1.27 (0.84 to 1.70)	0.242	2	2.14	1.00
Children with PTSD in humanitarian settings	Symptoms	Purgato 2018a ³⁹	3 (130)	0.052	93.0	-18.3 to 21.4	0.06 -0.59 to 0.72)	0.213	2	2.05	1.00
Children in humanitarian settings	PTSD symptoms	Purgato 2018b ⁴⁰	8 (2355)	5.975e ⁻⁴	80.2	-0.30 to 0.97	0.16 (-0.02 to 0.34)	0.286	4	4.52	0.73
Children in humanitarian settings	Depressive symptoms	Purgato 2018b ⁴⁰	10 (2672)	0.468	72.8	-0.47 to 0.58	0.07 (-0.11 to 0.25)	0.153	3	3.61	1.00
Children in humanitarian settings	Anxiety symptoms	Purgato 2018b ⁴⁰	7 (1969)	0.701	70.3	-0.49 to 0.56	0.14 (-0.06 to 0.33)	0.502	2	2.81	0.71
Adults and children refugees	PTSD symptoms	Turrini 2019 ¹⁵	9 (856)	7.802e ⁻⁴	88.6	-0.84 to 2.53	0.65 (0.43 to 0.86)	0.341	6	5.47	1.00
Adults and children refugees	Depressive symptoms	Turrini 2019 ¹⁵	5 (533)	5.746e ⁻⁵	92.7	-1.64 to 5.74	0.86 (0.64 to 1.09)	0.134	5	4.65	1.00
Adults and children refugees	Anxiety symptoms	Turrini 2019 ¹⁵	2 (445)	0.075	94.7	-	0.45 (0.24 to 0.66)	-	2	1.99	1.00

SMD = standardized mean difference; CI confidence interval; PTSD = post-traumatic stress disorder; CMDs = common mental disorders.

**Table 2. Ranking of the 19 meta-analyses comparing psychosocial interventions and inactive controls
by strength of association and credibility of evidence**

Strength of association	Credibility of evidence	Age group	Mental health condition	Context	Outcome	NNT (95% CI)	Meta-analysis
Convincing association							
Highly suggestive association	Moderate	Adults	Depression	Humanitarian settings	symptoms	3.0 (2.5 to 3.9)	Purgato 2018a ³⁹
	Moderate	Adults	CMDs	General population	symptoms	5.4 (4.2 to 7.4)	Singla 2017 ³⁸
	Low	Adults	Schizophrenia	General population	social functioning	3.1 (2.2 to 5.4)	De Silva 2013 ³⁵
	Low	Adults	Depression	General population	symptoms	2.4 (2.1 to 2.9)	Cuijpers 2018 ³⁶
	Low	Adults	PTSD	Humanitarian settings	symptoms	2.5 (2.0 to 3.3)	Purgato 2018a ³⁹
Suggestive association	Moderate	Adults	CMDs	Perinatal	symptoms	7.0 (4.7 to 13.2)	Rahman 2013 ³⁷
	Moderate	Children	Psychological distress	Humanitarian settings	PTDS symptoms	8.0 (5.0 to 19.4)	Purgato 2018b ⁴⁰
	Low	Adults	Depression	General population	social functioning	5.7 (3.8 to 11.2)	De Silva 2013 ³⁵
	Low	Children	Disruptive behavior	General population	conduct problems	7.1 (5.2 to 11.3)	Burkey 2018 ¹⁴
Weak association	Moderate	Adults	Anxiety	Humanitarian settings	symptoms	3.5 (2.7 to 5.3)	Purgato 2018a ³⁹
	Moderate	Children	PTSD or depression	General population	symptoms	2.9 (1.9 to 9.2)	van Ginneken 2013 ⁷

	Low	Adults	Schizophrenia	General population	symptoms	2.8 (1.8 to 9.7)	Asher 2017 ²
	Low	Adults and children	Psychological distress	Refugees	PTDS symptoms	3.1 (2.0 to 7.6)	Turrini 2019 ¹⁵
	Low	Adults and children	Psychological distress	Refugees	depressive symptoms	1.6 (1.4 to 2.5)	Turrini 2019 ¹⁵
	Low	Adults	PTSD	General population	symptoms	7.5 (3.9 to 63.2)	van Ginneken 2013 ⁷
No association	Moderate	Children	Psychological distress	Humanitarian settings	depressive symptoms	-	Purgato 2018b ⁴⁰
	Moderate	Children	Psychological distress	Humanitarian settings	anxiety symptoms	-	Purgato 2018b ⁴⁰
	Very low	Children	PTSD	Humanitarian settings	symptoms	-	Purgato 2018a ³⁹
	Very low	Adults and children	Psychological distress	Refugees	anxiety symptoms	-	Turrini 2019 ¹⁵

NNT = number needed to treat; CI = confidence interval; PTSD = post-traumatic stress disorder; CMDs = common mental disorders.

Table 3. Re-analysis of the 19 meta-analyses comparing psychosocial interventions and inactive controls by type of psychosocial intervention

Age group	Mental health condition	Context	Outcome	Type of psychosocial intervention	SMD (95% CI)	I ²	More than 1,000 participants	Strength of association	Meta-analysis
Adults	Schizophrenia	General population	symptoms	Psychoeducation	0.91 (0.33 to 1.50)	54.3	No	Weak	Asher 2017 ²
				Psychosocial rehabilitation	0.01 (-0.42 to 0.43)	81.0	No	No association	
				Case management	1.63 (0.96 to 2.29)	80.2	No	Weak	
Adults	Schizophrenia	General population	social functioning	Psychoeducation	1.15 (0.05 to 2.25)	95.1	No	Weak	De Silva 2013 ³⁵
				Multicomponent structured psychosocial interventions	0.33 (0.10 to 0.55)	0.0	No	Weak	
				Art therapy	0.71 (0.31 to 1.12)	-	No	Weak	
				Multicomponent community care	0.33 (0.10 to 0.55)	0.0	No	Weak	
Adults	Depression	General population	symptoms	Interpersonal therapy	1.25 (0.96 to 1.54)	12.4	No	Weak	Cuijpers 2018 ³⁶
				Cognitive-behavioral therapy	1.16 (0.89 to 1.43)	92.0	Yes	Highly suggestive	
				Other psychotherapies	0.94 (0.89 to 1.30)	73.3	Yes	Suggestive	
Adults	Depression	General population	social functioning	Interpersonal therapy	0.84 (0.39 to 1.29)	67.5	No	Weak	De Silva 2013 ³⁵
				Problem solving	0.10 (-0.15 to 0.35)	-	No	No association	
				Morita therapy	0.66	-	No	Weak	

					(0.26 to 1.05)				
				Multicomponent collaborative care	0.35 (0.11 to 0.59)	89.0	Yes	Suggestive	
Adults	PTSD	General population	symptoms	Psychological interventions	0.22 (-0.10 to 0.54)	0.0	No	No association	van Ginneken 2013 ⁷
				Narrative exposure therapy	0.72 (0.18 to 1.26)	-	No	Weak	
Adults	CMDs	General population	symptoms	Psychoeducation	0.36 (0.13 to 0.58)	50.2	No	Weak	Singla 2017 ³⁸
				Psychosocial interventions	0.25 (0.14 to 0.36)	0.0	Yes	Suggestive	
				Cognitive behavioral therapy	0.67 (0.37 to 0.97)	89.5	Yes	Suggestive	
				Interpersonal therapy	0.80 (0.57 to 1.03)	75.1	Yes	Highly suggestive	
				Problem-solving	0.64 (0.36 to 0.62)	0.0	No	Weak	
Adults	CMDs	Perinatal	symptoms	Parenting education	0.19 (0.09 to 0.30)	0.0	Yes	Suggestive	Rahman 2013 ³⁷
				Psychoeducation	0.36 (0.21 to 0.51)	9.6	Yes	Suggestive	
				Multimodal cognitive-behavioral therapy	0.94 (0.21 to 0.56)	93.0	Yes	Weak	
Adults	PTSD	Humanitarian settings	symptoms	Eye movement desensitization and reprocessing	2.01 (1.52 to 2.51)	2.4	No	Weak	Purgato 2018a ³⁹
				Cognitive-behavioral therapy	0.85 (0.58 to 1.13)	70.0	Yes	Highly suggestive	
				Interpersonal therapy	1.45 (0.44 to 2.47)	-	No	Weak	
				Thought field therapy	1.27 (0.91 to 1.63)	-	No	Weak	

