REVIEW ARTICLE

A systematic review and meta-analysis on controlled treatment trials of metacognitive therapy for anxiety disorders

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Background: To conduct a systematic review and meta-analysis on controlled treatment trials of meta-cognitive therapy for anxiety disorders. **Materials and Methods:** Studies were included if they employed controlled methodology and treated people above 18 years with anxiety disorders. Case studies (with less than 4 cases) and single case designed studies were excluded. A comprehensive literature search identified 15 trials for systematic review. **Results:** All included studies showed better treatment results in the MCT arms compared to the control groups. We also statistically pooled the results across studies (when possible). The meta-analyses also showed that MCT had statistically significant better results compared to the control groups in GAD (both immediately post-treatment and 12 months post-therapy results), OCD, and PTSD (p-values ranged <0.0001-0.025). **Conclusion:** Based on the results of our systematic review, MCT seems to be an effective treatment for anxiety disorders and can effectively control their psychological problems.

Key words: Anxiety disorders, meta-analysis, meta-cognitive therapy

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INTRODUCTION

The two most prevalent mental health problems in the general medical setting are anxiety and depression. These two disorders are prevalent, disabling, and often untreated in primary care and have a huge burden on health economy.[1]

According to USA National Comorbidity Survey Replication, anxiety disorders are the most prevalent class (28.8%) among mood, impulse-control, and substance use disorders. Among anxiety disorders, the more prevalent 12-month disorders were specific phobia (8.7%) and social phobia (6.8%).[2]

Anxiety disorders impose a high burden and in comparison with other psychiatric disorders cause more uncertainty feeling and fear for patients. Unlike social anxiety disorder that is caused by a special event (such as speaking in public or a first date), generalized anxiety disorders (GAD) last at least 6 months and can get worse if left untreated.[3,4]

Some new therapies for anxiety disorders are available, that can help some patients with anxiety disorders to lead productive, more joyful lives. Although cognitive and behavioral therapies (CBT) have produced large effect sizes (ES) for individually delivered treatments (van Balkom *et al*.), one of the major challenges in these therapies is to make effective treatments more readily available for the patients.[5,6]

The aim of CBT is changing maladaptive beliefs and behaviors. Although CBT can have beneficial effects on many patients, their therapeutic effect is still under question.[7]

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For the first time, Wells and Matthews presented a metacognitive model for treatment of emotional disorders. The term metacognition refers to any kind of cognitive process that provided cognitive evaluation or control.[8]

Metacognition has a main role in forming and developing anxiety disorders. This is the reason that metacognitive therapy (MCT) has emerged to address deficiency in CBT. Self-regulatory executive function model is the way to understand how cognition and behavior interaction works in the maintenance of anxiety disorders. Based on this perspective, metacognitive beliefs and emotional disorders have positive relationship.[9,10]

Metacognitive model of anxiety disorders tries to adjust erroneous negative metacognitive beliefs, positive metacognitive beliefs, and the unhelpful thought-control strategies. In this method, patients should learn new ways of relating to inner thoughts that act as triggers for worrying.

In addition, MCT modifies the meaning and consequences of intrusive thoughts and feelings, and beliefs about the necessity of doing rituals.[11]

In case of posttraumatic stress disorder (PTSD), this type of therapy helps patients to develop flexible metacognitive awareness and control, and also to free themselves from worry/rumination, and threat monitoring.[12]

Several studies showed the effectiveness of MCT on all types of anxiety disorders thus far,[12-15] however, no comprehensive literature review exists in this regard.

In this study, we conducted a comprehensive literature search on the efficacy of MCT on anxiety disorders and provided the results in a systematic review and meta-analysis format.

METHODS

The PRISMA statement was followed for the conduction of the current systematic review (www.prisma-statement.org).

Search strategy

The following databases were searched for the possible relevant studies: PubMed, Scopus, Scholar Google, Cochrane database, and Psycinfo.

"(Meta-cognition OR metacognitive) AND (anxiety OR Generalized Anxiety Disorder (GAD) OR Obsessive-Compulsive Disorder (OCD) OR Post Traumatic Stress Disorder (PTSD) OR phobia)" were used as keywords to search the above-mentioned databases. No language or date limit was imposed on the search. Two authors conducted the search independently.

