



The use of motivational interviewing in eating disorders: A systematic review

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ABSTRACT

This review examines the effectiveness of interventions that include the principles and techniques of motivational interviewing (MI) and its adaptations in the treatment of eating disorders. The aims are (1) to examine both the context and effectiveness of MI and Motivational Enhancement Therapy (MET) when used with either patients or carers of people with eating disorders, (2) to identify limitations and/or difficulties in this process and (3) to identify further research needs in this area. Electronic databases were searched up until April 2012. Articles were screened according to predetermined inclusion and exclusion criteria. Thirteen studies were finally selected for inclusion. A wide range of participants, interventions and outcomes were measured which made comparative analysis difficult. Promising results were found for interventions that included MI, particularly with regards to its use in increasing a readiness and motivation to change. Consequently, there is potential for using MI in the field of eating disorders, particularly with respect to 'readiness for change'. More homogeneity in study design and delivery of MI is needed along with some markers of treatment fidelity, including information as to how adherence to the intervention is assured.

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1. Introduction

Eating disorders (EDs) can lead to significant problems with psychosocial and physical functioning. Symptoms comprise of over/under eating and extreme behaviours related to weight control. As a result, the sufferer (Steinhausen, 2002, 2009) and their families (Treasure et al., 2005; Whitney and Eisler, 2005; Whitney et al., 2007) must learn to cope with these debilitating factors.

A major hurdle in the course of successful treatment is ED patients' reluctance and resistance to change. The individual does not recognise the ED as a problem (Treasure and Schmidt, 2010) and, therefore, their motivation to overcome the illness is limited (Dean et al., 2008). This stands in marked contrast to the concerns of both professionals and family. Clinicians working with sufferers are continuously challenged by patient resistance to treatment (Touyz et al., 2003; Treasure and Schmidt, 2001; Vitousek et al., 1998).

Caring for someone with a mental illness can elicit strong emotional reactions and carers of people with EDs frequently experience anxiety and depression at clinical levels (Zabala et al., 2009). Carers' emotional reactions are often associated with a change in expressed emotion, in particular, criticism/hostility and over-protection which then can generate a number of dysfunctional changes in family dynamics (Schmidt and Treasure, 2006).

Families may also accommodate to the symptoms of the illness (e.g. reassuring patient insecurities) and their effect on the individual can impact on the family's appraisal of the level of caring burden and their well-being. Consequently, the manner in which the family attempts to reduce the symptoms may inadvertently play a role in maintaining or aggravating the problems.

The trans-theoretical model of change (Prochaska and DiClemente, 1984) provides a conceptual framework that explains the process of change. The first stage of the model outlines the individual's readiness to change, which is related to improvement with therapy (Franko, 1997; Geller et al., 2004; Treasure et al., 1999) and can be used to predict short and long-term clinical outcomes (Gusella et al., 2003; Rieger et al., 2000). Clinical evidence corroborates this view (Geller et al., 2005, 2009, 2011). Therefore, 'readiness to change' could be considered as a proximal outcome that influences the more long-term distal outcome of improved health status.

A technique which could target readiness to change is motivational interviewing (MI). MI is a "client-centred directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence" (Miller and Rollnick, 2002). This interviewing technique is designed to be used when people are not ready or are ambivalent about change and provides a framework that allows therapists to work *with* their patients rather than *against* them (Treasure and Schmidt, 2010). The key principles include expressing empathy, developing discrepancy, rolling with resistance and supporting self-efficacy. Motivational approaches

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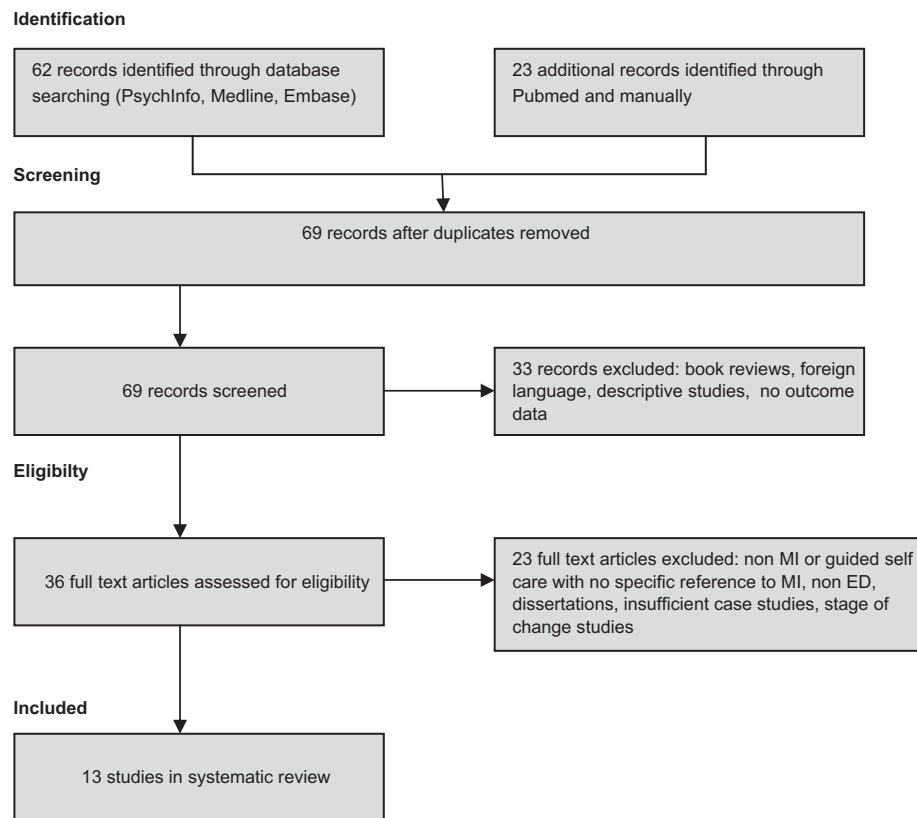


Fig. 1. Information flow.

allow the individual to play an active role in their recovery by acknowledging their position as the expert of their own experience, and by allowing them to have a sense of control over the pace of their recovery process (Gusella et al., 2003). Consequently, addressing motivation and readiness for change is essential to treating ED individuals who have high rates of relapse and drop-out (Geller et al., 2008).

