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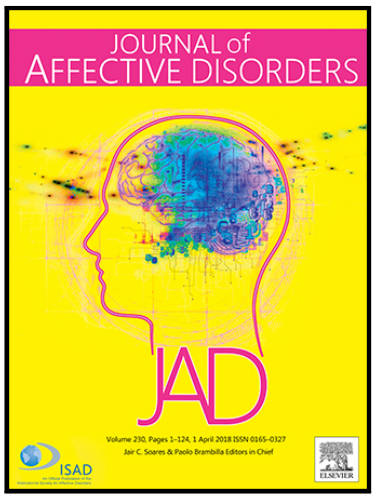

Cognitive Behavioural Therapy for Childhood Anxiety Disorders: What Happens to Comorbid Mood and Behavioural Disorders? A Systematic Review

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Highlights*:*

- High rates of comorbidity documented in the literature.
- Disorder specific CBT focused on primary anxiety disorder associated with positive outcomes for comorbid-untargeted disorders.
- Standard CBT protocols can be used as a valid approach when facing comorbid disorders.

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Cognitive Behavioural Therapy for Childhood Anxiety Disorders: What Happens to Comorbid Mood and Behavioural Disorders? A Systematic Review

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Abstract

Background: High rates of comorbidity among children and adolescents with anxiety disorders are widely documented. To date the question of what happens to comorbid disorders upon treatment of the primary anxiety disorder has received little attention and the optimal treatment strategy for cases with comorbidity remains to be determined.

Objectives: This review examines the literature on the impact of disorder-specific CBT on comorbid mood and behavioural disorders in young people with a primary anxiety disorder.

Search Methods: PsycINFO, EMBASE, MEDLINE and the Cochrane Library were systematically searched using predefined selection criteria. Two reviewers independently assessed the relevance of studies, obtained data using a data extraction form and undertook methodological quality analysis.

Results: Ten studies (1,647 children in total) were included in the review. All studies demonstrated positive outcomes for CBT focused on the primary anxiety disorder on untargeted comorbid mood and/or externalising disorders.

Conclusions*:* Findings suggest CBT focused on the primary anxiety disorder successfully reduces comorbid mood and/or behavioural diagnoses and symptoms of these co-occurring clinical diagnoses. Therefore, the implementation of disorder-specific CBT for the primary disorder is a valid alternative to transdiagnostic

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interventions and is recommended in cases of comorbidity in children and adolescents with a primary anxiety disorder.

1. Introduction

Anxiety disorders are one of the most prevalent forms of psychopathology in children and adolescents with prevalence rates of 5% to 19% (Costello, Egger, & Angold, 2004). However, such disorders rarely occur in isolation and comorbidity with other mental health disorders is common. The definition of comorbidity adopted in this article is the co-occurrence of two or more disorders within the same individual (Allen et al., 2010; Brown & Barlow, 1992; Tsao, Mystkowski, Zucker, & Craske, 2002, 2005). High rates of comorbid disorders are widely established among anxiety-disordered youth, with up to 80% of young people diagnosed with a primary anxiety disorder also meeting criteria for a co-occurring disorder (Costello et al., 2004; Kendall et al., 2010; Rapee et al., 2013). High levels of comorbidity are found in both clinical and community samples (Chu & Harrison, 2007; Costello et al., 2004). The most frequent comorbid disorders presented are other anxiety disorders, mood disorders and externalizing disorders including Attention Deficit Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) (Bernstein & Kinlan, 1997; Cummings, Caporino, & Kendall, 2014; Lewinsohn, Zinbarg, Seeley, Lewinsohn & Sack, 1997; Merikangas et al., 2010).

1.1 Comorbidity and treatment outcome

Clinically there is a common assumption that the presence of a comorbid condition complicates and reduces treatment effectiveness (Kennard, Ginsburg,

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Feeny, Sweeney, & Zagurski, 2005; Rapee et al., 2013). However, this assumption is not borne out by research findings. Ollendick, Jarrett, Grills-Taquechel, Hovey, and Wolff (2008) conducted a review examining the implications of comorbidity on treatment outcome. Fourteen of the 16 RCTs using CBT failed to report a significant difference between pre and post-treatment outcomes; the presence of a comorbid disorder did not affect treatment outcome. One study found a negative association between comorbid depression and poor treatment outcomes (Berman, Weems, Silverman, & Kurtines, 2000). However, whilst there is growing evidence that comorbidity does not affect treatment of the primary anxiety disorder, the optimal treatment for comorbid disorders in children and adolescents is unknown. Should 1) treatment focus on both disorders ('transdiagnostic') 2) treatment for one disorder precede treatment for another or 3) will the treatment of the primary disorder also affect the symptoms of the secondary disorder?

