Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents (Review)

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[Intervention Review]

Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

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ABSTRACT

Background

This is an update of a Cochrane Review first published in The Cochrane Library in Issue 4, 2006.

Obsessive-compulsive disorder (OCD) in children and adolescents is characterised by persistent intrusive thoughts, inappropriate impulses or images which cause marked anxiety, and/or by persistent repetitive behaviours such as hand washing, checking and ordering. Along with antidepressant medication, behavioural or cognitive-behavioural therapy (BT/CBT) is recommended as the treatment of choice for paediatric obsessive-compulsive disorder (OCD).

Objectives

This review examines the overall efficacy of BT/CBT for paediatric OCD, its relative efficacy against medication and whether there are benefits in using BT/CBT combined with medication.

Search strategy

We searched CCDANCTR-Studies,CCDANCTR-References (16/3/2009), MEDLINE, EMBASE, PsycINFO, national trials registers, reference lists of all selected studies and handsearched journals related to cognitive behavioural treatment of OCD.

Selection criteria

Included studies were randomised or quasi-randomised controlled trials trials with participants 18 years of age or younger with a diagnosis of OCD, established by clinical assessment or standardised diagnostic interview. Reviewed studies included standard behavioural or cognitive-behavioural techniques, either alone or in combination, compared with wait-list, attention placebo, pill placebo or medication.

Data collection and analysis

The quality of selected studies was assessed independently by two review authors. Using Review Manager software, weighted mean differences were calculated for the total severity of OCD symptoms at post treatment and relative risks for having OCD at post treatment.

Main results

Eight studies with 343 participants were included. The review found evidence for lower post-treatment OCD severity and reduced risk of continuing with OCD for the BT/CBT group compared to pill placebo or wait-list comparisons. There was no evidence found that the efficacy of BT/CBT alone and medication alone differ in terms of post treatment symptom severity or in the risk of having OCD. There was some evidence of a benefit for combined BT/CBT and medication compared to medication alone but not relative to BT/CBT alone. The low rates of drop out suggested BT/CBT is an acceptable treatment to child and adolescent patients and their families.

Authors' conclusions

Although only based on a small number of studies which vary in quality, behavioural or cognitive-behaviour therapy alone appears to be an effective treatment for OCD in children and adolescents. It is as effective as medication alone and may lead to better outcomes when combined with medication compared to medication alone. Additional higher quality trials are needed to confirm these findings.

PLAIN LANGUAGE SUMMARY

Behavioural and cognitive-behavioural therapy for obsessive-compulsive disorder (OCD) in children and adolescents

The onset of obsessive-compulsive disorder often occurs in childhood and adolescence. Paediatric OCD can be an extremely debilitating disorder, resulting in high levels of distress, impairment and disruption of psychosocial development. It also has a considerable impact on other family members. While there is evidence that medication can reduce symptoms, behavioural and cognitive-behavioural therapy (BT/CBT) are often proposed as acceptable alternative treatments. These therapies include assisting the child to better tolerate the anxiety-provoking situations and thoughts without the use of compulsive behaviour to manage their anxiety, psycho-educationabout anxiety and OCD; cognitive therapy in which the child is helped to learn to identify and challenge unhelpful ways of thinking; and parental support.

This review identified eight randomised controlled trials involving 343 participants, evaluating the benefits of behavioural and cognitive-behavioural therapy. The results show that, compared to a wait-list or pill placebo, BT/CBT is an effective treatment for reducing OCD symptoms and lowering the risk of having OCD after treatment. Based on three studies that directly compared BT/CBT with medication, there was no current evidence to suggest that either BT/CBT or medication was superior to the other. When combined with medication, BT/CBT produces better outcomes than medication alone. Although based on a small number of studies, these findings provide support for the value of BT/CBT in the treatment of children and adolescents with OCD.

BACKGROUND

Description of the condition

Obsessive-compulsive disorder (OCD) in children and adolescents is characterised by persistent intrusive thoughts, experience of inappropriate impulses or images which cause marked anxiety, or by persistent repetitive behaviours such as hand washing, checking and ordering. Like OCD in adults, the symptomatic presentation in children and adolescents is heterogenous, with some experiencing both obsessions and compulsions, and others describing obsessions or compulsions only (Piacentini 2003; Swedo 1992). Compulsions can be both overt, such as hand washing, and covert such as counting, repeating "magical" words or spelling words backwards. For some children the repetitive behaviours may not be experienced as anxiety-provoking. Estimates of the prevalence of OCD in childhood vary from 0.5% to 4% (Douglass 1995, Flament 1988, Rapoport 2000), with clear clinical evidence that it is often associated with significant disruption and impairment in the child's family, social and academic life and that it can have adverse impacts on the child's psychosocial development (Piacentini 2003). In addition, children and adolescents who have OCD may

have a heightened risk for clinically significant psychiatric and psychosocial problems as adults (Stewart 2004).

Description of the intervention

Behavioural or cognitive-behavioural therapy (BT/CBT) is recommended as the psychotherapeutic treatment of choice for children and adolescents with obsessive-compulsive disorder (AACAP 1998, March 1997). A common and arguably essential component of BT/CBT for OCD involves exposure to the situational and internal triggers to the anxiety which motivates the compulsive behaviours, while at the same time preventing the compulsive activities. For example, children with compulsive washing would be required in a graded way to touch objects which they fear lead to contamination, and prevent the washing which neutralises their fear. This exposure with response prevention technique (ERP) is a core aspect of contemporary BT/CBT treatment. In addition to ERP, BT/CBT treatments vary in the emphasis they place on other components such as psycho education, cognitive training and parental involvement. Some earlier behaviour therapy approaches put little or no treatment time into these aspects compared to recent CBT approaches, which integrate cognitive and behavioural strategies. The reasons for the expert consensus recommendation in favour of BT/CBT for children and adolescents with OCD are the demonstrated efficacy of BT/CBT with ERP for OCD in adults (Kobak 1998), together with the belief that OCD in childhood is "virtually identical to the adult form" (Shafran 1998). In addition, ERP has a logically consistent and compelling rationale which presents a clear relationship between the obsessive and compulsive symptoms, their maintenance and the BT/CBT treatment.

There are a number of issues, however, which indicate that the downward extension of BT/CBT to paediatric forms of OCD may face unique problems. Firstly, a number of studies question the presumed development continuity between paediatric OCD and adult OCD. Geller and colleagues have described a bimodal age of onset for OCD, with one peak at about 10 years of age and another during adulthood (Geller 1998, Geller 2001). While equally prevalent and similar in its clinical characteristics to adult OCD, the childhood onset disorder has a number of distinctive features that have implications for clinical management, including possible responsiveness to psychotherapeutic interventions. In particular, it is more predominant in boys and more strongly co-morbid with disruptive behavioural problems, developmental disorders including autistic disorder, depression and other anxiety disorders (Geller 1996). Obsessive-compulsive disorder in children also co-occurs with tic disorders, and has been noted as a part of a paediatric autoimmune neuropsychiatric disorder associated with streptococcal infections (PANDAS, Murphy 2002). These co-morbidities may impact on the rationale for BT/CBT, in so far as they indicate differing mechanisms for symptom onset and maintenance, for example, the observation that children with tic related OCD have less well-developed cognitions triggering their compulsions (Geller 2003a). Alternatively, co-morbidities may reduce the capacity of child and adolescent OCD patients to tolerate the discomfort involved in the exposure and response prevention component of BT/CBT.

A second issue of extending BT/CBT to paediatric forms of OCD concerns the more self-reflective cognitive techniques utilised with adults to enhance tolerance and adherence to ERP. Many of these techniques may be of limited value with younger children because they presume a level of meta-cognitive skill, for example an ability to reflect on thoughts and emotions, that may not be common until adolescence (Stegge 2007). Thirdly, BT/CBT for OCD in children generally requires support and therapeutic assistance from the family. Recent findings show that parents of children with OCD, aged 8 to 14 years, were less rewarding of the child's independence and less likely to promote positive problem solving than parents of children with other types of anxiety disorders, externalising problems or those with no problems. Barrett 2002 suggested significant limitations to parents' capacity to support their child with OCD in undertaking self-directed ERP.

Why it is important to do this review

Several recent reviews and meta-analyses (Abramowitz 2005, Barrett 2008,Freeman 2007,O'Kearney 2007,Turner 2006, Watson 2008) generally support the expert recommendation about the efficacy of CBT for paediatric OCD. There are, however, limitations to the quality of some of these reviews that obscure the degree and nature of the benefits associated with CBT and it relative efficacy compared to medication. Some(Abramowitz 2005, Freeman 2007, O'Kearney 2007) include both controlled and uncontrolled designs or do not report on risk of bias of the included studies. Others (Barrett 2008,de Haan 2005,Turner 2006,Watson 2008) compare CBT with medication by contrasting pooled effect sizes between independent CBT and medication studies. This type of contrast is problematic because of design differences between CBT and medication studies particularly the lack of a placebo control in the CBT trials and because, unlike meta-analyses of pharmacological treatment, most reported pooled effects sizes for CBTinclude pre-post estimations.

In contrast, accumulative evidence for the efficacy of selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine and sertraline, appears reliable (Compton 2002, Geller 2003b; Kobak 1998, Liebowitz 2002). Furthermore, there is a common belief amongst practitioners that combined medication and BT/CBT is the most beneficial approach (Harvard 2002). Nevertheless, there may be an understandable reluctance by clinicians to prescribe psychotropic medication to children and adolescents. This is in light of the recent concerns about increased suicidal attempts in depressed children and adolescents treated with SSRIs and the preference of patients and families for non-drug treatments (Bridge 2007). When

available, BT/CBT is often recommended as the first-line treatment.

Consideration concerning study design, risk of bias and study comparability are particularly important from a clinical perspective when examining the relative benefits of BT/CBT. The aim of the current review is to update the previous Cochrane systematic review of BT/CBT for paediatric OCD (O'Kearney 2006) to assist clinicians in prioritising treatment options for their patients. Although CBT interventions are often multi-component treatments they share common psychotherapeutic principles and underlying science, as well as practices. At the present time the inclusive "CBT" is the more frequently used term, but a failure to consider studies that identify as behaviour therapy may unnecessarily exclude important evidence. This review first considers trials of BT/CBT for OCD in children and adolescents as a group and additionally examines the available evidence for the specific benefits of ERP and cognitive training.

OBJECTIVES

The overall aim of this review was to examine the efficacy of behavioural/cognitive-behavioural therapy (BT/CBT) in children and adolescents with obsessive-compulsive disorder.

The review aimed to address the following questions:

Is BT/CBT superior to a wait-list, attention placebo or pill placebo?

Is BT/CBT superior to medication?

Is BT/CBT superior to other non-pharmacological treatments (e.g. clinical management, relaxation only, play therapy)?

Is BT/CBT with ERP superior to BT/CBT without ERP?

Is BT/CBT with cognitive training superior to BT/CBT without cognitive training?

In addition, because of the suggested benefits of combining BT/CBT with medication we addressed further questions:

Is BT/CBT combined with medication superior to placebo?

Is BT/CBT combined with medication superior to medication alone?

Is BT/CBT combined with medication superior to BT/CBT alone?

METHODS

Criteria for considering studies for this review

Types of studies

Studies were selected if they were judged to be randomised controlled trials or quasi-randomised controlled trials. Trials with a cluster-randomised design were eligible for inclusion.

Types of participants

Eligible studies included participants who were 18 years of age or younger at the time of treatment or who were considered "children and adolescents" as defined by the studies. Participants had a diagnosis of OCD, established by clinical assessment or standardised diagnostic interview.

Types of interventions

The key component of BT/CBT for OCD was exposure to the situational and internal triggers of the anxiety which motivated the compulsive behaviours, while at the same time preventing the compulsive activities. In addition to exposure with response prevention, CBT approaches include a number of cognitive therapy strategies such as thought monitoring, thought challenging and cognitive restructuring incorporated as cognitive training. Before ERP became prominent other behavioural techniques were used, including contingency management, systematic desensitisation and thought stopping. Studies were included if they used any of these techniques either alone or in combination. Studies were to be differentiated on the basis of use/non-use of ERP and the use/non-use of cognitive training. None of the included studies at this time, however, allowed for these comparisons.

Trials were included regardless of "treatment" status of comparison, and the non BT/CBT comparison included active drug, pill placebo, attention placebo or wait-list. Because we anticipated only a small number of studies which included a BT/CBT only arm and a non-active comparison the review addressed the efficacy of BT/CBT relative to any non-active comparison.

Studies of efficacy of medication that used BT/CBT as a comparison group were included as well as studies which combined BT/CBT and medications.

Types of outcome measures

Primary outcomes

1) Severity of OCD (measured by the frequency, duration and degree of distress of obsessions and compulsions as assessed by a validated OCD symptom rating scale).

2) Remission from OCD status (as defined by the study investigators or, if not so defined, and individual Child Yale-Brown Obsessive Compulsive Scale (Storch 2004) scores are provided, a cut off of more than 10 on the CY-BOCS might be used to classify participants as still having OCD).