Adults	Depression	Humanitarian settings	symptoms	Eye movement desensitization and reprocessing	1.44 (0.99 to 1.88)	0.0	No	Weak	Purgato 2018a ³⁹
				Cognitive-behavioral therapy	0.81 (0.60 to 1.02)	45.6	No	Weak	
				Interpersonal therapy	0.84 (0.08 to 1.60)	58.9	No	Weak	
Adults	Anxiety	Humanitarian settings	symptoms	Cognitive-behavioral therapy	0.74 (0.49 to 0.98)	48.1	No	Weak	Purgato 2018a ³⁹
Children	Disruptive behavior	General population	conduct problems	Child-focused cognitive-behavioral therapy	0.79 (0.03 to 1.56)	86.3	No	Weak	Burkey 2018 ¹⁴
				Child-focused interpersonal therapy	0.04 (-0.23 to 0.31)	44.2	No	No association	
				Child-focused psychosocial interventions	0.39 (0.15 to 0.63)	64.7	Yes	Weak	
				Child-focused social skill training	0.25 (-1.06 to 1.56)	97.0	No	No association	
				Parent-focused psychosocial interventions	0.39 (0.15 to 0.64)	70.0	Yes	Weak	
				Parent-focused cognitive-behavioral therapy	0.68 (0.22 to 1.14)	-	No	Weak	
				Multi-component psychosocial interventions	0.18 (-0.13 to 0.50)	74.7	No	No association	
				Classroom-based psychosocial interventions	0.49 (0.28 to 0.71)	0.0	No	Weak	
Children	PTSD or depression	General population	symptoms	ERASE stress	1.27 (0.84 to 1.70)	-	No	Weak	van Ginneken 2013 ⁷
				Narrative exposure therapy	0.24 (-0.29 to 0.78)	-	No	No association	
				Group psychotherapy	1.12	-	No	Weak	

					(0.64 to 1.60)				
Children	PTSD	Humanitarian settings	symptoms	Cognitive-behavioral therapy	1.56 (-0.02 to 3-13)	93.0	No	No association	Purgato 2018a ³⁹
Children	Psychological distress	Humanitarian settings	PTDS symptoms	group-based focused psychosocial interventions	0.33 (0.14 to 0.52)	80.2	Yes	Suggestive	Purgato 2018b ⁴⁰
Children	Psychological distress	Humanitarian settings	depressive symptoms	group-based focused psychosocial interventions	0.06 (-0.10 to 0.22)	72.8	Yes	No association	Purgato 2018b ⁴⁰
Children	Psychological distress	Humanitarian settings	anxiety symptoms	group-based focused psychosocial interventions	0.03 (-0.13 to 0.20)	70.3	Yes	No association	Purgato 2018b ⁴⁰
Adults and children	Psychological distress	Refugees	PTDS symptoms	Eye movement desensitization and reprocessing	2.04 (1.56 to 2.51)	11.2	No	Weak	Turrini 2019 ¹⁵
				Psychosocial interventions	0.69 (0.51 to 0.88)	0.0	No	Weak	
				Narrative exposure therapy	0.00 (-0.24 to 0.25)	0.0	No	No association	
Adults and children	Psychological distress	Refugees	depressive symptoms	Psychosocial interventions	2.96 (0.27 to 5.66)	96.0	No	Weak	Turrini 2019 ¹⁵
				Eye movement desensitization and reprocessing	1.46 (1.07 to 1.86)	0.0	No	Weak	
Adults and children	Psychological distress	Refugees	anxiety symptoms	Eye movement desensitization and reprocessing	1.56 (1.10 to 2.01)	-	No	Weak	Turrini 2019 ¹⁵
				Psychosocial interventions	0.45 (0.24 to 0.66)	.	No	Weak	

SMD = standardized mean difference; CI = confidence intervals; PTSD = post-traumatic stress disorder; CMDs = common mental disorders.

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- (70) da Silva ATC, Hanlon C, Susser E, et al. Enhancing mental health research capacity: emerging voices from the National Institute of Mental Health (NIMH) global hubs. *Int J Ment Health Syst* 2019; 13:21.
- (71) Bockting CLH, Williams AD, Carswell K, Grech AE. The potential of low-intensity and online interventions for depression in low- and middle-income countries. *Glob Ment Health (Camb)* 2016; 3:e25.
- (72) Einfeld SL, Stancliffe RJ, Gray KM, et al. Interventions provided by parents for children with intellectual disabilities in low and middle income countries. *J Appl Res Intellect Disabil* 2012; 25(2):135-142.
- (73) Fazel M, Patel V, Thomas S, Tol W. Mental health interventions in schools in low-income and middle-income countries. *Lancet Psychiatry* 2014; 1(5):388-398.
- (74) Naslund JA, Aschbrenner KA, Araya R, et al. Digital technology for treating and preventing mental disorders in low-income and middle-income countries: a narrative review of the literature. *Lancet Psychiatry* 2017; 4(6):486-500.
- (75) Petersen I, Lund C, Stein DJ. Optimizing mental health services in low-income and middle-income countries. *Curr Opin Psychiatry* 2011; 24(4):318-323.
- (76) Brooke-Sumner C, Petersen I, Asher L, Mall S, Egbe CO, Lund C. Systematic review of feasibility and acceptability of psychosocial interventions for schizophrenia in low and middle income countries. *BMC Psychiatry* 2015; 15:19.

- (77) Murray LK, Jordans MJ. Rethinking the service delivery system of psychological interventions in low and middle income countries. *BMC Psychiatry* 2016; 16:234.
- (78) Thornicroft G, Ahuja S, Barber S, et al. Integrated care for people with long-term mental and physical health conditions in low-income and middle-income countries. *Lancet Psychiatry* 2019; 6(2):174-186.
- (79) Semrau M, Lempp H, Keynejad R, et al. Service user and caregiver involvement in mental health system strengthening in low- and middle-income countries: systematic review. *BMC Health Serv Res* 2016; 16:79.

APPENDIX

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Umbrella review search strategy

Pubmed:

(meta analysis[Publication Type] OR meta analysis[Title/Abstract] OR meta analysis[MeSH Terms] OR review[Publication Type] OR search*[Title/Abstract]) AND (psychosocial OR psychological OR psychotherapy OR mental health intervention) AND (low and middle-income countr* OR lmic OR lamic OR low and middle income countr* OR humanitarian OR emergen* OR violence OR abuse* OR torture OR displace* OR refugee* OR conflict OR war OR disaster OR earthquake OR catastrophe* OR drought* OR evacuation* OR famine* OR flood* OR hurricane OR cyclone* OR landslide* OR land slide* OR mass casual* OR tsunami* OR tidal wave* OR volcano*) AND (randomized OR random OR controlled)

Hits, 28-05-2019: **1451**

Last 10 years: **996**

Ovid MEDLINE e PsycINFO

((psychosocial or psychological or psychotherapy or mental health intervention) and (((low and middle-income countr*) or lmic or lamic or low) and middle income countr*) or humanitarian or emergen* or violence or abuse* or torture or displace* or refugee* or conflict or war or disaster or earthquake or catastrophe* or drought* or evacuation* or famine* or flood* or hurricane or cyclone* or landslide* or land slide* or mass casual* or tsunami* or tidal wave* or volcano*) and (randomized or random or controlled) and (review or meta-analysis or search))

Hits, 28-05-2019: **1338**

Last 10 years: **898**

EPISTEMONIKOS

((psychosocial or psychological or psychotherapy or mental health intervention) and (((low and middle-income countr*) or lmic or lamic or low) and middle income countr*) or humanitarian or emergen* or violence or abuse* or torture or displace* or refugee* or conflict or war or disaster or earthquake or catastrophe* or drought* or evacuation* or famine* or flood* or hurricane or cyclone* or landslide* or land slide* or mass casualt* or tsunami* or tidal wave* or volcano*) and (randomized or random or controlled) and (review or meta-analysis or search))

Hits, 28-05-2019: **1816**

Last 10 years: **1311**

Cochrane library

((psychosocial or psychological or psychotherapy or mental health intervention) and (((low and middle-income countr*) or lmic or lamic or low) and middle income countr*) or humanitarian or emergen* or violence or abuse* or torture or displace* or refugee* or conflict or war or disaster or earthquake or catastrophe* or drought* or evacuation* or famine* or flood* or hurricane or cyclone* or landslide* or land slide* or mass casualt* or tsunami* or tidal wave* or volcano*) and (randomized or random or controlled) and (review or meta-analysis or search))