1.2 Transdiagnostic and modular CBT

'Transdiagnostic' and 'Modular' approaches to comorbidity have attracted increasing attention in recent years (Marchette & Weisz, 2017). Transdiagnostic CBT aims to target core cognitive and behavioural processes that are assumed to be present across a range of disorders hence treating a range of conditions in a single treatment context (Andersen, Toner, Bland, & McMillan, 2016). Specifically, there has been an increased amount of empirical literature surrounding transdiagnostic CBT and anxiety disorders due to symptom overlap and the existence of common underlying psychopathology across the breadth of anxiety disorders (Barlow, Allen, & Choate, 2004; Ehrenreich-May et al., 2017; Norton & Barrera, 2012). Modular approaches to comorbidity are equally valid (Weisz et al., 2012). However, such alternative

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approaches are in their relative infancy and it is important to understand how they compare in the treatment of comorbid disorders to the more established, traditional disorder-specific approaches such as CBT, which is the recommended optimal treatment for anxiety disorders (e.g. NICE, 2014) and is supported by an extensive body of literature in the treatment of anxiety disorders in children and adolescents (Cartwright- Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; Ishikawa, Okajima, Matsuoka, & Sakano, 2007; James, Soler, & Weatherall, 2005; James, James, Cowdrey, Soler, & Choke, 2013).

1.3 Aims and rationale for the present review

The aim of this review was to determine the impact on comorbid disorders after treatment of the primary anxiety disorder in children and adolescents using CBT.

2. Methods

Systematic review methodology was conducted in accordance with Cochrane guidelines (Higgins & Green, 2011). PsycINFO, EMBASE, MEDLINE and Cochrane Library were systematically searched on the 11th of January 2018 using the following search terms: Comorbidity or comorbid* AND (CBT OR cognitive therapy OR cognitive behaviour therapy OR cognitive behavior therapy OR cognitive behavioural therapy OR cognitive behavioral therapy) AND (Anxiety OR worry OR apprehension OR angst OR distress OR panic) AND (child OR adolescen*)

All searches were limited by age (children and adolescents up to 18 years) and English language publications. Grey literature searches were also conducted, through Google Scholar and grey literature databases including the Healthcare

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Management Information Consortium (HMIC), the National Technical Information Service (NTIS) and PsycEXTRA. Reference lists and citations of identified papers were also searched for relevant studies. Included studies of a Cochrane review were hand searched (James et al., 2005; James et al., 2013).

2.1 Inclusion criteria:

Study eligibility criteria were:

(1) Quantitative Studies of a Cognitive Behavioural Therapy intervention to treat an anxiety disorder. Studies of any methodology were included.

(2) Participants were children & adolescents aged 0-18 years with a primary anxiety disorder according to the *Diagnostic and Statistical Manual, Fifth Edition* (DSM-V; APA, 2013) and at least one comorbid mood or behavioural disorder diagnosis. This review only included studies that discussed comorbid mental health disorder diagnoses and not those that only discussed comorbid symptoms at pre-treatment to ensure participants met criteria for the comorbid diagnosis prior to the intervention. Studies that only reported co-morbid anxiety disorder diagnoses were excluded.

(3) Studies reported pre and post measures of comorbid mood or behavioural disorders (including either diagnostic status or measures of symptoms). .

2.1.1 Exclusion criteria:

Studies were excluded if they focused on the treatment of PTSD or OCD as a primary diagnosis of anxiety disorder, as they are no longer classified as an anxiety disorder according to DSM-V (APA, 2013). They were also excluded if classified as a comorbid diagnosis. Additionally studies that only reported other comorbid anxiety disorders, co-occurring physical illness, alcohol or substance abuse or comorbid neurodevelopmental disorders such as ASD and ADHD were excluded.

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2.2 Study selection

Study selection was performed by M.M. A random sample of 20% of studies, generated by https://www.randomizer.org, were independently reviewed by SJ against inclusion and exclusion criteria. RS or SB were consulted to resolve any disagreements regarding the eligibility of studies.

2.3 Data extraction

A data extraction form was developed, comprising of study characteristics and the main results of the primary and comorbid mental health disorders. Data were independently extracted by two reviewers MM and SJ in order to ensure reliability.