MI is one of the techniques recognised in the taxonomies of behaviour change strategies (Abraham and Michie, 2008) and is used in conjunction with other behaviour change methods or as a precursor to complex service interventions. It was originally intended to *instigate* change, i.e., to encourage a move from ambivalence to commitment, after which other change methods could follow (Miller and Rollnick, 2002). It has been suggested that people who are ready for change do not need MI and there is some evidence that it may even slow down their progress relative to action-oriented treatment (Miller and Rollnick, 2009; Project MATCH Research Group, 1997; Rohsenow et al., 2004; Stotts et al., 2001). The most obvious integration, then, is to offer MI as a first consultation, as a prelude to other services (Miller and Rollnick, 2002) or in combination with other therapies that target behaviour change, such as cognitive behavioural therapy (CBT) (The COMBINE Study Research Group, 2003) or as a form of guidance to accompany self-directed care.

MI is often combined with personal feedback of assessment results. This combination is known as Motivational Enhancement Therapy (MET) whereby the therapist uses structured feedback, delivered in a collaborative manner, regarding problems associated with the target behaviour and the patient's level of severity on each symptom compared with the norms (Project MATCH Research Group, 1993). There is considerable research evidence that supports both the efficacy and effectiveness of MI with various health-related problems (Armstrong et al., 2011; Lundahl et al., 2010; Vasilaki et al., 2006) using short interventions (Arkowitz et al., 2008; Rollnick et al., 2008) and in the

context of complex psychiatric problems (Barrowclough et al., 2001, 2010). Studies have also shown that MI may also be beneficial when working with carers in addressing the high expressed emotion and psychological distress and anxiety that carers experience when living alongside an individual with an ED (Goddard et al., 2011; Sepulveda et al., 2008b).

In this review we examine the effectiveness of interventions that include the principles and techniques of MI and its adaptation (i.e. MET), in the treatment of EDs. Our aims are as follows: (1) to examine both the context and effectiveness of MI and Motivational Enhancement Therapy (MET) when used with either patients or carers of people with eating disorders, (2) to identify limitations and/or difficulties in this process and (3) to identify further research needs in this area.

2. Method

2.1. Search applications

PsychInfo, Medline, Embase and Pubmed were searched up to and including April 2012. The search contained the following keywords: ANOREXIA, ANOREXIA NERVOSA, BULIMIA, BULIMIA NERVOSA, EATING DISORDERS NOT OTHERWISE SPECIFIED, BINGE EATING DISORDER, EATING DISORDERS, MOTIVATIONAL INTERVIEWING, MOTIVATIONAL ENHANCEMENT THERAPY, COGNITIVE BEHAVIOURAL THERAPY, MOTIVATIONAL INTERVIEWING ADHERENCE, MOTIVATIONAL LEVELS, TRANSTHEORETICAL MODEL, READINESS TO CHANGE. Additional searching through reference lists was also performed on the articles identified. Fig. 1 illustrates the search strategy and flow of information through the different phases of the review (Moher et al., 2009).

2.2. Selection

The search procedure yielded 62 articles. Forty-nine studies were excluded on the basis that they were either duplicates or did not fulfil inclusion criteria required in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2009). Articles were excluded if they

did not specifically involve MI or MET, if they were not written in the English language or if they were not specifically targeted at eating disordered behaviours. Book reviews were also omitted. Articles that focused on the trans-theoretical model, the concept of 'readiness to change' and the Readiness and Motivation Interview (RMI) were also excluded. Consequently, inclusion criteria included those quantitative studies that included a form of guided behavioural intervention that specifically referred to some aspects of the principles and techniques derived from MI (Miller and Rollnick, 2002), MET or adapted MI. These could be (1) stand-alone motivational interventions, (2) motivational interventions combined with another intervention, e.g., CBT or (3) as one element of an intensive programme (Willinge et al., 2010). Since it is unknown how brief an adaptation of MI can be and still capture MI principles and techniques (Rollnick and Miller, 1995), we included studies of even the briefest interventions as long as they met the inclusion criteria (Dunn et al., 2001). A total of 13 studies were selected.

In order to describe the content of behaviour change techniques utilised in the studies within this review, a technique taxonomy was devised (Table 1). This list incorporates the Abraham and Michie (2008) behaviour change taxonomy and has been extended to include additional MI and other techniques used in interventions in the field of EDs.

2.3. Data extraction

In Table 2 we present descriptive statistics on participants, study design, reported behaviour change techniques utilised and MI quality control (e.g. training monitoring practices). Key outcomes (mean, standard deviation and sample size) for MI/MET groups and control/comparison groups (where applicable) were extracted from the papers. Where a control or comparison group was utilised, effect sizes were also extracted. Cohen's effect sizes are understood as *negligible* (≥ -0.15 and < 0.15), *small* (≥ 0.15 and < 0.40), *medium* (≥ 0.40 and < 0.75), *large* (≥ 0.75 and < 1.10), *very large* (≥ 1.10 and < 1.45) and *huge* (> 1.45).

Also presented are the mean age of study participants, diagnoses and duration of illness, design of study (MI/MET as stand-alone or combined with other therapy, e.g. CBT plus frequency and duration), timeline and drop-out/non-completer rate. Only statistically significant outcome results were presented in full. In cases where results were non-significant but there was a notable 'readiness to change', then the 'readiness to change' results were also provided.

2.4. Study characteristics

In those studies in which participants were patients, four papers focused exclusively on one specific ED (Cassin et al., 2008; Gowers and Smyth, 2004; Treasure et al., 1999; Wade et al., 2009) whilst the remainder included a mixed ED sample. Six studies used a control or comparison group (Treasure et al., 1999; Dunn et al., 2006; Cassin et al., 2008; Dean et al., 2008; Wade et al., 2009; Katzman et al., 2010). In those studies in which participants were carers, one of the three papers used a comparison group (Goddard et al., 2011). All three carer studies included mixed ED samples (Goddard et al., 2011; Sepulveda et al., 2008a, 2008b).

