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TITLE: Guided self-help for eating disorders: A systematic review and meta-regression

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ABSTRACT

Background

Evidence-based self-help is a recommended first stage of treatment for mild-moderate eating disorders. The provision of guidance enhances outcome. The literature evaluating exclusively 'guided' self-help (GSH) has not been systematically reviewed.

Methods

The aim was to establish the effectiveness of GSH for reducing global eating disorder psychopathology and abstinence from binge eating, compared to controls. Results were pooled using random-effects meta-analysis and heterogeneity explored using meta-regression.

Results

Thirty randomized controlled trials met the inclusion criteria. Results showed an overall effect of GSH on global eating disorder psychopathology (-0.46) and binge abstinence (-0.20). There was strong evidence for an association between diagnosis of binge eating disorder and binge abstinence.

Discussion

Current interventions need to be adapted to address features other than binge eating. Further research is required to help us understand the effectiveness of GSH in children and young people, invariably high drop-out rates and how technology can enhance interventions.

Keywords: Binge eating, Self-help, Meta-regression

BACKGROUND

Eating disorders are common and costly, in personal terms and to healthcare providers. Some 13% of young women experience a diagnosable eating disorder in their lifetime, a disorder associated with functional impairment, emotional distress, and suicidality (Stice, Nathan Marti, & Rohde, 2013). Almost a quarter of women at any one time experience sub-threshold symptoms which significantly impair their quality of life (Herpertz-Dahlmann, Wille, Holling, Vloet, & Ravens-Sieberer, 2008; Wade, Wilksch, & Lee, 2012), and left untreated, can lead to full syndrome disorders (Stice et al., 2013). Furthermore, recovery is less likely if the disorder has remained untreated or inadequately treated for more than 3 years (Treasure & Russell, 2011).

There is a good rationale for implementing a stepped care approach in the management of eating disorders, as a matter of clinical and economic importance. Evidence-based self-help programmes are recommended in the UK as a possible first stage intervention for bulimia nervosa (BN) and binge eating disorders (BED) (NICE., 2004). Self-help programmes that include direct support from health professionals are termed guided self-help (GSH). They have better adherence and treatment outcomes than 'pure' self-help (Beintner, Jacobi, & Schmidt, 2014). Where appropriate, patients can be 'stepped up' to receive higher intensity treatment, e.g.16 or more sessions of specifically adapted or enhanced cognitive behaviour therapy (CBT-BN or CBT-E). Higher intensity psychological therapies cost more, are time consuming, require specialist training, and can be overly intense for people with milder problems. There is therefore a need for effective low intensity interventions within the treatment options for eating disorders.

There are two existing meta-analyses which focus on self-help approaches and compare pure self-help and GSH (Beintner et al., 2014; Perkins, Murphy, Schmidt, & Williams, 2006). Both include a range

of research designs. The first, a Cochrane review by Perkins and colleagues (2006), compared pure self-help and GSH to a range of alternative interventions. Based on the evidence at the time, GSH was considered superior to pure self-help. GSH was consistently better than waiting list control and performed as well as specialist psychological therapies on both eating disorder specific and psychiatric symptomatology.

The increase in use of technology in health service delivery has been reflected in new low intensity approaches to eating disorders. Acknowledging this new literature, Beintner et al. (2014) conducted a meta-regression which considered a range of moderators of intervention outcomes of self-help for BN and BED. The following participant and intervention characteristics made the largest contributions to outcome in order of importance: receiving guidance, a diagnosis of binge eating disorder, guidance from an eating disorder or CBT specialist, internet-based delivery, and higher baseline eating psychopathology.

Most of the research to date has focussed on clinically diagnosed BN and BED. There is less evidence for underweight anorexic disorders (AN) and atypical eating disorders or those that do not meet threshold for clinical diagnosis (EDNOS/OSFED), despite the latter being by far the most common presentation among those seeking treatment (Fairburn, Cooper, Bohn, O'Connor, Doll, & Palmer, 2007; Machado, Goncalves, & Hoek, 2013).

The aim of the current systematic review and meta-regression was to synthesize the evidence on the clinical effectiveness of GSH in the treatment of the range of eating disorders compared to controls. Given the literature suggesting comparability between GSH and specialist psychological therapies, controls included both waiting list and other active treatments in order to maximise the moderators that could be explored. Outcomes of interest were global eating disorder psychopathology and

abstinence from binge eating. We wanted to assess both cognitive and behavioural outcomes, and given the literature is heavily focussed on binge eating, we used abstinence as a primary outcome. Our review updates and builds on previous reviews of self-help for bulimia nervosa and BED and draws on the moderating variables highlighted by Beintner et al. (2014) to explain heterogeneity in the results. There is good evidence for the addition of guidance, therefore this is the first review to focus specifically on 'guided' self-help, and was limited to randomized controlled trials in order to assess the highest quality evidence available.

METHODS

The protocol for the systematic review was developed and published on PROSPERO (ID CRD42015024544). We adhered to the PRISMA guidelines in the reporting of the review and it conforms to the provisions of the Declaration of Helsinki.

Criteria for considering studies for this review

Types of studies

We included randomized controlled trials (RCT) only, including pilot and feasibility RCTs but excluding quasi-randomized trials (using alternate allocation).

Types of participants

Those with a primary problem of an eating disorder with no minimum number of symptoms required for inclusion. The primacy of an eating disorder is largely determined by the client, their presentation to a health professional, and their desire to seek help for their disordered eating. This included those who met DSM or equivalent criteria for AN, BN, BED and EDNOS (where any one of the diagnostic criteria is missing). EDNOS is now categorized in the most recent Diagnostic and Statistical Manual edition (DSM-5) (American Psychiatric Association, 2013) as other specified or unspecified feeding or eating disorder (OSFED, UFED). Also included were those who failed to meet the criteria for EDNOS/OSFED/UFED but nevertheless reported disordered eating symptoms that interfered with their everyday lives. For the purposes of this review, the definition of an eating disorder was purposely kept open, given the potential of GSH as an effective early intervention for mild and mixed patterns of eating disorder. We excluded overweight or obese participants with no reported eating disorder symptoms, studies of people at high risk of developing an eating disorder, prevention or health promotion studies.

There were no restrictions in terms of age, gender, or the setting of recruitment or treatment.

Types of interventions

Guided self-help interventions were those characterised by both of the following elements:

a) Self-help material – Used a clear model, structure of treatment and instructions on how the user could improve their skills to manage their difficulty. This included manuals, CD-ROM, video, and internet packages. This did not include prevention or purely educational materials, or use of a standard Cognitive Behavioural Therapy (CBT) manual.

b) Guidance – More than one guidance session with a 'guide' between commencing and finishing the GSH intervention. This could be delivered either face-to-face, remotely by telephone or email synchronously or asynchronously, or in a group format. Guides may be mental health professionals or lay people. This did not include peer support groups without a manual, guided self-help combined with another treatment e.g. CBT or drug treatments (although a continued, stable dose of anti-depressants prescribed prior to intervention was permitted), evaluations of preliminary or purely motivational interventions delivered prior to treatment, or therapist-led forms of psychotherapy. The primary feature of GSH was that the user was responsible for working through the materials with 'guidance', not therapy, from another person.

There were no restrictions on the number of sessions, frequency, or duration of treatment.

Types of outcome measures

In order to be considered for inclusion in the review, studies were required to include a standardized assessment of eating disorder symptoms (Eating Disorder Examination (Fairburn & Cooper, 1993), Eating Disorder Examination-Questionnaire (Fairburn & Beglin, 1994), Eating Disorder Inventory (Garner, Olmsted, & Polivy, 1984), Three Factor Eating Questionnaire (Stunkard & Messick, 1985) in order to measure eating disorder psychopathology and behaviours such as binge eating. There were no restrictions regarding whether these were completed online, by self-report, or interview.

Primary outcomes

The primary outcomes were;

a) Global eating disorder psychopathology.

b) Abstinence from objective binge eating over the past 28 days

Search methods for identification of studies

Electronic searches

The initial search was conducted in November 2014 and updated in April 2016 (full search strategy in Appendix 1). We designed a search strategy for three of the main electronic databases in general medicine; OVID MEDLINE (R) 1946, In Process and other Non-Indexed Citations, PsycINFO 1806, Embase Classic+Embase 1947. We also searched the Cochrane Collaboration libraries (Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials) for existing and ongoing research.

Searching other resources

Grey literature searching included: the Web of Science conferences, Proquest dissertation abstracts, a search of ongoing trials the WHO International Clinical Trial Registry Platform www.controlled-trials.com, the National Institutes of Health registry www.clinicaltrials.gov, the B-EAT website (UKs

eating disorder charity), and hand searching through the International Journal of Eating Disorders, European Eating Disorders Review, Eating Disorders: The Journal of Prevention & Treatment, and reference lists of existing systematic reviews and all retrieved studies. The search was restricted to English language publications.

Data collection and analysis

Selection of studies

Abstracts of all identified studies were screened for inclusion by two reviewers (GTT and AH). Full papers were independently assessed by both reviewers to determine whether they met the inclusion criteria. Differences of opinion were taken to a third reviewer. Reasons for exclusion are detailed in Figure 1.

Data extraction and management

Data extraction was carried out by one reviewer using a standardized proforma (GTT) which was independently checked by a second reviewer (AH). The proforma included citation details, study design, sample size and characteristics (age, gender, eating disorder diagnosis), location of recruitment and treatment, details of intervention (self-help manual, guidance structure, duration, mode, provider), comparison group(s), screening and outcome measures used, follow-up, drop-out and key findings.

Assessment of risk of bias in included studies

Quality assessment was conducted by the lead author (GTT) using the Cochrane Risk of Bias assessment tool outlined in the Cochrane handbook of systematic reviews of interventions, Section 8.5 (Higgins & Green., 2011). The tool considers five areas: sequence generation, allocation concealment, incomplete outcome data, selective reporting, and blinding of outcome assessment.