2.4 Assessment of risk of bias in included studies

Two independent reviewers, MM and SJ, assessed methodological quality using the Effective Public Health Practice Project Tool (EPHPP) (Thomas, Ciliska, Dobbins, & Micucci, 2004). Studies were rated on the following criteria: selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts. Each area was rated as strong, moderate or weak in accordance with the tool. Each study was given an overall rating, which was dependent on the total number of weak ratings they exhibited: strong was assigned to studies with no weak ratings, moderate was assigned to studies with one weak rating & weak was assigned to studies with two or more weak ratings**.** This tool was used because it allowed for a range of study designs to be assessed; however, it did not account for the total sample size reported in studies.

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3. Results

The search identified 1,807 independent papers. A total of ten studies met criteria for inclusion in this review (9 RCTs and 1 controlled trial). See Figure 1 for the PRISMA flowchart of the selection of studies and the primary reasons for exclusion of studies (Moher, Liberati, Tetzlaff, & Altman, 2009). See table 1 for the characteristics of included studies and table 2 for the summary of findings.

3.1 Study characteristics

A total of 1,647 participants were involved in the studies. The majority of studies randomly assigned participants to an intervention or waitlist control group. Comorbid disorders investigated included comorbid depression and comorbid externalizing disorders (conduct disorder and oppositional defiant disorder).

Comorbid depression diagnoses were established through the Anxiety Disorders Interview Schedule for Children/ Parents (ADIS-C/P) (Gallo, Chan, Buzzella, Whitton, & Pincus, 2012; Rapee et al., 2013) and symptoms of comorbid mood disorders were rated using children's self-report measures, Children's Depression Inventory (CDI) (Kendall, 1994; Kendall et al., 1997; Liber et al., 2010; Nauta, Scholing, Emmelkamp, & Minderaa, 2003; Ollendick et al., 2009; Öst, Svensson, Hellström, & Lindwall, 2001) and the Beck Depression Inventory for Youth (BDI-Y) (Levy, Hunt, & Heriot, 2007). Co-occurring externalising disorders were established through the ADIS and/or the parent or child reported Child Behaviour Checklist (CBCL) (Kendall, 1994; Kendall, Brady, & Verduin, 2001; Levy, 2007; Liber et al., 2010; Nauta et al., 2003) with the exception of one study, which used the CBCL and the Strengths and Difficulties Questionnaire (SDQ) (Rapee et al., 2013).

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3.2 Interventions

Some studies involved CBT treatment of a specific anxiety disorder (Gallo et al., 2012; Ollendick et al., 2009; Ost et al., 2001), whilst others used transdiagnostic CBT interventions targeting all anxiety disorders (Kendall, 1994; Kendall et al., 2001; Kendall et al., 1997; Levy et al., 2007; Nauta et al., 2003; Rapee et al., 2013). Protocols varied in format and the number and duration of sessions implemented; however, basic components of CBT were utilised in all studies. These included psychoeducation, cognitive restructuring, exposure to anxiety provoking situations and relapse prevention. CBT interventions were manualized but flexibly applied. The majority of studies were based on The Coping Cat Program (Kendall, Kane, Howard, & Siqueland, 1990) or The Cool Kids treatment programme (Rapee, Wignall, Hudson, & Schniering, 2000).

All interventions were delivered face-to-face. Seven of the studies delivered CBT using an individual format (Gallo et al., 2012; Kendall, 1994; Kendall et al., 2001; Kendall et al., 1997; Nauta et al., 2003; Ollendick et al., 2009; Ost et al., 2001), two were delivered using a group format (Levy et al., 2007; Rapee et al., 2013) and one randomly assigned participants to either a group or individual format (Liber et al., 2010). Sessions were approximately 60 minutes in duration with the exception of a group intervention that involved 2-hour sessions (Rapee et al., 2013).

One study used an 8-day intensive treatment of CBT (Gallo et al., 2012) and two studies delivered the intervention in a one-session treatment of a maximum duration of three hours (Ollendick et al., 2009; Öst et al., 2001). Three interventions included parental involvement (Levy et al., 2007; Liber et al., 2010; Nauta et al., 2003) where parents were given psychoeducation on anxiety and information about the skills and behavioural techniques their children would learn.

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[Please insert Figure 1 here]

[Please insert Table 1 here]

3.3 Quality assessment

The EPHPP tool (Thomas et al., 2004) was used to assess for overall quality. Three studies were rated as 'strong', 5 studies were rated as 'moderate' and 3 studies were rated as 'weak' overall (See table 1 for the global quality rating of each study individually). One study (Kendall et al., 2001) was rated as 'weak' since withdrawals and drop-outs were not reported and confounders were present; there was a substantially greater number of males than females in the sample and this was not controlled for in the design or analysis.