2.5. Outcome measures

The search yielded studies using the following outcome measures (1) psychological distress, (2) self-esteem/quality of life, (3) stage of change/readiness and motivation to change, (4) eating behaviours/attitudes/symptomatology, (4) carer burden and (5) expressed emotion.

2.5.1. Psychological distress

General Health Questionnaire (GHQ); Beck Depression Inventory (BDI) and Beck Depression Inventory-11 (BDI-II, updated version); Depression Anxiety and Stress Scale (DASS); Hospital Anxiety and Depression Scale (HADS); Recent Mood and Feelings Questionnaire (MFQ).

2.5.2. Self-esteem/quality of life

Rosenberg Self-Esteem Scale (RSE); Eating Disorder Quality of Life Questionnaire (EDQOL); The Extended Satisfaction with Life Scale (ESWLS).

2.5.3. Stage of change/readiness/motivation to change

Anorexia Nervosa Stage of Change Questionnaire (ANSOCQ); The University of Rhode Island Change Assessment Scale (URICA); Concerns about Change Scale (CCS); Decisional Balance Scale for Anorexia (DB); Treatment Engagement Questionnaire (TEQ).

2.5.4. Eating behaviours, attitudes and symptomatology

Eating Disorder Examination Interview (EDE); The Eating Disorder Inventory (EDI); Eating Disorder Inventory 2 (EDI-2); The Eating Disorder Inventory 3 (EDI-3); The Eating Attitudes Test (EAT); The Young Schema Questionnaire (YSQ); The Eating Disorder Diagnostic Scale (EDDS); The Health of the Nation Outcome Scales for Child and Adolescent Mental Health Services (HoNOSCA and HoNOSCA-SR);

Table 1
Technique taxonomy.

1. Provide general information/discussion of illness/descriptive norms.
2. Provide information on consequences.
3. Provide information about others' approval.
4. Prompt intention formation/outcome expectancies.
5. Prompt barrier identification.
6. Provide general encouragement.
7. Set graded tasks.
8. Provide instruction.
9. Model or demonstrate the behaviour.
10. Prompt specific goal setting and planning.
11. Prompt review of behavioural goals.
12. Prompt self-monitoring of behaviour.
13. Provide feedback on performance.
14. Provide contingent rewards.
15. Teach to use prompts/cues.
16. Agree on behavioural contract.
17. Prompt practice.
18. Use follow-up prompts.
19. Provide opportunities for social comparison.
20. Plan social support/social change.
21. Prompt identification as a role model.
22. Prompt self-talk/personal relevance.
23. Relapse prevention.
24. Stress management.
25. Motivational interviewing
 - 25a Elicit concerns about eating behaviours.
 - 25b Exploration of ambivalence.
 - 25c Discussion of trans-theoretical model of change and brief assessment of participant's stage of change—assessment of motivation of readiness and confidence to change.
 - 25d Written decisional balance.
 - 25e Bolster self-efficacy.
 - 25f Exploration of dissonance with values.
 - 25g Elicit ideas for possible behavioural alternatives to current ED behaviour.
 - 25h Work collaboratively on devising a change plan consisting of small, manageable steps.
 - 25i Complete "Plans for Change" worksheet.
 - 25j Interventionist empathy.
 - 25k Use of reflective listening.
26. Time management.
27. Problem solving.
28. Discussion on personal and moral norms.
29. Weight gain meetings: weighing, meal planning, adherence.
30. Maladaptive cognitions: body image groups, working with unhelpful core beliefs.
31. Addressing problematic co-morbid behaviours: e.g. laxatives, diuretic use and excessive exercise.
32. Family work.
33. Quality of life improvements: addressing any fear of 'normal life' challenges.
34. Mindfulness techniques—addressing mood intolerance and emotional deregulation.

1–27 (Abraham and Michie, 2008).

25a–k and 27–34 added to suit the requirements of interventions in eating disorders.

The Short Evaluation of Eating Disorders (SEED); Testable Assumptions Questionnaire for Eating Disorders (TAQ-ED); Self-Efficacy Scale for Anorexia Nervosa (SES).

2.5.5. Carer burden, expressed emotion, self-efficacy, accommodation and enabling

The Experience of Caregiving Inventory (ECI); The Eating Disorders Symptom Impact Scale (EDSIS); The Family Questionnaire (FQ); Revised Scale for Caregiving Self-Efficacy (CSE); The Accommodation and Enabling Scale for Eating Disorders (AESED); Global Eating Disorder Functioning (GEDF).

3. Results

The results are presented according to participants (ED cases and carers) and the outcomes measured. The sub-headings in Sections 3.1 and 3.2 reflect the effectiveness of the intervention in

Table 2
Study demographics.