Inclusion criteria

All studies used metacognitive treatment for anxiety disorders with the following criteria were included:

1. Participants should be above 18 and have met full criteria for any of anxiety disorders including GAD, OCD, PTSD, specific and social phobia, and panic disorder.
2. Only controlled studies (i.e., studies with a control group) were included: Case studies (with <4 cases) and single case designed studies were excluded. Study selection was done by two authors independently. Duplicate studies were discussed, and only the most recent reports were included.

References of the included studies were hand searched in order not to miss any possible relevant study.

Statistical analyses

Studies with enough quantitative data were further analyzed by meta-analysis. At least sample size, pre- and post-therapy means, and standard deviations for psychological tests scores in MCT and control arms were needed for meta-analysis. Means and standard deviations of difference in pre- and post-treatment scores were calculated according to Cochrane Collaboration guidelines for quantitative data processing.

The calculated ES for each study was standardized difference in means of pre- and post-treatment psychological test score changes (MCT compared to the control arms). Random effects model was used to pool the ES across the included studies.[16] Cochrane Q value was used to evaluate the heterogeneity across studies, and $P < 0.05$ were considered statistically significant. I^2 index was used to quantify the amount of heterogeneity. All statistical analyses were performed using comprehensive meta-analysis version 2.

RESULTS

PRISMA flowchart of the study is shown in Figure 1. As shown in Figure studies finally met our inclusion criteria.

Table 1 shows the characteristics of the included studies. Tables 2 and 3 shows the quality assessment of the

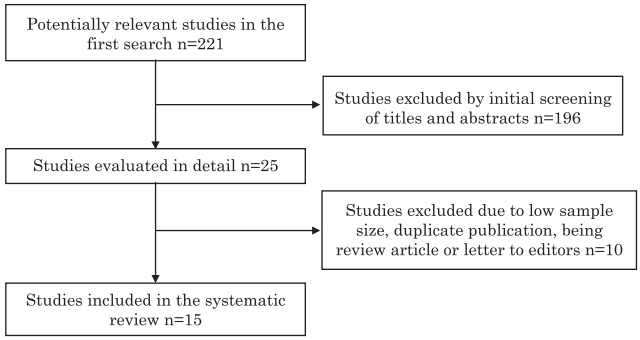

Figure 1: PRISMA flowchart of the study

included studies according to the Oxford Center for Evidence-Based Medicine checklist for randomized controlled trials (RCTs) and New Castle Othawa Quality Assessment Scale.[17]

Qualitative synthesis

Generalized anxiety disorders

Three studies were conducted on GAD patients. Wells *et al*. compared MCT and applied relaxation (AR) in an RCT.