[Please insert Table 2 here]

3.4 Efficacy/ effectiveness of CBT on comorbid mental health disorders

The nine studies utilising RCT designs were considered to have the highest validity and reliability. For all RCTs, disorder specific CBT had a positive impact on comorbid conditions that were not treatment targets of the intervention. This impact was characterized as a reduction in either the number of diagnoses of comorbid disorders or an alleviation of symptoms of the comorbid clinical diagnosis.

3.5 Efficacy/ effectiveness of CBT on comorbid depression

All studies reviewed measured comorbid depression. Of these, two clinician rated studies reported significant reductions in the severity of depression using the

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ADIS-IV-C/P (Gallo et al., 2012; Rapee et al., 2013). Clinician rated scales are more reliable than self-report measures (Poznanski et al., 1984). Seven studies reported a reduction in co-occurring depressive symptoms (Kendall, 1994; Kendall et al., 1997; Levy et al., 2007; Liber et al., 2010; Nauta et al., 2003; Ollendick et al., 2009; Öst et al., 2001).

Three studies reported clinically significant change on comorbid depression using the CDI, a child self-report measure(Kendall, 1994; Kendall et al., 1997; Liber et al., 2010). The remaining trials reported a non-significant reduction in children's depressive symptomology using the CDI at pre-treatment, post-treatment and a 3 month, 6 month and year long follow-up respectively; (Nauta et al., 2003; Ollendick et al., 2009; Öst et al., 2001).

3.6 Efficacy/effectiveness of CBT on comorbid externalizing disorders

Seven studies measured comorbid externalising disorders (Gallo et al., 2012; Kendall, 1994; Kendall et al., 2001; Levy et al., 2007; Liber et al., 2010; Nauta et al., 2003; Rapee et al., 2013) and were all associated with reductions upon treatment for the primary anxiety disorder in children and adolescents. Of these, five reported significant reductions in the co-occurring externalising disorder diagnosis (Gallo et al., 2012; Kendall, 1994; Kendall et al., 2001; Levy et al., 2007; Rapee et al., 2013). Levy and colleagues (2007) found that a transdiagnostic intervention, that addressed ODD in addition to anxiety, did not appear to have treatment gains over the primary anxiety disorder specific intervention.

The remaining studies that measured comorbid externalising disorders before and after treatment reported a reduction in parent reported symptoms (Liber et al., 2010; Nauta et al., 2003), as opposed to a change in diagnosis.

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4. Discussion

4.1 Principal findings

The aim of the present review was to determine what happens to comorbid mental health disorders upon treatment of the primary anxiety disorder using CBT in children and adolescents. The review indicates that CBT focused on treating the primary anxiety disorder reduces symptoms of comorbid mental health disorders to sub-clinical levels, even though they are not specific treatment targets.

Ten studies were included, nine RCTs and one controlled clinical trial. Six studies showed significant reductions of CBT on untargeted comorbid diagnoses (Gallo et al., 2012; Kendall, 1994; Kendall et al., 2001; Levy et al., 2007; Rapee et al., 2013) and the remaining studies reported reductions on untargeted symptoms of comorbid disorders. Consistent with previous research (Bernstein & Kinlan, 1997; Cummings et al., 2014; Merikangas et al., 2010) other depression and externalizing disorders were the most common presenting comorbid non-anxiety disorders.

Overall, whilst for the majority of studies, comorbid disorders were not explicitly addressed in the treatment of the principal anxiety disorder they were significantly affected. This review suggests that CBT focused on the primary anxiety disorder has a positive impact on the symptoms and the diagnoses of comorbid psychiatric disorders.

4.2 Mechanisms of Change

The findings of this review suggest that CBT interventions focused on the principal anxiety disorder may be generalized to other disorders, as most studies included in this review were only focused on treating the primary anxiety disorder. Several mechanisms could explain this alleviation of untargeted comorbid conditions:

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Firstly, core components of CBT (psychoeducation, cognitive restructuring and therapeutic exposure) may be used effectively across disorders. The majority of interventions included behavioural or coping strategies, such as role-playing, breathing and relaxation exercises. These strategies are used in protocols for other mental health disorders, particularly depression (Lewinsohn, Clarke, Hops, & Andrews, 1990), and this component of the interventions may have impacted the children and adolescents' comorbid difficulties.