Studies were classified as low, medium, or high risk of bias. Those at high risk were not excluded from the review, but an appraisal of the strength of evidence is reported in Table 1, and the findings interpreted in light of this.

Data synthesis

Data were collated within RevMan Version 5.2, then exported to the R statistical software Version 3.2.2 for meta-analyses and meta-regression using the R::metafor package Version 1.9-7. The main characteristics of included studies are summarised in narrative and tabular form (Table 1). We anticipated some heterogeneity across studies, therefore we initially pooled the results using a random-effects meta-analysis. Relative risk was used for binary outcomes (abstinence from objective binge eating). Post-treatment means and standard deviations were used for continuous outcomes (global eating disorder psychopathology) and 95% confidence intervals (CI) were calculated for each outcome.

All comparison groups were handled in the same way irrespective of the type of comparison group. The most common types were waiting list/delayed treatment or an active treatment other than GSH. Details are provided in the Results section, however, all were pooled in the analyses under 'control' groups. This was done to maximise the moderators which could be explored and as a result, our findings provide a conservative estimate of effect. Figures are stratified by type of control group.

When considering global eating disorder psychopathology, post-treatment scores were taken as the outcome. All trials involved randomization of treatment so that balance at baseline is a reasonable assumption. Only a few trials reported the difference of post-treatment scores from baseline scores but all reported post-treatment scores.

Mean global EDE and EDE-Q scores were obtained and analysed at trial-level.

Exploring heterogeneity

Heterogeneity between studies for both global eating disorder psychopathology and binge abstinence was explored using random-effects meta-regression. Each explanatory variable was entered individually, due to the modest number of studies. Moderators which have shown promise in the literature for binge eating disorders (Beintner et al., 2014; Perkins et al., 2006) were included and coded as follows: 'diagnosis' of eating disorder was categorised as BED, BN or mixed (to include transdiagnostic studies and those of AN and EDNOS), 'mode of guidance' was either face to face, group, other (email, online, telephone), 'severity of eating disorder' was either threshold, sub-threshold or both, and 'amount of contact time' was categorized as low (below the mean value of included studies ≤360 minutes), high (>360 minutes), or email contact only. We chose 'contact time' rather than number of sessions or duration of intervention which is a better indicator of the time commitment of guides.

Sensitivity analysis

In order to examine the possibility of publication bias, we generated funnel plots. The majority of trials reported Global EDE-Q at post-intervention. Two further trials reported EDI rather than Global EDE-Q. As a sensitivity analysis, these were included in the meta-analysis and the meta-regression by diagnosis. In place of the scores as outcomes, standardized effects were used. That is, the treatment effect was measured in terms of the number of standard deviations.

RESULTS

Description of studies

Results of search

3785 publications were identified through the search strategy (See Flow diagram in Figure 1 and Appendix 1). After title and abstract screening, 71 full papers were considered for inclusion and 30 studies met the inclusion criteria and included in the review.

----- Figure 1. 'PRISMA diagram of study selection' near here ----

Included studies

All 30 studies were randomized controlled trials using adequate methods of sequence generation outlined in the Cochrane handbook of systematic reviews of interventions (Higgins & Green., 2011). Overall, the studies included 3091 participants. Some studies had additional treatment arms which were not included in the review, therefore 2601 participants were eligible for inclusion in the analysis.

Participants

The age of participants ranged from 12–65 years (Mean = 31.72). The majority of studies included participants 18 years and over with no upper limit. Two studies specifically looked at adolescents (Heinicke, Paxton, McLean, & Wertheim, 2007; Schmidt et al., 2007). Although participants were predominantly female, 12 studies included both male and female participants. Participant gender was not stated in 3 studies (Bailer, et al., 2004; Ghaderi & Scott, 2003; Schmidt et al., 2006).

The majority of studies included participants with bulimia nervosa (20 studies) and BED (17 studies). Eight of the studies included participants with EDNOS and only four had participants with anorexia

nervosa. One study included students with body image concerns and some symptoms of eating disorders (Heinicke et al., 2007). Fifteen studies included participants whose eating disorder met DSM criteria for diagnosis, five focussed on sub-threshold syndromes, and ten studies included both.

Intervention

The majority of studies delivered GSH with printed manuals or books via bibliotherapy (N=19) using one of the following: Overcoming Bulimia Nervosa, Overcoming Binge Eating (Fairburn, 1995), Getting Better Bit(e) by Bit(e) (Schmidt & Treasure, 1993), Bulimia Nervosa and Binge Eating: A guide to recovery (Cooper, 1995), Working to Overcome Eating Difficulties (Heywood-Everett & Hill, 2005). Six delivered GSH online using the following programmes: Student Bodies+, Netunion.com, SALUT, ESS-KIMO, My Body and My Life. Two studies included both manuals and online treatment arms (Ruwaard, et al., 2013; Wagner, et al., 2013).

The nature and extent of guidance varied between studies. The number and duration of sessions ranged from 4 to 18 sessions, delivered over 6 weeks to 7 months. Guidance was delivered by trained therapists in 12 of the studies, graduate or doctoral students in 12 studies, by facilitators with no formal training in five studies, and by a GP in one study (Banasiak, Paxton, & Hay, 2005). The mode of guidance also varied. It was most commonly delivered face-to-face (20 studies). Alternative modes of delivery included: online guidance (4 studies), email guidance (5 studies), and telephone guidance (1 study). Guidance was offered on an individual basis in most studies and in a group format in four (Burton & Stice, 2006; Heinicke et al., 2007; Peterson, Mitchell, Crow, Crosby, & Wonderlich, 2009; Peterson, Mitchell, Engbloom, Nugent, Mussell, & Miller, 1998).

Comparison

There were two types of comparison group, those which compared GSH to waiting list, delayed treatment control or placebo conditions (N = 20 studies) and those which compared GSH to other

active treatments including other modes of GSH (2), pure self-help (3), treatment as usual (2), or other specialist psychological therapies including CBT, IPT and family therapy (3). All were included in the analyses as 'controls'.

Because of the nature of using waiting list or delayed treatment control conditions, most studies used a cross-over design, therefore we did not include follow-up data.

Outcomes

Although a range of measures were considered appropriate for inclusion, the majority of studies that were included in the review used the EDE or questionnaire version (EDE-Q) to ascertain binge frequency and global eating disorder psychopathology. There were seven studies which used alternative outcome measures, and those included in the analyses used the EDI (Bailer et al., 2004; Wagner et al., 2013). A sensitivity analysis including these studies using standardized effects, showed very little change from the analyses reported for Global EDE-Q alone, and there was no difference in the conclusions drawn.

Assessment of methodological quality

The majority of studies (N=17) were of good quality and classified at low risk of bias, 8 at moderate, and 5 at high risk of bias. Based on the Cochrane Risk of Bias assessment tool, we appraise included studies on their methodological rigour. Details can be seen for individual studies in Table 1.

Sequence generation

Twenty studies employed adequate methods of randomisation. Fifteen of these used computer-generated methods and five used random number tables. Two studies randomised at group-level

(Bailer et al., 2004; Peterson et al., 1998). The risk of bias was 'unclear' in eight of the studies due to lack of detail on the randomisation process.

Allocation concealment

The method of allocation concealment was deemed 'unclear' in almost half of studies due to insufficient detail. Allocation concealment was adequate in the remaining 16 studies. Eleven were computer generated and allocated by an independent person and five used opaque envelopes.

Incomplete outcome data

Outcome data was presented for all randomised, 22 studies used intention to treat - 16 using Last Observation Carried Forward (LOCF), three using mixed model, two maximum likelihood estimation and one multiple imputation. This was unclear in five studies (DeBar et al., 2011, Sanchez-Ortiz et al., 2011, Wagner et al., 2013, Ljotsson et al., 2007, Heinicke et al., 2007) either because full information was not reported, or they only included those who returned pre-assessment or post-assessment questionnaires. There was incomplete outcome data in three studies because only completer data was presented (Schmidt et al., 2006, Jacobi et al., 2012, Peterson et al., 1998).

Selective reporting

Data was presented for primary and secondary outcomes for all participants randomised in 17 studies. In one of these studies, two participants in each group didn't return pre-assessment measures (Ljotsson et al., 2007). In seven studies, data reporting might be deemed selective, three studies only presented completer data for either primary or secondary outcomes and in one, mean scores were not reported, only researcher defined categories (Palmer et al., 2002). Selective reporting was unclear in six studies due to insufficient detail.

Blinding of outcome assessment

Assessors were blind to treatment allocation in most studies (N=16) and outcome measures were complete by self-report and returned via post or online in eight. Given the pragmatic nature of interventions, blinding was not possible in the remaining studies.

Global eating disorder psychopathology

Nineteen of the 30 studies identified in the search were included in the meta-regression for global eating disorder psychopathology (See Figure 2a). Of the remaining 11 studies, intention to treat data was not available for four of them and we were unable to obtain the relevant data from authors for seven studies.

Results showed an overall effect in favour of GSH compared to controls on reducing global eating disorder psychopathology with a moderate effect size -0.46 (-0.64, -0.28), p=<.0001 (Figure 2a). This means that overall those receiving GSH experienced a reduction in half a point on the EDE/EDE-Q measures. Cochran's Q-test for homogeneity revealed significant inter-study heterogeneity among effect sizes I^2 = 66.56%, Q=53.10, p=<.0001 (Figure 2b). This suggests that there was greater variation than would be expected on the basis of sampling variability.

------ Figure 2a and b. 'Forest and funnel plot' near here -----

------ Table 2. 'Results of meta-regression' near here ----

In order to explore the heterogeneity, key variables were entered into the model individually (See Table 2 for statistics). There was a small (ES=0.2) effect of 'mode of guidance' on eating disorder psychopathology, with results suggesting that group guidance may be favourable to face to face, or other (email, online, telephone). However, this finding did not reach significance. Results for the 'amount of contact time,' 'severity of eating disorder' and 'diagnosis,' were not significant moderators of eating disorder psychopathology.