	<i>N</i>	Age: sufferers	Gender: sufferers	Diagnosis	Study design	Behaviour change techniques targeted ^a	Control/comparison group	Frequency/duration of Intervention (Baseline-Post)	Duration of illness	Recruitment	Drop-out/Non-completer	Interventionist	MI/MET training	Monitoring/supervision of MI/MET reported
Patients														
Cassin et al., 2008	108	42.5 (12.7)	Female	BED	AMI +SHM vs. SHM only	AMI:1,2,4,6,7,10,11,12,25a-1 SHM:1,2	Yes	1 × 81.8 min/16 weeks	15.1 yr (11.6)	College students	14	Clinical psychologist	Yes	Yes
Dean et al., 2008	42	22.4 (7.37)	Female	AN,BN, EDNOS	MET vs. TAU	MET: 1,2,4,5,6,8,9,25b,c,d,f	Yes	4 × 1.25 h	64 months (64)	In-patient	0	NR	NR	NR
Dunn et al., 2006	90	19 (2.64)	Female(79)	BN, BED	MET+SHM vs. SHM only	MET: 1,2,6,11,12,13, 22,25c,d,f,j,k, 27 SHM: 1,12,23,27	Yes	NR (pre, post and follow-up) 1 × 90 min 16 weeks	NR	College students	NR	Undergraduate/Masters student	Yes	Yes
Feld et al., 2001	38	26.5 (8.7)	Male (11) NR	AN, BN, EDNOS	MET	NR	No	4 × 60 min 16 weeks+6 week follow-up	NR	Diagnosed-ED by professionals	19	NR	NR	NR
Gowers and Smyth, 2004	42	16.1 (2.0)	Female (41) Male (1)	AN	Motivational assessment Interview+CBT	NR	No	NR 6 weeks	NR	Outpatient	9	Health Professional	NR	NR
Katzman et al., 2010	225	29.3 (7.5)	NR	BN, EDNOS	3 group, 2 phase trial ^b	MET:1,4,5,6,10,11,13,19, 20,22,25c,f, 28 CBT:1,6,8	Yes	4 × 50 min	NR	Diagnosed-ED by professionals	32	Health professional	Yes	Yes
Treasure et al., 1999	125	28.8 (7.8)	Female	BN	3 group, 2 phase trial ^b	NR	Yes	12 weeks+1 year and 2.5 year follow-up NR 12 weeks+follow-up	10.8 years MET (8.4) 11.4 years CBT (6.4)	Diagnosed-ED by professionals	38	Health professional	Yes	Yes
Wade et al., 2009	47	21.8 (5.37)	Female (45)	AN	MI vs. TAU	MI: 1,6,10,25c,d,f	Yes	4 × 60 min 6 weeks	6.93 years (7.22)	In-patient	8	Clinical psychologist	Yes	Yes
Willinge et al., 2010	58	22.0 (5.2)	Male (2) NR	AN, BN, EDNOS	MET+CBT	6,8,10,11,12,25c,d,29,30, 31,32,33,34	No	5 days prog+3 days prog ^c	6.1 years (5.2)	Day-patient	14	Health professional	NR	NR
George et al., 2004	8	36 range (23–56)	Female	AN, EDNOS	MET+schema-focused CBT	NR	No	2 days/week for 5 h/d 6 months	18 years range (7–42)	Day-patient	0	Health Professional	NR	NR
Carers														
	<i>N</i>	Age carers	Gender carers	Diagnosis	Study design	Behaviour change techniques targeted ^a	Control/comparison group	Frequency/duration of intervention (Baseline-Post)	Duration of loved one's illness	Sufferer living at home	Drop-out/mon-completer	Interventionist	MI/MET training	Monitoring/supervision of MI/MET reported
Sepulveda et al., 2008a	16	52.1 (7.7) Carer 17.2 (4.3) Sufferer	Female(13) Male (3)	AN, BN	Self-help manual+MI telephone coaching	N/A	No	3 × 30 min 3 months	NR	10/14	2	Undergraduate/Masters students+Health professional	Yes	No

Author	N	Sample size	Gender	AN, BN	MI	N/A	No	6 × 2 h workshops 3 months	6.1 years (6.1)	21/28	7	Health professional	NR	NR
Sepulveda et al., 2008b	35	52.7 (7.2) Carer (22.7) (7.7) Sufferer	Female (23) Male (5)		MI	N/A	No							
Goddard et al., (2011)	153	48.7 (9.1)	Female (136) Male (17)	AN, BN EDNOS	Self-help manual vs. Self-help manual + MI telephone coaching	N/A	Yes	3 × 40 min-1 h coaching Sessions 12 weeks	3 (7) self-help only	63/78 self-help only	40	Doctoral student+ Health professional+ Clinical psychologist	Yes	NR

N= sample size; AMI=adapted motivational interviewing, MET=motivational enhancement training, TAU= treatment as usual; NR= not reported; AN= anorexia nervosa; BN= bulimia nervosa; BED= binge eating disorder; EDNOS= eating disorder not otherwise specified; NA= not available; SHM= self-help manual; N/A= not applicable.

^a Behaviour change techniques (see Table 1).

^b We report on Phase I (comparing MET with CBT only); Groups 1–4 individual MET+8 individual CBT. Groups 2–4 individual MET+8 group CBT. Groups 3–4 individual CBT+8 group CBT.

^c MET+CBT incorporated into 5 d programme of approximately 4 weeks, before transition to 3 d programme or discharge.

relation to the various outcomes. Few studies met the detailed criteria or standards required by the PRISMA statement to be included when reporting a systematic review or meta-analysis.

3.1. Participants as patients

3.1.1. Psychological distress

Six studies measured change in patient psychological distress as outcome (Cassin et al., 2008; Dean et al., 2008; Feld et al., 2001; George et al., 2004; Gowers and Smyth, 2004; Willinge et al., 2010). Of these, two utilised a control/comparison group (Cassin et al., 2008; Dean et al., 2008). In a study that compared MI+self-help manual with self-help manual only, there was a moderate change in depression at 16 week follow-up in the adapted MI+manual group ($p < 0.001$, $d=0.64$) (Cassin et al., 2008). In two case series before/after studies, small/moderate changes in psychological distress were also found. Gowers and Smyth (2004) also reported pre-post improvements in mood and distress (-5.4 (13.5), $t=-2.3$, $p < 0.03$). Likewise, Feld et al. (2001) reported a statistically significant decrease in the mean BDI score in the post-intervention assessment compared with the pre-intervention assessment, although mean scores remained in the clinically depressed range ($t=2.886$, $d.f.=18$, $p=0.01$). Outcomes are presented in Table 3.

3.1.2. Self-esteem/quality of life

Three studies measured self-esteem (Feld et al., 2001; Cassin et al., 2008; Willinge et al., 2010) using the RSE as an outcome measure. Cassin et al. (2008) found a moderate increase in self-esteem and Quality Of Life (QOL) at 16 weeks follow-up, again to a greater extent in the motivational interviewing group than in the self-help group only ($p < 0.01$, $d=0.6$). In a case series measuring quality of life, Willinge et al. (2010) found a moderate/large effect size from admission to discharge ($d=0.7$) and from discharge to follow-up ($d=0.6$). Feld et al. (2001) also reported a significant increase in the RSE from pre-intervention to post-intervention assessment, indicating improved self-esteem ($t=5.69$, $d.f.=18$, $p=0.001$). In Willinge et al. (2010) all sub-scales on the Quality Of Life (QOL) demonstrated significant improvement from admission to discharge except 'financial QOL'. Total psychological and work/school QOL continued to improve from discharge to follow-up. Financial QOL also demonstrated significant improvement from discharge to follow-up with a small effect size. Effect sizes at discharge to follow-up were generally small to medium, with the largest effect sizes found for total psychological and work/school QOL, depression and stress, demonstrating medium effects. Only total QOL results are reported in this review. For individual sub-scales, readers should refer to the original paper (Willinge et al., 2010).