Secondary outcomes

1) General levels of distress and disruption (including depression/anxiety/behavioural problems) using established self-report measures.
2) Quality of life
3) Adverse effects
4) Drop-outs
5) Acceptability of treatment

Search methods for identification of studies

CCDAN-CTR Registers

The Cochrane Depression, Anxiety and Neurosis Group (CCDAN) maintains two clinical trials registers at their editorial base in Bristol, UK. A references register and a studies based register. The CCDAN-CTR References Register contains over 23,000 reports of trials in depression, anxiety and neurosis. Approximately 70% of these references have been coded to individual trials. These coded trials are held in the CCDAN-CTR Studies Register (which contains over 11,000 records). References to trials for inclusion in the Group's registers are collated from routine generic searches of MEDLINE, EMBASE PsycINFO; the Cochrane Central Register of Controlled Trials (CENTRAL); PSYNDEX, LILACS, AMED and CINAHL.. Details of the generic search strategies can be found in the Specialized Register section of the CCDAN Groups module text.

Electronic searches

The CCDAN-CTR Studies Register was searched on the 6^{th} August 2008 using the following terms:
Diagnosis = Obsessive-Compulsive
and
Age-Group = Child or Adolescent

The CCDANCTR-References was searched on the same date using the following terms:
Keyword = Obsess* or Compul*
and
Title or Abstract = child* or adolesc* or juvenil* or school* or pediatri* or paediatri*

The Trials Search Co-ordinator scanned through the results and excluded any studies or references which did not include a behavioral intervention.
The researchers conducted additional searches on the Cochranes Central Register of Controlled Trials (CENTRAL), PubMed, PsycINFO and SCOPUS on the 19th March 2009.
The search strategies can be found in Appendix 1.

Searching other resources

Reference checking

The reference lists of all selected studies were inspected for more published reports and citations of unpublished research. In addition, online national registers of controlled trials were searched and other relevant review papers and major textbooks which covered anxiety and affective disorder were checked.

Handsearching

Any journals specifically relating to behavioural treatment of OCD were searched. In particular, we searched Journal of the American Academy of Child and Adolescent Psychiatry, American Journal of Psychiatry, Behavour Therapy, Behaviour Research and Therapy, British Journal of Psychiatry, Journal of Behaviour Therapy and Experimental Psychiatry, and the Journal of Consulting and Clinical Psychology.

Personal communications

The authors of registered trials and other experts in the field were asked for their knowledge of other studies, unpublished as well as published. Where appropriate the first author of the included studies was contacted for clarification or additional information or data.

Data collection and analysis

Selection of studies

Through the use of an inclusion criteria form and whole reports of studies, two reviewers (RO'K and VONS; RO'K and AH) independently reviewed each study and selected eligible trials for inclusion. Disagreements were resolved through discussion or through use of a third judge (KA).

Data extraction and management

Data extraction was completed by the reviewers (RO'K and KA) independently, using a data extraction form. This included verification of study eligibility, sample size, age, mean age of onset of OCD, gender mix, diagnostic criteria used, length of treatment, number and frequency of sessions, therapist allegiance, BT/CBT treatment components, control components, outcomes (primary and secondary measures), reported statistics, length of follow up and number of participants lost or excluded at each stage of the trial. Any discrepancies in the data were checked by a third reviewer (AH).

Assessment of risk of bias in included studies

Both the original (2006) and the current version of this review (Issue 1, 2010) rely upon methodological criteria specified in the Cochrane Handbook (Alderson 2004), which pays particular attention to the quality of the randomisation procedure and allocation concealment, to assess risk of bias in the studies. In addition, risk of bias was assessed using the CCDAN Quality Rating Scale (Moncrieff 2001). This includes items on sample size, method of diagnosis, evaluation of treatment fidelity and attrition. Two reviewers (RO'K and KA; RO'K and AH) independently assessed each study, with disagreements resolved through discussion. Descriptions of key sources of bias were provided in the text.

In future versions of this review it is anticipated that we will update the review in line with recommendations of the current Handbook (Higgins 2008a; Higgins 2008b).

Assessment of heterogeneity

Heterogeneity between studies, providing data on the same comparison, was examined formally using I-squared (I^2). Where there was evidence of marked heterogeneity (I^2 was more than 50%) no pooling of data was undertaken. Where there was moderate heterogeneity and sufficient number of studies pooling of data was carried out using a random-effects model.

If marked heterogeneity was evident and there were sufficient studies in each group we present subgroup results to examine if differences could be explained through study differences. Study differences focused on type of control, participant selection (selection and exclusion criteria), BT/CBT delivery (description, fidelity, compliance, therapist allegiance) and outcome measurement (specification of methods and instruments).

Assessment of reporting biases

Publication bias

If sufficient studies were available for inclusion in the review it was planned to test for publication bias using scatter plots of treatment effects estimated against the sample size of each study (funnel plots).

Data synthesis

Treatment outcomes

The primary outcome comprised of post treatment scores on clinical outcome measures. Where the same measurement scale had been used across studies for continuous outcomes, the weighted mean difference (WMD) was used to pool differences in scores at post-treatment or change in scores pre to post where applicable. If different scales were used to measure the same outcomes and pooling was appropriate, standardised mean differences (SMD) were used. For continuing OCD at post treatment relative risks (RR) together with the 95% confidence intervals (CI) were calculated at post-treatment. Intention-to-treat analysis, using last observation carried forward (LOCF), was performed where applicable in most studies.

Subgroup analysis and investigation of heterogeneity

We planned to carry out a subgroup analysis examining the effect of age of onset on responsiveness to BT/CBT, comparing children versus adolescents. The current analysis included a comparison of BT/CBT with a waitlist control and BT/CBT with placebo control. There may be opportunities in the future to reorganise analysis by subgroups of studies which use specific types of control, e.g. wait-list, pill placebo, attention placebo, alternative psychological treatment.

Sensitivity analysis

See above, Assessment of heterogeneity.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Results of the search

After reviewing the titles, abstracts and full texts where necessary, of the 1681 relevant titles initially identified by our search, 42 studies where located which provided data on BT/CBT for OCD in children and adolescents. Reasons for further discarding studies at this point included: lack of a BT/CBT intervention or control group; case study or case series; the study investigated factors affecting prognosis or treatment response rather than BT/CBT efficacy; participants were older than 18 years; participants had mixed anxiety disorder diagnoses;data for BT/CBT participants or OCD participants not reported separately; the study was not a treatment trial or was a review only. Of the identified studies, 17 were considered to be eligible for inclusion in the review. Two of these (Freeman 2009, Franklin 2003) were descriptions on the design and methods of a study reported elsewhere (POTS 2004) and of an ongoing study (POTS II ongoing). Six identified studies were ongoing and are yet to report outcomes (Bolton ongoing, Ivarsson ongoing, Murphy ongoing, O'Neil ongoing, POTS II ongoing,

Turner ongoing). One study was considered as awaiting classification Himle 2003b because it is an unpublished conference paper with pilot data and without enough information to assess the study's risk of bias. We are awaiting responses to our request for clarification from the author. There were eight studies with data suitable for extraction.

Included studies

Participants

The age of the 343 children and adolescents in the included studies ranged from 4 years to 18 years 2 months. Participants in de Haan 1998 (n = 23), POTS 2004 (n = 112), Bolton 2008 (n = 20), and Williams ND (n = 21) ranged from 7 to 18 while Neziroglu 2000 (n = 10) ranged from 10 to 17 years, Barrett 2004 (n = 77) ranged from 10 to 13 years 6 months, Asbahr 2005 (n=40) ranged from 9 to 17, and Freeman 2008 (n = 42) treated younger children from 4 to 8. Gender distribution was about even for all the studies except Bolton 2008 (70% boys), Williams ND (62% boys) and Asbahr 2005 (60%). The nationality of the participants was Dutch (de Haan 1998), Australian (Barrett 2004), American (Neziroglu 2000; POTS 2004 (92% white); Freeman 2008 (80% white), Brazilian (Asbahr 2005) and British (Bolton 2008, Williams ND). Participants were diagnosed with OCD using either a well established diagnostic semi-structured interview for anxiety disorders (Anxiety Disorders Interview Schedule; Child and Parent versionsAnthony 1998, Silverman 1996; Barrett 2004 used the parent as respondent ADIS-P; POTS 2004, Bolton 2008, and Williams ND used the ADIS-C or ADIC-P; Freeman 2008 used the KSADS) or by clinical interview (Asbahr 2005, de Haan 1998, Neziroglu 2000). Diagnostic reliability was established Freeman 2008 reported in Neziroglu 2000, Barrett 2004 and POTS 2004. Neziroglu 2000 selected participants who had previously not responded to or complied with a trial of behaviour therapy of at least 10 sessions. Neziroglu 2000 and Williams ND did not specify exclusion criteria but there was considerable overlap in the well-specified exclusion criteria across the other studies. POTS 2004 and Freeman 2008 excluded participants if they had a previous failed an adequate trial of CBTand Asbahr 2005 if they had any previous treatment with CBT or medication. Of those assessed for eligibility, 28% (de Haan 1998), 27% (POTS 2004), 23% (Bolton 2008), 61% (Freeman 2008) and 4% (Williams ND) were excluded while the numbers excluded in Asbahr 2005, Barrett 2004, Neziroglu 2000 were not reported.

Behaviour therapy/cognitive-behaviour therapy

The BT/CBT interventions had between 12 and 20 sessions (of 1 or 1.5 hours) with a total of 30 hours of treatment for Neziroglu 2000, 21 hours for Barrett 2004, 18 hours for Asbahr 2005, 14 hours for POTS 2004, 15 hours for Freeman 2008, while in Bolton 2008 it averaged between 8.8 and 13.2 hours. de Haan 1998 and Williams ND do not report hours of treatment but both had 12 sessions. In Neziroglu 2000 and Bolton 2008 therapy focused exclusively on exposure with response prevention with no parent involvement or cognitive therapy. For Asbahr 2005, Barrett 2004, de Haan 1998, POTS 2004, and Freeman 2008 therapy was multimodal, manualised and had equivalent components including psycho-education, cognitive therapy and ERP. These studies were based on a similar protocol (March 1998) and included parental involvement (all sessions for Barrett 2004 and Freeman 2008; at least three sessions for POTS 2004 with additional parental involvement dictated by OCD symptom picture and developmental stage of child; number not specified for de Haan 1998). Barrett 2004 also included sibling involvement and randomised delivery of BT/CBT in an individual or group format. Asbahr 2005 delivered CBT in a group format, included 2 sessions of full parent involvement while parents were present for the last 15 minutes of all other sessions. In POTS 2004 BT/CBT was combined with sertraline in one group. In Williams ND treatment was based on a cognitive model of OCD and although not well described the treatment provided appears strongly cognitive but included instructions for behavioural experiments which could be regarded as ERP tasks Williams 2009.

Non BT/CBT comparison group

Four studies used a medication comparison group (clomipramine in de Haan 1998; fluvoxamine in Neziroglu 2000; sertraline in POTS 2004 and Asbahr 2005). POTS 2004 had a pill placebo control, Barrett 2004, Bolton 2008 and Williams ND had a wait-list control and Freeman 2008 a family-based relaxation treatment as a "psychological" placebo control. The medication administration was standardised, well described and met the recommended therapeutic guidelines. POTS 2004 reported median highest daily dosage of 150 mg, 200 mg and 200 mg for the combined group, sertraline alone and placebo groups respectively. de Haan 1998 reported the mean dosage of clomipramine as 2.5 mg/kg of body weight with a range of 1.4 to 3.3, while Neziroglu 2000 showed that all participants reached 200 mg per day before BT/CBT was added or not. In Asbahr 2005 participants had a mean daily dosage of 137.5mg and maximum of 200mg. All comparison groups were assessed at post-treatment, except in Barrett 2004 where outcomes for the control group was assessed after four to six weeks wait because of ethical concerns. The data provided for Asbahr 2005 (Asbahr 2009) is for 1 month after treatment for both groups.

Outcomes

Data at pre-treatment and post-treatment were reported in the studies for all the randomised groups. It was not possible to estimate the interval from baseline to posttreatment assessment as

none of the studies provided details of the average time between pre-treatment assessment and beginning treatment. Change scores were supplied in Freeman 2008 for the main outcome or could be estimated from the presented data for de Haan 1998 and Neziroglu 2000. Asbahr 2009 recently provided clarifying data for the Asbahr 2005 study with means and standard deviations for the main outcomes at nine monthly post treatment follow-ups. We calculated the mean pre treatment score for the group from the data provided by Asbahr 2009 and for any individual with a missing value at post treatment we substituted the pre-treatment mean for the group in order to compare the intention-to-treat outcomes for the BT/CBT and setraline groups at one month post treatment. Neziroglu 2000 and Asbahr 2005 reported follow-up data for both groups but none of the other studies provide follow-up data beyond post-treatment for the control group.