Abstinence from binge eating

----- Figure 3a and b. 'Forest and funnel plot' near here -----

Twenty-four out of the 30 identified studies were included in the meta-regression for abstinence from binge eating. Abstinence was not an outcome measured in three of the remaining studies and we were unable to obtain the relevant data from three studies.

There was an overall effect in favour of GSH compared to controls on achieving binge abstinence with a small effect size -0.20 (CI-0.28, -0.12) p=<.0001, OR= 0.81 (Figure 3a). This means that provision of GSH increased the chances of abstinence from binge eating by around 19%. Again, the Q-test indicated significant inter-study heterogeneity I^2 = 65.08%, Q = 62.7, p=<.0001 (Figure 3b).

When considering moderators, there was no significant effect of 'mode of guidance' or 'severity of eating disorder.' Results for the 'amount of contact time' did not reach statistical significance, although they suggested more contact time may be beneficial and email contact faired worst.

There was strong evidence for an association between 'diagnosis' and treatment effect. In studies that included participants with BED there was an increased likelihood of abstinence compared to those with BN or mixed eating disorders. The effect sizes were 0.25 OR=1.28 (95% CI (0.11, 0.40)) and 0.30 OR=1.35 (0.15, 0.46) respectively on a log odds scale (See Figure 4). Therefore, the exponential values show that in studies including participants with BED, individuals were 28% more likely to abstain than in studies with BN and 35% more likely than those including mixed eating disorders.

----Figure 4a and b. 'Forest and funnel plot' near here ----

DISCUSSION

The aims of the current systematic review and meta-regression were to evaluate the effectiveness of GSH compared to waiting list and/or active controls in the treatment of a range of eating disorders. Outcomes of interest included global eating disorder psychopathology and abstinence from binge eating. There is known heterogeneity between studies in terms of both participant and intervention characteristics. Therefore, we aimed to delineate the factors which help explain treatment outcomes in existing RCT's. Building on recent reviews of self-help for binge eating disorders (Beintner et al., 2014; Perkins et al., 2006) we focussed the meta-regression on the strongest and most clinically important moderators to date. Therefore, we explored the type and severity of eating disorders amenable to GSH and how interventions can be optimally delivered (mode of delivery and contact time).

Across 30 studies, the findings indicate that GSH was effective in reducing global eating disorder psychopathology and achieving abstinence from binge eating compared to controls. GSH was associated with half a point reduction in EDE/EDE-Q global psychopathology which is not only statistically significant but also has clinical importance, and around 19 times the odds of achieving binge abstinence. The meta-regression showed that unsurprisingly, the main moderator of binge abstinence was a diagnosis of BED. The moderators of eating disorder psychopathology remain less clear. None of the moderating variables explained a significant amount of heterogeneity between studies. Eating disorder psychopathology is a far more complex construct to address and to measure than purely behavioural outcomes. Both the EDE and EDE-Q measures comprise four features of core psychopathology (eating concern, weight concern, shape concern and restraint). Exploring each subscale as an outcome may have been more informative but this was not possible given the small number of studies with these data available.

Interestingly, there was no significant dose-response effect for either outcome (eating disorder psychopathology or abstinence from binge eating), although there was an indication that a greater amount of contact time was beneficial. There are counter-arguments in the broader eating disorder literature that more intense interventions may result in higher drop-out rates and poorer outcomes (Shapiro, Berkman, Brownley, Sedway, Lohr & Bulik., 2007). From their review of the binge eating literature, Beintner et al., (2014) suggested that it may be the quality of guidance which is important. They found that receiving guidance from a specialist was associated with larger intervention effects on some outcomes than non-specialist guidance, and face-to-face guidance was associated with better intervention participation than email guidance.

It is well documented that drop-out rates in self-help studies are highly variably (between 1-88%; (Beintner et al., 2014). We chose not to explore drop-out due to insufficient details in studies and inconsistent terminology. In a qualitative study which explored guide's perspectives on drop-out client's 'recovery' was given as a reason (Traviss, Heywood-Everett & Hill., 2013). Guides recognized that some participants failed to attend as they considered they no longer required treatment. Levels of drop-out may be associated with severity of disorder, potentially following a U-shaped curve. There is likely to be high drop-out in milder disorders due to recovery and again in more severe cases due to non-engagement. In order to enable further investigation, future studies need to provide clear details of participation, for example number of sessions attended, number of sessions constituting completion, reasons for drop-out where possible.

We did not attempt to explore 'age' as a moderator because it is likely confounded by diagnosis i.e. people with anorexia tend be younger and those with binge eating disorder, older (See Table 1). Within this review, there were only two studies which focussed on adolescents (Heinicke et al., 2007;

Schmidt et al., 2007). We know that eating disorders are one of the more common problems in those who access Children and Young People's mental health services (NCCMH., 2015). In addition, those who receive early intervention are more likely to recover (Treasure & Russell, 2011). This begs the question, why are there so few evaluations of low intensity interventions for adolescents? In order to truly test the value of early intervention there need to be more studies of children and young people, conducted in settings appropriate to their management (i.e. school or community health settings rather than within specialist services).

This review points to other gaps in knowledge about the effectiveness of low intensity interventions such as GSH. In addition to a lack of evidence in children and young people, there is limited evidence for GSH in addressing features of eating disorders other than binge eating behaviour. Eighteen of the 30 studies in this review either only recruited patients who binged or used an overcoming binge eating manual in their intervention. Relatively few studies have focused on people with restrictive eating patterns, atypical (UFED/OSFED formerly EDNOS) or subthreshold disorders, despite GSH being recommended as a first stage intervention. The potential for group use of GSH over individual use remains poorly addressed, as does the extent to which GSH can embrace features of e- and m-health. Furthermore, the approach would benefit from an assessment of cost effectiveness to run alongside that of clinical effectiveness (Wilson & Zandberg, 2012).

To fully understand the potential for GSH in the arena of eating disorders, two further developments are necessary. One is the development or adaptation of existing materials to encompass eating disorder-specific behaviours other than binge eating. This could be achieved by developing GSH materials in line with the transdiagnostic approach advocated by Fairburn (1981). A focus here would be on addressing the core psychopathology (over-evaluation and control of eating, weight and shape) from which behavioural features are thought to stem. A second would be to ensure that interventions

include a comprehensive training and supervision package for those acting as guides. This would better equip guides with the knowledge and skills to engage young people during the intervention. Being a guide in GSH is different to acting as a therapist in delivering treatment. While there is some overlap in skills, GSH invites the young person to take primary responsibility in overcoming their problems. The duties of the guide therefore include helping to motivate, being supportive and facilitatory, and providing continuity (Traviss et al, 2013). These more generic skills also mean that a wider group of people can act as guides than the specialists needed for more intensive eating disorder treatment.

One of the strengths of this review was its' focus on RCTs and the synthesis of the highest quality evidence. This is evident in the assessment of methodological quality. This approach enables us to say with some confidence that the results hold true, but may limit the generalisability of findings. In order to avoid selection bias in the review; titles, abstracts and full-texts were independently screened by two authors. Analyses were conducted on intention-to-treat data only and in trials where symptom improvement was hypothesized, our results offer a conservative estimate. This approach also maintains the fidelity of randomization. Limitations included the trade-off between study quality and quantity. Thirty high quality studies were included which compromised the number of moderator variables we were able to explore. We were unable to investigate drop-out in more detail and 'age' as a meaningful moderator of outcome. Finally, we were only able to obtain data on eating disorder psychopathology for two-thirds of the selected studies. Future studies need to broaden the range of symptoms that interventions are directed at.

We did not exclude studies based on quality but acknowledge that these may have affected the results. There were a few studies that demonstrated a high risk of bias (DeBar et al., 2011; Huon, 1985; Jacobi et al., 2012; Peterson et al., 1998; Wagner et al., 2013). These were predominantly due to unclear

reporting on aspects of the methodology, or their analyses focused on completers only. Authors were contacted in an attempt to clarify methodological details and to obtain intention-to-treat data where possible. Where this was not possible, the data were not included in the analysis for the outcome. While a level of caution should be taken in interpreting the results, it should be noted that when studies at high risk of bias were removed from the analyses, there was still an overall effect in favour of GSH.

It is also possible that a proportion of heterogeneity in the studies reviewed could be due to the variation in comparator groups i.e. waiting list and active treatments. Whilst exploring this would have been useful, the small number of studies prohibited further detailed analysis and by combining active treatments, our results again provide a conservative estimate of effects.

CONCLUSIONS

In conclusion, this systematic review and meta-regression of the effectiveness of GSH interventions for reducing eating disorder psychopathology and binge eating across a range of eating disorders, demonstrates clearly that GSH is effective compared to both waiting list and other active treatments for eating disorders. Moderator analyses show that GSH is particularly effective in addressing the behavioural feature of binge eating. The current materials available to support GSH may need to be adapted for other presentations or features of eating disorders. Further research is needed to establish the effectiveness of GSH in children and young people, to better understand drop-out in these interventions and to exploit advances in technology by incorporating aspects of e-health and exploring innovative modes of guidance. This will strengthen the place of GSH within a stepped-care model of treatment delivery.

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Contribution of authors

Dr Gemma Traviss-Turner designed and registered the protocol, conducted the search strategy with advice from a Senior Information Specialist (Dr Judy Wright), selected studies for inclusion, contributed to the analyses and prepared the manuscript. Professor Andrew Hill finalised studies for inclusion and provided ongoing intellectual input into the manuscript. Professor Robert West conducted the statistical analyses

Conflicts of interest

The authors were involved in developing and evaluating the Working to Overcome Eating Difficulties guided self-help manual used in Traviss et al.,2011 study included in the review.