Secondly, shared underlying psychopathology, such as overestimation of risk of threat, fear of events and avoidance, may have a positive impact on secondary disorders (Borkovec, Abel, & Newman, 1995; Brown, Antony, & Barlow, 1995). Thirdly, the comorbid condition may be causally related to the primary disorder (e.g. an individual may develop depression as they cannot cope with the anxiety), therefore successfully treating the primary disorder may alleviate the comorbid condition (Tsao, Lewin, & Craske, 1998). Finally self-efficacy, an individual's belief in their ability to successfully overcome a specific situation or produce favourable outcomes, may be used to theoretically explain improvements on comorbid disorders (Bandura, 1977b). (Bandura, 1977a, 1994). Kendall and colleagues (2016) found that changes in self-efficacy were a significant mediator of anxiety changes over time. In this review as the children and adolescents have successfully applied the skills from CBT to overcome their primary anxiety disorder, this may provide them with a sense of self-efficacy, therefore enabling them with the ability to confidently generalise these skills to other disorders. Thus, the severity and rate of these untargeted comorbid disorders may be significantly reduced.

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4.3 Strengths and Limitations of the Current Systematic Review

This was the first systematic review to directly examine the impact of disorder-specific CBT on secondary conditions. The data in this review confirm the findings that CBT focused on the primary anxiety disorder successfully ameliorates comorbid diagnoses and symptoms of co-occurring clinical diagnoses. The present review has addressed a clear gap in the literature. This review is considered to have several strengths. An extensive and replicable search strategy was conducted; this is essential for all systematic reviews. In addition, a comprehensive methodological quality assessment was conducted and strict inclusion and exclusion criteria were applied in an attempt to reduce potential biases as a result of weak methodologies.

Nevertheless, limitations of this review should be noted. Firstly, when looking at secondary outcomes for comorbid disorders the utilised search strategy may not be optimal as authors were usually focused on determining the impact of CBT on the primary anxiety disorder and may not have mentioned comorbid mood or behavioural disorders in their abstracts. The term 'comorbid's term was selected as it was a recurrent keyword that was listed in relevant papers for this review. Efforts were made to search included papers of previous systematic reviews, relevant RCT's and reference lists of included studiesAlthough a substantial number of trials reported high rates of comorbidity amongst anxiety disordered children and adolescents; they do not routinely report pre and post outcome measures of comorbid disorders. Twenty-two out of eighty-four papers, identified in the search for this review, were excluded upon reading the full-text for this reason. Thus, this limitation results in missed opportunities to examine important treatment effects. The papers reported in the present review did not generally report changes in symptoms/diagnoses for specific participants and therefore for studies reporting only changes in comorbid

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symptoms, rather than diagnoses, it is not possible to ascertain whether the symptom changes were in those who met diagnostic criteria for a co-morbid mental health disorder at pre-treatment.

Additionally, this review excluded physical illness, alcohol or substance abuse and neurodevelopmental disorders including ADHD and ASD as comorbid disorders due to the sheer number of papers initially identified in the search and time constraints. Exploring the impact of CBT on these comorbid disorders may provide further insight into whether CBT focused on the primary disorder is beneficial for range of comorbid disorders.

Finally, no meta-analysis was conducted so it is not possible to quantify the amount of change in comorbid disorders. This would be an important contribution to the literature, particularly if it facilitated a direct comparison between disorder-specific and transdiagnostic/modular approaches.

4.4 Clinical Implications

The present systematic review supports the efficacy of CBT on untargeted comorbid conditions in children and adolescents. Due to the high rates of children and adolescents presenting with comorbid disorders (Costello et al., 2004; Merikangas et al., 2010; Rapee et al., 2013), it is crucial treatment benefits both the primary and secondary disorders. Disorder-specific CBT that also improves comorbid disorders has significant implications for treatment planning and implementation. While there is much interest in transdiagnostic and modular approaches to comorbidity, the value of disorder-specific approaches is highlighted by this review and should not be overlooked.

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Therefore, when clinicians are faced with comorbidity this method of treatment should be implemented, given that they are recommended by NICE guidelines as the treatment of choice for the primary disorder (NICE, 2014). The findings of this review have high ecological validity as they can be applied to everyday referrals in child and adolescent mental health settings. Clinicians need to be made aware of the positive impact of disorder-specific treatments on comorbid mental health disorders as this might facilitate adherence to the protocol rather than trying to use different components from multiple protocols (Levy et al., 2007). Clinicians must also be mindful that they may drift from evidence based cognitive behavioural protocols due to cognitive distortions, emotional reactions and the implementation of safety behaviours; therefore attention to model adherence is critical (Waller, 2009).