Hits, 28-05-2019: **188**

Last 10 years **188**

Total, all databases, last 10 years: **3393**; without duplicates: **2116**

List of excluded studies with reason

Acharibasam JW, Wynn R. Telemental Health in Low- and Middle-Income Countries: A Systematic Review. <i>Int J Telemed Appl</i> 2018;2018:9602821.	Wrong intervention (no psychosocial intervention)
Akanbi MO, Carroll AJ, Achenbach C, O'Dwyer LC, Jordan N, Hitsman B, et al. The efficacy of smoking cessation interventions in low- and middle-income countries: a systematic review and meta-analysis. <i>Addiction</i> 2019 Apr;114(4):620-35.	Wrong population (no mental health condition)
Akena D, Joska J, Obuku EA, Amos T, Musisi S, Stein DJ. Comparing the accuracy of brief versus long depression screening instruments which have been validated in low and middle income countries: a systematic review. <i>BMC Psychiatry</i> 2012 Nov 1;12:187.	Wrong intervention (no psychosocial intervention)
Ali GC, Ryan G, De Silva MJ. Validated Screening Tools for Common Mental Disorders in Low and Middle Income Countries: A Systematic Review. <i>PLoS One</i> 2016;11(6):e0156939.	Wrong intervention (no psychosocial intervention)
Andrews L. Non-Specialist Health Worker Interventions for the Care of Mental, Neurological, and Substance-Abuse Disorders in Low- and Middle-Income Countries. <i>Issues Ment Health Nurs</i> 2016;37(2):131-2.	Wrong study design (commentary on van Ginneken 2013)
Arean PA, Mackin S, Vargas-Dwyer E, Raue P, Sirey JA, Kanellopolos D, et al. Treating depression in disabled, low-income elderly: a conceptual model and recommendations for care. <i>Int J Geriatr Psychiatry</i> 2010 Aug;25(8):765-9.	Wrong study design (no meta-analysis)
Arjadi R, Nauta MH, Chowdhary N, Bockting CLH. A systematic review of online interventions for mental health in low and middle income countries: a neglected field. <i>Glob Ment Health (Camb)</i> 2015;2:e12.	Wrong study design (no meta-analysis)
Babulal GM, Bakhshi P, Kopriva S, Ali SA, Goette SA, Trani JF. Measuring participation for persons with mental illness: a systematic review assessing relevance of existing scales for low and middle income countries. <i>BMC Psychol</i> 2015 Oct 14;3:36.	Wrong intervention (no psychosocial intervention)
Bacchus LJ, Colombini M, Contreras UM, Howarth E, Gardner F, Annan J, et al. Exploring opportunities for coordinated responses to intimate partner violence and child maltreatment in low and middle income countries: a scoping review. <i>Psychol Health Med</i> 2017 Mar;22(sup1):135-65.	Wrong study design (no meta-analysis)
Bantjes J, Iemmi V, Coast E, Channer K, Leone T, McDaid D, et al. Poverty and suicide research in low- and middle-income countries: systematic mapping of literature published in English and a proposed research agenda. <i>Glob Ment Health (Camb)</i> 2016;3:e32.	Wrong study design (no meta-analysis)
Barry MM, Clarke AM, Jenkins R, Patel V. A systematic review of the effectiveness of mental health promotion interventions for young people in low and middle income countries. <i>BMC Public Health</i> 2013 Sep 11;13:835.	Wrong population (no mental health condition)
Bockting CLH, Williams AD, Carswell K, Grech AE. The potential of low-intensity and online interventions for depression in low- and middle-income countries. <i>Glob Ment Health (Camb)</i> 2016;3:e25.	Wrong study design (no meta-analysis)
Brandao DJ, Fontenelle LF, da Silva SA, Menezes PR, Pastor-Valero M. Depression and excess mortality in the elderly living in low- and middle-income countries: Systematic review and meta-analysis. <i>Int J Geriatr Psychiatry</i> 2019 Jan;34(1):22-30.	Wrong intervention (no psychosocial intervention)

Breuer E, De Silva MJ, Shidaye R, Petersen I, Nakku J, Jordans MJ, et al. Planning and evaluating mental health services in low- and middle-income countries using theory of change. <i>Br J Psychiatry</i> 2016 Jan;208 Suppl 56:s55-s62.	Wrong study design (no meta-analysis)
Bright T, Wallace S, Kuper H. A Systematic Review of Access to Rehabilitation for People with Disabilities in Low- and Middle-Income Countries. <i>Int J Environ Res Public Health</i> 2018 Oct 2;15(10).	Wrong intervention (no psychosocial intervention)
Brooke-Sumner C, Petersen I, Asher L, Mall S, Egbe CO, Lund C. Systematic review of feasibility and acceptability of psychosocial interventions for schizophrenia in low and middle income countries. <i>BMC Psychiatry</i> 2015 Feb 12;15:19.	Wrong study design (no meta-analysis)
Burns JK, Tomita A. Traditional and religious healers in the pathway to care for people with mental disorders in Africa: a systematic review and meta-analysis. <i>Soc Psychiatry Psychiatr Epidemiol</i> 2015 Jun;50(6):867-77.	Wrong intervention (no psychosocial intervention)
Chibanda D, Cowan FM, Healy JL, Abas M, Lund C. Psychological interventions for Common Mental Disorders for People Living With HIV in Low- and Middle-Income Countries: systematic review. <i>Trop Med Int Health</i> 2015 Jul;20(7):830-9.	Wrong study design (no meta-analysis)
Chowdhary N, Sikander S, Atif N, Singh N, Ahmad I, Fuhr DC, et al. The content and delivery of psychological interventions for perinatal depression by non-specialist health workers in low and middle income countries: a systematic review. <i>Best Pract Res Clin Obstet Gynaecol</i> 2014 Jan;28(1):113-33.	Wrong study design (no meta-analysis)
Clarke K, King M, Prost A. Psychosocial interventions for perinatal common mental disorders delivered by providers who are not mental health specialists in low- and middle-income countries: a systematic review and meta-analysis. <i>PLoS Med</i> 2013 Oct;10(10):e1001541.	Included in Rahman 2013
Dchmidt ID. Addressing PTSD in low-income victims of intimate partner violence: moving toward a comprehensive intervention. <i>Soc Work</i> 2014 Jul;59(3):253-60.	Wrong study design (no meta-analysis)
de Jesus MJ, Tofoli LF, Noto C, Li LM, Diehl A, Claudino AM, et al. Pharmacological and psychosocial management of mental, neurological and substance use disorders in low- and middle-income countries: issues and current strategies. <i>Drugs</i> 2013 Sep;73(14):1549-68.	Wrong study design (no meta-analysis)
Demissie M, Hanlon C, Birhane R, Ng L, Medhin G, Fekadu A. Psychological interventions for bipolar disorder in low- and middle-income countries: systematic review. <i>BJPsych Open</i> 2018 Sep;4(5):375-84.	Wrong study design (no meta-analysis)
Docherty M, Shaw K, Goulding L, Parke H, Eassom E, Ali F, et al. Evidence-based guideline implementation in low and middle income countries: lessons for mental health care. <i>Int J Ment Health Syst</i> 2017;11:8.	Wrong study design (no meta-analysis)
Eaton J, McCay L, Semrau M, Chatterjee S, Baingana F, Araya R, et al. Scale up of services for mental health in low-income and middle-income countries. <i>Lancet</i> 2011 Oct 29;378(9802):1592-603.	Wrong study design (no meta-analysis)

Einfeld SL, Stancliffe RJ, Gray KM, Sofronoff K, Rice L, Emerson E, et al. Interventions provided by parents for children with intellectual disabilities in low and middle income countries. <i>J Appl Res Intellect Disabil</i> 2012 Mar;25(2):135-42.	Wrong study design (no meta-analysis)
Fazel M, Patel V, Thomas S, Tol W. Mental health interventions in schools in low-income and middle-income countries. <i>Lancet Psychiatry</i> 2014 Oct;1(5):388-98.	Wrong study design (no meta-analysis)
Fellmeth G, Fazel M, Plugge E. Migration and perinatal mental health in women from low- and middle-income countries: a systematic review and meta-analysis. <i>BJOG</i> 2017 Apr;124(5):742-52.	Wrong intervention (no psychosocial intervention)
Fisher J, Cabral de MM, Patel V, Rahman A, Tran T, Holton S, et al. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review. <i>Bull World Health Organ</i> 2012 Feb 1;90(2):139G-49G.	Wrong intervention (no psychosocial intervention)
Furlan AD, Irvin E, Munhall C, Giraldo-Prieto M, Fullerton L, McMaster R, et al. Rehabilitation service models for people with physical and/or mental disability living in low- and middle-income countries: A systematic review. <i>J Rehabil Med</i> 2018 Jun 15;50(6):487-98.	Wrong study design (no meta-analysis)
Gajaria A, Ravindran AV. Interventions for perinatal depression in low and middle-income countries: A systematic review. <i>Asian J Psychiatr</i> 2018 Oct;37:112-20.	Wrong study design (no meta-analysis)
Gelaye B, Rondon MB, Araya R, Williams MA. Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. <i>Lancet Psychiatry</i> 2016 Oct;3(10):973-82.	Wrong study design (no meta-analysis)
Halim N, Beard J, Mesic A, Patel A, Henderson D, Hibberd P. Intimate partner violence during pregnancy and perinatal mental disorders in low and lower middle income countries: A systematic review of literature, 1990-2017. <i>Clin Psychol Rev</i> 2018 Dec;66:117-35.	Wrong intervention (no psychosocial intervention)
Hanlon C, Tesfaye M, Wondimagegn D, Shibre T. Ethical and professional challenges in mental health care in low- and middle-income countries. <i>Int Rev Psychiatry</i> 2010;22(3):245-51.	Wrong study design (no meta-analysis)
Hansotte E, Payne SI, Babich SM. Positive postpartum depression screening practices and subsequent mental health treatment for low-income women in Western countries: a systematic literature review. <i>Public Health Rev</i> 2017;38:3.	Wrong study design (no meta-analysis)
Healy EA, Kaiser BN, Puffer ES. Family-based youth mental health interventions delivered by nonspecialist providers in low- and middle-income countries: A systematic review. <i>Fam Syst Health</i> 2018 Jun;36(2):182-97.	Wrong study design (no meta-analysis)
Heim E, Henderson C, Kohrt BA, Koschorke M, Milenova M, Thornicroft G. Reducing mental health-related stigma among medical and nursing students in low- and middle-income countries: a systematic review. <i>Epidemiol Psychiatr Sci</i> 2019 Apr 1;1-9.	Wrong study design (no meta-analysis)