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APPENDICES

Appendix 1

Search Strategy

A. Ovid Medline (R) 1946-Apr week 4 2016

EATING DISORDER

1 eating disorders/ or anorexia nervosa/ or binge-eating disorder/ or bulimia nervosa/ or female athlete triad syndrome/ or pica/

2 anorexi*.tw.

3 ednos.tw.

4 ((eating or bulimic) adj3 (disorder* or difficult*)).tw.

5 1 or 2 or 3 or 4

RANDOMIZED CONTROLLED TRIAL

6 randomized controlled trial.pt.

7 controlled clinical trial.pt.

8 randomized.ab.

9 placebo.ab.

10 drug therapy.fs.

11 randomly.ab.

12 trial.ab.

13 groups.ab.

14 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13

15 exp animals/ not humans.sh.

16 14 not 15

17 5 and 16

SELF HELP

18 Bibliotherapy/

19 biblio*.tw.

20 Self-Help Groups/

21 self help.tw.

22 Self Care/

23 "self car*".tw.

24 "self manage*".tw.

25 "self support*".tw.

26 "self change".tw.

27 "self direct*".tw.

28 "self treat*".tw.

29 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28

30 "manual*".tw.

31 ("CD" or "CD ROM*").tw.

32 ("DVD" or "video*").tw.

33 ("telephone" or "phone").tw.

34 ("online" or "internet*" or "web*").tw.

35 30 or 31 or 32 or 33 or 34

36 29 or 35

37 17 and 36

B. EMBASE Classic+Embase 1947-Apr 2016

EATING DISORDER

1 eating disorder/ or anorexia nervosa/ or binge eating disorder/ or bulimia/ or female athlete triad/ or pica/

2 anorexi*.tw.

3 ednos.tw.

4 ((eating or bulimic) adj3 (disorder* or difficult*)).tw.

5 1 or 2 or 3 or 4

RANDOMIZED CONTROLLED TRIAL

6 (random$ or placebo$ or single blind$ or double blind$ or triple blind$).ti,ab.

7 RETRACTED ARTICLE/

8 6 or 7

9 (animal$ not human$).sh,hw.

10 (book or conference paper or editorial or letter or review).pt. not exp randomized controlled trial/

11 (random sampl$ or random digit$ or random effect$ or random survey or random regression).ti,ab. not exp randomized controlled trial/

12 8 not (9 or 10 or 11)

SELF HELP

13 exp self help/ or self care/

14 self help.tw.

15 bibliotherapy/

16 biblio*.tw.

17 "self car*".tw.

18 "self manage*".tw.

19 "self support*".tw.

20 "self change".tw.

21 "self direct*".tw.

22 "self treat*".tw.

23 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22

24 "manual*".tw.

25 ("CD" or "CD ROM*").tw.

26 ("DVD" or "video*").tw.

27 ("telephone" or "phone").tw.

28 ("online" or "internet*" or "web*").tw.

29 24 or 25 or 26 or 27 or 28

30 23 or 29

31 5 and 12 and 30

C. PsychINFO 1806- Apr 2016

EATING DISORDER

1 eating disorders/ or anorexia nervosa/ or binge eating disorder/ or bulimia/ or pica/ or "purging (eating disorders)"/ or appetite/ or binge eating/ or eating behavior/ or feeding disorders/ or underweight/

RANDOMIZED CONTROLLED TRIAL

6 clinical trials/

7 random*.tw.

8 control*.tw.

9 placebo.tw.

10 groups.tw.

11 6 or 7 or 8 or 9 or 10

12 animal models/ or animals/

13 11 not 12

SELF HELP

14 self help techniques/ or self management/ or psychotherapeutic techniques/ or self monitoring/ or support groups/ or treatment/ or twelve step programs/

D. Cochrane Library

Eating disorder (MESH) AND Therapy (qualifier term)

E. Web of Science conferences

Eating Disorder* AND

Help*

F. Online registries

www.clinicaltrials.gov

Advanced search within Mental Health & Behavioural Disorders category

Condition: Eating disorder

Intervention: Self-help

WHO International Clinical Trial Registry Platform www.Controlled-trials.com

Advanced search with

Title: Eating disorder

Intervention: Self help OR Treatment

G. Proquest dissertations

Eating NEAR/1 disorder* in Title AND

Treatment OR Intervention in Title

H. Hand searching major journals for additional papers

International Journal of Eating Disorders

European Eating Disorders Review

Eating Disorders: The Journal of Prevention & Treatment

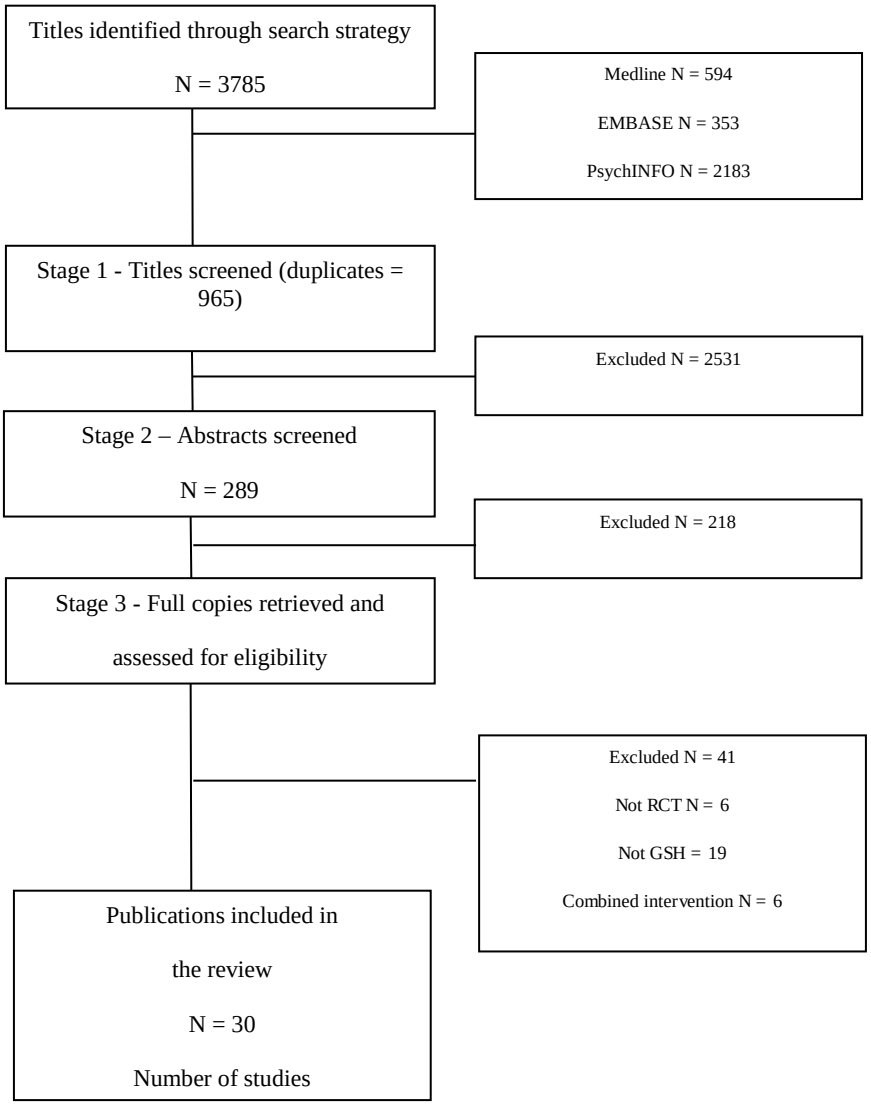


Figure 1. PRISMA diagram of study selection process

Table 1. Characteristics of included studies

Study	Participants	Mean Age (SD)	Intervention/comparison	Duration	Outcome Measure	Country	Risk of bias
Ter Huurne 2015	N=214, BN, BED, EDNOS, Female, Adults	39.4 (11.6)	Look at Your Eating (CBT web-based application with 10 assignments and twice weekly asynchronous feedback from trained healthcare graduate) WL	15 weeks	EDE-Q	Netherlands	Low
Saekow 2015	N=65, Subthreshold AN, BN, BED, Female, Adults	20.8 (range 18-25)	Student Bodies (10 sessions online CBT with asynchronous discussion board and weekly text-based coaching from clinical psychology trainee) WL	10 weeks	EDE-Q	USA	Low
Hotzel 2014	N=212, Symptoms of AN or BN, Female, Adults	27.1 (range 18-50)	Internet-based self-help (Internet-based program ESS-KIMO 6 x 45m modules with individualised feedback from authors) vs WL	8 weeks	German version EDE-Q	Germany	Low
Masson 2013	N=60, BED criteria or BED criteria with binge eating, Female and 7 male, Adults	42.8 (10.5)	DBT- GSH (DBT for Binge Eating manual with 6 biweekly support phone calls) vs WL	13 weeks	EDE-Q	Canada	Low
Wagner 2013	N=155, DSM criteria TR purging BN or EDNOS with binge eating or purging behaviour, Female, Adults	24.6 (range 16-35)	GSH (Getting Better Bite by Bite manual plus weekly email support from psychologists with experience in eating disorders) vs Internet CBT (netunion.com supported via email as above)	4-7 months	EDI	Austria	High (not true ITT analysis and selective reporting)