Table 1: The characteristics of the included studies

Title	Year	First author	Disorder	Site of the study	Tests	Control	Sample size	Type of study
A pilot randomized trial of metacognitive therapy versus AR in the treatment of adults with GAD	2010	Wells	GAD	UK	Trait-anxiety subscale of the STAI-T PSWQ BDI BAI MCQ	AR group	MCT: 10 Control: 10	RCT
RCT on the effectiveness of metacognitive therapy and IUT for GAD	2012	van der Heiden	GAD	Netherlands	PSWQ STAI-T (SCL-90) BDI MCQ The IUS	IUT DT	MCT: 54 IUT: 52 DT: 20	RCT
Comparison of metacognitie therapy, fluvoxamine and combined treatment in improving metacognitie beliefs and subjective distress of patients with obsessive compulsive disorder	2010	Sharreh	OCD	Iran	SUD MCQ (global) MCQ1[a] MCQ2[b] MCQ3[c] MCQ4[d] MCQ5[e]	Three group: MCT fluvoxamine and combined treatment	MCT: 7 Fluvoxamine: 7	RCT
Effect of Wells metacognitive therapy on thought fusion in patients with obsessive compulsive disorder	2010	Khorramdel	OCD	Iran	TFI	Control: No treatment	MCT: 12 Control: 12	RCT
The effect of metacognitive and drug therapies on metacognitive beliefs of disease with OCD	2011	Abolghasemi	OCD	Iran	MCQ obsessive-compulsive inventory (modsley)	Drug therapy + control group	MCT: 20 Drug: 20 Control: 20	RCT
Efficacy of metacognitive behavioral therapy in reducing self-punishment in patients with PTSD	2007	Bakhtavar	PTSD	Iran	TCQ	Control: Only drug therapy	MCT: 15 Control: 15	RCT
Effects of metacognitive therapy on symptoms of social phobia patients	2010	Bahadori	Social phobia	Iran	SPSAQ FNE scale	Control: Waiting list	MCT:10 Control:9	RCT
Effects of metacognitive therapy on symptoms of fear of negative judgments in social phobia patients	2010	Bahadori	Social phobia	Iran	FNE scale	Control: Waiting list	MCT: 10 Control: 9	RCT
Effects of metacognitive therapy on metacognitive beliefs and cognitive confidence in social phobia patients	2010	Bahadori	Social phobia	Iran	MCQ 1 (positive) MCQ2 (cognitive confidence)	Control: Waiting list	MCT: 10 Control: 9	RCT
Comparison effect of meta cognitive therapy and drug on obsession	2010	Abdolahzadeh	Obsession		Y-BOCS MCQ30 BDI DASS-21 TCQ (anxiety) STAI-T	Drug	MCT: 8 Control: 8	Controlled trial
The efficacy of metacognitive therapy on patients suffering from pure obsession	2012	Andouz	Pure obsession	UK	OCI-R MCQ Y-BOCS TFI BDI	Multiple baseline: Single subject design	6	Controlled trial
Efficacy of metacognitive-behavioral therapy on panic beliefs in female panic patients	2010	Afshari	Panic disorder	Netherlands	Panic belief questionnaire	Control: Drug	MCT: 10 Control: 10	RCT

(Continued)

Table 1: Continued

Title	Year	First author	Disorder	Site of the study	Tests	Control	Sample size	Type of study
Treating posttraumatic stress disorder with metacognitive therapy: A preliminary controlled trial	2012	Wells	PTSD	Iran	PDS Scale; Foa IES; Horowitz BDI BAI Assessor rating TCQ	Control: DT	MCT: 10 Control: 10	Controlled trial
Effect of metacognitive therapy on anxiety and metacognitive components in GAD patients	2013	Atash	GAD	Iran	BAI MWQ (MCQ-30) MCQ1 MCQ2 MCQ3 MCQ4 MCQ5	Control: No treatment	MCT: 10 Control: 10	RCT
Comparison of the effectiveness of behavioral-cognitive and behavioral-metacognitive approaches in patients with OCD	2010	Akrami	OCD	Iran	Maudsley	Control: CBT	MCT: 11 Control: 18	Controlled trial

[a]MCQ1 = Positive belief; [b]MCQ2 = Negative belief; [c]MCQ3 = Low cognitive confidence; [d]MCQ4 = Superstitious themes; [e]MCQ5 = Cognitive self-awareness. PSWQ = Penn-State Worry Questionnaire; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; MCQ = Metacognitions Questionnaire; MCT = Metacognitive therapy; GAD = Generalized anxiety disorder; OCD = Obsessive-compulsive disorder; PTSD = Posttraumatic stress disorder; SCL-90 = Symptom Checklist 90; IUS = Intolerance-of-Uncertainty Scale; DT = Delayed treatment; CBT = Cognitive and behavioral therapies; TFI = Thought-fusion inventory; TCQ = Thought Control Questionnaire; SPSAQ = Social Phobia Symptoms Assessment Questioner; FNE scale = Fears of Negative Evaluation scale; Y-BOCS = Yale-Brown Obsessive Compulsive Scale; DASS-21 = Depression Anxiety Stress Scale 21; OCI-R = Obsessive-Compulsive Inventory Revised; PDS = Posttraumatic Stress Diagnostic; IES = Impact of Events Scale; MWQ = Meta-worry Questionnaire; IUT = Intolerance-of-uncertainty therapy; RCT = Randomized controlled trial; AR = Applied relaxation; STAI-T = Trait version of the State-Trait Anxiety Inventory

Table 2: Quality assessment of the included studies according to Oxford Center for Evidence Based Medicine checklist for RCTs