We planned to examine both change scores from prior treatment to post treatment assessment as well as group differences in post treatment and follow-up scores. However, as only one included study reported prior to post-treatment or prior to follow up change scores the focus of this review was post treatment scores in OCD clinical symptoms, which was available from all the included studies. Only one study reported follow-up data for all arms of the trial.

Primary outcomes

All of the studies reported data on the clinician rated CY-BOCS which had strong reliability and validity and is the gold standard of outcome assessment for OCD (Storch 2004). It assesses the frequency and intensity of obsession and compulsions as well as the amount of interference and degree of distress they produce. Neziroglu 2000, Barrett 2004 and Asbahr 2005 also reported data about OCD severity using the clinician rated single item NIMH-GOCS Insel 1983, Freeman 2008 reported also on the Clinical Global Impressions Severity and Improvement scales NIMH 1985 and Asbahr 2005 for the Clinical Global Impressions Severity scale and Children's Global Assessment Scale NIMH 1985. All studies except Williams ND and Asbahr 2005 reported data which allowed comparisons of rates of non remission from OCD at post-treatment.

Secondary outcomes

Barrett 2004, de Haan 1998, Asbahr 2005and Williams ND reported participants' self-reported post-treatment levels of depression. Barrett 2004, Asbahr 2005 and Williams ND used the Children's Depression Inventory Kovacs 1992, while de Haan 1998 used the Children's Depression Scale Reynolds 1989. de Haan 1998 also reported overall behaviour and emotional problems post-treatment. Barrett 2004 and Williams ND included post-treatment anxiety, and Barrett 2004 also provided data on family functioning.

A full description of each study is provided in the Characteristics of included studies table.

Excluded studies

Excluded trials, with reasons, are listed in the Characteristics of excluded studies table. Fifteen of the ineligible studies did not have a control group, four were case studies, four were case series and two failed to report data separately for the participants who were less than 18.

Risk of bias in included studies

See also table of included studies.

Selection bias

POTS 2004 reported on the method of randomisation and on allocation concealment, which were adequately done. de Haan 1998 clarified the method of randomisation and reported on allocation concealment, which appeared adequate (de Haan 2006). Bolton 2008 and Williams ND reported method of randomisation but did not specify method of allocation concealment. Neziroglu 2000, Barrett 2004, Asbahr 2005, and Freeman 2008 did not report on the method of randomisation or on allocation concealment. In Barrett 2004 the description of the process of block randomisation suggested quasi-randomisation.

de Haan 1998 , POTS 2004, Asbahr 2005, Bolton 2008 and Freeman 2008 checked for baseline comparability on all outcomes, demographics and co-morbidity. Barrett 2004 checked for comparability on age and co-morbidity but not on outcomes and made appropriate adjustment in the analysis for the between group age difference. Neziroglu 2000 and Williams ND did not check for comparability of groups prior to treatment.

Performance bias

Barrett 2004, de Haan 1998, POTS 2004, Bolton 2008 and Freeman 2008 described processes to enhance the fidelity of the delivered intervention with the manual by using supervision from experienced clinicians. Barrett 2004 and Freeman 2008 formally assessed protocol adherence by the therapists and found it to be good. Neziroglu 2000, Asbahr 2005, and Williams ND did not describe any fidelity or quality assurance processes.

It was not possible to blind participants and therapists in the BT/CBT treatment groups to the therapeutic nature of the intervention. For the pills only groups in POTS 2004 (sertraline, placebo) both participants and psychiatrists were blinded to group. There was no reported blinding of therapists or participants in any group in Asbahr 2005. There was no blinding in the BT/CBT combined with sertraline group in POTS 2004. de Haan 1998 and

Neziroglu 2000 did not report on blinding for their medication group.

Detection bias

It was not possible to have blinded outcome detection for participant self-report measures. For the CY-BOCS and other clinical rated instruments assessors were clearly blinded in POTS 2004, de Haan 1998, Asbahr 2005, Williams ND and Freeman 2008. Neziroglu 2000 and Bolton 2008 did not report on the status of assessors. Barrett 2004 described the assessors at initial assessment as blind to study hypotheses, but it was not clear if assessors at post-treatment for CY-BOCS were also blinded. Barrett 2004 used the ADIS-P based on parent report to assess diagnosis, because parents were involved in the intervention this assessment was not blinded. Barrett 2004 compared post treatment status on all measures assessed four to six weeks after initial assessment for the wait list control group and after 12 weeks for the BT/CBT treatment group. All other studies compared the groups after the same interval post assessment.

Attrition bias

POTS 2004, Bolton 2008, Freeman 2008 and Williams ND described flow of participants and reasons for attrition from all groups and performed intention-to-treat analyses using last observation carried forward. In POTS 2004 87% of participants completed the protocols while two participants dropped out from each of Bolton 2008, Freeman 2008 and Williams ND. Barrett 2004 and de Haan 1998 reported loss to follow up for the CY-BOCS of two and one case (s) respectively but did not use intention-to-treat analyses. There was no attrition at post-treatment in Neziroglu 2000. Asbahr 2005 provides a narrative account of the loss to follow-up of 3 from the CBT group and 7 from the medication group but intention-to-treat analysis is not undertaken in the paper.

Summary

The POTS 2004 study overall had a low risk of bias. de Haan 1998 included adequate concealment of allocation and randomisation methods and had a risk of bias arising from non-blinded assessors and exclusion of missing data in the analysis. Bolton 2008 and Williams ND reported on method of randomisation but not on allocation concealment and did not specify if assessors were blinded at post assessment. Freeman 2008 and Asbahr 2005 do not describe method of randomisation or concealment of allocation. Neziroglu 2000 failed to specify method of randomisation, allocation concealment and whether assessors were blinded. Barrett 2004 had a risk of bias arising from method of randomisation, failure to specify method of concealment of allocation, between group difference in timing of post treatment assessments, possible non-blinded post assessments of diagnosis and exclusion of missing data in the analysis. Asbahr 2005 excludes missing data from analysis and the published data does not provide unambiguous post treatment and follow-up data.

Effects of interventions

The eight studies described 12 comparisons between an intervention with a BT/CBT component and a comparison group without BT/CBT. One study included a comparison of BT/CBT combined with medication against BT/CBT alone. We reported the results of the comparisons which addressed the objectives of the review.

Four of these addressed the question: Is BT/CBT superior to no active treatment (wait-list, pill placebo)?

One addressed the question: Is BT/CBT superior to other non-pharmacological treatments (i.e., relaxation)?

Three addressed the question: Is BT/CBT superior to medication, specifically clomipramine and sertraline?

One addressed the question: Is BT/CBT combined with medication superior to no treatment (pill placebo)?

Two addressed the question: Is BT/CBT combined with medication superior to medication alone?

One addressed the question: Is BT/CBT combined with medication against BT/CBT alone?

There were no data from included studies which addressed these questions of interest: Is BT/CBT with ERP superior to BT/CBT without ERP? Is BT/CBT with cognitive training superior to BT/CBT without cognitive training?

As all of the selected studies reported outcomes for the CY-BOCS score at post-treatment we reported the results for CY-BOCS and for the binary outcome of number of participants with OCD at post-treatment. We then report results for additional measures of OCD severity and then for the secondary outcomes.

(1) Comparison 1: BT/CBT versus wait list or placebo

(1.1) Primary outcome: CY-BOCS

There were six comparisons (Barrett 2004 (2), Bolton 2008, Freeman 2008, POTS 2004, Williams ND,) which tested the efficacy of BT/CBT in reducing the severity of OCD (using the CY-BOCS) against a control considered non effective for OCD. Four of these were against a wait-list group (Barrett 2004(2), Bolton 2008, Williams ND); one against a pill placebo group (POTS 2004), and one against a psychological placebo (family relaxation training) (Freeman 2008). There was marked statistical heterogeneity (chi ^{2} = 35.18;df = 5; p < .00001; I^2 = 86%) and potential between study differences arising from design and interventions differences. We used random-effects modeling to estimate pooled effects for the BT/CBT versus wait-list and BT/CBT versus placebo control studies separately. Against a wait-list, the WMD

in favour of individual BT/CBT was -10.71 (95% CI -17.04 to -4.38, P = 0.009) (Barrett 2004, Bolton 2008,Williams ND) while against a placebo control it was -5.24 (95% CI -9.98 to -0.50, P = 0.03) (Freeman 2008, POTS 2004). The only trial to compare BT/CBT to a psychological placebo control group (family-based relaxation) Freeman 2008, however, found mean difference for BT/CBT on post CY-BOCS scores (WMD = - 2.65, 95% CI -7.41 to 2.11, P = 0.27) and for change in CY-BOCS score (WMD = -3.99, 95% CI -8.40 to 0.42, P = 0.08)) which do not confidently rule out an effect in favour of the family relaxation group. Barrett 2004 found a marked effect for group BT/CBT compared to a wait-list group (WMD = -15.76 (95% CI -18.90 to -12.62,P < 0.00001).

(1.2) Primary outcome: Number of participants who remained disordered at post-treatment

POTS 2004 used a cut off of more than 10 on the CY-BOCS to classify participants as still having OCD, Freeman 2008 used greater than 12 and Bolton 2008 used the CY-BOCS to classify but did not fully specify the cut-off score while Barrett 2004 used the ADIS-P diagnosis. Because there was only 2 studies in each of the subgroups which compared BT/CBT to a waitlist and BT/CBTcompared to a placebo control and because of the varying direction of the outcomes we did not pool the data. Barrett 2004 found that participants who received individual BT/CBT (n = 24) were less likely than those on the wait-list (n = 24) to have OCD at post-treatment (RR = 0.14, 95% CI 0.05 to 0.38, P < 0.0001) while Bolton 2008 found no evidence within a 95% CI that the risk of continuing to have OCD at post-treatment was different for those who received BT/CBT compared to those in the wait list group (RR = 0.62 05% CI 0.37 to 1.03, P = 0.06). The two studies with a placebo control also report different outcomes. POTS 2004 found a reduced risk of having OCD at post treatment for BT/CBT participants compared to pill placebo controls (RR = 0.63, 95% CI 0.46 to 0.86, P =0.003) while Freeman 2008 found no evidence within a 95% CI of a difference in risk of having OCD at post-treatment between the BT/CBT and family relaxation placebo groups (RR = 0.63, 95% CI 0.39 to 1.00, P =0.05). In Barrett 2004, those who received group BT/CBT (n = 29) were less likely than those on the wait-list (n = 24) to have OCD post treatment (RR = 0.24, 95% CI 0.13 to 0.46, P < 0.0001).

(2) Comparison 2: BT/CBT versus medication alone

(2.1) CY-BOCS

Three comparisons (de Haan 1998, POTS 2004, Asbahr 2005) tested the relative efficacy of BT/CBT alone against medication (clomipramine, sertraline). Because the data provided for Asbahr 2005 (Asbahr 2009) is one month post treatment rather than immediately after treatment and as mean substitution (i.e., we calculated the mean pre treatment score for the group from the data provided by Asbahr 2009 and for any individual with a missing value at post treatment we substituted the pre-treatment mean for the group) was used for the intention-to-treat analysis rather than LOCF we present the pooled estimate excluding Asbahr 2005. In addition, Asbahr 2005 used group BT/CBT. For the 2 individual BT/CBT studies de Haan 1998, POTS 2004 random-effects models were used and pooling of estimates was undertaken because of moderate heterogeneity (I^2 = 25.0%) The pooled weighted mean difference showed no evidence of a difference between the two treatments (weighted mean difference (WMD = -4.28 (95% CI -9.65 to 1.09, P =0.12). Neither study found a difference in post-treatment CY-BOCS between BT/CBT versus clomipramine (de Haan 1998) WMD = -8.50 (95% CI -17.44 to 0.44, P = 0.06); or POTS 2004 BT/CBT versus sertraline WMD = -2.50 (95% CI -7.37 to 2.37, P = 0.31). The results from Asbahr 2005 also showed no evidence of a difference between group BT/CBT and sertraline (WMD = -2.45 (95% CI -7.68 to 2.78, P = 0.36).

(2.2) Number of participants who remained disordered at post-treatment

To allow comparability we classified de Haan 1998 participants into those continuing to have OCD at post-treatment using POTS 2004 criteria (CY-BOCS more than 10). The pooled data indicated that there is no evidence of a difference in the proportion of participants continuing to have OCD at post-treatment for BT/CBT and medication (RR = 0.76 95% CI 0.55 to 1.05, P = 0.10). There is no data from Asbahr 2005 available for this outcome.