Ruwaard 2013	N=105, BN symptoms, Female and 1 male, Adults	31 (10)	Online CBT (online self-directed CBT with 25 scheduled therapist feedback moments by graduates in clinical psychology, no face-face) vs SH manual (no guidance so not included) vs WL	20 weeks	EDE-Q	Netherlands	Low (method of sequence generation not clear)
Jacobi 2012	N=126, Weight and shape concerns plus behavioural symptoms of eating disorder, Female, Adults	22.3 (2.9)	Student Bodies (8 x online CBT plus discussion groups and weekly feedback from psychology graduate) vs WL	8 weeks	EDE-Q, EDI	Germany	High (unclear method of randomization, selective reporting completers)
Carrard 2011	N=74, DSM criteria threshold or sub-threshold BED, Female, Adults	36.1 (11.4)	Internet GSH (Online programme adapted from Overcoming Binge Eating plus weekly guidance by psychologist) vs WL	6 months	EDE-Q, EDI, TFEQ	Switzerland	Low
Sanchez-Ortiz 2011	N=76, DSM criteria BN and EDNOS, Female and 1 male, Adults	23.9 (5.9)	iCBT (Overcoming Bulimia Online 8 x 45m sessions, supported by emails from cognitive behavioural therapist) vs Delayed treatment control	12 weeks	EDE	UK	Moderate (selective reporting)
DeBar 2011	N=160, Binge eating at least once a week for 3 months, Female, Adults	39 (6.7)	CBT GSH (Overcoming Binge Eating manual plus 8 x 25m with therapist) vsUsual Care	12 weeks	EDE-36, EDE-Q	USA	High (all criteria unclear)
Traviss 2011	N=68, Range of disordered eating, Female and 2 male, Adults	37 (11.9)	GSH (Working to Overcome Eating Difficulties manual plus 7 x 1hr sessions with trained guide) vs WL	12 weeks	EDE-Q	UK	Low

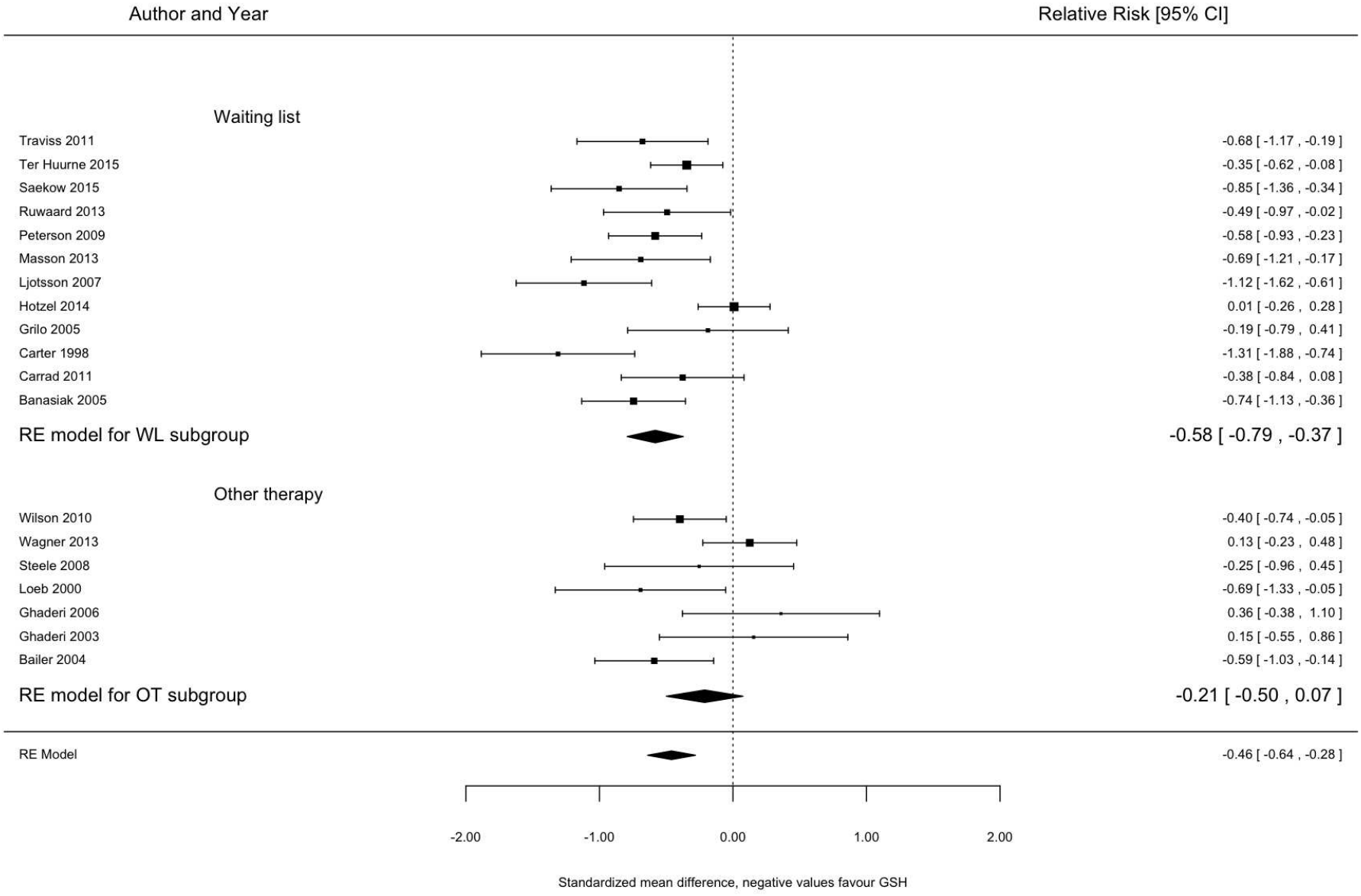
Striegel-Moore 2010	N=123, DSM criteria BN, BED or EDNOS, Female and 10 male, Adults	37.2 (7.8)	CBT GSH (Overcoming Binge Eating manual plus 8 x 25m with Masters-level therapist trained and supervised to deliver intervention) vs Usual care	12 Weeks	EDE, EDE-Q	USA	Moderate (unclear method of randomization, allocation concealment, selective reporting)
Wilson 2010	N=205, DSM criteria for BED, Female and 30 male, Adults	48.3 (range 19-77)	CBT GSH (Overcoming Binge Eating manual plus 10 x 25m sessions supported by graduates with no experience of CBT or BED) vs Behavioural weight loss treatment (20 individual sessions) vs (Interpersonal Psychotherapy not included in analysis)	24 weeks	EDE	USA	Low (unclear allocation concealment)
Peterson 2009	N=259, DSM-IV BED, Female and 32 male, Adults	47.2 (10.4)	Therapist-assisted self-help (15 x 80m group sessions with psychoeducational video plus review and discussion with doctoral-level psychotherapist) vs WL vs (Self-help and therapist-led conditions not included in analysis)	20 weeks	EDE, TFEQ	USA	Low
Steele 2008	N=48, BN (with two modified APA criteria - frequency and loss of control of bingeing), Female and 1 male, Adults	26.0 (5.8)	GSH (Bulimia and Binge Eating manual 8 x 40m with postgraduate psychology students) vs Placebo (Mindfulness based cognitive therapy for depression) (Perfectionism condition not included in analysis)	6 weeks	EDE	Australia	Low (unclear allocation concealment)