5. Conclusion

Overall, the findings of this systematic review clearly indicate that CBT focused on the primary anxiety disorder produces robust effects on comorbid anxiety disorders, comorbid depression and comorbid externalizing disorders in children and adolescents. Standard CBT protocols that do not address comorbidity can be used effectively.

This suggests that other treatment strategies may not be needed such as transdiagnostic CBT or treating disorders individually. Hence, this systematic review suggests CBT focused on the principal anxiety disorder is a valid approach to the treatment of comorbidity.

Author Statement Contributions

We confirm that all named authors have contributed to and have approved the final manuscript.

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Declarations of interest

All authors declare that they have no conflicts of interest.

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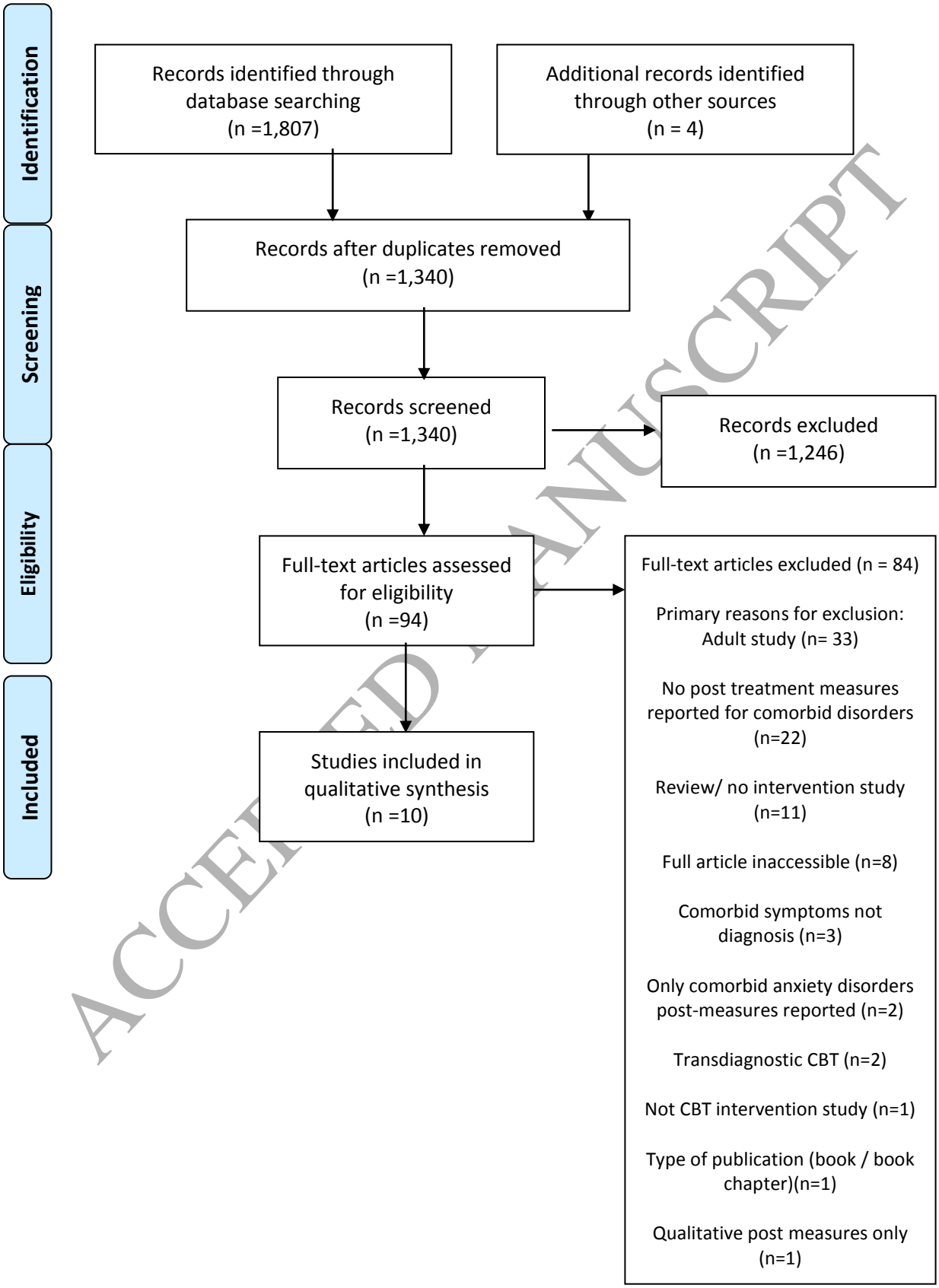
Figure 1. PRISMA flow diagram of literature search (Moher et al., 2009)