Herba CM, Glover V, Ramchandani PG, Rondon MB. Maternal depression and mental health in early childhood: an examination of underlying mechanisms in low-income and middle-income countries. <i>Lancet Psychiatry</i> 2016 Oct;3(10):983-92.	Wrong study design (no meta-analysis)
Hodgkinson S, Godoy L, Beers LS, Lewin A. Improving Mental Health Access for Low-Income Children and Families in the Primary Care Setting. <i>Pediatrics</i> 2017 Jan;139(1).	Wrong study design (no meta-analysis)
Iemmi V, Bantjes J, Coast E, Channer K, Leone T, McDaid D, et al. Suicide and poverty in low-income and middle-income countries: a systematic review. <i>Lancet Psychiatry</i> 2016 Aug;3(8):774-83.	Wrong intervention (no psychosocial intervention)
Jordans MJ, Pigott H, Tol WA. Interventions for Children Affected by Armed Conflict: a Systematic Review of Mental Health and Psychosocial Support in Low- and Middle-Income Countries. <i>Curr Psychiatry Rep</i> 2016 Jan;18(1):9.	Wrong study design (no meta-analysis)
Juengsiragulwit D. Opportunities and obstacles in child and adolescent mental health services in low- and middle-income countries: a review of the literature. <i>WHO South East Asia J Public Health</i> 2015 Jul;4(2):110-22.	Wrong study design (no meta-analysis)
Kemp CG, Jarrett BA, Kwon CS, Song L, Jette N, Sapag JC, et al. Implementation science and stigma reduction interventions in low- and middle-income countries: a systematic review. <i>BMC Med</i> 2019 Feb 15;17(1):6.	Wrong study design (no meta-analysis)
Keynejad R, Semrau M, Toynbee M, Evans-Lacko S, Lund C, Gureje O, et al. Building the capacity of policy-makers and planners to strengthen mental health systems in low- and middle-income countries: a systematic review. <i>BMC Health Serv Res</i> 2016 Oct 21;16(1):601.	Wrong study design (no meta-analysis)
Keynejad RC, Dua T, Barbui C, Thornicroft G. WHO Mental Health Gap Action Programme (mhGAP) Intervention Guide: a systematic review of evidence from low and middle-income countries. <i>Evid Based Ment Health</i> 2018 Feb;21(1):30-4.	Wrong study design (no meta-analysis)
Kim K, Lee Y. The effects of depressive symptom management interventions on low-income mothers: A systematic review and meta-analysis. <i>J Adv Nurs</i> 2018 Nov 20.	Wrong setting (no LMICs)
Klasen H, Crombag AC. What works where? A systematic review of child and adolescent mental health interventions for low and middle income countries. <i>Soc Psychiatry Psychiatr Epidemiol</i> 2013 Apr;48(4):595-611.	Wrong study design (no meta-analysis)
Kohrt BA, Asher L, Bhardwaj A, Fazel M, Jordans MJD, Mutamba BB, et al. The Role of Communities in Mental Health Care in Low- and Middle-Income Countries: A Meta-Review of Components and Competencies. <i>Int J Environ Res Public Health</i> 2018 Jun 16;15(6).	Wrong study design (no meta-analysis)
Larson LM, Yousafzai AK. A meta-analysis of nutrition interventions on mental development of children under-two in low- and middle-income countries. <i>Matern Child Nutr</i> 2017 Jan;13(1).	Wrong intervention (no psychosocial intervention)
Levy LB, O'Hara MW. Psychotherapeutic interventions for depressed, low-income women: a review of the literature. <i>Clin Psychol Rev</i> 2010 Dec;30(8):934-50.	Wrong setting (no LMICs)

Lund C, Breen A, Flisher AJ, Kakuma R, Corrigall J, Joska JA, et al. Poverty and common mental disorders in low and middle income countries: A systematic review. Soc Sci Med 2010 Aug;71(3):517-28.	Wrong intervention (no psychosocial intervention)
Lund C, De SM, Plagerson S, Cooper S, Chisholm D, Das J, et al. Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. Lancet 2011 Oct 22;378(9801):1502-14.	Wrong intervention (no psychosocial intervention)
Marlow M, Servili C, Tomlinson M. A review of screening tools for the identification of autism spectrum disorders and developmental delay in infants and young children: recommendations for use in low- and middle-income countries. Autism Res 2019 Feb;12(2):176-99.	Wrong intervention (no psychosocial intervention)
Maselko J. Social Epidemiology and Global Mental Health: Expanding the Evidence from High-Income to Low- and Middle-Income Countries. Curr Epidemiol Rep 2017;4(2):166-73.	Wrong study design (no meta-analysis)
Mayston R, Kinyanda E, Chishinga N, Prince M, Patel V. Mental disorder and the outcome of HIV/AIDS in low-income and middle-income countries: a systematic review. AIDS 2012 Dec;26 Suppl 2:S117-S135.	Wrong study design (no meta-analysis)
Mendenhall E, Norris SA, Shidhaye R, Prabhakaran D. Depression and type 2 diabetes in low- and middle-income countries: a systematic review. Diabetes Res Clin Pract 2014 Feb;103(2):276-85.	Wrong intervention (no psychosocial intervention)
Meyer SR, Lasater M, Tol WA. Migration and Mental Health in Low- and Middle-Income Countries: A Systematic Review. Psychiatry 2017;80(4):374-81.	Wrong intervention (no psychosocial intervention)
Morina N, Malek M, Nickerson A, Bryant RA. Meta-analysis of interventions for posttraumatic stress disorder and depression in adult survivors of mass violence in low- and middle-income countries. Depress Anxiety 2017 Aug;34(8):679-91.	Included in Purgato 2018
Munodawafa M, Mall S, Lund C, Schneider M. Process evaluations of task sharing interventions for perinatal depression in low and middle income countries (LMIC): a systematic review and qualitative meta-synthesis. BMC Health Serv Res 2018 Mar 23;18(1):205.	Wrong study design (no meta-analysis)
Murray LK, Jordans MJ. Rethinking the service delivery system of psychological interventions in low and middle income countries. BMC Psychiatry 2016 Jul 12;16:234.	Wrong study design (no meta-analysis)
Mutamba BB, van GN, Smith PL, Wandiembe S, Schellenberg D. Roles and effectiveness of lay community health workers in the prevention of mental, neurological and substance use disorders in low and middle income countries: a systematic review. BMC Health Serv Res 2013 Oct 13;13:412.	Wrong study design (no meta-analysis)
Nadkarni A, Hanlon C, Bhatia U, Fuhr D, Ragoni C, de Azevedo Perocco SL, et al. The management of adult psychiatric emergencies in low-income and middle-income countries: a systematic review. Lancet Psychiatry 2015 Jun;2(6):540-7.	Wrong study design (no meta-analysis)
Naslund JA, Aschbrenner KA, Araya R, Marsch LA, Unutzer J, Patel V, et al. Digital technology for treating and preventing mental	Wrong study design (no meta-analysis)

disorders in low-income and middle-income countries: a narrative review of the literature. <i>Lancet Psychiatry</i> 2017 Jun;4(6):486-500.	
Nguyen T, Holton S, Tran T, Fisher J. Informal mental health interventions for people with severe mental illness in low and lower middle-income countries: A systematic review of effectiveness. <i>Int J Soc Psychiatry</i> 2019 Mar 7;20764019831322.	Wrong study design (no meta-analysis)
Padmanathan P, De Silva MJ. The acceptability and feasibility of task-sharing for mental healthcare in low and middle income countries: a systematic review. <i>Soc Sci Med</i> 2013 Nov;97:82-6.	Wrong study design (no meta-analysis)
Parsons CE, Young KS, Rochat TJ, Kringelbach ML, Stein A. Postnatal depression and its effects on child development: a review of evidence from low- and middle-income countries. <i>Br Med Bull</i> 2012;101:57-79.	Wrong study design (no meta-analysis)
Passchier RV, Abas MA, Ebuanyi ID, Pariante CM. Effectiveness of depression interventions for people living with HIV in Sub-Saharan Africa: A systematic review & meta-analysis of psychological & immunological outcomes. <i>Brain Behav Immun</i> 2018 Oct;73:261-73.	Wrong study design (pre-post comparison meta-analysis)
Pega F, Liu SY, Walter S, Pabayo R, Saith R, Lhachimi SK. Unconditional cash transfers for reducing poverty and vulnerabilities: effect on use of health services and health outcomes in low- and middle-income countries. <i>Cochrane Database Syst Rev</i> 2017 Nov 15;11:CD011135.	Wrong intervention (no psychosocial intervention)
Petersen I, Lund C, Stein DJ. Optimizing mental health services in low-income and middle-income countries. <i>Curr Opin Psychiatry</i> 2011 Jul;24(4):318-23.	Wrong study design (no meta-analysis)
Petersen I, Evans-Lacko S, Semrau M, Barry MM, Chisholm D, Gronholm P, et al. Promotion, prevention and protection: interventions at the population- and community-levels for mental, neurological and substance use disorders in low- and middle-income countries. <i>Int J Ment Health Syst</i> 2016;10:30.	Wrong study design (no meta-analysis)
Pullar J, Allen L, Townsend N, Williams J, Foster C, Roberts N, et al. The impact of poverty reduction and development interventions on non-communicable diseases and their behavioural risk factors in low and lower-middle income countries: A systematic review. <i>PLoS One</i> 2018;13(2):e0193378.	Wrong study design (no meta-analysis)
Rane A, Church S, Bhatia U, Orford J, Velleman R, Nadkarni A. Psychosocial interventions for addiction-affected families in Low and Middle Income Countries: A systematic review. <i>Addict Behav</i> 2017 Nov;74:1-8.	Wrong study design (no meta-analysis)
Reed RV, Fazel M, Jones L, Panter-Brick C, Stein A. Mental health of displaced and refugee children resettled in low-income and middle-income countries: risk and protective factors. <i>Lancet</i> 2012 Jan 21;379(9812):250-65.	Wrong study design (no meta-analysis)
Robertson J, Emerson E, Hatton C, Yasamy MT. Efficacy of community-based rehabilitation for children with or at significant risk of intellectual disabilities in low- and middle-income countries: a review. <i>J Appl Res Intellect Disabil</i> 2012 Mar;25(2):143-54.	Wrong study design (no meta-analysis)