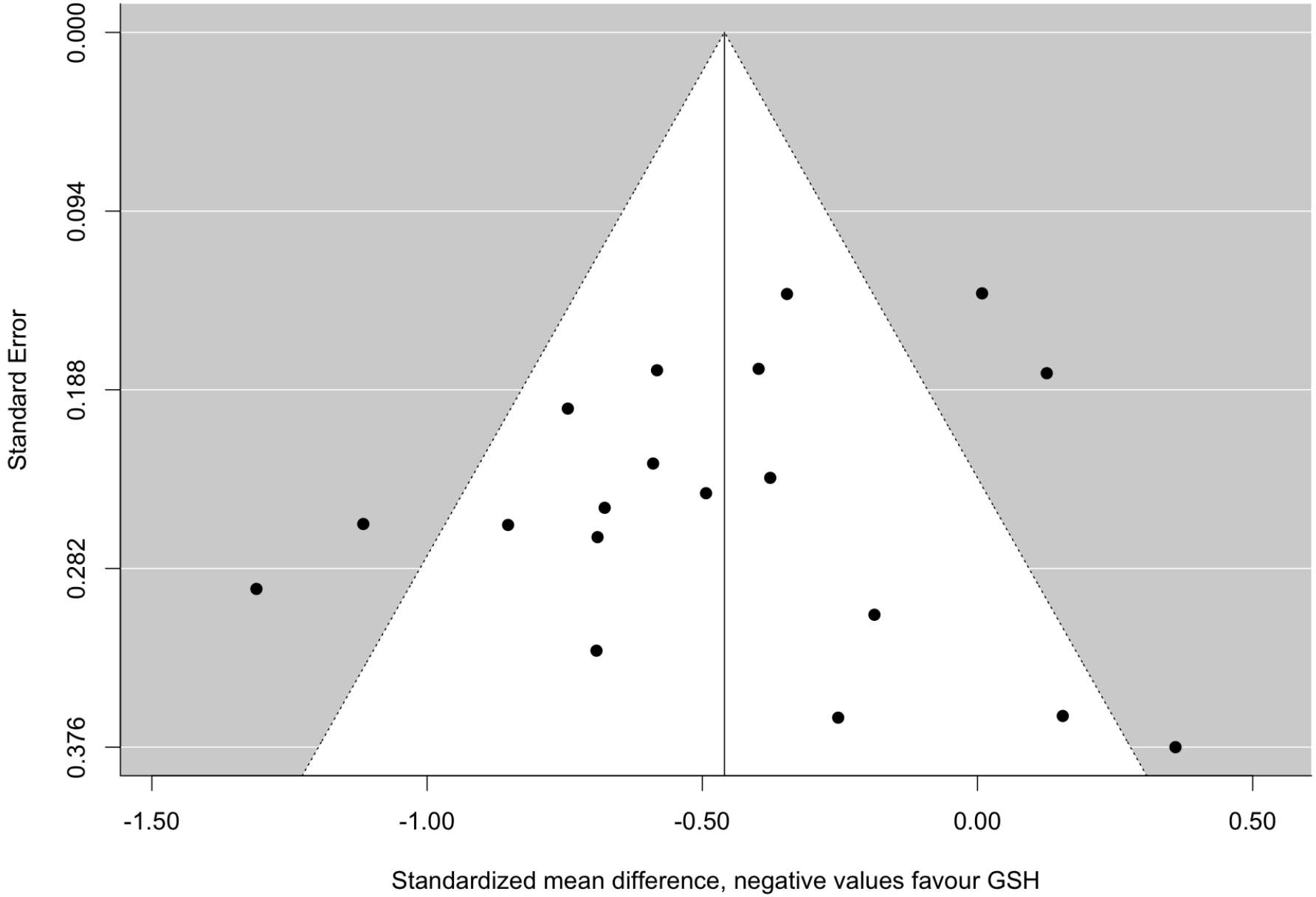
Schmidt 2007	N=85, BN criteria or EDNOS, Female and 2 male, Adolescents	17.7 (1.7)	CBT GSH (Getting Better Bite by Bite plus 10 weekly sessions with experienced therapists with training in both interventions) vs Family therapy (13 sessions)	10 weeks, 3 monthly follow-ups	EATATE, SEED	UK	Moderate (unclear how incomplete outcome data addressed and some selective reporting)
Ljotsson 2007	N=73, Full or subthreshold BN or BED, Female and 4 male, Adults	34.6 (10.4)	Internet assisted CBT (Overcoming Binge Eating manual delivered with email guidance up to twice a week from graduate psychology student) vs WL	12 weeks	EDE-Q, EDI-2	Sweden	Low (unclear allocation concealment)
Heinicke 2007	N=83, Self-identification of body image or eating problems, Female, Adolescents	14.4 (1.48)	Internet-delivered group intervention (6 x 90m online group sessions facilitated by a GSH manual adapted from the Set Your Body Free Program and a trained therapist) vs Delayed treatment control	6 weeks	BSQ-SF, Restraint DEBQ-R, extreme weight loss EWLB, bulimic symptoms EDI-B	Australia	Low (some selective reporting at FU)
Ghaderi 2006	N=29, DSM criteria BN, BED, EDNOS, Female, Adults	31 (9.4)	GSH (Overcoming Binge Eating manual plus 6 x 25m with a trained Undergraduate Psychology student) vs. Pure self-help	12 weeks	EDE, EDE-Q	Sweden	Low (no blinding of outcome assessment)
Schmidt 2006	N=61, DSM-IV defined BN or EDNOS, Female and male, Adults	28.8 (8.3)	CBT guided self-care with feedback (Getting Better Bite by Bite manual plus 10 x 50m with experienced therapist. Individual and normative feedback via letter and computer) vs CBT GSH without feedback (Getting Better Bite by Bite manual plus 10 weekly sessions with experienced therapist)	10 weeks, 4 monthly follow-ups	SEED	UK	Moderate (Did not impute missing values, some selective reporting)

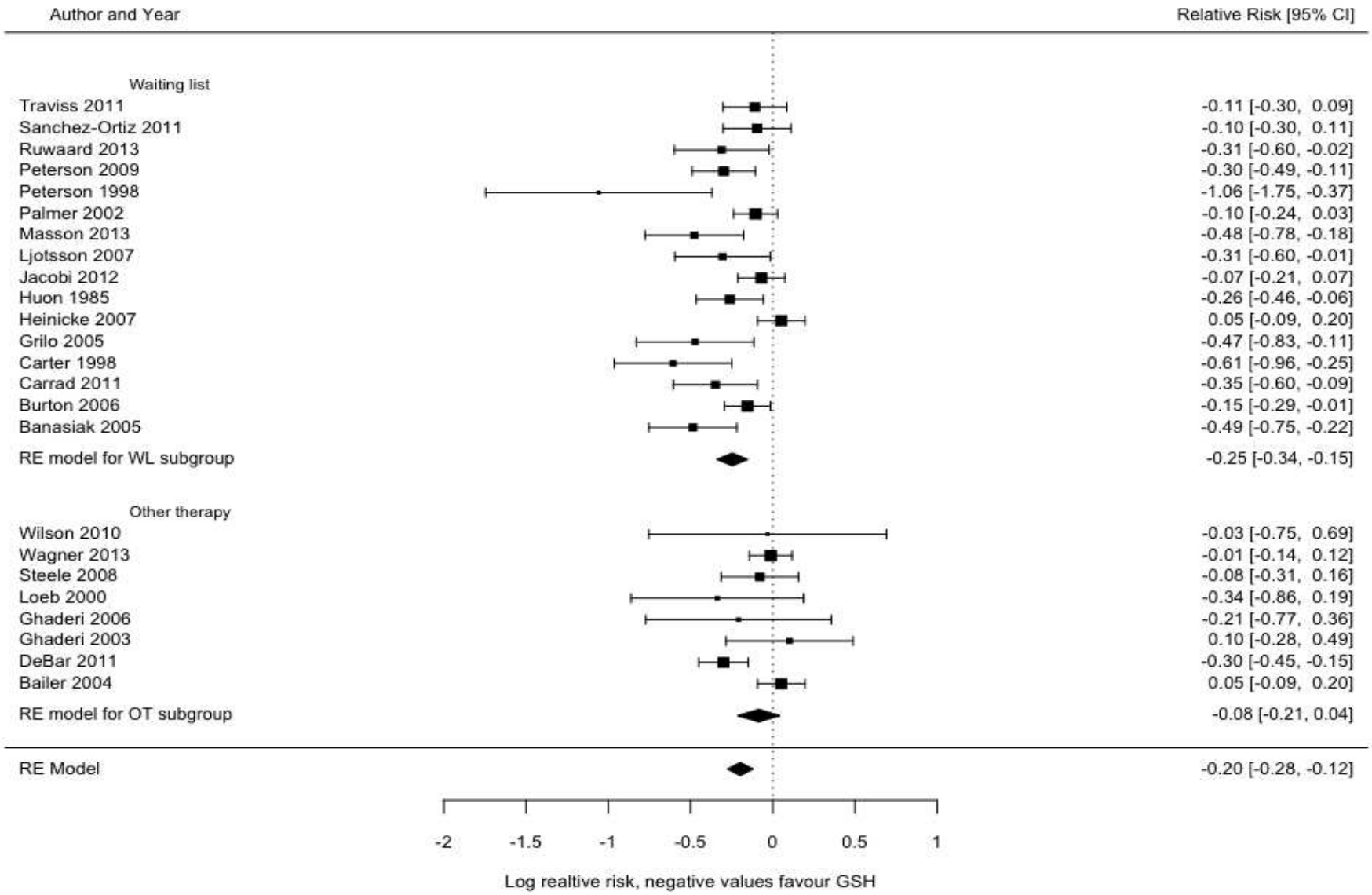
Burton 2006	N=85, DSM criteria BN and subthreshold, Female, Adults	21 (5.3)	Healthy Weight Program (6 x group sessions led by Masters graduate with handouts and goal setting) vs. WL	6 weeks	EDE	USA	Low (unclear method of randomization)
Banasiak 2005	N=109, DSM Full or modified criteria for BN, Female, Adults	28.9 (8.5)	GSH (Bulimia Nervosa and Binge Eating guide to recovery manual plus 9 x 20m over 16 weeks with trained GP) vs Delayed Treatment Control	17 weeks	EDE, EDE-Q	Australia	Low
Grilo 2005b	N=90, DSM criteria for BED, Female and 19 male, Adults	47 (9.0)	GSH (Overcoming Binge Eating manual plus 6 x 20 minutes with doctoral research clinicians trained in CBT) vs WL vs (Behavioural weight loss condition not included in analysis)	12 weeks	EDE-Q	USA	Low
Bailer 2004	N=81, DSM criteria BN, Adults	23.8 (4.5)	GSH (Getting Better Bite by Bite German plus 18 x 20m sessions with residents in Psychiatry) vs Group Cognitive Behavioural Therapy (18 weeks 1.5 hour group therapy)	18 weeks	EDI (German version), EDQ, EB-IV	AUSTRIA	Moderate (randomised by group, allocation concealment not reported, selective reporting secondary outcomes)
Ghaderi 2003	N=31, DSM criteria BN, Subthreshold BN, BED or EDNOS-binge eating, Female and male, Adults	29 (10.7)	GSH (Overcoming Binge Eating plus 6-8 x 25m with trained Undergraduate psychology student) vs Pure self-help	16 weeks	EDE, EDE-Q	Sweden	Moderate (unclear method of randomization)