3.1.3. Eating behaviours, attitudes and symptomatology

Eight studies measured eating behaviours, attitudes and symptomatology of which four used a randomized controlled trial (RCT) or case control design. Results are reported on an individual basis as opposed to comparative analysis, due to mismatch in terms of design, diagnosis, age and extent to which MI techniques were used. Although no differences were reported between the groups in the four RCTs, three of the studies found a higher readiness to change, which will be discussed in the next section (Dean et al., 2008; Dunn et al., 2006; Wade et al., 2009).

Five studies (four RCT/one pre-post design) reported no significant changes in behavioural and attitudinal features of EDs (George et al., 2004; Dunn et al., 2006; Dean et al., 2008; Wade et al., 2009; Katzman et al., 2010). Treasure et al. (1999) also found no differences between MET and CBT in terms of

Table 3
Outcome measures.

Study (measures)	Aims	Outcome	Mean (S.D.) of MI/MET group	Mean (S.D.) of control/comparison group	Effect size (<i>d</i>)
Studies with control/comparison groups (patient studies)					
Cassin et al. (2008) (BDI, RSE, ESWLS)	1) A single AMI session+self-help book will reduce BED to greater extent than self-help book alone. 2) AMI group expected to report greater improvement in depression, self-esteem and quality of life. 3) AMI group will report significantly greater self-efficacy, as well as importance, confidence and readiness to change, relative to the control group.	(16 weeks)			
		<ul style="list-style-type: none"> ● Binge eating: (days/month) 	2.8 (3.5)	6.3 (6.0)	$F(1,106)=8.97$, $p < 0.01$, $d=0.58$
		<ul style="list-style-type: none"> ● BDI ● RSE ● ESWLS 	14.2 (11.1)	16.2 (12.2)	$F(1,106)=10.9$, $p < 0.001$, $d=0.64$
			22.5 (5.8)	22.9 (5.7)	$F(1,106)=9.44$, $p < 0.01$, $d=0.60$
		21.9 (8.4)	19.6 (8.4)	$F(1, 106)=6.22$, $p < 0.05$, $d=0.48$	
Dean et al. (2008) (ANSOCQ, DB, SES, TEQ, EDI-2, EDE-Q, BDI-II)	1) Participants who completed MET would exhibit greater improvements than TAU on all formal outcome measures. 2) MET group would be more likely to be engaged in appropriate treatment at follow-up (see below).	(6 weeks)			
		No sig. effects on any assessment measure except 'drive for thinness' subscale on EDI-II but in the opposite direction, i.e. improvement in TAU	−1.38 (3.78)	−4.28 (4.28)	$t(33)=2.13$, $p=0.041$, $p < 0.05$
	Readiness to change:				
	(2) Action/maintenance	MET (ANSOCQ) ↑3/23 (13%)—pre-treatment ↑6/19 (31.6%)—post-treatment ↑7/17 (41.2%)—follow-up	TAU (ANSOCQ) ↑3/19(15.8%)—pre-treatment ↑4/16(25%)—post-treatment ↓1/11(9.1%)—follow-up		
	A significant high proportion of MET group were engaged in appropriate levels of treatment at follow-up ($\chi^2=6.311$, d.f.=1, $p=0.012$), with 84% (16/19) of the MET completeters and 44% (7/16) of the TAU completeters either within an inpatient or day-patient programme.				
Dunn et al. (2006) (EDDS, EDE-Q, URICA)	1) MET session would increase participants readiness to change (see below). 2) MET session would increase efficacy of self-help programme by decreases in binge eating and maladaptive eating attitudes. 3) MET session would increase participants' compliance with self-help manual.	(16 weeks)			
		<ul style="list-style-type: none"> ● Few differences found for changes in eating attitudes and frequency of binge eating and compensatory behaviours between MET and comparison groups. ● No sig. effects for compliance between groups. 			