(3) Comparison 3: BT/CBT combined with medication

(3.1) CY-BOCS

POTS 2004 post-treatment data showed a superior effect of BT/CBT combined with medication relative to placebo (WMD = -10.30, 95% CI -14.06 to -6.54, P < 0.00001). Neziroglu 2000 and POTS 2004 compared BT/CBT combined with medication relative to medication alone. Outcomes on the CY-BOCS at the two post-treatment points (43 and 52 weeks) were averaged in Neziroglu 2000. The pooled weighted mean difference in favour of the combined treatment was -4.55 (95% CI -7.40 to -1.70, P = 0.002) with both studies reporting a superior effect for BT/CBT combined with medication relative to medication alone. POTS 2004 also compared BT/CBT combined with sertraline with BT/CBT alone and examination of unadjusted CY-BOCS

scores at post-treatment showed no evidence of a difference between these treatments (WMD = -2.80, 95% CI -7.55 to 1.95, P = 0.25).

(3.2) Number of participants who remained disordered at post-treatment

We classified Neziroglu 2000 participants into those who continued to have OCD at post-treatment using POTS 2004 criteria (CY-BOCS more than 10). As all participants in both groups scored above 10 the relative risk could not be estimated. In POTS 2004 participants in the BT/CBT combined with medication group (n = 28) were significantly less likely to continue to have OCD at post-treatment compared to the medication alone group (n = 28) (RR = 0.59, 95% CI 0.38 to 0.92, P = 0.02) and the pill placebo group (n = 28) (RR = 0.48, 95% CI 0.32 to 0.72, P = 0.0004). There was no evidence that the relative risk of participants continued to have OCD in the BT/CBT combined with medication group (n = 28) was different from that of the BT/CBT alone group (n = 28) (RR = 0.76, 95% CI 0.47 to 1.26, P = 0.29).

(4) Other primary outcomes

Barrett 2004 compared the group and individual BT/CBT to their wait-list control group on the NIMHGOCS measure. Both BT/CBT groups were superior to the wait-list group with a weighted mean difference of -5.50, 95% CI -6.74 to -4.28, P < 0.00001 in favour of individual BT/CBT and of -5.69, 95% CI -6.87 to -4.51, P < 0.00001 in favour of group BT/CBT. Neziroglu 2000 also used the NIMHGOCS in their comparison of BT/CBT combined with fluvoxamine and fluvoxamine alone and found no evidence of a superiority for the combined treatment (WMD = -0.20, 95% CI -2.31 to1.91, P = 0.85). Asbahr 2005 found no evidence that group CBT was different from sertraline on post-treatment NIMHGOCS scores (WMD = -0.91 (95% CI -2.78 to 0.96, P = 0.34).

Neziroglu 2000 found that post-treatment clinician rating of OCD severity and degree of improvement (CGI-S; CGI-I) was superior for the combined group compared to the medication group (WMD = 0.70, CI 95% 0.25 to 1.15, P = 0.002 for severity; WMD = 0.7, CI 95% 0.06 to 1.34, P = 0.03 for improvement). Freeman 2008 also reported outcomes for the CGI-I and found no evidence that BT/CBT and family relaxation produced different post treatment effects in terms of improvement on the CGI (WMD = -0.39, 95% CI -1.07 to 0.29, P = 0.26).

(5) Secondary outcomes

(5.1) Self-reported depression at post-treatment

Five comparisons in four studies examined self-reported levels of depression at post-treatment. Barrett 2004, Asbahr 2005 and Williams ND used the Children's Depression Inventory, while de Haan 1998 used the Children's Depression Scale. There was no evidence of an effect of individual BT/CBT on depression relative to a wait-list control Barrett 2004 (WMD = -1.81 95% Ci -5.73 to 2.11, P = 0.37) and Williams ND (WMD = 0.12 95% CI -7.57 to 7.81, P = 0.98) or relative to medication (de Haan 1998 WMD = -14.00 95% Ci -51.12 to 23.12, P = 0.46). Participants in the group BT/CBT treatment group in Barrett 2004 had lower post-treatment levels of depression relative to a wait-list control (WMD -4.72 95% Ci -8.21 to -1.23, P = 0.008) while there was no evidence that group CBT in Asbahr 2005 was different to sertraline in post-treatment depression score (WMD = 1.02 95% CI -3.71 to 5.75, P = 0.67).

(5.2)

There were no differences between BT/CBT and the control group for any of the other secondary outcomes measured, except for anxiety symptoms in the group BT/CBT in Barrett 2004. Levels of anxiety at post-treatment relative to the wait-list group was significantly lower for the group BT/CBT group (WMD = -10.38, 95% CI -19.96 to -0.80, P = 0.03) but there was no evidence of a similiar effect on anxiety for the individual BT/CBT group Barrett 2004 (WMD = 0.90, 95% CI -7.90 to 9.70, P = 0.84) or Williams ND . (WMD = -5.63 95% CI -24.69 to 13.43, P = 0.56).There were no data available to examine adverse effects, quality of life (family and school functioning), or acceptability of treatment.

(5.3) Drop-out rates

Two of the reviewed studies reported refusal and drop-out rates (de Haan 1998, POTS 2004). In de Haan 1998 four out of the 27 participants (14.8%) refused and one out of 12 (8.3%) in the BT/CBT treatment group dropped out. POTS 2004, 10 out of the 122 participants (8.1%) refused and 6 out of 56 (10.7%) in BT/CBT treatment groups dropped out.

(6) Subgroup analyses

There was not sufficient data available to examine age of onset differences in responsiveness to BT/CBT.

DISCUSSION

Overall, the main findings of this updated review (2010) remain consistent with the earlier version O'Kearney 2006 ; that is, that the evidence reviewed continues to support BT/CBT as a potentially effective treatment option for paediatric OCD. We found no evidence that BT/CBT and medication alone differ in their benefits in reducing the severity of OCD symptoms or in preventing participants from continuing with OCD at post-treatment. Data

from two studies indicate that combining BT/CBT with medication produces better outcomes than medication alone. Despite the addition of four new studies to this update, the size and quality of included studies together with the variability in study protocols mean that the absolute and relative strength of the benefits associated with BT/CBT remain open to question.

Our review now identified eight RCTs (twelve comparisons) with 343 participants. Four of those comparisons tested the efficicacy of BT/CBT relative to non treated controls (Barrett 2004 (2 comparisons),Bolton 2008, Williams ND) and two against a placebo control (Freeman 2008 POTS 2004). Their results suggest that BT/CBT reduces severity of OCD by about 11 points on the CY-BOCS when compared to a wait-list control and by about 5 points on the CY-BOCS when compared to groups receiving a pill or psychological placebo. Three comparisions (Barrett 2004 (2); POTS 2004) reported that BT/CBT reduced the risk of children and young people continuing to have OCD at post-treatment relative to the control group whilst two other studies (Bolton 2008; Freeman 2008) found no evidence that the proportion of participants with OCD at post treatment differed between BT/CBT and the control. It is noteworthy that the one study using a psychological placebo control (family-based relaxation; Freeman 2008) did not find an advantage for BT/CBT in post treatment symptom severity, continuing to have OCD at post treatment, or in change in symptom severity or global impression of improvement using intention-to-treat data. The authors (Freeman 2008) note, however, that participants who completed the CBT treatment showed greater improvement at post treatment than those who completed the family relaxation treatment.

The review also provides some additional data relevant to clinical questions concerning the choice between BT/CBT and medication alone for paediatric OCD. While there are many considerations for clinicians in advising their patients about this choice, one of these considerations is evidence about their relative efficacy. Inconclusive evidence about this now comes from three RCTs (Asbahr 2005, de Haan 1998, POTS 2004). Separately the effect sizes from the three studies do not provide evidence of a difference between the two treatments in terms of symptom severity on the CY-BOCS and risk of continuing with OCD; nor does combining data from the two comparable studies indicate a difference between the two treatments. Whilst the trials do show trends in favour of BT/CBT, they are few and sample sizes are small. Clearly any decision to begin treatment for paediatric OCD with medication alone before a trial of BT/CBT would depend on a number of important issues such as patient preference, the availability of skilled CBT practitioners, cost to patients and the patient's treatment history. The impact of co-morbidities and the severity of the OCD will also be important factors although there is still little evidence from RCTs currently available on how to include these factors in decision making.

The evidence from this review continues to provide cautious support for the claimed advantage of BT/CBT combined with medication both when compared to a placebo POTS 2004 and medication alone Neziroglu 2000; POTS 2004. However, the utility of the advice relative to BT/CBT alone is less compelling. While favouring combined treatment over BT/CBT alone, the confidence interval around this estimate from one RCT (POTS 2004) does not exclude the possibility of the more benefits of BT/CBT alone over the combined treatment. Despite these findings from the high quality POTS 2004 study the relative benefits of combining CBT with medication need to demonstrated in additional studies.

The BT/CBT interventions reviewed here are similar, with five of the eight studies using treatments derived from a standard protocol for the BT/CBT treatment of OCD in children and adolescents. While the protocol and manuals are readily available (March 1998), training and supervision in its delivery are less accessible. ERP was a part of all the BT/CBT interventions reviewed, but there was no evidence regarding the relative benefits of the various BT/CBT treatment components. Two studies (Bolton 2008, Neziroglu 2000) used ERP only with no cognitive components or family involvement. The intensity of BT/CBT treatment varied between 8.8 to 30 hours, but the 14 hours of therapy found to be effective in th ehighest quality study POTS 2004 represents a feasible and reasonable outlay of personnel time in most public and private clinical settings. The inclusion of parents in the treatment may also be an important consideration in the application of the findings for some patients and settings.

All the participants were diagnosed with OCD using standard clinical assessment practices, either a clinical or semi-structured clinical interview. In assessing the relevance of the results the exclusion of participants with some common co-morbidities (particularly major depressive disorder and Tourette's syndrome) needed to be considered. POTS 2004 and Freeman 2008 included children who had comorbid attention deficit hyperactivity disorder (ADHD) who were stabilised on medication. These co-morbidities may affect compliance and/or responsiveness to ERP in adults and similar difficulties may have been evident for children and adolescents. Only Neziroglu 2000 considered difficult to treat participants with OCD, while Asbahr 2005 and POTS 2004 excluded participants who had any earlier treatment or treatment failures.

Adverse effects

None of the studies report adverse events. Nevertheless, there are possible adverse outcomes of BT/CBT such as the immediate impact on relationships within the family which need to be considered when advising on treatment choices. One of the suggested disadvantages of BT/CBT is a high rate of treatment refusal and drop-out. However, the refusal rates (8.1% - 14.8%) and drop-out rates (8.3% - 10.7%) from two studies (de Haan 1998, POTS

2004) suggest that BT/CBT may have been an acceptable approach to the participants in these studies.

AUTHORS' CONCLUSIONS

Implications for practice

The evidence from this systematic review supports behaviour therapy/cognitive-behaviour therapy as an effective treatment for OCD in children and adolescents. Findings from the review suggest that BT/CBT alone reduces the severity of OCD sysptoms and that it is at least as effective as medication alone. There is some, albeit, limited evidence that BT/CBT, when combined with medication, may result in greater reduction in OCD symptoms relative to what can be achieved with medication alone. The evidence from this review shows that when available BT/CBT allows clinicians to effect improvement for patients when psychological treatment is the preferred treatment. In addition, adding BT/CBT may provide clinicians with the opportunity to improve treatment outcomes for patients who will accept a trial of medication when appropriate. There is still insufficient evidence to be able to specify the preferred sequence of treatments for paediatric OCD.

Implications for research

Our review suggests that the priority for research in BT/CBT for paediatric OCD would be a well conducted replication of the comparisons in the high quality POTS 2004 study. This would strengthen the claims regarding the usefulness of BT/CBT and increase the precision of the estimates of the magnitude of its benefits. In addition, a replication would help clarify questions about the relative efficacy of BT/CBT against medication and when combined with medication. There are a number of ongoing studies addressing these questions. Further research evaluating relative efficacy, cost-effectiveness and suitability to various patients groups is warranted. The age range of participants in most studies to date is developmentally wide although the CBT treatment protocols are similar. It would be valuable for future work to evaluate the role of age of onset, and age of treatment in predicting treatment response in BT/CBT. Future research should also extend the range of outcomes to include sound patient measures of the impact of the OCD on the child's or youth's life functioning in their family, interpersonal relationships, school, and work roles and should also pay more attention to possible adverse outcomes. An equally important area of research arising from the results would be an examination of how well BT/CBT could be disseminated and implemented in non-specialist centres or non-academic settings, as often the main limitation to offering BT/CBT is availability of skilled therapists.