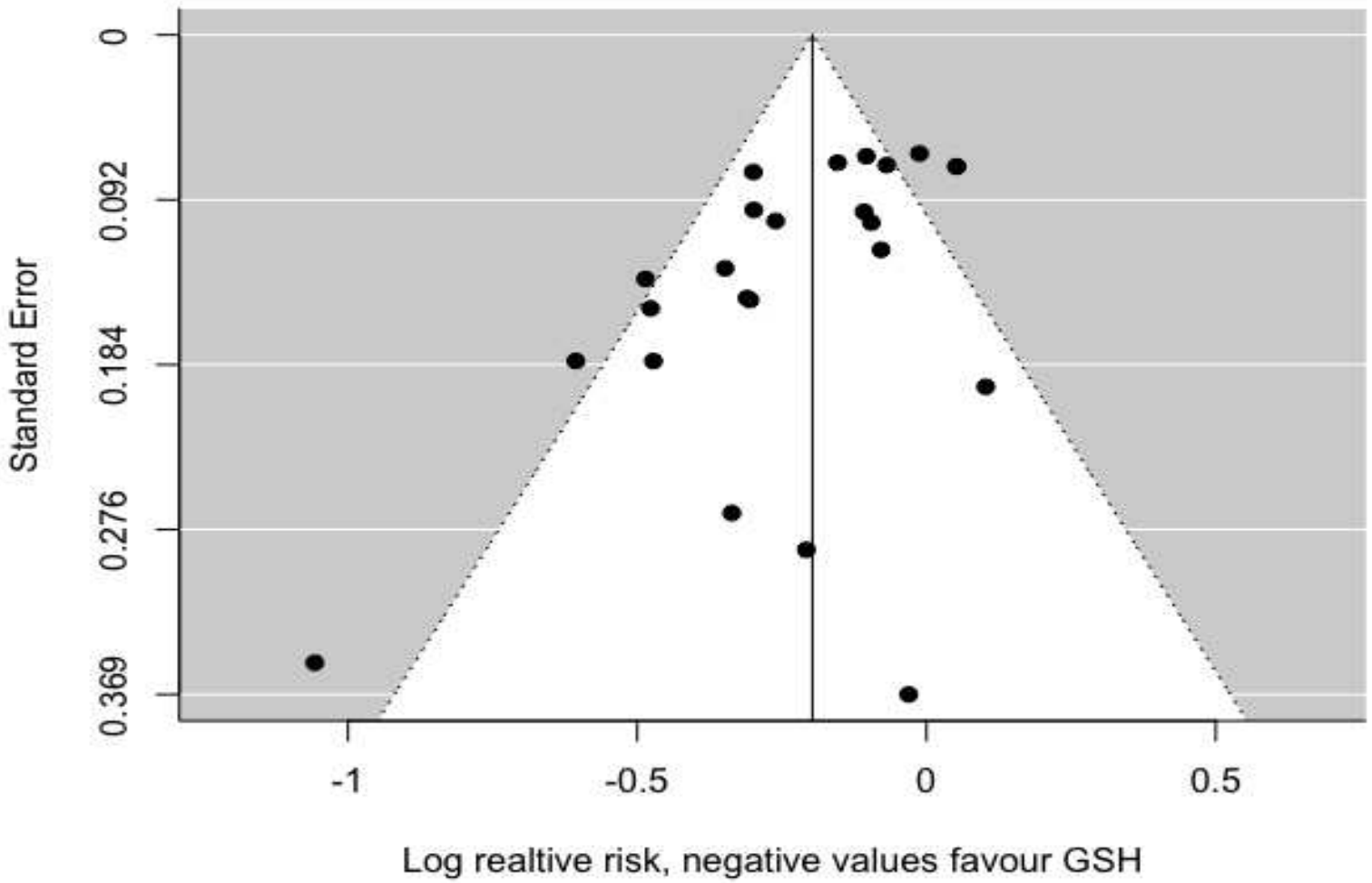
Palmer 2002	N=121, DSM criteria BN, Subthreshold BN or BED, Female and 4 male, Adults	26.9	GSH (Overcoming Binge Eating manual plus 4 x 30m with nurse-therapist) vs WL (Self-help with telephone guidance and PSH conditions which were not included in analysis)	4 months	EDE	UK	Moderate (selective reporting, no blinding of outcome assessment)
Loeb 2000	N=40, Threshold and subthreshold non-purging BN or BED, subthreshold purging BN, Female, Adults	41.5 (9.4)	GSH (Overcoming Binge Eating manual plus 6 x 30m sessions with clinical psychologist) vs Pure self-help	10 weeks	EDE, EDE-Q	USA	Moderate (unclear allocation concealment, selective reporting at FU, blinding of outcome assessment)
Carter 1998	N=72, DSM criteria BED, Female, Adults	39.7 (10)	GSH (Overcoming Binge Eating manual plus 6-8 x 25m sessions with facilitator with no clinical experience) vs WL (Pure self-help not included in analysis)	12 weeks	EDE, EDE-Q	UK	Low
Peterson 1998	N=61, DSM criteria BED, Female, Adult	42.4 (10.2)	Partial self-help (14 x 1 hour group sessions including psychoeducational video plus discussion with psychologist trained in CBT) vs WL (Structured self-help and therapist-led conditions not included in analysis)	8 weeks	EB-IV, TFEQ	USA	High (group randomization, selective reporting, other criteria unclear)

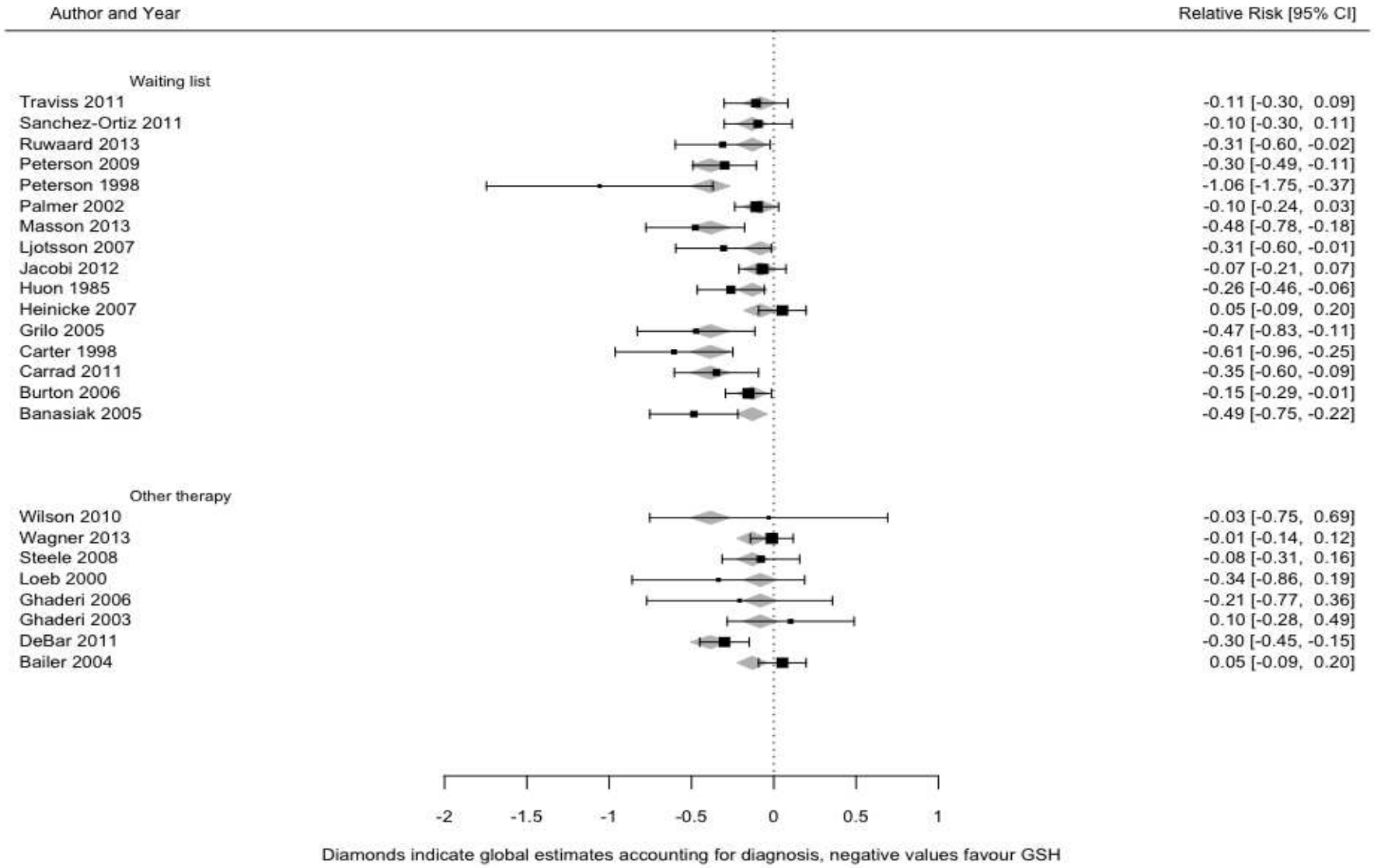
Huon 1985	N=120, DSM criteria BN, Female, Adults	22.5 (range 15-42)	SH + recovered BN (7 monthly mailed self-help components + guidance from patient) vs WL SH + improved BN (not included in analysis) Pure self-help (not included in analysis)	7 months	Frequency of binge eating, Body cathexis, Self-cathexis	Australia	High (all criteria unclear)


Author and Year
Relative Risk [95% CI]
Waiting list
Traviss 2011
-0.68 [-1.17 , -0.19]
Ter Huurne 2015
-0.35 [-0.62 , -0.08]
Saekow 2015
-0.85 [-1.36 , -0.34]
Ruwaard 2013
-0.49 [-0.97 , -0.02]
Peterson 2009
-0.58 [-0.93 , -0.23]
Masson 2013
-0.69 [-1.21 , -0.17]
Ljotsson 2007
-1.12 [-1.62 , -0.61]
Hotzel 2014
0.01 [-0.26 , 0.28]
Grilo 2005
-0.19 [-0.79 , 0.41]
Carter 1998
-1.31 [-1.88 , -0.74]
Carrad 2011
-0.38 [-0.84 , 0.08]
Banasiak 2005
-0.74 [-1.13 , -0.36]
RE model for WL subgroup
-0.58 [-0.79 , -0.37]
Other therapy
Wilson 2010
-0.40 [-0.74 , -0.05]
Wagner 2013
0.13 [-0.23 , 0.48]
Steele 2008
-0.25 [-0.96 , 0.45]
Loeb 2000
-0.69 [-1.33 , -0.05]
Ghaderi 2006
0.36 [-0.38 , 1.10]
Ghaderi 2003
0.15 [-0.55 , 0.86]
Bailer 2004
-0.59 [-1.03 , -0.14]
RE model for OT subgroup
-0.21 [-0.50 , 0.07]
RE Model
-0.46 [-0.64 , -0.28]
-2.00
-1.00
0.00
1.00
2.00
Standardized mean difference, negative values favour GSH