Studies	1a. R-Was the assignment of patients to treatments randomized?	1b. R-Were the groups similar at the start of the trial?	2a. A-Aside from the allocated treatment, were groups treated equally?	2b. A-Were all patients who entered the trial accounted for? — And were they analyzed in the groups to which they were randomized?	3. M-Were measures for assessment outcome objective?
A pilot randomized trial of MCT versus AR in the treatment of adults with generalized anxiety disorder	Yes Randomization by draw sealed envelope from the box	Yes	Yes	There was no drop-out from MCT and 10% at 6 m follow-up from AR	Yes Objective measures of outcome: SCID, STAI-T, PSWQ, BAI, BDI
RCT on the effectiveness of MCT and intolerance-of-uncertainty therapy for generalized anxiety disorder	Yes Randomization by throwing a dice	Yes	Yes	Yes This study reports intention to treat 126 patients randomized 7 patients from MCT and 4 from IUT lost to follow-up	Yes Objective measures of outcome: SCID, PSWQ, STAI-T, BDI, SCL-90
Comparison of MCT, fluvoxamine and combined treatment in Improving metacognitive beliefs and subjective distress of patients with obsessive-compulsive disorder	Yes Type of randomization not available	Yes	Yes	Yes 1 patient in fluvoxamine group and 1 from combined group excluded	Yes Objective measures of outcome: SUDs, MCQ30
Effect of Wells MCT on thought fusion in patients with obsessive compulsive disorder	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: TFI
The effect of metacognitive and drug therapies on metacognitive beliefs of disease with obsessive-compulsive disorder	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: SCID, MCQ30
Efficacy of metacognitive behavioral therapy in reducing self-punishment in patients with posttraumatic stress disorder	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: TCQ

(Continued)

Table 2: Continued

Studies	1a. R-Was the assignment of patients to treatments randomized?	1b. R-Were the groups similar at the start of the trial?	2a. A-Aside from the allocated treatment, were groups treated equally?	2b. A-Were all patients who entered the trial accounted for? — And were they analyzed in the groups to which they were randomized?	3. M-Were measures for assessment outcome objective?
Effects of MCT on symptoms of social phobia patients	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: FNE, SPSAQ
Effects of MCT on symptoms of fear of negative judgments in social phobia patients	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes objective measures for outcome: FNE
Effects of MCT on metacognitive beliefs and cognitive confidence in social phobia patients	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: MCQ
Comparison effect of MCT and drug on obsession	No	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: MCQ, Y-BOCS, TCQ, DASS, BDI, STAI-T
Efficacy of metacognitive-behavioral therapy on panic beliefs in female panic patients	Yes Type of randomization not available	Yes	Yes	No Of 24 patients 2 patients from MCT and 2 from control excluded (20 at last analyzed)	Yes Objective measures of outcome: PBQ
Treating posttraumatic stress disorder with MCT: A preliminary controlled trial	Yes Type of randomization not available	Yes	Yes	Yes	Yes Objective measures of outcome: PDS, TCQ, BDI, BAI, IES
Effect of MCT on anxiety and metacognitive components in GAD patients	Yes Type of randomization not available	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: SCID, MCQ, BAI, MWQ
Comparison of the effectiveness of behavioral-cognitive and behavioral-metacognitive approaches in patients with OCD	No	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: MOCI
The efficacy of MCT on patients suffering from pure obsession	No	Yes	Yes	Yes Lost to follow-up not reported	Yes Objective measures of outcome: BDI, TFI, SCID, OCI-R, Y-BOCS

MCT = Metacognitive therapy; RCT = Randomized controlled trial; GAD = Generalized anxiety disorder; OCD = Obsessive-compulsive disorder; AR = Applied relaxation; IUT = Intolerance-of-uncertainty therapy; SCID = Structural Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Dissociative Disorders; PSWQ = Penn-State Worry Questionnaire; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; SCL-90 = Symptom Checklist 90; SUDs = Substance use disorders; MCQ = Metacognitions Questionnaire; TCQ = Thought Control Questionnaire; FNE scale = Fears of Negative Evaluation scale; SPSAQ = Social Phobia Symptoms Assessment Questioner; Y-BOCS = Yale-Brown Obsessive Compulsive Scale; DASS = Depression Anxiety Stress Scale; PBQ = Patient benefit questionnaire; PDS = Posttraumatic Stress Diagnostic; IES = Impact of Events Scale; MWQ = Meta-worry Questionnaire; MOCI = Maudsley Obsessional-Compulsive Inventory; TFI = Thought-fusion inventory; OCI-R = Obsessive-Compulsive Inventory Revised; STAI-T = Trait version of the State-Trait Anxiety Inventory