Implications for policy

There are clear implications for health service managers and policy makers. Service planning for the treatment of paediatric OCD should consider the development of workforce skills to make BT/CBT more readily available as a treatment option. It would be disappointing to consumers and health service managers if a treatment which can optimise outcomes for patients preferring psychological treatment or medication, and which has a well documented and standardised protocol, was not accessible for suitable patients.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Asbahr 2005

Methods	Selection bias: Random assignment but method not specified Allocation concealment not specified No baseline differences between groups on outcomes or other characteristics (age, gender, age of onset, duration of symptoms) Performance bias: Medication only treatment group - Clinicians and participants not blinded Detection bias: CY-BOCS, NIMHGOCS, CGI - assessors blinded to intervention status Attrition: Flow of participants is not well described and there is significant attrition of participants from medication group Intention to treat analysis is not carried out Available comparison: BT/CBT group versus medication
Participants	Source: Recruited as part of community awareness campaign Inclusion criteria: DSM-IV diagnosis of OCD of at least 6 months duration and score >= 7 on NIMHGOCS Exclusion criteria: No current or previous drug or CBT treatment for OCD, Primary diagnosis of Major depressive disorder, Bipolar disorder, ADHD, neurological disorder other than Tourette's, pervasive developmental disorder, psychosis, PTSD, borderline personality disorder or any organic brain disorder Reduction of 25% on CYBOCS or 2 points on NIMHGOCS between first evaluation and beginning treatment Total assessed for eligibility = not specified Total excluded = not specified Total allocated = 40 Age range: 9 to 17 Mean (SD) Age Total sample 11.7 (2.7) GroupCBT 13.7 (2.3) Sertraline 12.4 (2.8) Gender 26 boys 14 girls
Interventions	Group BT/CBT: Group administered 12 x 1.5 hour sessions of manualised treatment over 12 weeks; 6 and 7 per group Components included: 1) psycho education, cognitive therapy in sessions 1 to 3; 2) graded ERP in sessions 4 to 11; 3) family involvement session 7 & 12 Parents attended last 15 minutes of each session. 2 experienced therapists (1 psychiatrist; 1 clinical psychologist) Medication: Total 12 weeks of sertraline Begun at 25 mg/d per day and then titration every 4 days up to 200mg/d or tolerable level below 200mg The mean (sd) highest daily dosages = 137.5 (57.1) mg Fidelity:

Asbahr 2005 (*Continued*)

	Not reported
Outcomes	Specific OCD symptom measures (pre- and post-intervention): CY-BOCS National Institute on Mental Health Global Obsessive-Compulsive Scale (NIMHGOCS) Other measures: Clinical Global Assessment Scale; Multidimensional Anxiety Scale; Child Depression Inventory Number and type of adverse events for pill groups is specified
Notes	

Barrett 2004

Methods	Selection bias: Block randomised - method not stated Suggested quasi-randomisation - if three or more children in same age group were referred in a 2-week period they were allocated into the group CBT arm of the study Concealment of allocation unclear No baseline differences between groups on age and comorbidity Baseline differences between groups on outcome measures not reported Performance bias: Participants and clinicians not blinded to intervention type Detection bias: ADIS- P and CY-BOCS - assessors were blinded to the hypotheses of the study Diagnosis assessment post-treatment - assessors not blinded to group due to usage of parent report Other measures - participant self-report Attrition: Variable lost of pre and post assessment data due to different rates of return of self-report measures Individual CBT group - 2 had no post treatment CY-BOCS data Analyses did not use intention to treat for these missing data Available comparison: BT/CBT (individual and group) versus wait list*.
Participants	Source: General practitioners and mental health services Number from each not stated Inclusion criteria: DSM-IV diagnosis of OCD established by Anxiety Disorder Interview Schedule - Parent version administered by graduate students in clinical psychology Interrater reliability of diagnosis (k = 1) for 25% of videotaped ADIS-P interviews Normal IQ One parent willing to attend sessions Exclusion criteria: Primary diagnosis of another anxiety disorder, primary externalising disorder, psychotic disorder, Tourette's, autism, organic mental disorder, mental retardation or major depressive disorder Participants receiving medication for OCD were required to remain on same medication for 3 months and maintain this during course of trial Total assessed for eligibility = not reported

Barrett 2004 (*Continued*)

	Total excluded = not reported Total allocated = 77 Age range 10.00 to 13.56 Mean (SD)Age: Individual CBT 10.75 (2.54) Group CBT 12.90 (2.30) Wait list 11.75 (3.05) Gender 38 boys 39 girls 17 participants using OCD medication (not specified)3 ICBT; 9 GCBT; 5 Wait list
Interventions	BT/CBT: Individual and group administered 14 x 1.5 hour weekly sessions of manualised treatment Components included: 1) psycho education, anxiety management, cognitive therapy; 2) ERP; and 3) resiliency building and relapse prevention Two booster sessions delivered at 1 and 3 months after end of 14 weekly sessions Parents included in all sessions and siblings in 5 sessions Therapist were graduate students- number of therapists is not reported Wait list: No treatment for 4 to 6 weeks after assessment Fidelity: Videotapes of all sessions were checked for therapist adherence to the treatment protocol with 89% concordance
Outcomes	Specific OCD symptom measures: Clinician rated ADIS-P for diagnosis National Institute on Mental Health Global Obsessive-compulsive Scale (NIMHGOCS) CY-BOCS General psychological distress and symptoms measured by self-report: Multidimensional Anxiety Scale for Children (MASC) Children's Depression Inventory (CDI) Family functioning (McMaster Family Assessment Device) Parent psychopathology (Depression Anxiety Stress Scale) Sibling accommodation to OCD (Sibling Accommodation Scale) All measures used at pre-, post-treatment and 3 and 6 months follow-up NIMHGOCS, MASC and CDI also used at pre, week 6, week 11 and post
Notes	*BT/CBT comparisons with wait list compare post treatment scores (i.e. at 14 weeks) for interventions groups with post wait scores (i.e. at 4 to 6 weeks) for wait list group

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Bolton 2008

Methods	Selection bias: RCT - randomisation using random numbers table Concealment of allocation adequate No significant differences between groups at baseline on age, gender, comorbidity and CYBOCS Performance bias: Participants and clinicians not blinded to intervention type Detection bias: CY-BOCS - unclear if assessors blinded to intervention type Other measures - Participant self-report Attrition: BT/CBT group - 2 participant dropped-out of BT/CBT; none from waiting list Available comparison: BT/CBT versus wait-list
Participants	Source: Specialist clinics for OCD and anxiety Inclusion criteria: DSM-IV diagnosis of OCD using ADIS-C/P; child form for adolescents; child and parent form otherwise Exclusion criteria: not on medication; autism spectrum disorders; IQ>70; no other disorder requiring more urgent attention; able to attend several times over 4-7weeks. Total assessed for eligibility = 26 Total excluded = 6 (3 did not meet diagnostic criteria; 3 on medication) Total allocated = 20 Age Range 8 years 10 months - 17 years 9 months Mean (SD) Age BT 13.0 (2.33) 4/10 female wait-list.13.4 (2.4) 2/10 female
Interventions	BT/CBT up to12 session individually delivered 1-2 sessions of assessment; up to 10 sessions of E/RP weekly sessions over 7 weeks; 1-3 times weekly; 1 - 1.5 hr duration no parent involvement; excluded cognitive techniques; excluded psychoeducation; excluded anxiety management
Outcomes	Specific OCD symptom measure Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) self report Children's obsessional compulsive inventory - no data for control group Clinical remission on CYBOCS (cut off not specified)
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

de Haan 1998

Methods	Selection bias: RCT - randomisation using random numbers table Concealment of allocation adequate No significant differences between groups at baseline on demographics, comorbidity and outcome measures Performance bias: Participants and clinicians not blinded to intervention type Detection bias: CY-BOCS - Investigators and participants not blinded Unclear for assessors Other measures - Participant self-report Attrition: BT/CBT group - one participant dropped-out post randomisation and not included in analysis Clomipramine group - none Available comparison: BT/CBT versus medication
Participants	Source: General practitioners and mental health services Numbers from each not mentioned Inclusion criteria: DSM-IIIR diagnosis of OCD of at least 6 months by clinical interview Exclusion criteria: Co-morbid organic mental disorder; psychotic disorder, Tourette's, autism, mental retardation, major depressive disorder Treatment with BT/CBT or SRI in previous 6 months Total assessed for eligibility = 32 Total excluded = 9 (4 co-morbid Tourette's; 4 refused to participate; 1 admitted to hospital; 1 left country*) Total allocated = 23 Age Range 9 - 18 years 2 months Mean (SD) Age BT 13.3 (2.9) Clom.14.4 (3.9) Mean (SD) Age of onset BT 9.8 (3.3) Clom12 (2.6) Mean (SD) duration of OCD BT 3.1 (3.2) Clom 1.9 (1.1)
Interventions	BT/CBT group: Individually delivered manualised treatment 12 weekly sessions with ERP, cognitive elements for older children and parent sessions Clomipramine: Total of 12 weeks 25 mg for the first week After first week, titrated every 4 days to maximum of 3 mg/kg of weight/day or 200 mg/day Target dosage achieved in 3 or 4 weeks Fidelity: BT/CBT - 4 therapists (2 behaviour therapists; 2 trainee child psychiatrists)delivered the BT/CBT; Fidelity to manual checked verbally in weekly supervision Clomipramine - administered by 2 psychiatrists and 2 trainee psychiatrists; Mean dosage 2.5mg/kg of weight/day; Ideal dosage not obtained in some children (number not reported)

de Haan 1998 (*Continued*)

Outcomes	Specific OCD symptom measure (pre- and post-intervention): Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) Leyton Obsessional Inventory-Child Version (LOI-CV) Responders/non responders: Cutoff of 30% improvement in CY-BOCS from pre- to post-treatment General psychological distress and symptoms measures: Children's Depression Scale (CDS) and Achenbach Child Behavior Checklist - parent form Number and types of adverse events for clomipramine specified
Notes	* It is not stated whether these exclusion occurred after randomisation

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Freeman 2008

Methods	Selection bias: Blocked randomised - method of randomisation not stated Allocation concealment not clear No baseline differences between groups on outcomes or child or parent psychopathology measures Performance bias: Participants and clinicians not blinded to intervention type Detection bias: Assessors blinded to intervention status on all clinician rated measures Attrition: Flow of participants is well described and attrition of participants from each group in accounted for Intention to treat analysis is carried out Available comparison: BT/CBT versus Family-based relaxation training (attention placebo)
Participants	Source: Pediatricians,social workers, psychologists and parents via media announcements Number from each not stated Inclusion criteria:Initial telephone and face-to-face screening DSM-IV diagnosis based on K-SADS-PL; OCD symptom duration > 3 months; age 5-8 Participants stably medicated with an OCD or ADHD medication for 6 weeks prior to evaluation were eligible Evaluators trained to > = 80% reliability on clinician rated measures Exclusion criteria: Primary diagnosis not OCD or co-morbid diagnosis required initiation of active treatment, treated with anti-depressants for a depressive disorder, pervasive developmental disorder including Asperger's, mental retardation; psychosis;conduct disorder; acute suicidality, PANDAS subtype of OCD/tics Current psychotherapy or behavioural parent training 1 previous failed adequate trial of CBT Total screened for initial eligibility by phone = 211 Total excluded = 102 (reasons not reported but presume

Freeman 2008 (*Continued*)

	no OCD symptoms) Total assessed for inclusion = 109 Total excluded = 67 (57 ineligible; 4 needed more intensive treatment; 4 could not make appointments; 2 refused research) Total allocated = 42 Age range: 4 to 8 (1 participant turned 5 during study) Mean (SD) Age Total sample 7.11 (1.26) Gender 18 boys 24 girls
Interventions	Family-based BT/CBT: Family administered 12 sessions of manualised treatment over 14 weeks (first 10 sessions weekly last 2 biweekly). First 2 session with parents only, remaining 10 sessions with parents and children Components included: 1) psycho education, 2) parent tools - differential attention; 3) modelling and scaffolding; child tools - EX/RP Family- based Relaxation training - same timetable for delivery Components - 1) education about emotions; 2) relaxation training (PMR; guided imagery); 3) rewards to encourage practice. All therapists experienced with behaviour therapy with anxiety disorder; relaxation training and family - based treatments. Fidelity: 15% of session videotaped and assessed for adherence. For CBT 92% (33) were rated as adherent; 5% (2) missed one component; and 3% (1) was rated as non-adherent. For relaxation training 100% (33) were rated as adherent
Outcomes	Specific OCD symptom measures: CY-BOCS Clinical Global Impressions - severity and improvement scale (CGI-S; CGI-I) Clinical remission: CY-BOCS cut off of < or = 12 other baseline measures not reported as outcomes
Notes	