Standard Error
0.000
0.094
0.188
0.282
0.376
-1.50
-1.00
-0.50
0.00
0.50
Standardized mean difference, negative values favour GSH


Author and Year
Relative Risk [95% CI]
Waiting list
Traviss 2011
-0.11 [-0.30, 0.09]
Sanchez-Ortiz 2011
-0.10 [-0.30, 0.11]
Ruwaard 2013
-0.31 [-0.60, -0.02]
Peterson 2009
-0.30 [-0.49, -0.11]
Peterson 1998
-1.06 [-1.75, -0.37]
Palmer 2002
-0.10 [-0.24, 0.03]
Masson 2013
-0.48 [-0.78, -0.18]
Ljotsson 2007
-0.31 [-0.60, -0.01]
Jacobi 2012
-0.07 [-0.21, 0.07]
Huon 1985
-0.26 [-0.46, -0.06]
Heinicke 2007
0.05 [-0.09, 0.20]
Grilo 2005
-0.47 [-0.83, -0.11]
Carter 1998
-0.61 [-0.96, -0.25]
Carrad 2011
-0.35 [-0.60, -0.09]
Burton 2006
-0.15 [-0.29, -0.01]
Banasiak 2005
-0.49 [-0.75, -0.22]
RE model for WL subgroup
-0.25 [-0.34, -0.15]
Other therapy
Wilson 2010
-0.03 [-0.75, 0.69]
Wagner 2013
-0.01 [-0.14, 0.12]
Steele 2008
-0.08 [-0.31, 0.16]
Loeb 2000
-0.34 [-0.86, 0.19]
Ghaderi 2006
-0.21 [-0.77, 0.36]
Ghaderi 2003
0.10 [-0.28, 0.49]
DeBar 2011
-0.30 [-0.45, -0.15]
Bailer 2004
0.05 [-0.09, 0.20]
RE model for OT subgroup
-0.08 [-0.21, 0.04]
RE Model
-0.20 [-0.28, -0.12]
-2
-1.5
-1
-0.5
0
0.5
1
Log realtive risk, negative values favour GSH


Standard Error
0
0.092
0.184
0.276
0.369
-1
-0.5
0
0.5
Log realtive risk, negative values favour GSH


Author and Year
Relative Risk [95% CI]
Waiting list
Traviss 2011
-0.11 [-0.30, 0.09]
Sanchez-Ortiz 2011
-0.10 [-0.30, 0.11]
Ruwaard 2013
-0.31 [-0.60, -0.02]
Peterson 2009
-0.30 [-0.49, -0.11]
Peterson 1998
-1.06 [-1.75, -0.37]
Palmer 2002
-0.10 [-0.24, 0.03]
Masson 2013
-0.48 [-0.78, -0.18]
Ljotsson 2007
-0.31 [-0.60, -0.01]
Jacobi 2012
-0.07 [-0.21, 0.07]
Huon 1985
-0.26 [-0.46, -0.06]
Heinicke 2007
0.05 [-0.09, 0.20]
Grilo 2005
-0.47 [-0.83, -0.11]
Carter 1998
-0.61 [-0.96, -0.25]
Carrad 2011
-0.35 [-0.60, -0.09]
Burton 2006
-0.15 [-0.29, -0.01]
Banasiak 2005
-0.49 [-0.75, -0.22]
Other therapy
Wilson 2010
-0.03 [-0.75, 0.69]
Wagner 2013
-0.01 [-0.14, 0.12]
Steele 2008
-0.08 [-0.31, 0.16]
Loeb 2000
-0.34 [-0.86, 0.19]
Ghaderi 2006
-0.21 [-0.77, 0.36]
Ghaderi 2003
0.10 [-0.28, 0.49]
DeBar 2011
-0.30 [-0.45, -0.15]
Bailer 2004
0.05 [-0.09, 0.20]
-2
-1.5
-1
-0.5
0
0.5
1
Diamonds indicate global estimates accounting for diagnosis, negative values favour GSH

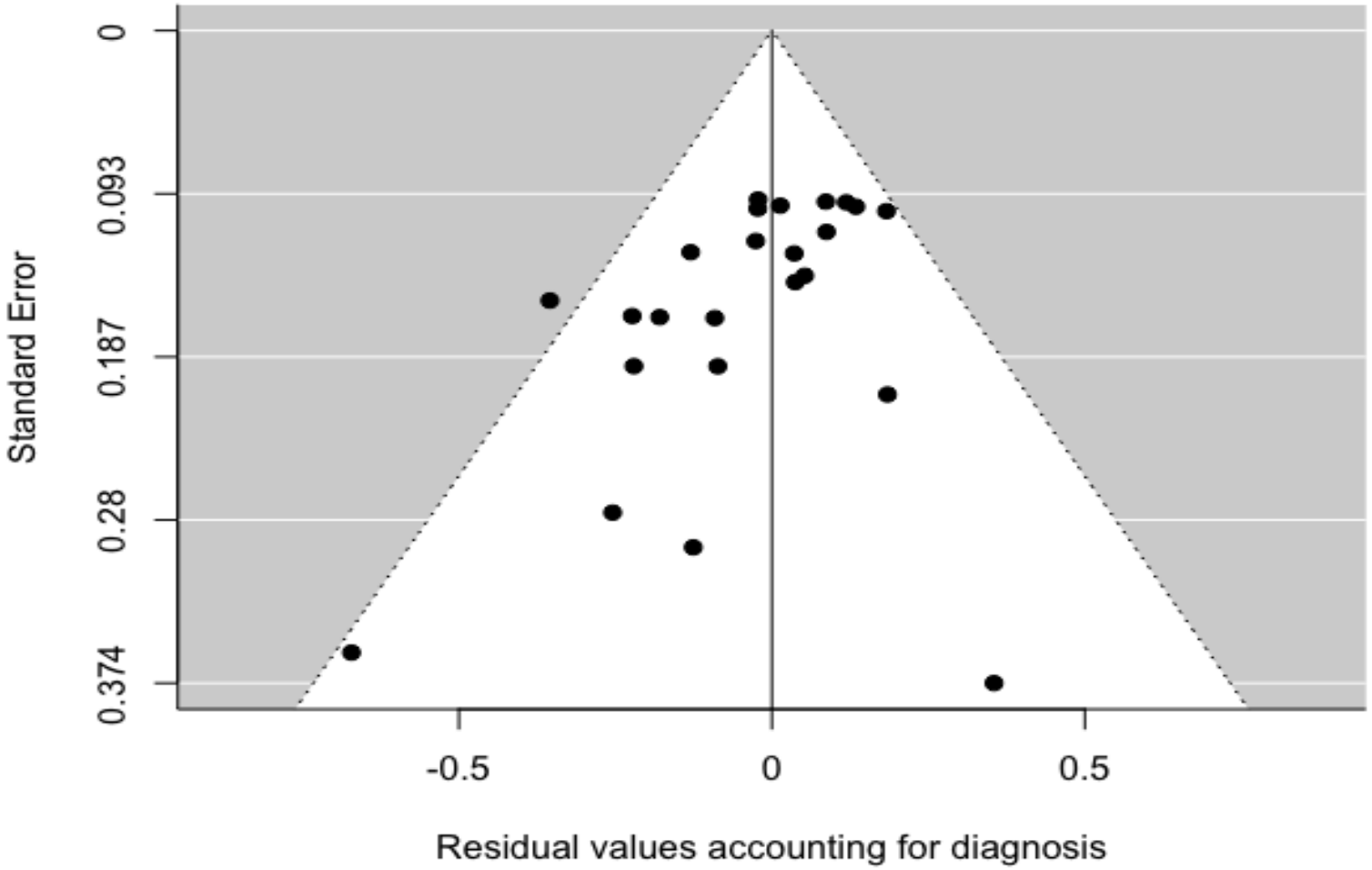

Standard Error
0
0.093
0.187
0.28
0.374
-0.5
0
0.5
Residual values accounting for diagnosis

Table 2. Results of meta-regression analyses for moderators of intervention effects

	Intercept (SE)	Estimate of coefficient (SE)	p	95% CI
ED Psychopathology				
Mode of guidance (face to face vs)	-0.46 (0.16)			
group		-0.12 (0.44)	0.003	-0.76, -0.15
other		-0.04 (0.25)	0.87	-0.53, 0.45
Contact time (low vs)	-0.40 (0.14)			
high		-0.19 (0.27)	0.48	-0.72, 0.34
email		-0.34 (0.32)	0.30	-0.97, 0.30
Severity (threshold vs)	-0.50 (0.17)			
subthreshold		0.30 (0.31)	0.33	-0.30, 0.90
both		-0.07 (0.23)	0.77	-0.52, 0.38
Diagnosis (BED vs)	-0.58 (0.17)			
BN		0.05 (0.30)	0.88	-0.55, 0.64
mixed		0.23 (0.25)	0.37	-0.27, 0.71
Abstinence				
Mode of guidance (face to face vs)	-0.20 (0.06)			
group		0.01 (0.12)	0.93	-0.22, 0.24
other		-0.01 (0.09)	0.91	-0.19, 0.17
Contact time (low vs)	-0.23 (0.06)			
high		0.03 (0.11)	0.79	-0.18, 0.24
email		0.08 (0.10)	0.40	-0.11, 0.28
Severity (threshold vs)	-0.24 (0.06)			
subthreshold		0.16 (0.12)	0.17	-0.07, 0.40
both		0.05 (0.09)	0.56	-0.12, 0.22
Diagnosis (BED vs)	-0.39 (0.06)			
BN		0.25 (0.08)	0.0008	0.11, 0.40
mixed		0.30 (0.08)	0.0001	0.15, 0.46

*****Reference group in brackets