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Tables

Table 1. Characteristics of studies

Study	Primary disorder	Comorbid Disorder(s)	Intervention	Interventionist	Type of Study	Intervention Location	Participant N of the total sample (% male)	Age of participants M years (SD)	Country	Global quality rating
Gallo et al., 2012	Panic Disorder (with/without agoraphobia)	Specific phobia, GAD, Social Phobia, MDD, OCD	Intensive CBT		RCT		55(40)	12-17 years (Mean=15.10, SD=1.71)	USA	Moderate
Kendall, 1994	Over-anxious Disorder, SAD, Avoidant disorder	Depression, ODD, CD, Simple Phobia	Individual CBT	Doctoral candidates	RCT	Child and adolescent anxiety disorders clinic of the Division of Psychology, Temple University	47(60)	9-13 years	USA	Strong
Kendall et al., 1997	Over-anxious Disorder, SAD, Avoidant Disorder	Simple Phobia, ADHD, ODD, MDD, CD	Individual CBT	Doctoral candidates	RCT	Child and adolescent anxiety disorders clinic of the Division of Psychology, Temple University	94(62)	9-13 years	USA	Strong
Kendall et al., 2001	SAD, GAD, Social Phobia	GAD, SAD, Specific Phobia, Simple Phobia, OCD, PD, School Phobia, Depression,	Individual CBT		RCT	Child & adolescent anxiety disorders clinic	173(62)	8-13 years (mean=11.2)	USA	Weak

		ODD, CD								
Levy et al 2007	SAD, GAD, Social Phobia, Specific Phobia, or Panic Disorder	Anxiety, depression, externalizing disorders	Group CBT	Experienced clinical psychologists and co-therapists who were often intern clinical psychologists	RCT	University psychology clinic	69(80)	8-14 years (Mean=10.61, SD=1.69)	Australia	Moderate
Liber et al 2010	SAD, GAD, Social Phobia or Specific Phobia	SAD, GAD, Specific Phobia, Social Phobia, Agoraphobia, ADHD, ODD, Depression, Dysthymia	Individual or group CBT	Anxiety & Depression outpatient clinic	RCT	Anxiety & Depression outpatient clinic	124(56)	8-12 years	The Netherlands	Moderate
Nauta et al 2003	SAD, Social Phobia, GAD, Panic disorder with/without agoraphobia	Other anxiety disorders, depression, dysthymia, ODD, ADHD	Individual CBT	Clinical psychologist trainee students and registered child psychologists	RCT	One of 2 medical centres	79(49)	7-18 years	The Netherlands	Moderate
Ollendick et al 2009	Specific Phobias	Specific Phobia, SAD, GAD, Social Phobia, MDD, ADHD, OCD, PTSD, ODD	One-session treatment (Intensive CBT)	Clinicians with Masters degree or above. Experience beyond basic coursework was 1-4 years	RCT		196(46)	7-16 years	USA & Sweden	Strong
Ost et al 2001	Specific Phobias	Specific Phobia, Social Phobia, SAD, GAD,	Individual	Clinical psychologists, both licensed psychotherapists	RCT		60(39)	7-17 years (mean=11.7yrs, SD=2.8)	Sweden	Moderate

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		MDD, enuresis		with post training CBT						
Rapee et al 2013	Anxiety Disorder	Anxiety, Externalizing and Mood disorders	Group CBT	Clinical psychologists or graduate students in clinical psychology	Controlled Clinical Trial	Centre for Emotional Health at Macquarie University	750(53)	6-18 years	Australia	Weak

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Table 2. Summary of results of comorbid mental health disorders