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B-unclear

Neziroglu 2000

Methods	Selection bias: RCT - method of randomisation not stated Concealment of allocation unclear 7/10 patients had no co-morbidity Fluvoxamine with BT/CBT group mean CY-BOCS scores at baseline = 28.0 (SD 6.20); Fluvoxamine alone group mean CY-BOCS scores at baseline = 22.8 (SD 4.21); Not statistically significant (t = 1.55, p = .159) due to small numbers Performance bias: Participants and researchers not blinded to intervention type Detection bias: Not stated whether assessors on CY-BOCS and other clinician rated measures were blind to allocation Attrition: Fluvoxamine plus BT/CBT group - none Fluoxamine alone group - 2 lost to follow-up 2 years post-treatment Data presented as individual patient data and no between group statistical analyses preformed Available comparison: Combined BT/CBT medication versus medication alone
Participants	Source: Not stated Inclusion criteria: DSM-IV diagnosis of OCD by clinical interview independently by 2 clinicians with 100% agreement Previous failure to comply with behaviour therapy for a minimum of 10 sessions Exclusion criteria: Not stated Total assessed for eligibility = not stated Total excluded = not stated Total allocated = 10 Age Range 10 - 17 Mean (SD) Age Overall 14.5 (2.4) Mean (SD) Age of onset Overall 9.9 (11.7) sic
Interventions	Fluvoxamine plus BT/CBT group: Fluvoxamine alone for 10 weeks After 10 weeks, individually delivered exposure with response prevention for 90 minutes weekly for 20 sessions All participants completed 20 sessions of ERP within 33 weeks, i.e., by week 43 Fluvoxamine alone: 52 weeks of medication administered at 50 mg/day over the first month to maximal dose of 200 mg/day All participants reached maximal dose by 10 weeks and continued at 200 mg/day until week 52 Fidelity: No fidelity check of BT described
Outcomes	Specific OCD symptom: Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) National Institute on Mental Health Global Obsessive-compulsive Scale (NIMHGOCS) The Clinical Global Impressions Severity and Improvement Scales (CGI-S; CGI-I) All measures used at pre-intervention, 10 weeks (beginning BT), 43 weeks (end of BT) and post-intervention (52 weeks)

Neziroglu 2000 (*Continued*)

Notes		
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

POTS 2004

Methods	Selection bias: RCT using a computer generated randomised permuted blocking procedure with masking Allocation concealment adequate No baseline differences between groups Selection bias statistically tested with no evidence of bias Performance bias: Pills only - Clinicians and participants were blinded CBT and combined CBT plus medication - Clinicians and participants not blinded Detection bias: ADIS-C, CY-BOCS, NIMHGOCS - assessors blinded to treatment status Attrition: Flow of participants is well described and attrition of participants from each group in accounted for Intention to treat analysis is carried out Available comparisons: BT/CBT versus placebo BT/CBT versus medication Combined BT/CBT medication versus placebo Combined BT/CBT medication versus BT/CBT alone Combined BT/CBT medication versus medication alone
Participants	Source: General practitioners and mental health clinicians and via media announcements Number from each not stated Inclusion criteria: DSM-IV diagnosis based on ADIS-C, CY-BOCS > 16, NIMHGOCS score > 7; FSIQ > 80 OCD medication free prior to start of study Patients with ADHD who had been stably medicated with a psychostimulant for 3 months were eligible Interrater reliability of baseline diagnosis and severity of OCD was established for 20% of interviews for ADIS-C (k = .875) and CY-BOCS (r = .81) Exclusion criteria: Primary diagnosis of Tourette's, Major depressive disorder, Bipolar disorder, pervasive developmental disorder, psychosis 2 previous failed SSRI trials Documented intolerance to sertraline 1 previous failed trial of CBT Previous successful treatment with medication or CBT Pregnancy Total assessed for eligibility = 154.

POTS 2004 (*Continued*)

	Total excluded = 42 (31 ineligible; 10 refused to participate; 1 asymptomatic at baseline) Total allocated = 112 Age range: 7 to 17 Mean (SD) Age Total sample 11.7 (2.7) CBT 11.4 (2.8) Sertraline 11.7 (2.4) Combined 11.7 (2.8) Placebo 12.3 (3.0) Gender 56 boys 56 girls
Interventions	BT/CBT: Individual administered 14 x 1 hour sessions of manualised treatment over 12 weeks (2 sessions per week in first 2 weeks) Components included: 1) psycho education, anxiety management, cognitive therapy in sessions 1 to 4; 2) ERP in sessions 5 to 12; and 3) generalisation training and relapse prevention in sessions 13 and 14 Experience of therapists not specified Medication: Total 12 weeks of sertraline Titration from 25 mg/d to 200mg/d over 6 weeks Followed by adjustment for adverse effects only during 9 x 30 minute visits (first visit 45 minutes) The mean (sd) highest daily dosages = 133 (64) mg (combined); 170 (33) mg (Sertraline)and 176 (40) mg (Placebo) Each patient treated by the same child psychiatrist throughout Fidelity: Regular and ad hoc supervision of CBT therapists and medication clinicians There was also cross centre quality assurance procedures in place
Outcomes	Specific OCD symptom measures (pre- and post-intervention): Clinician rated ADIS-C for diagnoses Clinical Global Impressions Scale National Institute on Mental Health Global Obsessive-Compulsive Scale (NIMHGOCS) CY-BOCS Clinical remission: CY-BOCS cut off of < or = 10 Number and type of adverse events for pill groups is specified
Notes	

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Williams ND

Methods	Selection bias: RCT using a predetermined random number schedule Allocation concealment unclear Baseline differences between groups not specified Performance bias: Clinicians and participants were blinded Detection bias: ADIS-C, CY-BOCS - assessors blinded to intervention status Attrition: Intention to treat analysis is carried out Available comparison: BT/CBT versus wait list
Participants	Source: Family doctors or Child and Aolescent Menal Health teams Number from each not stated Inclusion criteria: DSM-IV diagnosis based on ADIS-C Exclusion criteria: No exclusion criteria stated Total assessed for eligibility = 22. Total excluded = 1 (1 ineligible) Total allocated = 21 2 drop outs 1 from each group Age range: 9 to 18 Mean (SD) Age Total sample 13.7 (sd not reported) Gender 13 boys 8 girls
Interventions	BT/CBT: Individual administered 12 x 1 hour sessions of treatment over 12 weeks (2 sessions per week in first 2 weeks) Components not described but emphaises on changing distorted cognitions but included behavioural experiements to challenge predictions. Experience of therapists not specified. no adherence checks
Outcomes	Specific OCD symptom measures (pre- and post-intervention): CY-BOCS; Obsessions and Compulsion Inventory Secondary outocmes: Child Depression Inventory Clinical remission: not specified
Notes	This is unpublished study. A manuscript supplied by first author was used to gather information on risk of bias and data for extraction.

Risk of bias

Item	Authors' judgement	Description

Williams ND (*Continued*)

Allocation concealment?	Unclear	B-Unclear

Characteristics of excluded studies *[ordered by study ID]*

Benazon 2002	No control group
Bjorgvinsson 2008	No control group
Bolton 1983	Case series without control group
Cannon 2003	No control group
Dopfner 2007	No control group
Harris 1992	Case study only
Himle 2003a	No control for BT/CBT. Compared BT/CBT for OCD patients with and without tics
Jaffa 1999	No control group
Kearney 1990	Case study only
Knox 1996	Case series without control group
Lumpkin 2002	Case series without control group
March 1994	Case study only
March 1995a	No control group
Martin 2005	No control group
Mehta 1990	Age range 17 to 56 years. Data not analysed for adolescents
Piacentini 2002	No control group
Sallinen 2004	Case study
Scahill 1996	No control group
Simeon 1994	No control group
Storch 2007a	Case series without control

(*Continued*)

Storch 2007b	Case series without control
Thienemann 2001	No control group
Thornicroft 1991	No control group
Van Noppen 1997	Ages 12 to 66 but data not analysed for < 18 years.
Waters 2001	No control group
Wever 1997	No control group
Whiteside 2008	Case series without control
Willmuth 1988	Case study

Characteristics of studies awaiting assessment *[ordered by study ID]*

Himle 2003b

Methods	Not specified
Participants	10 participants 5 per group
Interventions	Group CBT Components not specified Group anxiety managment
Outcomes	CYBOCS
Notes	Data from this study is reported in Watson & Ress (2008). Author has been contacted to provide details of study to allow assessment of risk of bias. Awaiting response.

Characteristics of ongoing studies *[ordered by study ID]*

Bolton ongoing

Trial name or title	A randomised controlled trial comparison of brief cognitive behaviour therapy, standard cognitive behaviour therapy and wait list.
Methods	Random allocation with assessors blind to treatment status at all assessment points. Allocation stratified by medication (Yes/No)

Bolton ongoing (*Continued*)

Participants	Inclusion criteria: DSM-IV diagnosis of OCD using ADIS-C/P; child form for adolescents; child and parent form otherwise Exclusion criteria: medication not stable previosu 6 weeks; autism specturm disorders; IQ>70; psychosis,no other disorder requiring more urgent attention; able to attend several times over 4-7weeks. Total assessed for eligibility = 124. Total excluded = 28 (19 ineligible; 6 refused to participate; 3 other reasons asymptomatic at baseline) Total allocated = 97 (Brief CBT 36; Standard CBT 37; Wait list brief - 12; wait list standard -12) Mean (SD) Age Total sample 14.5 (Range 10-18) Gender 49 boys 57 girls
Interventions	Standard 12 session; Brief 5 sessions and use of workbook; wait list
Outcomes	CY-BOCS; measures of depression; anxiety and responsibility appraisals
Starting date	2002
Contact information	Dr Tim Williams Berkshire Healthcare NHS Trust and School of Psychology, University of Reading
Notes	

Ivarsson ongoing

Trial name or title	Nordic Long-term Obsessive compulsive disorder (OCD) Treatment Study
Methods	Randomised, active controlled trial with three steps: 1: Open uncontrolled 2: Randomised and controlled 3: Open uncontrolled
Participants	Patients 7 - 17 years of age Moderate-severe obsessive compulsive disorder according to Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM IV). Severity is defined by Children's Yale-Brown Obsessive Compulsive Scales (CY-BOCS) scores of 16 or above.
Interventions	Step 1: Cognitive behaviour therapy (CBT) Step 2: Sertraline plus CBT support (less intensive CBT) or intensive CBT Step 3: Sertraline plus CBT support plus aripiprazol Non-responders to CBT are randomised to continued CBT or sertraline with CBT support. CBT plus sertraline non-responders are treated un-controlled with aripiprazole. Outcome is studied for 36 months.
Outcomes	1. CYBOCS 2. Clinical Global Impression Scale 3. Clinical Global Improvement Scale 4. Children's OCD Impact Scale Outcomes measured (approximately)at weeks 0, 7, 13, and months 6, 12, 24, 36.

Ivarsson ongoing (*Continued*)

Starting date	01/01/2008
Contact information	Dr Tord Ivarsson The Centre for Child and Adolescent Mental Health, Eastern and Southern Norway, Gullhaug Torg 4B Oslo
Notes	

Murphy ongoing

Trial name or title	SSRI-Induced Activation Syndrome in Pediatric Obsessive Compulsive Disorder
Methods	This double-blind study will be divided into two phases. Phase 1 will involve the development and evaluation of a new behavioral test to measure antidepressant side effects. Participants will attend a 2-hour screening interview during which they will be asked to describe any side effects experienced from antidepressant medications and to rate how problematic these side effects are for them. Participants will be contacted by phone 1 week later to answer questions repeated from the interview. Participation in Phase 1 will last about 10 days. Phase 2 will comprise the medication/CBT treatment portion of the study. Potential participants will undergo an initial screening visit that will include an interview on psychological symptoms associated with OCD and possible family history of OCD. Eligible participants will then undergo a physical exam, blood draw, DNA sampling, and pregnancy test if applicable. Participants will be randomly assigned to receive either sertraline or placebo daily for 18 weeks. At weekly study visits, participants will receive their study drug, complete questionnaires about symptoms of OCD, and undergo vital sign measurements. At specified visits, participants will also perform a task (Stop Signal Task) on a computerized assessment device to measure attention and impulse control and may have blood drawn. For the first 4 weeks of Phase 2, participants will wear a wristwatch-like device (Actigraph)to monitor sleep patterns. During the first three visits, participants will receive supportive psychotherapy. At Visit 4, participants will begin receiving 60-minute CBT sessions, which will continue until the final visit. The final visit will include a second physical exam, questionnaires, and blood testing.
Participants	7 to 17 year olds with OCD
Interventions	Sertaline and CBT; placebo and CBT
Outcomes	Performance of sertraline.CBT versus placebo/CBT on both the TE-ASAP and existing behavioral measures of irritability, impulsivity/aggression, restlessness, and mania
Starting date	February 2008
Contact information	Professor Tanya K. Murphy, MD.,University of Florida
Notes	

O'Neil ongoing

Trial name or title	Cognitive Behavioural therapy and glutametergic neurometabolities in pediatric OCD
Methods	Participants with OCD will be randomly assigned to either receive a 12-week CBT intervention or be placed on a waiting list for 8 weeks before receiving the 12-week intervention. A group of non-OCD participants in the same age group will be used as a control. All groups will undergo magnetic resonance spectroscopic imaging (MRSI), which will measure the concentrations of neurometabolites in multiple brain regions. The control group and the group initially given the CBT intervention will be scanned upon entry of the study and after 12 weeks. The group initially placed on a waiting list will be scanned three times: once upon entry, once after the 8-week waiting period, and once after the 12-week CBT intervention. To determine which participants are benefiting from the treatment, the Yale-Brown Obsessive-Compulsive Scale and other clinical and neurocognitive measures will be administered concurrently with each brain scan.
Participants	Children and adolescents ages 8 through 17
Interventions	CBT; wait list
Outcomes	Regional concentration of glutamate and glutamine in brain, as measured by Magnetic Resonance Spectroscopic Imaging; and Yale-Brown Obsessive-Compulsive Scale
Starting date	June 2008
Contact information	Professor John C. Piacentini, PhD; UCLA Child Psychiatry
Notes	