Table 3: Quality assessment of nonrandomized studies according to NewCastle-Ottawa Quality Assessment Scale

Studies	Description of control group	Comparability	Objectivity of outcome	Adequacy of follow-up
Comparison effect of MCT and drug on obsession	Control group with same diagnosis drawn from different source and exposed to drug therapy	Study controls for metacognitive beliefs, obsession, depression and anxiety at pretest	Self-report measures	No statement about follow-up
Comparison of the effectiveness of behavioral-cognitive and behavioral-metacognitive approaches in patients with OCD	Control group drawn from the same community with the same diagnosis but exposed to different treatment (CBT)	Study controls for OCD diagnosis and intensity	Self-report measures	No statement about follow-up
The efficacy of MCT on patients suffering from pure obsession	Every two patient made a pair and role as control for each other	Study controls for OCD diagnosis and intensity, depression	Self-report measures	Follow-up 3 months after treatment

OCD = Obsessive-compulsive disorder; CBT = Cognitive and behavioral therapies

Results showed that at posttreatment and at follow-up MCT was superior to AR.[13] van der Heiden *et al*. compared the effectiveness of MCT and intolerance-of-uncertainty therapy (IUT). These patients were randomly assigned to MCT, IUT, or delayed treatment (DT). With large ES (ranging between 0.94 and 2.39) both MCT and IUT, but not DT, produced significant reductions in GAD symptoms. They also showed that MCT provided better results than IUT.[18] Atash *et al*. in their study investigated the effectiveness of MCT on anxiety and metacognitive components in GAD patients. Results showed that patients in MCT group in all measures gained better results than the control group.[19]

Obsessive-compulsive disorder

Five studies evaluated the efficacy of MCT in the OCD patients. Sharreh *et al*. investigate the efficacy of MCT compare to fluvoxamine and the combination of MCT with fluvoxamine. Their results showed that unlike the fluvoxamine, the MCT and combined treatment led to significant improvements in Metacognitions Questionnaire (MCQ) components and subjective units of distress scale. However, there were no significant differences between MCT and combined therapy.[20] Khorramdel *et al*. investigated the effect of MCT on thought fusion in OCD patients. The study experimental group showed statistically significant decreases in thought fusion general scores in posttest and follow-up, compared with the control group.[21] Abolghasemi *et al*. investigated the effect of MCT and drug therapy on metacognitive beliefs of OCD patients. Their results showed that MCT was more effective in reducing symptoms, and modifying dysfunctional metacognitive beliefs than drug therapy.[22] Akrami *et al*. compared MCT and CBT in the treatment of OCD patients. According to their results, both methods effectively decreased obsessive-compulsive symptoms, however, there was no significant difference between CBT and MCT.[23] Abdolahzadeh *et al*. compared MCT and drug therapy in an obsession in OCD patients. Their results showed that MCT was more effective than the drug in reducing the severity of obsessions and stress and dysfunctional metacognitive beliefs. On the other hand; for general function, drug therapy produced better results than MCT.[24] Andouz *et al*. investigated the efficacy of MCT on patients with obsession. Their results indicated that MCT was effective in reducing OCD symptoms and modifying dysfunctional metacognitive and thought-fusion beliefs.[25]

Posttraumatic stress disorder

Two of the included studies reported the MCT effect on PTSD patients. Bakhtavar *et al*. investigated the efficacy of MCT on reducing self-punishment behaviors in PTSD. Their results showed that MCT was effective in reaching this goal.[26] Wells and Colbear evaluated MCT in treating PTSD patients. Their results indicated that MCT in comparison with control condition led to reductions in PTSD symptoms, depression, and anxiety.[27]

Panic disorder

Only Afshari *et al*. investigated MCT on panic beliefs in females suffering from panic disorder. They showed that MCT was effective in reducing panic beliefs compared to the control group.[28]

Social phobia

Bahadori *et al*. in three nonduplicate studies investigated the effectiveness of MCT on symptoms of social phobia fear of negative judgments, metacognitive beliefs, and cognitive confidence in patients suffering from social phobia.[10,29,30] Their results showed that MCT had a significant effect in reducing symptoms of social phobia, fear of negative judgments, metacognitive beliefs, and cognitive confidence.