Sapkota D, Baird K, Saito A, Anderson D. Interventions for reducing and/or controlling domestic violence among pregnant women in low- and middle-income countries: a systematic review. <i>Syst Rev</i> 2019 Apr 2;8(1):79.	Wrong study design (no meta-analysis)
Semrau M, Lempp H, Keynejad R, Evans-Lacko S, Mugisha J, Raja S, et al. Service user and caregiver involvement in mental health system strengthening in low- and middle-income countries: systematic review. <i>BMC Health Serv Res</i> 2016 Mar 1;16:79.	Wrong study design (no meta-analysis)
Shidhaye R, Mendenhall E, Sumathipala K, Sumathipala A, Patel V. Association of somatoform disorders with anxiety and depression in women in low and middle income countries: a systematic review. <i>Int Rev Psychiatry</i> 2013 Feb;25(1):65-76.	Wrong study design (no meta-analysis)
Shrestha SD, Pradhan R, Tran TD, Gualano RC, Fisher JR. Reliability and validity of the Edinburgh Postnatal Depression Scale (EPDS) for detecting perinatal common mental disorders (PCMDs) among women in low-and lower-middle-income countries: a systematic review. <i>BMC Pregnancy Childbirth</i> 2016 Apr 4;16:72.	Wrong intervention (no psychosocial intervention)
Sikkema KJ, Dennis AC, Watt MH, Choi KW, Yemeke TT, Joska JA. Improving mental health among people living with HIV: a review of intervention trials in low- and middle-income countries. <i>Glob Ment Health (Camb)</i> 2015 Jan;2.	Wrong study design (no meta-analysis)
Sorensen CW, Baek O, Kallestrup P, Carlsson J. Integrating mental health in primary healthcare in low-income countries: changing the future for people with mental disorders. <i>Nord J Psychiatry</i> 2017 Feb;71(2):151-7.	Wrong study design (no meta-analysis)
Sturrock S, Hodes M. Child labour in low- and middle-income countries and its consequences for mental health: a systematic literature review of epidemiologic studies. <i>Eur Child Adolesc Psychiatry</i> 2016 Dec;25(12):1273-86.	Wrong intervention (no psychosocial intervention)
Thornicroft G, Ahuja S, Barber S, Chisholm D, Collins PY, Docrat S, et al. Integrated care for people with long-term mental and physical health conditions in low-income and middle-income countries. <i>Lancet Psychiatry</i> 2019 Feb;6(2):174-86.	Wrong study design (no meta-analysis)
Tol WA, Song S, Jordans MJ. Annual Research Review: Resilience and mental health in children and adolescents living in areas of armed conflict--a systematic review of findings in low- and middle-income countries. <i>J Child Psychol Psychiatry</i> 2013 Apr;54(4):445-60.	Wrong study design (no meta-analysis)
Tol WA, Murray SM, Lund C, Bolton P, Murray LK, Davies T, et al. Can mental health treatments help prevent or reduce intimate partner violence in low- and middle-income countries? A systematic review. <i>BMC Womens Health</i> 2019 Feb 14;19(1):34.	Wrong study design (no meta-analysis)
Uthman OA, Magidson JF, Safren SA, Nachega JB. Depression and adherence to antiretroviral therapy in low-, middle- and high-income countries: a systematic review and meta-analysis. <i>Curr HIV /AIDS Rep</i> 2014 Sep;11(3):291-307.	Wrong intervention (no psychosocial intervention)
van't Hof E, Cuijpers P, Waheed W, Stein DJ. Psychological treatments for depression and anxiety disorders in low- and middle- income countries: a meta-analysis. <i>Afr J Psychiatry (Johannesbg)</i> 2011 Jul;14(3):200-7.	Included in Cuijpers 2019

Votruba N, Ziemann A, Grant J, Thornicroft G. A systematic review of frameworks for the interrelationships of mental health evidence and policy in low- and middle-income countries. <i>Health Res Policy Syst</i> 2018 Aug 22;16(1):85.	Wrong study design (no meta-analysis)
Watters C, O'Callaghan P. Mental health and psychosocial interventions for children and adolescents in street situations in low- and middle-income countries: A systematic review. <i>Child Abuse Negl</i> 2016 Oct;60:18-26.	Wrong study design (no meta-analysis)
Weinmann S, Koesters M. Mental health service provision in low and middle-income countries: recent developments. <i>Curr Opin Psychiatry</i> 2016 Jul;29(4):270-5.	Wrong study design (no meta-analysis)
Yatham S, Sivathasan S, Yoon R, da Silva TL, Ravindran AV. Depression, anxiety, and post-traumatic stress disorder among youth in low and middle income countries: A review of prevalence and treatment interventions. <i>Asian J Psychiatr</i> 2018 Dec;38:78-91.	Wrong study design (no meta-analysis)

Rating the reporting quality of the included reviews with AMSTAR-2*

AMSTAR-2 (A Measurement Tool to Assess Systematic Reviews) assesses reviews on the following categories: (1) formulation of the research question; (2) a priori design provided; (3) explanation for the chosen study design of the included studies; (4) comprehensive literature search; (5) study selection; (6) data extraction; (7) presence of a list of excluded studies, along with reason for exclusion; (8) comprehensive description of the main features of the included studies; (9) risk of bias assessment; (10) information about the sources of funding for the studies included in the review; (11) methods for statistical combination of results; (12) assessment of the potential impact of risk of bias of individual studies on the meta-analysis result; (13) discussion / interpretation of the potential impact of risk of bias of individual studies on the meta-analysis result; (14) discussion of the heterogeneity observed in the study results; (15) likelihood of publication bias; (16) declaration of study authors' conflict of interest.

Of these 16 domains, seven can particularly affect the validity of the review and its conclusion and are considered "critical domains" (domains 2 – 4 – 7 – 9 – 11 – 13 – 15). Each item allows for the following response options: yes, partial yes, or no. AMSTAR-2 is not intended to be scored. AMSTAR-2 proposes the following scheme for interpreting weaknesses detected in critical and non-critical items:

• High

No or one non-critical weakness: the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest;

• Moderate

More than one non-critical weakness*: the systematic review has more than one weakness but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review;

• Low

One critical flaw with or without non-critical weaknesses: the review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest;

• Critically low

More than one critical flaw with or without non-critical weaknesses: the review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

*Multiple non-critical weaknesses may diminish confidence in the review and it may be appropriate to move the overall appraisal down from moderate to low confidence.

* From: Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, Moher D, Tugwell P, Welch V, Kristjansson E, Henry DA. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ 2017, 358, j4008.

Criteria for evaluation of the strength of associations according to umbrella review criteria *

Strength of association	Criteria
Convincing (Class I)	<ul style="list-style-type: none"> ✓ More than 1000 participants ✓ Significant summary associations ($p < 10^{-6}$) per random-effects calculations ✓ No evidence of small-study effects ✓ No evidence of excess of significance bias ✓ Prediction intervals not including the null value ✓ Largest study nominally significant ($p < 0.05$) ✓ Not large heterogeneity (i.e., $I^2 < 50\%$)
Highly Suggestive (Class II)	<ul style="list-style-type: none"> ✓ More than 1000 participants ✓ Significant summary associations ($p < 10^{-6}$) per random-effects calculation ✓ Largest study nominally significant ($p < 0.05$)
Suggestive (Class III)	<ul style="list-style-type: none"> ✓ More than 1000 participants ✓ Significant summary associations ($p < 10^{-3}$) per random-effects calculations
Weak (Class IV)	<ul style="list-style-type: none"> ✓ Significant summary associations ($p < 0.05$) per random-effects calculations
Non-significant association	<ul style="list-style-type: none"> ✓ Non-significant summary associations ($p > 0.05$)

* From: Machado MO, Veronese N, Sanches M, Stubbs B, Koyanagi A, Thompson T, Tzoulaki I, Solmi M, Vancampfort D, Schuch FB, Maes M, Fava GA, Ioannidis JP, Carvalho AF. The association of depression and all-cause and cause-specific mortality: an umbrella review of systematic reviews and meta-analyses. *BMC medicine* **2018**, 16 (1), 112.

Interpretation of the credibility of evidence according to the GRADE methodology*

Quality level	Interpretation
High certainty	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate certainty	The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty	The true effect may be substantially different from the estimate of the effect.
Very low certainty	the true effect is likely to be substantially different from the estimate of effect

* From: Balshem H, Helfand M, Schunemann HJ, Oxman AD, Kunz R, Brozek J, Vist GE, Falck-Ytter Y, Meerpohl J, Norris S, Guyatt GH. GRADE guidelines: 3. Rating the quality of evidence. *J Clin Epidemiol* **2011**, 64 (4), 401-6.