POTS II ongoing

Trial name or title	The pediatric obsessive-compulsive disorder treatment study II
Methods	Randomisation to one of 3 groups : Mediciation maintenance only(MM); Combined brief CBT and Medication (I-CBT);Combined standard CBT and Medication (CBT). The standard CBT is administered by a psychologists while the brief CBT will be delivered by a the same psychiatrist who manages the medication.
Participants	Children and youth with OCD who experienced a partial response to SRI
Interventions	MM - maintenance SRI with 7 visits; I-CBT- maintenance SRI plus CBT provided by same doctor in 7 visits of longer duration; CBT - Maintenacne plus standard 12 sessions of CBT provided by different therapist.
Outcomes	CY-BOCS plus range of other measures including functional impairment; anxiety; depression; quality of life, social functioning.
Starting date	Recuirting underway at time of publication January 2009
Contact information	Dr Jennifer Freeman; Department of Psychiaty and Human Behavior, Brown University School of Medicine, Providence, RI, USA
Notes	

Turner ongoing

Trial name or title	Evaluation and dissemination of a telephone-administered cognitive behaviour therapy (CBT) program for children and young people with obsessive-compulsive disorder (OCD)
Methods	Single blinded randomised controlled non-inferiority trial
Participants	N= 80; 11-18 years.
Interventions	14 session of face-to-face CBT; telephone CBT
Outcomes	CY-BOCS and cost effectiveness
Starting date	September 2008
Contact information	Dr Cynthia Turner, Maudsley Hospital Children Department, London, UK
Notes	

DATA AND ANALYSES

Comparison 1. BT/CBT versus waitlist or placebo

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 CY-BOCS at post treatment	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 BT/CBT versus wait-list control	3	87	Mean Difference (IV, Random, 95% CI)	-10.71 [-17.04, -4.38]
1.2 BT/CBT versus placebo control	2	98	Mean Difference (IV, Random, 95% CI)	-5.24 [-9.98, -0.50]
1.3 Group BT/CBT versus wait-list	1	53	Mean Difference (IV, Random, 95% CI)	-15.76 [-18.90, -12.62]
2 Number with OCD at post treatment	4		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 BT/CBT individual versus wait list control	2		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.2 BT/CBT individual versus placebo control	2		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.3 Group BT/CBT versus wait list control	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
3 NIMH-GOCS at post treatment	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 BT/CBT individual	1	48	Mean Difference (IV, Fixed, 95% CI)	-5.5 [-6.72, -4.28]
3.2 BT/CBT group	1	48	Mean Difference (IV, Fixed, 95% CI)	-5.69 [-6.87, -4.51]
4 Clinical Global Impressions-Improvement	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5 Change in CY-BOCS prior to post	1	42	Mean Difference (IV, Fixed, 95% CI)	-3.99 [-8.40, 0.42]

Comparison 2. BT/CBT versus medication

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 CY-BOCS score at post treatment	3	118	Mean Difference (IV, Random, 95% CI)	-3.30 [-6.62, 0.01]
1.1 BT/CBT Group versus medication	1	40	Mean Difference (IV, Random, 95% CI)	-2.45 [-7.68, 2.78]
1.2 BT/CBT versus medication	2	78	Mean Difference (IV, Random, 95% CI)	-4.28 [-9.65, 1.09]
2 Number with OCD at post treatment	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 BT/CBT versus medication	2	78	Risk Ratio (M-H, Random, 95% CI)	0.76 [0.55, 1.05]
3 NIMH-GOCS at post treatment	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Comparison 3. BT/CBT combined with medication versus other

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 CY-BOCS score at post treatment	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 BT/CBT combined with medication versus placebo	1	56	Mean Difference (IV, Random, 95% CI)	-10.3 [-14.06, -6.54]
1.2 BT/CBT combined with medication versus medication alone	2	76	Mean Difference (IV, Random, 95% CI)	-4.55 [-7.40, -1.70]
1.3 BT/CBT combined with medication versus BT/CBT alone	1	56	Mean Difference (IV, Random, 95% CI)	-2.80 [-7.55, 1.95]
2 Number with OCD at post treatment	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 BT/CBT combined with medication versus placebo	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.2 BT/CBT combined with medication versus medication alone	2		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.3 BT/CBT combined with medication versus BT/CBT alone	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
3 NIMH-GOCS at post treatment	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4 CGIS at post treatment	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5 CGII at post treatment	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Comparison 4. BT/CBT versus other - secondary outcomes

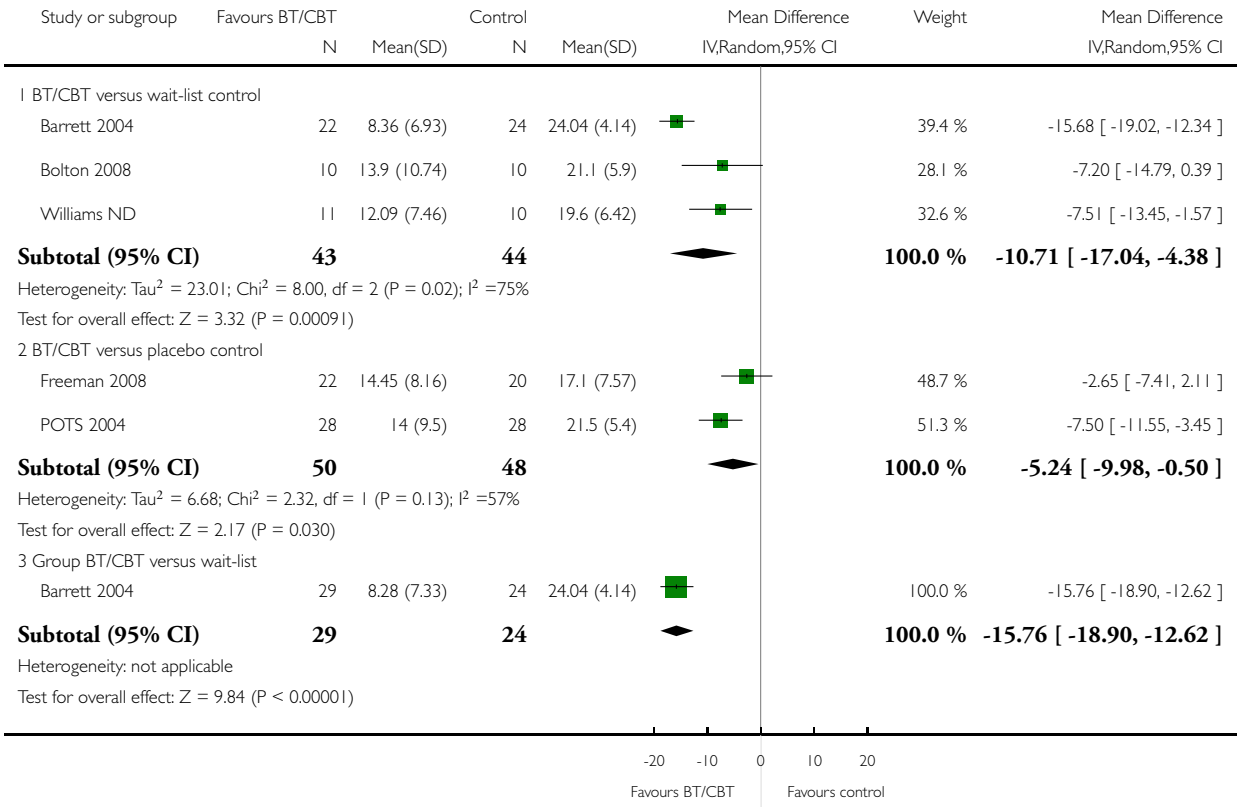
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Self-reported depression at post treatment	4		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 BT/CBT individual versus waitlist	2		Mean Difference (IV, Fixed, 95% CI)	Not estimable
1.2 BT/CBT group versus waitllist	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
1.3 BT/CBT versus medication	2		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2 Self-reported anxiety at post treatment	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 BT/CBT individual	2		Mean Difference (IV, Fixed, 95% CI)	Not estimable
2.2 BT/CBT group	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Analysis 1.1. Comparison 1 BT/CBT versus waitlist or placebo, Outcome 1 CY-BOCS at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 1 BT/CBT versus waitlist or placebo

Outcome: 1 CY-BOCS at post treatment



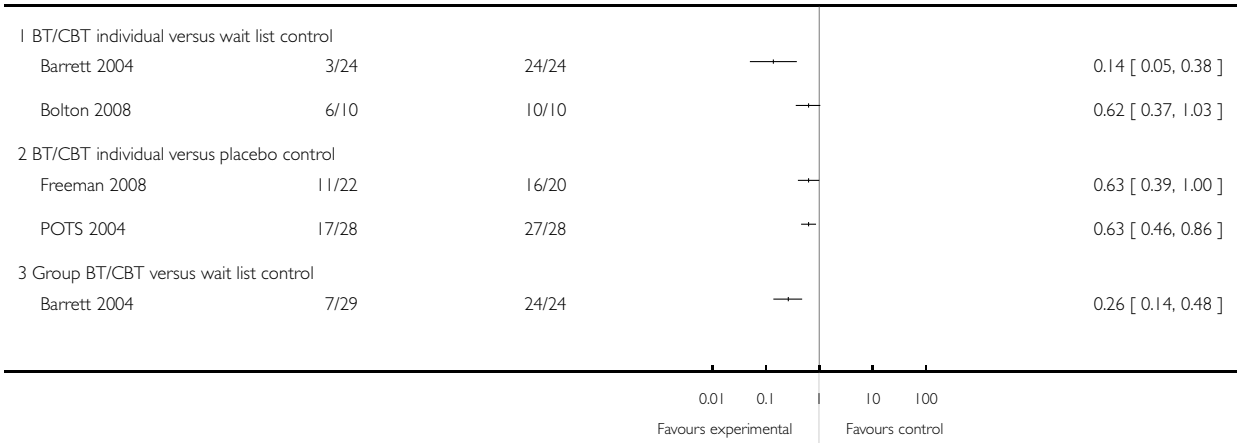
Analysis 1.2. Comparison 1 BT/CBT versus waitlist or placebo, Outcome 2 Number with OCD at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 1 BT/CBT versus waitlist or placebo

Outcome: 2 Number with OCD at post treatment

Study or subgroup	BT/CBT n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 BT/CBT individual versus wait list control				
Barrett 2004	3/24	24/24		0.14 [0.05, 0.38]
Bolton 2008	6/10	10/10		0.62 [0.37, 1.03]
2 BT/CBT individual versus placebo control				
Freeman 2008	11/22	16/20		0.63 [0.39, 1.00]
POTS 2004	17/28	27/28		0.63 [0.46, 0.86]
3 Group BT/CBT versus wait list control				
Barrett 2004	7/29	24/24		0.26 [0.14, 0.48]



Analysis 1.3. Comparison 1 BT/CBT versus waitlist or placebo, Outcome 3 NIMH-GOCS at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 1 BT/CBT versus waitlist or placebo

Outcome: 3 NIMH-GOCS at post treatment

Study or subgroup	BT/CBT N	Mean(SD)	Waitlist N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 BT/CBT individual							
Barrett 2004	24	3.5 (2.3)	24	9 (2)		100.0 %	-5.50 [-6.72, -4.28]
Subtotal (95% CI)	**24**		**24**			**100.0 %**	**-5.50 [-6.72, -4.28]**
Heterogeneity: not applicable							
Test for overall effect: Z = 8.84 (P < 0.00001)							
2 BT/CBT group							
Barrett 2004	24	3.31 (2.16)	24	9 (2)		100.0 %	-5.69 [-6.87, -4.51]
Subtotal (95% CI)	**24**		**24**			**100.0 %**	**-5.69 [-6.87, -4.51]**
Heterogeneity: not applicable							
Test for overall effect: Z = 9.47 (P < 0.00001)							
Test for subgroup differences: Chi^2 = 0.05, df = 1 (P = 0.83), I^2 =0.0%							

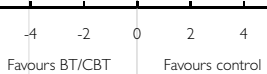
Analysis 1.4. Comparison 1 BT/CBT versus waitlist or placebo, Outcome 4 Clinical Global Impressions-Improvement.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 1 BT/CBT versus waitlist or placebo

Outcome: 4 Clinical Global Impressions-Improvement

Study or subgroup	BT/CBT N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Freeman 2008	22	2.37 (1.17)	20	2.76 (1.09)		-0.39 [-1.07, 0.29]



Analysis 1.5. Comparison 1 BT/CBT versus waitlist or placebo, Outcome 5 Change in CY-BOCS prior to post.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 1 BT/CBT versus waitlist or placebo