Quantitative synthesis (meta-analyses)

Three studies had enough information for the quantitative synthesis of MCT effect on GAD.[13,18,19] Figure 2 shows the forest plots of these analyses. Standardized differences in means of psychological test score changes were 7.94 (95% confidence interval: 2.2-13.67) (P = 0.007, Q = 10 [P = 0.01], I^2 = 90%), 7.18 (2.2-12.15) (P = 0.005, Q = 9.2 [P = 0.002], I^2 = 89%), 7.68 (0.94-14.43) (P = 0.025, Q = 11.5 [P = 0.0006], I^2 = 91%) for Penn State Worry Questionnaire (PSWQ), Beck Depression Inventory (BDI), and Beck Anxiety Inventory tests of the posttreatment period. For 12 months posttreatment data the pooled ES were 0.979 (0.616-1.343) (P < 0.00001, Q = 21 [P = 0.00001], I^2 = 95%), and 0.633 (0.292-0.975) (P < 0.00001, Q = 5.8 [P = 0.01], I^2 = 82%) for PSWQ and BDI, respectively.

Three studies had enough information for quantitative synthesis of the MCT effect on OCD.[20,22,23] Figure 3 shows the forest plot of the analyses. Standardized differences in means of psychological test score changes were 5.426 (4.272-6.581) (P < 0.00001, Q = 0.5 [P = 0.8], I^2 = 0), and 1.835 (1.209-2.46) (P < 0.00001, Q = 25 [P = 0.000001], I^2 = 95%) for MCQ global and Maudsley tests, respectively.

Finally, two studies had enough information for the quantitative synthesis of the MCT effect on PTSD.[26,27] Figure 4 shows the forest plot of the analysis. Standardized differences in means of psychological test score changes were 1.099 (0.504-1.694) (P < 0.00001, Q = 0.16 [P = 0.68], I^2 = 0%) for Thought Control Questionnaire test.

DISCUSSION

In this study, we reviewed the available published clinical trials of MCT in adults with anxiety disorders.