AMSTAR-2 quality rating

		De Silva 2018	Purgato 2018a	Purgato 2018b	Rahman 2013	Turrini 2019	van Ginneken 2013	Burkey 2018	Cuijpers 2018	Singla 2017	Asher 2017
1	Did the research questions and inclusion criteria for the review include the components of PICO?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	partially	✓	✗	✓	✗	✓	✓	✗	✗	✗
3	Did the review authors explain their selection of the study designs for inclusion in the review?	✗	✓	✓	✗	✗	✗	✗	✗	✓	✗
4	Did the review authors use a comprehensive literature search strategy?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Did the review authors perform study selection in duplicate?	✓	✓	✓	✓	✓	✗	✓	✗	✓	✗

6	Did the review authors perform data extraction in duplicate?	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗
7	Did the review authors provide a list of excluded studies and justify the exclusions?	✓	✓	✗	✓	✓	✓	✓	✓	✗	✓
8	Did the review authors describe the included studies in adequate detail?	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓
9	Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	✓	✓	✗	✓	✓	✓	✓	✓	✗	✓
10	Did the review authors report on the sources of funding for the studies included in the review?	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
11	If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	✓	✓	✗	✓	✓	✓	✓	✓	✗	✓

13	Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	✓	✓	x	x	✓	✓	✓	✓	x	✓
14	Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	✓	✓	✓	✓	✓	✓	✓	x	x	x
15	If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	✓	✓	✓	✓	✓	✓	✓	✓	x	✓
16	Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reporting quality of each meta-analysis		low	High	high	Low	moderate	high	Low	Low	Critically low	Low

GRADE summary of findings table

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	psychosocial interventions	inactive controls	Relative (95% CI)	Absolute (95% CI)		

Adults with schizophrenia - psychotic symptoms

7	randomised trials	not serious	serious: I-squared 94.7	not serious	not serious	publication bias strongly suspected: Egger's p-value 0.043	495	367	-	SMD 0.945 SD higher (0.28 higher to 1.609 higher)	⊕⊕○○ LOW	CRITICAL
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Adults with schizophrenia - social functioning

10	randomised trials	not serious	serious: I-squared 89.7	not serious	not serious	publication bias strongly suspected: Egger's p-value 0.013	865	806	-	SMD 0.839 SD higher (0.488 higher to 1.191 higher)	⊕⊕○○ LOW	CRITICAL
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Adults with depression - depressive symptoms

32	randomised trials	not serious	serious: I-squared 89.7	not serious	not serious	publication bias strongly suspected: Egger's p-value 0.009	2222	2446	-	SMD 1.095 SD higher (0.893 higher to 1.297 higher)	⊕⊕○○ LOW	CRITICAL
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Adults with depression - social functioning

12	randomised trials	not serious	serious: I-squared 89.5	not serious	not serious	publication bias strongly suspected: Egger's p-value 0.004	1975	2123	-	SMD 0.465 SD higher (0.244 higher to 0.686 higher)	⊕⊕○○ LOW	CRITICAL
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Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	psychosocial interventions	inactive controls	Relative (95% CI)	Absolute (95% CI)		

Adults with PTSD - PTSD symptoms

3	randomised trials	very serious: one non-randomised trial included	not serious	not serious	not serious	none	126	97	-	SMD 0.358 SD higher (0.045 higher to 0.671 higher)	⊕⊕○○ LOW	CRITICAL
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Adults with common mental disorders - symptoms

24	randomised trials	not serious	serious: I-squared 83.2	not serious	not serious	none	3438	3265	-	SMD 0.490 SD higher (0.36 higher to 0.62 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Pregnant or post-natal women with common mental disorders - symptoms

14	randomised trials	not serious	serious: I-squared 79.9	not serious	not serious	none	8470	8121	-	SMD 0.383 SD higher (0.208 higher to 0.559 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Adults with PTSD humanitarian settings - PTSD symptoms

16	randomised trials	Serious: performance bias, attrition bias, therapist-investigator allegiance	serious: I-squared 77.8	not serious	not serious	none	660	612	-	SMD 1.066 SD higher (0.786 higher to 1.347 higher)	⊕⊕○○ LOW	CRITICAL
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Adults with depression humanitarian settings - depressive symptoms

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	psychosocial interventions	inactive controls	Relative (95% CI)	Absolute (95% CI)		
14	randomised trials	Serious: performance bias, attrition bias, therapist-investigator allegiance	not serious	not serious	not serious	none	651	603	-	SMD 0.867 SD higher (0.667 higher to 1.066 higher)	⊕⊕⊕○ MODERATE	CRITICAL

Adults with anxiety in humanitarian settings - anxiety symptoms

5	randomised trials	Serious: performance bias, attrition bias, therapist-investigator allegiance	not serious	not serious	not serious	none	370	324	-	SMD 0.739 SD higher (0.495 higher to 0.984 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Children with disruptive behaviour problems - conduct problems

26	randomised trials	not serious	serious: I-squared 76.9	not serious	not serious	publication bias strongly suspected: Egger's p-value 0.001	2317	2083	-	SMD 0.375 SD higher (0.241 higher to 0.509 higher)	⊕⊕○○ LOW	CRITICAL
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Children with PTSD/depression - PTSD/depression symptoms

3	randomised trials	not serious	serious: I-squared 78.7	not serious	not serious	none	148	150	-	SMD 0.893 SD higher (0.293 higher to 1.493 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Children with PTSD humanitarian settings - PTSD symptoms

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	psychosocial interventions	inactive controls	Relative (95% CI)	Absolute (95% CI)		
3	randomised trials	not serious	serious: I-squared 93.0	not serious	very serious: few participants, wide confidence intervals	none	62	68	-	SMD 1.558 SD higher (0.016 lower to 3.131 higher)	⊕○○○ VERY LOW	CRITICAL

Children with psychological distress in humanitarian settings - PTSD symptoms

8	randomised trials	not serious	serious: I-squared 80.2	not serious	not serious	none	1142	1213	-	SMD 0.334 SD higher (0.143 higher to 0.524 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Children with psychological distress in humanitarian settings - depression symptoms

10	randomised trials	not serious	serious: I-squared 72.8	not serious	not serious	none	1313	1359	-	SMD 0.059 SD higher (0.1 lower to 0.217 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Children with psychological distress in humanitarian settings - anxiety symptoms

7	randomised trials	not serious	serious: I-squared 70.3	not serious	not serious	none	949	1020	-	SMD 0.033 SD higher (0.134 lower to 0.199 higher)	⊕⊕⊕○ MODERATE	CRITICAL
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Adults and children refugees with psychological distress - PTSD symptoms

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	psychosocial interventions	inactive controls	Relative (95% CI)	Absolute (95% CI)		
9	randomised trials	not serious	serious: I-squared 88.6	serious: adult and children populations mixed	not serious	none	435	421	-	SMD 0.841 SD higher (0.35 higher to 1.331 higher)	⊕⊕○○ LOW	CRITICAL

Adults and children refugees with psychological distress - depressive symptoms

5	randomised trials	not serious	serious: I-squared 92.7	serious: adult and children populations mixed	not serious	none	280	253	-	SMD 2.051 SD higher (1.052 higher to 3.051 higher)	⊕⊕○○ LOW	CRITICAL
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Adults and children refugees with psychological distress - anxiety symptoms

2	randomised trials	not serious	serious: I-squared 94.7	serious: adult and children populations mixed	serious: wide confidence interval (from appreciable benefit to no difference)	none	231	214	-	SMD 0.986 SD higher (0.101 lower to 2.073 higher)	⊕○○○ VERY LOW	CRITICAL
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CI: Confidence interval; SMD: Standardised mean difference

Forest plot for each comparison

Asher 2017: adults with schizophrenia - symptoms

Random-effect p-value = 0.0053465247623531

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 7 Root MSE = 3.041

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	-1.111782	.651969	-1.71	0.149	-2.787722	.5641574
bias	9.031034	3.347948	2.70	0.043	.4248594	17.63721

Test of H0: no small-study effects P = 0.043

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	7	5.33	5	0.77	0.68	0.78	0.53	
+-----+								

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De Silva 2013: adults with schizophrenia – social functioning

Random-effect p-value = 2.90269885248e-06

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 10					Root MSE	= 2.198	
<hr/>							
Std_Eff		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
<hr/>							
slope		-.1141786	.2162994	-0.53	0.612	-.6129659	.3846087
bias		4.36069	1.377608	3.17	0.013	1.18392	7.537459

Test of H0: no small-study effects P = 0.013

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	10	8.31	10	0.15	0.23	0.16	1.00	
+-----+								

Cuijpers 2018: Adults with depression – symptoms

Random-effect p-value = 2.17213727119e-26

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 35

Root MSE = 2.856

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.4584124	.1551172	2.96	0.006	.1428241	.7740007
bias	2.432951	.8788917	2.77	0.009	.644832	4.221069

Test of H0: no small-study effects P = 0.009

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less
1	35	28.38	31	0.26	0.39	0.18	0.92

De Silva 2013: Adults with depression – social functioning

Random-effect p-value = 0.0000363931057538

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 12					Root MSE	=	2.081

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
-----+-----							
slope	-.2217036	.1274155	-1.74	0.112	-.505603	.0621959	
bias	4.36145	1.15718	3.77	0.004	1.783093	6.939807	

Test of H0: no small-study effects P = 0.004

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	12	6.47	5	0.39	0.41	0.87	0.29	
+-----+								