Study (measures)	Aims	Outcome	Significance levels
<p>Readiness to change: BRTC: (Bingeing) Increase in MET contemplation pre–post intervention $t(44) = -3.36, p < 0.01, d = 0.42$ SH alone: unchanged Increase in MET action pre–post intervention $t(44) = -3.39, p < 0.01, d = 1.02$ SH alone: unchanged CRTC: (Compensatory behaviours) no interaction effect observed. No interaction effect observed.</p> <p>Katzman et al. (2010) (SEED, URICA, EDE)</p>	<p>To examine whether additional MET will reduce dropout/improve outcome compared with participants who receive pure CBT</p>	<p>(12 weeks + 1 + 2.5 yr follow-up) No difference between groups in dropout rates or treatment adherence</p>	
<p>Treasure et al., 1999 (URICA)</p>	<p>MET is more effective than CT in moving patients into action and in the development of a good therapeutic alliance</p>	<p>(12 weeks + follow-up) There were no differences between MET and CBT in terms of reducing bulimic symptoms or in terms of developing a therapeutic alliance or increasing readiness to change</p>	
<p>Wade et al. (2009) (EDE, ANSOCQ)</p>	<p>To examine whether supplemental MI can significantly improve motivation to recover compared with TAU</p>	<p>(6 week follow-up) MI did not significantly enhance motivation or decrease eating pathology</p>	
<p>Readiness to change: Significantly lower drop-out in the MI group compared to the TAU at follow-up. Participants from TAU were 1.33 times (95% confidence interval = 1.03–1.72) more likely to withdraw from study than MI group. More people in MI group crossed from low to high readiness to change as measured by ANSOCQ. MI group increased in motivation at 2 week follow up and then significantly decreased at 6 week follow up but did remain above baseline. TAU group had small increase followed by significant decrease ending up below baseline</p>	<p>Readiness to change: Significantly lower drop-out in the MI group compared to the TAU at follow-up. Participants from TAU were 1.33 times (95% confidence interval = 1.03–1.72) more likely to withdraw from study than MI group. More people in MI group crossed from low to high readiness to change as measured by ANSOCQ. MI group increased in motivation at 2 week follow up and then significantly decreased at 6 week follow up but did remain above baseline. TAU group had small increase followed by significant decrease ending up below baseline</p>	<p>(6 week follow-up) MI did not significantly enhance motivation or decrease eating pathology</p>	
<p>Feld et al. (2001) (URICA, CCS, EDE, EDE-Q, EDI, BDI, RSE, BDI)</p>	<p>Studies with no control/comparison group (patient studies) To increase participants' motivation to change increasing likelihood they would successfully complete a specialized treatment programme for their ED</p>	<p>(4 weeks + 6 week follow-up)</p> <ul style="list-style-type: none"> ● URICA: sig. increase in action subscale. ● EDE-Q: no significant changes. ● EDI: sig. increase on 'Interpersonal Distrust' subscale but no sig. changes on behavioural subscales. ● CCS: sig. increase in 'failure to recognise irrationality of problem' subscale. ● BDI statistically sig. decrease on mean pre–post intervention score. ● RSE statistically sig. increase on pre–post intervention scores 	<p>$t = 3.164, d.f. = 18, p = 0.005$ $t = 2.97, d.f. = 18, p = 0.008$ $t = 3.25, d.f. = 18, p = 0.004$ $t = 2.886, d.f. = 18, p = 0.01$ $t = 5.69, d.f. = 18, p = 0.001$</p>
<p>Gowers and Smyth (2004) (EDI-II, MFQ, HoNOSCA, HoNOSCA-SR, Motivational questionnaire^a)</p>	<ol style="list-style-type: none"> 1. To assess the ability of a motivational assessment interview to enhance self-rated motivation. 2. To measure engagement with outpatient treatment. 3. To measure initial response to treatment. 4. To assess relationship between motivational status, compliance with treatment and early cognitive/behavioural change. 	<p>(6 weeks)</p> <ul style="list-style-type: none"> ● Sig. increase in pre–post intervention motivation scores. ● 33/42 offered treatment had accepted and continued in treatment for first three individual therapy sessions (21/22 with baseline higher motivation and 12/20 with poor motivation). ● EDI-2. ● MFQ. ● Clinician HoNosca. ● Self HoNosca—no sig. changes. ● Weight. 	<p>$t = 3.8, p < 0.001$ (Fisher's exact test, $p = 0.008$) Pre–post change: $-23.0 (31.9), t = -4.1, p < 0.001$ Pre–post change: $-5.4 (13.5), t = -2.3, p < 0.03$ Pre–post change: $-4.1 (5.8), t = -4.8, p < 0.001$ Pre–post change: $+1.2 (3.6), t = 2.0, p = 0.05$</p>
<p>Willinge et al. (2010) (EDE-Q, EDI-3, TAQ-ED, ANSOCQ, DASS, RSE, EDQOL)</p>	<p>To increase patient motivation to aid their advancement to a later stage of readiness to change (motivational component as part of a more extensive CBT programme)</p>	<p>(5 d prog + 3 d prog)^b</p> <ul style="list-style-type: none"> ● BMI. ● Readiness to change. ● Self-esteem. ● Quality of Life (total). 	<p>Admission–discharge: Underweight group ($n = 28$) 17.6 (1.9)—19.5 (2.0), $p = 0.000, d = 0.5$ Normal weight ($n = 16$) 21.9 (3.6)—22.6 (3.1), $p = 0.019, d = 0.2$</p>

Table 3 (continued)

Study (measures)	Aims	Outcome	Mean (S.D.) of MI/MET group	Mean (S.D.) of control/comparison group	Effect size (<i>d</i>)	
				Discharge–follow-up: Underweight group (<i>n</i> = 18) 19.4 (2.0)—19.5 (2.6), <i>p</i> = 0.984, <i>d</i> = 0.0 Normal weight (<i>n</i> = 9) 24.1 (3.2)—23.6 (2.2), <i>p</i> = 0.473, <i>d</i> = 0.1 Admission–discharge (<i>n</i> = 44): 62.6 (16.6)—78.3 (16.3), <i>F</i> = 103.8, <i>d</i> = 0.7 Discharge–follow-up: (<i>n</i> = 27): 78.8 (17.5)—75.9 (20.2), <i>F</i> = 1.2, <i>d</i> = 0.1 <i>F</i> (1,44) = 81.8 (Sig.: bonferroni adjusted), <i>d</i> = 0.8 (admission–discharge) <i>F</i> (1,27) = 6.9, <i>p</i> ≤ 0.05, <i>d</i> = 0.4 (discharge–follow up) <i>F</i> (1,44) = 124.9 (Sig.: bonferroni adjusted), <i>d</i> = 0.7 (admission–discharge) <i>F</i> (1,27) = 23.8 (Sig.: bonferroni adjusted), <i>d</i> = 0.6 (discharge–follow up)		
George et al. (2004) (ANSOCQ, ESWLS, GHQ, EAT, YSQ)	To explore usefulness of a day programme, involving use of MET+schema based CBT in treatment of patients with long-term AN	(6 months) ● ANSOCQ. ● GHQ—no sig changes. ● EAT—no sig changes. ● YSQ—no sig. changes.		Admission–completion: 2.06 (0.57)—2.81 (0.82) (<i>Z</i> = −0.237, two tailed <i>p</i> = 0.02)		
Sepulveda et al. (2008a) (GHQ, HADS, ECI, FQ)	Carer studies To examine whether skills training would lead to a change in carers' attitudes to the illness, a change in communication or reduction in anxiety, depression, caregiving burden and expressed emotion	No sig. effects on any outcome measure				
Sepulveda et al. (2008b) (GHQ, ECI, EDSIS)	To examine whether the difficulties an distress involved in caring for a relative with an ED were reduced by the 'Maudsley Eating Disorder Collaborative Care Skills Workshop'.	● ECI positive—no sig. changes. ● ECI negative. ● GHQ. ● EDSIS.		<i>F</i> (2,17) = 4.1, <i>p</i> = 0.035, <i>d</i> = 0.68 ^c , 0.6 ^d <i>F</i> (2,14) = 6.5, <i>p</i> < 0.05, <i>d</i> = 0.39 ^c , 0.5 ^d <i>F</i> (2,17) = 5.1, <i>p</i> < 0.01, <i>d</i> = 0.48 ^c , 0.07 ^d		
Goddard et al. (2011) (HADS, GHQ, ECI, EDSIS, FQ, CSE, AESED, GEDF)	To examine whether supplementary telephone coaching using MI enhances a self-help manual/DVD skills training intervention for carers	No significant changes on any of the outcome measures except GEDF but in opposite direction to that hypothesised, i.e. greater increase in MI group		GEDF self-help only: (estimated increase: 6.8, <i>p</i> < 0.001; 95% CI: 3.8–9.8) GEDF self-help+MI: (estimated difference: −5.7, <i>p</i> = 0.007; 95% CI: −9.8–1.6)		