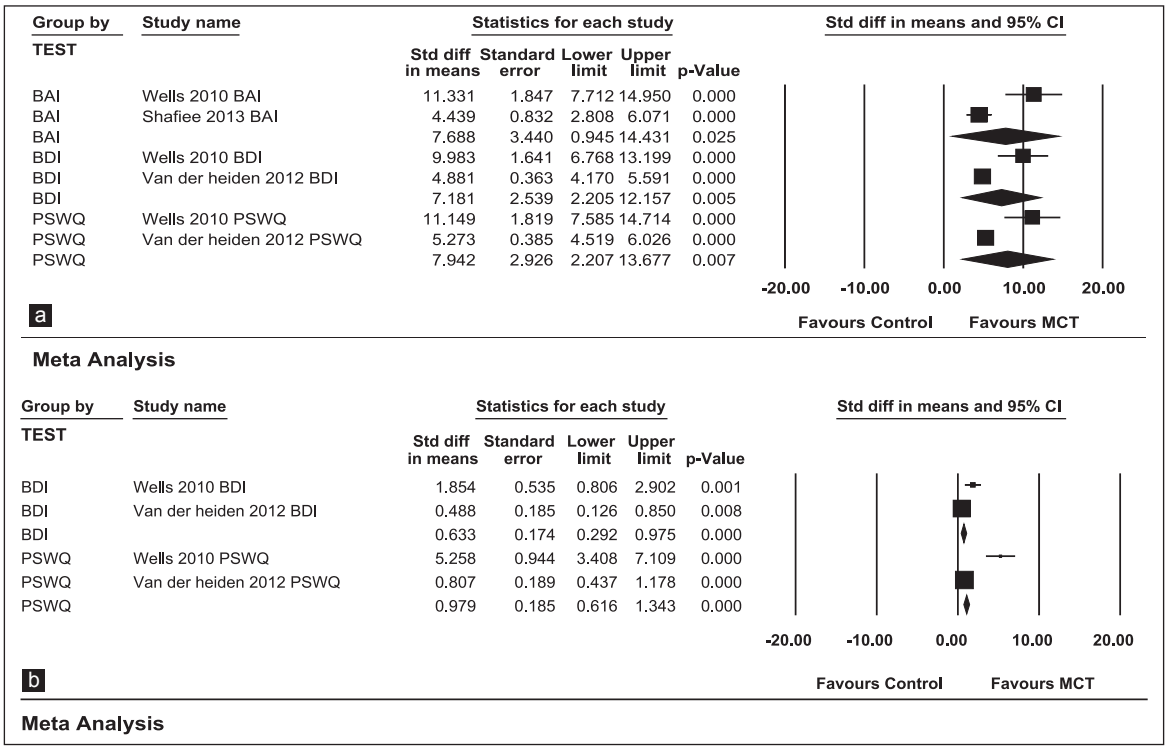

Figure 2: (a) Forrest plot of the difference in means of changes in Beck Depression Inventory, Beck Anxiety Inventory, and Penn State Worry Questionnaire after metacognitive therapy in generalized anxiety disorders. (b) Forrest plot of difference in means of changes in Beck Depression Inventory, Beck Anxiety Inventory, and Penn State Worry Questionnaire after metacognitive therapy in generalized anxiety disorders for 12-month posttreatment

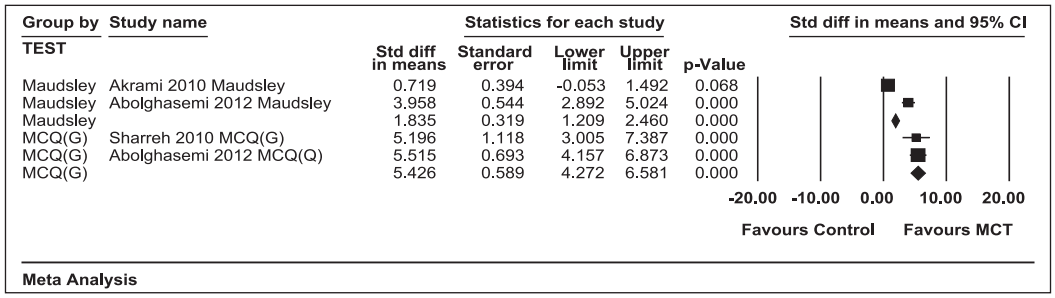

Figure 3: Forrest plot of the difference in means of changes in Metacognitions Questionnaire and Maudsley after metacognitive therapy in Obsessive-Compulsive Disorder

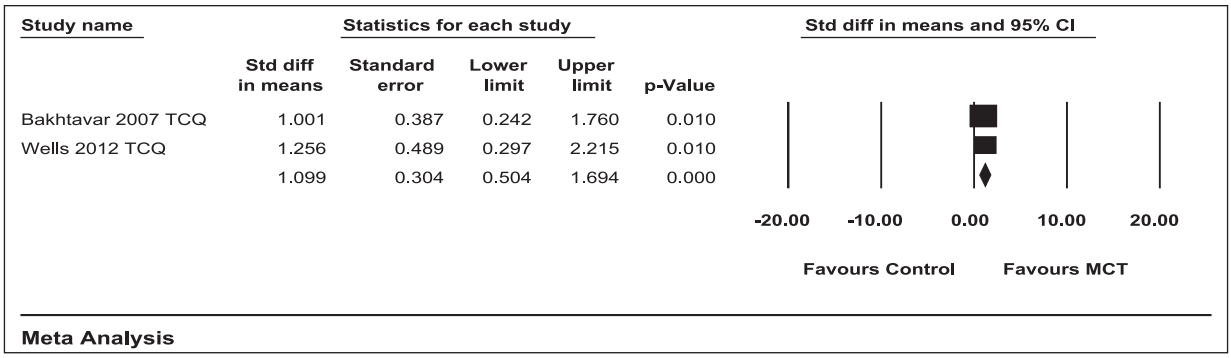

Figure 4: Forrest plot of the difference in means of changes in Thought Control Questionnaire after metacognitive therapy in posttraumatic stress disorder

Our results showed that MCT had statistically significant effect on different domains in anxiety disorders. We located clinical trials on different anxiety disorders including GAD, OCD, PTSD, specific and social phobia, and panic disorder. All included studies showed better treatment results in the MCT arms compared to the control groups. We also statistically pooled the results across studies (when possible). The meta-analyses also showed that MCT had

statistically significant better results compared to the control groups in GAD (both immediately posttreatment and 12 months posttherapy results), OCD, and PTSD (*P* values ranged <0.0001-0.025).