Van Ginneken 2013: Adults with PTSD – symptoms

Random-effect p-value = 0.0251016429508729

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 3		Root MSE		= .4542			
Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
slope	-2.316475	.7910236	-2.93	0.209	-12.36738	7.734433	
bias	10.99942	3.251909	3.38	0.183	-30.32	52.31884	

Test of H0: no small-study effects P = 0.183

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+

M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
1	3	1.09	1	0.92	1.00	0.74	0.70	
+								+

Random-effect p-value = 8.17348556801e-13

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 24		Root MSE		= 2.196		
Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.8768083	.1234915	7.10	0.000	.6207026	1.132914

bias	-2.477048	.9857687	-2.51	0.020	-4.521407	-.4326885
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Test of H0: no small-study effects P = 0.020

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+									
	M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+									
	1	24	15.23	16	0.74	0.83	0.46	0.70	
+-----+									

Rahman 2013: Adults with perinatal CMDs – symptoms

Random-effect p-value = 0.0000193109745936

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 14 Root MSE = 2.324

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
slope	.3852706	.2550583	1.51	0.157	-.1704538 .940995
bias	-.0215546	1.804248	-0.01	0.991	-3.952673 3.909564

Test of H0: no small-study effects P = 0.991

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	14	9.39	8	0.43	0.41	0.86	0.30	
+-----+								

Purgato 2018a: Adults with PTSD in humanitarian settings – symptoms

Random-effect p-value = 8.62323902122e-14

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 16 Root MSE = 1.907

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.4167009	.2509696	1.66	0.119	-.1215752	.9549771
bias	2.228228	1.043749	2.13	0.051	-.0103902	4.466846

Test of H0: no small-study effects P = 0.051

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+							
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less
+-----+							
1	16	12.68	14	0.42	0.55	0.33	0.87
+-----+							

Purgato 2018a: Adults with depression in humanitarian settings – symptoms

Random-effect p-value = 1.51551410356e-17

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 14 Root MSE = 1.528

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.7249117	.2055057	3.53	0.004	.2771532	1.17267
bias	.5636194	.9163324	0.62	0.550	-1.432897	2.560136

Test of H0: no small-study effects P = 0.550

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	14	10.69	12	0.41	0.54	0.32	0.88	
+-----+								

Purgato 2018a: Adults with anxiety in humanitarian settings – symptoms

Random-effect p-value = 3.27079092025e-09

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 5 Root MSE = .9072

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.3013108	.1647265	1.83	0.165	-.2229225	.8255441
bias	2.35869	.9355137	2.52	0.086	-.6185327	5.335912

Test of H0: no small-study effects P = 0.086

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	5	4.57	5	0.49	1.00	0.64	1.00	
+-----+								

Burkey 2018: Children with disruptive behavior – conduct problems

Random-effect p-value = 4.36666328627e-08

Egger's test for small-study effects:
 Regress standard normal deviate of intervention
 effect estimate against its standard error

Number of studies = 26 Root MSE = 1.694

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
slope	-.2662187	.1541605	-1.73	0.097	-.5843903 .0519529
bias	3.586022	.970594	3.69	0.001	1.582814 5.589229

Test of H0: no small-study effects P = 0.001

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	26	15.46	15	0.85	0.84	0.65	0.50	
+-----+								

Van Ginneken 2013: Children with PTSD or depression – symptoms

Random-effect p-value = 0.003552064530973

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 3 Root MSE = 1.134

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	5.424452	1.792257	3.03	0.203	-17.34833	28.19724
bias	-18.5022	7.380376	-2.51	0.242	-112.2788	75.27437

Test of H0: no small-study effects P = 0.242

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+

M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	

1	3	2.14	2	0.86	1.00	0.80	0.64	
+-----+								

First author	year	ES (95% CI)	Weight
McMullen	2013	2.71 (1.91, 3.51)	32.83
O'Callaghan	2013	1.94 (1.23, 2.66)	33.40
Pityaratstian	2015	0.06 (-0.59, 0.72)	33.77
Overall (I-squared = 93.0%, p = 0.000)		1.56 (-0.02, 3.13)	100.00
with estimated predictive interval		(-18.30, 21.41)	

NOTE: Weights are from random effects analysis

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	-11.71561	4.563981	-2.57	0.236	-69.70649	46.27526
bias	36.00443	12.49099	2.88	0.213	-122.7086	194.7175

M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
1	3	2.05	2	0.95	1.00	0.76	0.68	
+								+

First author	year	ES (95% CI)	Weight
Gordon	2008	1.01 (0.54, 1.49)	8.08
Tol	2008	0.71 (0.50, 0.91)	13.67
Jordans	2010	0.32 (0.10, 0.53)	13.45
Betancourt	2014	0.30 (0.05, 0.56)	12.58
O'Callaghan	2014	0.26 (-0.05, 0.58)	11.25
Punamaki	2014	0.16 (-0.02, 0.34)	14.18
Tol	2014	0.15 (-0.08, 0.39)	13.02
Tol	2012	0.02 (-0.18, 0.22)	13.77
Overall (I-squared = 80.2%, p = 0.000)		0.33 (0.14, 0.52)	100.00
with estimated predictive interval		(-0.30, 0.97)	

NOTE: Weights are from random effects analysis

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	-.1396733	.3800493	-0.37	0.726	-1.06962	.7902737
bias	3.771043	3.217849	1.17	0.286	-4.10275	11.64484

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	8	4.52	4	0.71	0.73	0.77	0.49	
+-----+								

Purgato 2018b: Children in humanitarian settings – depressive symptoms

Random-effect p-value = 0.4688788143257169

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 10 Root MSE = 1.775

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.5388047	.2874326	1.87	0.098	-.124016	1.201625
bias	-3.531725	2.234549	-1.58	0.153	-8.684605	1.621154

Test of H0: no small-study effects P = 0.153

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	10	3.61	3	0.69	1.00	0.76	0.48	
+-----+								

Purgato 2018b: Children in humanitarian settings – anxiety symptoms

Random-effect p-value = 0.7016160626440185

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 7					Root MSE	=	1.912
Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
slope	.412033	.5119676	0.80	0.457	-.9040215	1.728088	
bias	-3.075983	4.253465	-0.72	0.502	-14.00986	7.857897	

Test of H0: no small-study effects P = 0.502

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	7	2.81	2	0.53	0.71	0.84	0.42	
+-----+								

Turrini 2019: Adults and children refugees – PTSD symptoms

Random-effect p-value = 0.0007802554618627

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 9 Root MSE = 2.957

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.2547306	.4053709	0.63	0.550	-.7038194	1.21328
bias	1.920419	1.881765	1.02	0.341	-2.529248	6.370085

Test of H0: no small-study effects P = 0.341

Excess of significance test

This is version 1.0 of the signBiasTester module.

Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	9	5.47	6	0.72	1.00	0.50	0.75	
+-----+								

Turrini 2019: Adults and children refugees – depressive symptoms

Random-effect p-value = 0.0000574661080852

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 5 Root MSE = 2.763

Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	.3504217	.4537922	0.77	0.496	-1.093748	1.794591
bias	4.241133	2.080727	2.04	0.134	-2.380668	10.86293

Test of H0: no small-study effects P = 0.134

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

+-----+								
M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less	
+-----+								
1	5	4.65	5	0.54	1.00	0.70	1.00	
+-----+								

Turrini 2019: Adults and children refugees – anxiety symptoms

Random-effect p-value = 0.0754956528784885

Egger's test for small-study effects:
Regress standard normal deviate of intervention
effect estimate against its standard error

Number of studies = 2		Root MSE		=		0
Std_Eff	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
slope	-.5014287	.	.	.	.	.
bias	8.880001	.	.	.	.	.

Test of H0: no small-study effects P = .

Excess of significance test

This is version 1.0 of the signBiasTester module.
Disagreements in the number of observed and expected significant studies

M-A	N	Expected	Observed	pChi	pBin	pBin, more	pBin, less
-----	---	----------	----------	------	------	------------	------------