Study	Main study findings for comorbid depression outcome	Main study findings for comorbid externalizing disorders outcome	Main study findings for comorbid mental health outcomes generally
Gallo et al. (2012)	- ADIS severity of MDD diagnoses reduced from pre to post treatment following an 8-day intensive intervention for patients with a primary diagnosis of Panic Disorder with Agoraphobia. - Only 4 adolescents had comorbid MDD, therefore due to small sample this reduction was not significant.	- Reported a reduction in severity of OCD from pre to post-treatment using the ADIS C/P -Only 2 people had OCD therefore it was not powered to detect a significant difference	-78.2% of adolescents had at least one comorbid diagnosis at pre-treatment. At Post-treatment 43.6% had a comorbid diagnosis -This was significant ($p<.001$) -Significant difference between post- WL group and post- treatment CBT group -At 6 weeks severity & frequency of comorbid disorder declined in the intervention but not WL group
Kendall et al. (1994)	- 32% displayed with comorbid depression -Sample was too small to permit for a meaningful statistical comparison. - -CDI reductions observed at post-treatment and maintained at 1-year follow-up. A greater number of subjects in the intervention group compared to WL control group demonstrated clinically significant change ($p<0.01$).	-- 13% presented with ODD & 2% with CD - Significant reduction in parent reported externalising disorders using the ADIS & CBCL disorders from pre to post treatment and maintained at a 1yr follow-up.	
Kendall et al. (1997)	- 6% of participants displayed comorbid major depression -Significant reduction in child reported CDI when compared to waitlist ($p<0.001$). - CDI scores decreased from pre-post treatment and maintained at 1-year follow-up.	- At pre-treatment 8% had comorbid ODD and 1% had comorbid CD at pre-treatment - No measure was used to examine the impact of disorder specific treatment on these externalising disorders	
Kendall et al. (2001)	- Only 8 children were comorbid with depression or dysthymia, number too small to permit for a meaningful statistical analysis - Impact of treatment on comorbid depression was not explored.	- Significant reduction in the rate of comorbid ODD from pre-treatment (9.2%) to follow-up (1.8%) and post-treatment follow up - Although a reduction was demonstrated from pre-treatment to post-treatment, it was only found to be significant at follow-up ($p<.05$). - ADIS & CBCL measures were used to assess the impact	The overall rate of comorbidity significantly reduced from pre to post treatment and at follow-up -79% of children had at least 1 comorbid diagnoses at pre-treatment - 47% had a comorbid diagnoses at post-treatment

			- 20% had a comorbid diagnoses at follow-up
Levy et al. (2007)	- Reduction of depression at post-treatment and a 3 month follow-up using BDI-Y	-Significant reductions in parent reported ODD using the CBCL-EXT, from pre-treatment to post-treatment and at a 3-month follow-up (p<. 05). - At pre-treatment 88% had a diagnosis of ODD, however the majority of children (76.5%) no longer met diagnostic criteria for ODD at follow-up.	-Significant reductions were demonstrated for both internalizing and externalizing problems
Liber et al. (2010)	-Significant reduction in self-report depressive symptoms using CDI	- Significant reduction in parent reported externalizing problems using CBCL-Ext	Change in pre and post treatment symptoms was more likely for children with a higher level of overall severity but to a lesser extent if they suffered from a comorbid disorder other than anxiety -Overall severity predicted greater improvement in parent reported internalizing and externalizing symptoms and child reported depressive symptoms
Nauta et al. (2003)	- Reduction in self-reported depression from pre to post-treatment and at a 3 month follow-up	-Reduction in parent reported ODD and ADHD using the CBCL-EXT scale at post-treatment and a 3-month follow up.	-Significant reduction on parent reported internalizing problems from pre to post-treatment and at a 3 month follow-up
Ollendick et al. (2009)	- 12 met criteria for MDD at pre-treatment Non significant reduction reported on child reported depression using CDI	- No measure used to assess pre and post differences for externalizing disorders	Significant reduction in parent reported internalizing symptoms
Ost et al. (2001)	- 4 met criteria for MDD at pre-treatment - There was a non significant reduction from pre to post treatment in depression using self-reported scale (CDI)	N/A	For all comorbid disorders: At pre-treatment, post-treatment and a 1 month follow-up significant reductions reported on independent assessor rating of severity of comorbid disorders
Rapee et al. (2013)	- Significant decreases in comorbid mood disorders ADIS severity and gains were maintained at 1-year follow-up (p= .001). - 55.8% free of a clinical mood disorder post-treatment and 61.1% at FU. - Reduction in mood disorders mirrored reduction observed in anxiety disorders.	-- Reduction in parent reported externalising disorders at post-treatment and follow up but this was non-significant (p= .0645) - 34.3% free of a clinical externalizing diagnosis after treatment and 39.6% at FU - CBCL & SDQ were used to assess the impact on externalising disorders	Decreased comorbid mood disorders, and to a lesser degree comorbid externalizing disorders