Considering the aim of MCT that is gaining more control over the stream of thoughts particularly in anxiety provoking situations, and the nature of anxiety disorders (damage of natural information processing), it seems that MCT can be effective via modification of maladaptive metacognitive beliefs and facilitation of information processing. MCT gives the opportunity to patients to confront effectively with their beliefs about their disorders. In addition, the recovery rates and magnitude of change in MCT demonstrate that this therapy can be a highly effective treatment. The results of our systematic review also provide additional support for the relevance of Wells metacognitive model to the treatment and understanding of anxiety disorders.[10,21,22]

Thus far, several other systematic reviews have been published on psychotherapy for anxiety disorders in children and adolescents. For example, Watson and Rees conducted a meta-analysis on randomized, controlled treatment trials of pediatric OCD. Random effects modeling yielded statistically significant pooled ES estimates for pharmacotherapy (ES = 0.48, $P < 0.00001$) and cognitive-behavior therapy (ES = 1.45, $P = 0.002$). CBT showed a greater ES than pharmacotherapy.[31] In another study, Reynolds *et al*. conducted a meta-analytic review on psychotherapy for anxiety in children and adolescents. Psychological therapy for anxiety in children and adolescents was moderately effective overall, but ES were small to medium when psychological therapy was compared to an active control condition. The ES for non-CBT interventions was not statistically significant.[32]

There are also several meta-analyses that investigated the effectiveness of CBT for anxiety disorders. For example, Butler *et al*. review 16 meta-analyses of CBT for different disorders. This review suggested that CBT is highly effective for adult unipolar depression, adolescent unipolar depression, GAD, panic disorder with or without agoraphobia, social phobia, PTSD, and childhood depressive and anxiety disorders. The comparison-weighted grand mean ES for these disorders, when compared to no-treatment, waitlist, or placebo controls, was 0.95 (standard deviation [SD] = 0.08). Statistically significant evidence for long-term effectiveness was also found for depression, generalized anxiety, panic, social phobia, OCD, sexual offending, schizophrenia, and childhood internalizing disorders.[33]

Aside these studies that conducted meta-analyses on CBT and psychotherapy for anxiety disorders, we could not find any systematic review on MCT for anxiety disorders.

Limitations

Our systematic review had several limitations that should be taken into account while interpreting the results.

First of all, the number of studies was limited which forced us to include both randomized and non-RCTs. This can limit the validity of our systematic review although only four of the included studies were nonrandomized. Our results were further limited by the quality of the included studies as most studies did not report the loss to follow-up and did not report on the intention to treat basis. We cannot use double-blind design for our study because, psychological therapy needs to be delivered by therapists who are not blind to the treatment, and this is a limitation.

Another important limitation is the heterogeneity and quality of reporting in the included studies. The psychological tests used for evaluation of treatment effect varies considerably across the studies and limited the extraction of useful data. In addition, almost all of the included studies reported the averages and SDs of pre- and post-psychological tests in the treatment and control arms and in fact differences in pre- and post-treatment data were not compared between the MCT and control groups.

CONCLUSION

Based on the results of our systematic review, MCT seems to be an effective treatment for anxiety disorders and can effectively control their psychological problems. However, due to low number of the included studies and poor quality of their reporting, our results should be interpreted with caution. Further large studies with consistent design and better quality of report are needed in order to validate the results of our review.

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Nil.

Conflicts of interest

There are no conflicts of interest.

AUTHOR'S CONTRIBUTION

RS: analysis of the results, manuscript revision, writing of discussion. NM: writing of discussion, method, manuscript revision. LZM: analysis of the results. NA: (corresponding author), articles search, preparing the tables, writing of introduction, and manuscript revision. HS: preparing the tables.

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