BRTC: Binge Readiness to Change; CRTC: Compensation Readiness to Change.

^a Devised by authors of paper.

^b MET + CBT incorporated into 5 d programme of approximately 4 weeks, before transition to 3 d programme or discharge

^c The effect size (Cohen's *d*) between baseline and post-intervention.

^d The effect size (Cohen's *d*) between baseline and follow-up.

reducing bulimic symptoms. There was a significant difference between the two groups in the Dean et al. (2008) study on one of the EDI sub-scales “drive for thinness”. However, it was the Treatment As Usual (TAU) group that reported a significantly greater reduction compared with the MET group.

Gowers and Smyth (2004) reported a significant pre–post change in the EDI-2 scores and weight, whilst in another case series, Willinge et al. (2010) found that for underweight patients in the programme, Body Mass Index (BMI) improved across treatment and was maintained at discharge ($M=19.4$) and follow-up ($M=19.5$). In the Feld et al. (2001) study, a significant decrease was found on the EDI Interpersonal Distrust subscale following the MET intervention ($t=2.97$, $d.f.=18$, $p=0.008$). There was also a decrease observed on the Ineffectiveness subscale ($t=2.24$, $d.f.=18$, $p=0.038$), although this difference did not achieve statistical significance.

3.1.4. Stage of change/readiness/motivation to change

Eight studies measured increasing readiness or motivation to change, five of which utilised a RCT or case control design (Dean et al., 2008; Dunn et al., 2006; Katzman et al., 2010; Treasure et al., 1999; Wade et al., 2009). Three out of the five RCT studies found a higher readiness to change (Dean et al., 2008; Dunn et al., 2006; Wade et al., 2009). Those studies whose design included a comparison/control group all report higher increases to change in the MET group compared to the control. Dunn et al. (2006) found the MET group significantly increased their contemplation scores from pre–post ($d=0.42$) and action scores from pre–post ($d=1.02$), whilst only the self-help group scores remained unchanged. Dean et al. (2008) found that a significantly higher proportion of the MET group was engaged in appropriate levels of treatment at follow-up ($\chi^2=6.311$, $d.f.=1$, $p=0.012$), with 84% (16/19) of the MET completers and 44% (7/16) of the TAU completers, either within an inpatient or day-patient programme. Wade et al. (2009) found a significantly lower drop-out in the MI group compared to the TAU at follow-up. Participants from TAU were 1.33 times (95% confidence interval=1.03–1.72) more likely to withdraw from study than the MI group. Furthermore, more people in the MI group crossed from low to high readiness to change as measured by the ANSOCQ. The MI group increased in motivation at two week follow-up and then significantly decreased at six week follow-up but did remain above baseline. The TAU group showed a small increase followed by a significant decrease, ending up below baseline.

Feld et al. (2001) reported a statistically significant increase on the mean action stage subscale score of the URICA ($t=3.164$, $d.f.=18$, $p=0.005$). No significant differences, however, were found on the other sub-scales of the URICA. In the same study, a significant increase occurred across the sessions of the intervention on all three motivational scales utilised using Likert scoring, suggesting an increase in motivation to change. George et al. (2004) reported an increase in motivation for change at the end of a six month period with chronic patients. This change was reflected by scores on the ANSOCQ from admission to completion (2.06 (0.57) to 2.81 (0.82), $Z=-2.37$, two tailed $p=0.02$). The results from Willinge et al. (2010), demonstrate that across treatment, readiness to change improved on average from a ‘preparation’ stage of change to an ‘action’ stage of change with participants reporting that by discharge and at follow-up, they were actively making changes towards recovery.

3.2. Participants as carers

3.2.1. Psychological distress

All three studies (one RCT) measured psychological distress in carers (Goddard et al., 2011; Sepulveda et al., 2008a, 2008b).

Although the RCT (Goddard et al., 2011) showed improvements in distress for the overall self-help intervention, no added improvement was evident for the supplementary telephone coaching.

Sepulveda et al. (2008b) reported improvements in mood and distress in carers at the $p < 0.05$ significance level. Effect sizes for baseline and post-intervention and baseline and follow-up were $d=0.39$ and $d=0.5$, respectively.

3.2.2. Burden/carer self-efficacy/expressed emotion/accommodation and enabling/perceived severity of symptom scale

Although the Goddard et al. (2011) study showed reductions in burden, expressed emotion, accommodation and enabling, perceived severity of symptoms and increase in carer self-efficacy for the overall psycho-educational support, the supplementary coaching with MI showed no additional benefits. The only difference between self-help and guided self-help was on carers’ perceived severity of symptoms but in the opposite direction to the hypothesis, i.e., carers perceived greater severity of symptoms than those carers who had not received supplementary coaching.