	1	2	1.99	2	0.91	1.00	0.99	1.00	
+									+

Subgroup analyses by type of psychosocial intervention

Asher 2017 – adults with schizophrenia - symptoms

De Silva 2013 – adults with schizophrenia – social functioning

Cuijpers 2018 – adults with depression - symptoms

De Silva 2013 – adults with depression – social functioning

Van Ginneken 2013 – adults with PTSD - symptoms

Singla 2017 – adults with CMDs - symptoms

Rahman 2013 – women with perinatal CMDs – symptoms

Purgato 2018a – adults with PTSD in humanitarian settings - symptoms

Purgato 2018a – adults with depression in humanitarian settings - symptoms

Purgato 2018a – adults with anxiety in humanitarian settings - symptoms

Burkey 2018 – children with disruptive behavior – conduct problems

Van Ginneken 2013 – children with PTSD or depression - symptoms

Purgato 2018a – children with PTSD in humanitarian settings - symptoms

Purgato 2018b – children in humanitarian settings - PTSD symptoms

Purgato 2018b – children in humanitarian settings - depressive symptoms

Purgato 2018b – children in humanitarian settings - anxiety symptoms

Turrini 2016 – adults and children refugees - PTSD symptoms

Turrini 2019 – adults and children refugees - depressive symptoms

Turrini 2019 – adults and children refugees - anxiety symptoms

Tabular descriptions of umbrella review criteria by meta-analysis

Population	Outcome	Meta-analysis	More than 1000 participants	Significant summary associations ($p < 10^{-6}$)	Significant summary associations ($p < 10^{-3}$)	Not large heterogeneity (i.e., $I^2 < 50\%$)	Prediction intervals not including the null value	Largest study nominally significant ($p < 0.05$)	No evidence of small-study effects	No evidence of excess of significance bias	Strength
Adults with schizophrenia	Symptoms	Asher 2017	No	No	No	No	No	No	No	Yes	Weak
Adults with schizophrenia	Social functioning	De Silva 2013	Yes	Yes	Yes	No	No	Yes	No	Yes	Highly suggestive
Adults with depression	Symptoms	Cuijpers 2018	Yes	Yes	Yes	No	No	Yes	No	Yes	Highly suggestive
Adults with depression	Social functioning	De Silva 2013	Yes	No	Yes	No	No	No	No	Yes	Suggestive
Adults with PTSD	Symptoms	van Ginneken 2013	No	No	No	Yes	No	No	Yes	Yes	Weak
Adults with CMDs	Symptoms	Singla 2017	Yes	Yes	Yes	No	No	Yes	No	Yes	Highly suggestive
Adults with perinatal CMDs	Symptoms	Rahman 2013	Yes	No	Yes	No	No	Yes	Yes	Yes	Suggestive
Adults with PTSD in humanitarian settings	Symptoms	Purgato 2018a	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Highly suggestive
Adults with depression in humanitarian settings	Symptoms	Purgato 2018a	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Highly suggestive
Adults with anxiety in humanitarian settings	Symptoms	Purgato 2018a	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Weak

Children with disruptive behavior	Conduct problems	Burkey 2018	Yes	Yes	Yes	No	No	No	No	Yes	Suggestive
Children with PTSD or depression	Symptoms	van Ginneken 2013	No	No	No	No	No	Yes	Yes	Yes	Weak
Children with PTSD in humanitarian settings	Symptoms	Purgato 2018a	No	No	No	No	No	No	Yes	Yes	No association
Children in humanitarian settings	PTSD symptoms	Purgato 2018b	Yes	No	Yes	No	No	No	Yes	Yes	Suggestive
Children in humanitarian settings	Depressive symptoms	Purgato 2018b	Yes	No	No	No	No	No	Yes	Yes	No association
Children in humanitarian settings	Anxiety symptoms	Purgato 2018b	Yes	No	No	No	No	No	Yes	Yes	No association
Adults and children refugees	PTSD symptoms	Turrini 2019	No	No	Yes	No	No	Yes	Yes	Yes	Weak
Adults and children refugees	Depressive symptoms	Turrini 2019	No	No	Yes	No	No	Yes	Yes	Yes	Weak
Adults and children refugees	Anxiety symptoms	Turrini 2019	No	No	No	No	-	Yes	-	Yes	No association

Umbrella review database

Reference	Age	Population	Outcome	studies	ES	Cases	Controls	Total	Meta-analysis (Random Effect)	Lower Limit (LL)	Upper Limit (UL)	predictive interval LL	predictive interval UL	Z	i ²	p-value of meta-analysis	Egger's test coef. bias	Egger's test p-value	Largest study SMD	LL	UL	Observed significant studies	Expected significant studies	p-value excess significance test
Asher 2017	Adults	schizophrenia	symptoms	7	SMD	495	367	862	0.945	0.28	1.609	-1.44	3.33	2.79	94.7	0.0053465347623531	9.0310340	0.043	0.220	-0.04	0.480	5	5.3	0.68
Burkey 2018	Children	disruptive behaviour	conduct problems	26	SMD	2317	2083	6400	0.375	0.241	0.509	-0.24	0.99	5.48	76.9	4.366666-08	3.5860220	0.001	0.110	-0.08	0.300	15	15.46	0.84
Cuijpers 2018	adults	depression	symptoms	35	SMD	2222	2446	4668	1.095	0.893	1.297	-0.03	2.22	10.6	89.7	2.17214E-26	2.4329510	0.009	0.62	0.48	0.76	31	28.38	0.39
De Silva 2013	Adults	depression	social functioning	12	SMD	1975	2123	4098	0.465	0.244	0.686	-0.35	1.28	4.13	89.5	0.0000363931057538	4.3614500	0.004	0.06	-0.05	0.16	5	6.47	0.41
De Silva 2013	Adults	schizophrenia	social functioning	10	SMD	865	806	1671	0.839	0.488	1.191	-0.42	2.1	4.68	89.7	2.90269885248e-06	4.3606900	0.013	0.24	0.1	0.38	10	8.31	0.23
Rahman 2013	Adults	Perinatal CMDs	symptoms	14	SMD	8470	8121	16591	0.383	0.208	0.559	-0.27	1.04	4.27	79.9	0.0000193109745936	-0.0215546	0.991	0.62	0.44	0.8	8	9.39	0.41
Purgato 2018a	Adults	humanitarian settings	PTSD symptoms	16	SMD	650	612	1272	1.066	0.786	1.347	0.02	2.11	7.46	77.8	8.63233902112e-14	2.2282280	0.051	0.79	0.54	1.04	14	12.68	0.55
Purgato 2018a	Children	humanitarian settings	PTSD symptoms	3	SMD	62	68	130	1.558	-0.016	3.131	-18.3	21.41	1.94	93	0.0523327187111629	36.0044300	0.213	0.06	-0.59	0.72	2	2.05	1.00
Purgato 2018a	Adults	humanitarian settings	anxiety symptoms	5	SMD	370	324	694	0.739	0.495	0.984	0.03	1.44	5.92	48.1	3.27079092025e-09	2.3586900	0.086	0.48	0.24	0.72	5	4.57	1.00
Purgato 2018a	Adults	humanitarian settings	depressive symptoms	14	SMD	651	603	1254	0.867	0.667	1.066	0.26	1.47	8.53	55	1.51551410356e-17	0.5636194	0.55	0.9	0.65	1.15	12	10.69	0.54
Turrimi 2019	Adults and children	refugees	PTSD symptoms	9	SMD	435	421	856	0.841	0.35	1.331	-0.84	2.53	3.36	88.6	0.0007802554618627	1.9204190	0.341	0.65	0.43	0.86	6	5.47	1.00
Turrimi 2019	Adults and children	refugees	depressive symptoms	5	SMD	280	253	533	2.051	1.052	3.051	-1.64	5.74	4.02	92.7	0.0000574661080852	4.2411330	0.134	0.96	0.64	1.09	5	4.65	1.00
Turrimi 2019	Adults and children	refugees	anxiety symptoms	2	SMD	231	214	445	0.986	-0.101	2.073	-	-	1.78	94.7	0.07548956528784885	-	-	0.45	0.24	0.66	2	1.99	1.00
Purgato 2018b	Children	humanitarian settings	PTSD symptoms	8	SMD	1142	1213	2355	0.334	0.143	0.524	-0.3	0.97	3.43	80.2	0.0005975334565208	3.7710430	0.286	0.16	-0.02	0.34	4	4.52	0.73
Purgato 2018b	Children	humanitarian settings	depression symptoms	10	SMD	1313	1359	2672	0.059	-0.1	0.217	-0.47	0.58	0.72	72.8	0.4688788143257169	-3.5317250	0.153	0.07	-0.11	0.25	3	3.61	1.00
Purgato 2018b	Children	humanitarian settings	anxiety symptoms	7	SMD	949	1020	1969	0.033	-0.134	0.199	-0.49	0.56	0.38	70.3	0.7016160626440185	-3.0759830	0.502	0.14	-0.06	0.33	2	2.81	0.71
van Ginneken 2013	Adults	PTSD	symptoms	3	SMD	126	97	223	0.358	0.045	0.671	-2.26	2.98	2.24	22.1	0.0251016429508729	10.9994200	0.183	0.28	-0.17	0.73	1	1.09	1.00
van Ginneken 2013	Children	PTSD or depression	symptoms	3	SMD	148	150	298	0.893	0.293	1.493	-6.24	8.02	2.92	78.7	0.003552064530973	-18.5022000	0.242	1.27	0.84	1.7	2	2.14	1.00
Singla 2017	Adults	CMDs	symptoms	24	SMD	3438	3265	6703	0.490	0.36	0.62	-0.13	1.11	7.16	83.2	8.17348556801e-13	-2.4770480	0.02	0.77	0.67	0.86	15	16	0.83

Stata syntax used to calculate umbrella review criteria

*****Random effects meta-analysis, significant threshold reached, I², predictive interval, random-effects standardised mean difference (SMD) and 95% confidence interval (CI) of the largest study

```
. metan SMD lower95CI higher95CI, rfdist random  
. return list
```

*****Egger's test (SE = standard error)

```
. metabias SMD SE, egger  
. metafunnel SMD SE, title(funnelplot)
```

*****Excess of significance test (SMD = standardised mean difference; SE = standard error)

```
. signBiasTester power SMD SE
```

Prisma checklist

Section/topic	#	Checklist item	Reported on page
TITLE			
Identify the report as a systematic review, meta-analysis, or both.	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Provide a structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3
INTRODUCTION			
Describe the rationale	3	Describe the rationale for the review in the context of what is already known.	6-7
Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	7
METHODS			
Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	7
Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	7-9
Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	8 and appendix
Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	appendix
State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8-9
Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	9
List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8-9
Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	9
State the principal summary measures (e.g., risk ratio, difference in means).	13	State the principal summary measures (e.g., risk ratio, difference in means).	9-10
Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10-11