Of the two remaining studies, one study working with MI with carers of people with eating disorders in a face-to-face workshop setting, reported significant changes in the EDSIS outcome measure and the ECI negative sub-scales for caregiving appraisal of burden. No significant effects were found, however, on any of the outcome measures in the pilot DVD study (Sepulveda et al., 2008a), although this may have been due to the small sample size.

4. Discussion

In this review we examine the effectiveness of interventions that include the principles and techniques of MI and its adaptations (MET) in the treatment of eating disorders in which participants are either patients or family members/carers. MI was used in a variety of different contexts and there was considerable variation in the extent to which MI or MET was administered. Study designs ranged from MET alone, to MI as a brief intervention, to a ‘motivational assessment interview’. Five out of the ten patient studies combined MI or MET with CBT. Although the studies were extremely heterogeneous with a variety of outcomes measured, we have attempted to synthesise the findings.

4.1. Effectiveness

Out of the six studies that utilised a control group, one study reported significant findings with respect to a reduction in symptoms (Cassin et al., 2008). The authors found that although the self-help handbook alone helped women to improve their binge eating, the addition of one adapted motivational interviewing (AMI) session significantly improved outcome. Out of the same six studies, another three reported a higher readiness to change in the MI condition (Dean et al., 2008; Dunn et al., 2006; Wade et al., 2009). From the remaining studies that did not use a control group, four also reported a higher readiness to change and/or higher motivation in the MI/MET condition (Feld et al., 2001; George et al., 2004; Gowers and Smyth, 2004; Willinge et al., 2010).

Out of the three carer studies, one study that used MI in a workshop carer skills setting reported significant reductions in caregiving appraisal of burden (Sepulveda et al., 2008b). Although the Goddard et al. (2011) study reported significant reductions in burden, expressed emotion, accommodation and enabling, perceived severity of symptom and increase in self-efficacy for the overall psycho-educational intervention, there was no added

improvement to the additional telephone support utilising MI strategies.

Given the wide range of participants, interventions and outcomes measured, comparative analysis was difficult. However, there is an indication that MI can increase 'readiness to change' in patients.

4.2. MI quality control

Six out of the twelve patient and carer participant studies provided details of interventionists having received MI training. Details of this explication varied from study to study. Five out of the thirteen studies indicated some form of interventionist monitoring to ensure MI principles were being adhered to. Eight of the studies used health professionals, three studies used undergraduate, masters or doctoral students and three studies used clinical psychology doctoral students whilst the remaining two studies did not report this information (two studies used a mixture of students, health professional and clinical psychologist). A more detailed reporting of MI training, supervision and monitoring would be beneficial for comparative purposes and study replication.

4.3. Difficulties in making comparative conclusions

In conducting this systematic review on the use of MI in eating disorders, our findings substantiate many of those arguments presented in systematic reviews of MI in general health (Dunn et al., 2001; Knight et al., 2006). Knight et al. (2006), for example, voiced their concerns that the internal content validity of studies in their review remains worryingly low. Similarly in this review, although several studies present positive results for the effects of MI and MET, few RCTs have been conducted and it is often unclear what behaviour change techniques were used in addition to the MI/MET condition or in the comparison group. Hence, it is important that standardised reporting of the intervention components is clearly presented.

Lack of homogeneity was a major challenge in assessing the use of MI in EDs. Samples were predominantly small which may suggest lack of power in several studies. There were also considerable variations in intervention timeline, frequency and duration of actual MI/MET sessions, illness diagnosis, duration of illness and age of patient. The main problematic area that we encountered in compiling a systematic review of the literature was focused on the variation in design and methodology. Consequently, the field would benefit from future studies that present a clearer description of the process implemented, along with a more transparent depiction of the training, monitoring and supervision procedures administered.

4.4. Future research

In order to ascertain clinical significance in the use of MI in eating disorders, more RCTs or studies are required that utilise larger sample sizes and control groups, reporting effect sizes and confidence intervals. This review highlights how important it is for treatment studies to define the behaviour change process used, as suggested by Michie et al. (2009). A thorough description of the methods utilised would be beneficial, not only to allow for replication but to allow researchers to distinguish between variations in the MI or the MET being administered. Likewise, when MI is used in conjunction with CBT, for example, a clear depiction of methodological design is required.

Monitoring MI style and/or technique would also be highly beneficial. The Revised Global Scales: Motivational Interviewing Treatment Integrity (3.0) (MITI) was devised to measure the

integrity of MI delivery (Moyers et al., 2007). Moyers et al. (2005) concluded that stringent coding systems indicate good sensitivity for detecting improvement in clinical practice as a result of training. Less complex than previous coding structures, the MITI may be best used for measuring beginner levels of proficiency, such as measuring whether or not clinicians have begun using MI after receiving training. Forsberg et al. (2008) addressed construct validity of MI by using factor analysis on 120 MITI coded sessions and concluded that not only can MITI be used as a training tool to enhance MI practice in clinical settings, but also to evaluate MI integrity in clinical research. Consequently, such a tool would be helpful in assessing the competence of MI in future research studies.

5. Conclusion

Our aim was to identify the effectiveness of MI when used with both patients and carers of people with EDs and to examine both context and outcome. The studies in this review do indicate the potential for using MI in the field of EDs, particularly with respect to 'readiness for change'. It may be that MI is a behaviour change process designed to be helpful when an individual is not ready to instigate change. As such, it can be used as an introduction or a preliminary phase before any of the interim behaviour change processes that may be needed in order to produce symptom change. An MI approach, for example, may be helpful to instigate several behaviour change activities that are used within CBT, e.g. food diaries, structured eating, exposure, behavioural experiment, surveys etc. There is uncertainty about which of these micro-skills are necessary or sufficient for treatment in eating disorders. Few, if any, ED treatment studies indicate which procedures have been delivered and utilised. In addition, treatment studies of EDs have rarely considered mediators or moderators of change and process issues.

Defining the common effective elements between therapies that produce change may be more helpful than comparing "brands of therapy" where it may be difficult to ensure that the component ingredients have been successfully delivered. We would suggest that treatment studies include some markers of treatment fidelity and include information as to how adherence to, or receipt of, the intervention is assured.

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