Outcome: 5 Change in CY-BOCS prior to post

Study or subgroup	BT/CBT N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Freeman 2008	22	-8.59 (7.84)	20	-4.6 (6.73)		100.0 %	-3.99 [-8.40, 0.42]
Total (95% CI)	**22**		**20**			**100.0 %**	**-3.99 [-8.40, 0.42]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.77 (P = 0.076)							

Analysis 2.1. Comparison 2 BT/CBT versus medication, Outcome 1 CY-BOCS score at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 2 BT/CBT versus medication

Outcome: 1 CY-BOCS score at post treatment

Study or subgroup	Favours BT/CBT N	Mean(SD)	Medication alone N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 BT/CBT Group versus medication							
Asbahr 2005	20	13.59 (7.08)	20	16.04 (9.62)		40.1 %	-2.45 [-7.68, 2.78]
Subtotal (95% CI)	**20**		**20**			**40.1 %**	**-2.45 [-7.68, 2.78]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.92 (P = 0.36)							
2 BT/CBT versus medication							
de Haan 1998	12	9.1 (9.1)	10	17.6 (11.8)		13.7 %	-8.50 [-17.44, 0.44]
POTS 2004	28	14 (9.5)	28	16.5 (9.1)		46.2 %	-2.50 [-7.37, 2.37]
Subtotal (95% CI)	**40**		**38**			**59.9 %**	**-4.28 [-9.65, 1.09]**
Heterogeneity: Tau^2 = 4.50; Chi^2 = 1.33, df = 1 (P = 0.25); I^2 =25%							
Test for overall effect: Z = 1.56 (P = 0.12)							
Total (95% CI)	**60**		**58**			**100.0 %**	**-3.30 [-6.62, 0.01]**
Heterogeneity: Tau^2 = 0.0; Chi^2 = 1.50, df = 2 (P = 0.47); I^2 =0.0%							
Test for overall effect: Z = 1.95 (P = 0.051)							

Analysis 2.2. Comparison 2 BT/CBT versus medication, Outcome 2 Number with OCD at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 2 BT/CBT versus medication

Outcome: 2 Number with OCD at post treatment

Study or subgroup	BT/CBT interventions n/N	Medication alone n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
1 BT/CBT versus medication					
de Haan 1998	5/12	6/10		15.2 %	0.69 [0.30, 1.61]
POTS 2004	17/28	22/28		84.8 %	0.77 [0.54, 1.10]

Analysis 2.3. Comparison 2 BT/CBT versus medication, Outcome 3 NIMH-GOCS at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 2 BT/CBT versus medication

Outcome: 3 NIMH-GOCS at post treatment

Study or subgroup	Group CBT N	Mean(SD)	Medication alone N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Asbahr 2005	20	5.52 (2.52)	20	6.43 (3.45)		-0.91 [-2.78, 0.96]

Analysis 3.1. Comparison 3 BT/CBT combined with medication versus other, Outcome 1 CY-BOCS score at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 3 BT/CBT combined with medication versus other

Outcome: 1 CY-BOCS score at post treatment

Study or subgroup	Combined N	Mean(SD)	Single modality N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 BT/CBT combined with medication versus placebo							
POTS 2004	28	11.2 (8.6)	28	21.5 (5.4)		100.0 %	-10.30 [-14.06, -6.54]
Subtotal (95% CI)	**28**		**28**			**100.0 %**	**-10.30 [-14.06, -6.54]**
Heterogeneity: not applicable							
Test for overall effect: Z = 5.37 (P < 0.00001)							
2 BT/CBT combined with medication versus medication alone							
Neziroglu 2000	10	15.2 (4.25)	10	19.3 (3.98)		54.7 %	-4.10 [-7.71, -0.49]
POTS 2004	28	11.2 (8.6)	28	16.5 (9.1)		45.3 %	-5.30 [-9.94, -0.66]
Subtotal (95% CI)	**38**		**38**			**100.0 %**	**-4.55 [-7.40, -1.70]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.16$, df = 1 (P = 0.69); $I^2 = 0.0\%$							
Test for overall effect: Z = 3.13 (P = 0.0017)							
3 BT/CBT combined with medication versus BT/CBT alone							
POTS 2004	28	11.2 (8.6)	28	14 (9.5)		100.0 %	-2.80 [-7.55, 1.95]
Subtotal (95% CI)	**28**		**28**			**100.0 %**	**-2.80 [-7.55, 1.95]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.16 (P = 0.25)							

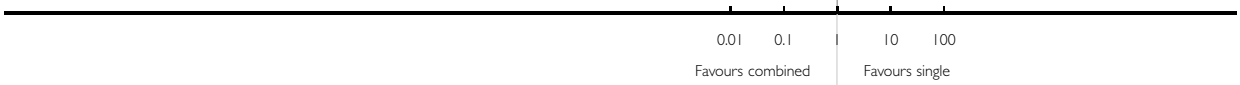
Analysis 3.2. Comparison 3 BT/CBT combined with medication versus other, Outcome 2 Number with OCD at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 3 BT/CBT combined with medication versus other

Outcome: 2 Number with OCD at post treatment

Study or subgroup	Combined n/N	Single modality n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 BT/CBT combined with medication versus placebo				
POTS 2004	13/28	27/28		0.48 [0.32, 0.72]
2 BT/CBT combined with medication versus medication alone				
Neziroglu 2000	5/5	5/5		0.0 [0.0, 0.0]
POTS 2004	13/28	22/28		0.59 [0.38, 0.92]
3 BT/CBT combined with medication versus BT/CBT alone				
POTS 2004	13/28	17/28		0.76 [0.47, 1.26]



Analysis 3.3. Comparison 3 BT/CBT combined with medication versus other, Outcome 3 NIMH-GOCS at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 3 BT/CBT combined with medication versus other

Outcome: 3 NIMH-GOCS at post treatment

Study or subgroup	Combined N	Mean(SD)	Single modality N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Neziroglu 2000	10	6.9 (1.14)	10	7.1 (3.2)		-0.20 [-2.31, 1.91]

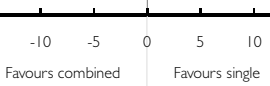
Analysis 3.4. Comparison 3 BT/CBT combined with medication versus other, Outcome 4 CGIS at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 3 BT/CBT combined with medication versus other

Outcome: 4 CGIS at post treatment

Study or subgroup	Combined N	Mean(SD)	Single modality N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Neziroglu 2000	10	3.5 (0.45)	10	4.2 (0.57)		-0.70 [-1.15, -0.25]



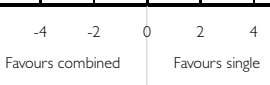
Analysis 3.5. Comparison 3 BT/CBT combined with medication versus other, Outcome 5 CGII at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 3 BT/CBT combined with medication versus other

Outcome: 5 CGII at post treatment

Study or subgroup	Combined N	Mean(SD)	Single modality N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Neziroglu 2000	10	2.3 (0.48)	10	3 (0.91)		-0.70 [-1.34, -0.06]



Analysis 4.1. Comparison 4 BT/CBT versus other - secondary outcomes, Outcome 1 Self-reported depression at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 4 BT/CBT versus other - secondary outcomes

Outcome: 1 Self-reported depression at post treatment

Study or subgroup	BT/CBT N	Mean(SD)	Other N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 BT/CBT individual versus waitlist						
Barrett 2004	24	6.26 (6.59)	24	8.07 (7.26)		-1.81 [-5.73, 2.11]
Williams ND	11	12.9 (8.69)	10	12.78 (9.23)		0.12 [-7.57, 7.81]
2 BT/CBT group versus waitllist						
Barrett 2004	24	3.35 (4.82)	24	8.07 (7.26)		-4.72 [-8.21, -1.23]
3 BT/CBT versus medication						
Asbahr 2005	20	10.68 (8.76)	20	9.66 (6.3)		1.02 [-3.71, 5.75]
de Haan 1998	12	129.2 (50.8)	10	143.2 (37.9)		-14.00 [-51.12, 23.12]

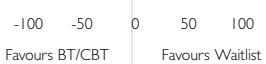
Analysis 4.2. Comparison 4 BT/CBT versus other - secondary outcomes, Outcome 2 Self-reported anxiety at post treatment.

Review: Behavioural and cognitive behavioural therapy for obsessive compulsive disorder in children and adolescents

Comparison: 4 BT/CBT versus other - secondary outcomes

Outcome: 2 Self-reported anxiety at post treatment

Study or subgroup	BT/CBT N	Mean(SD)	Waitlist N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 BT/CBT individual						
Barrett 2004	24	50.37 (15.31)	24	49.47 (15.78)		0.90 [-7.90, 9.70]
Williams ND	11	58 (25)	10	63.63 (19.44)		-5.63 [-24.69, 13.43]
2 BT/CBT group						
Barrett 2004	24	39.09 (18)	24	49.47 (15.78)		-10.38 [-19.96, -0.80]



APPENDICES

Appendix 1. Search strategies used in review

The Cochrane Central Register of Controlled Trials (CENTRAL) was searched using the following terms:
1) Keywords = ((obsess* or compul*) AND (child* or adolesc* or juvenil* of school* or pediatri* or paediatri*))
2) MeSH terms = (Obsessive-Compulsive Disorder/ AND (Adolescent/or Child/ or Infant/))
3) 1 or 2
PubMed was searched using the following terms:
For Health Condition (Concept 1):
1. Obsessive-Compulsive Disorder
"obsessive-compulsive disorder"[MeSH Terms] OR ("obsessive-compulsive"[All Fields] AND "disorder"[All Fields]) OR "obsessive-compulsive disorder"[All Fields] OR ("obsessive"[All Fields] AND "compulsive"[All Fields] AND "disorder"[All Fields]) OR "obsessive compulsive disorder"[All Fields]
For Age Group (Concept 2):
2. Adolescent
"adolescent"[MeSH Terms] OR "adolescent"[All Fields]
3. Child
"child"[MeSH Terms] OR "child"[All Fields]
4. Infant
"infant"[MeSH Terms] OR "infant"[All Fields]
5. #2 OR #3 OR #4
For Study Design (Concept 3):
6. Randomized Controlled Trial
"randomized controlled trial"[Publication Type] OR "randomized controlled trials as topic"[MeSH Terms] OR "randomized controlled trial"[All Fields] OR "randomised controlled trial"[All Fields]
7. Controlled Clinical Trials
"controlled clinical trial"[Publication Type] OR "controlled clinical trials as topic"[MeSH Terms] OR "controlled clinical trials"[All Fields]
8. Clinical Trials
"clinical trial"[Publication Type] OR "clinical trials as topic"[MeSH Terms] OR "clinical trials"[All Fields]
9. Random Allocation
"random allocation"[MeSH Terms] OR ("random"[All Fields] AND "allocation"[All Fields]) OR "random allocation"[All Fields]
10. Double-blind Method
"double-blind method"[MeSH Terms] OR ("double-blind"[All Fields] AND "method"[All Fields]) OR "double-blind method"[All Fields] OR ("double"[All Fields] AND "blind"[All Fields] AND "method"[All Fields]) OR "double blind method"[All Fields]
11. Single-Blind Method
"single-blind method"[MeSH Terms] OR ("single-blind"[All Fields] AND "method"[All Fields]) OR "single-blind method"[All Fields] OR ("single"[All Fields] AND "blind"[All Fields] AND "method"[All Fields]) OR "single blind method"[All Fields]
12. Placebos
"placebos"[MeSH Terms] OR "placebos"[All Fields]
13. Research Design
"research design"[MeSH Terms] OR ("research"[All Fields] AND "design"[All Fields]) OR "research design"[All Fields]
14. Comparative Study
"comparative study"[Publication Type] OR "comparative study"[All Fields] =
15. Evaluation Studies
Experimental[All Fields] AND ("Studies"[Journal] OR "Brigham Young Univ Stud"[Journal] OR "studies"[All Fields]
16. Follow-up Studies
"follow-up studies"[MeSH Terms] OR ("follow-up"[All Fields] AND "studies"[All Fields]) OR "follow-up studies"[All Fields] OR ("follow"[All Fields] AND "up"[All Fields] AND "studies"[All Fields]) OR "follow up studies"[All Fields]
17. Prospective Studies
"prospective studies"[MeSH Terms] OR ("prospective"[All Fields] AND "studies"[All Fields]) OR "prospective studies"[All Fields]
18. Longitudinal Studies

"longitudinal studies"[MeSH Terms] OR ("longitudinal"[All Fields] AND "studies"[All Fields]) OR "longitudinal studies"[All Fields]
19. Cohort Studies
"cohort studies"[MeSH Terms] OR ("cohort"[All Fields] AND "studies"[All Fields]) OR "cohort studies"[All Fields]
19. #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR#18 OR #19
Combining all 3 concepts:
20. #1 AND #5 AND #19
21. Limits were applied: articles published in the last 5 years (2004 and 2009)

PsychINFO via Ovid was searched using the following terms:

For Health Condition (Concept 1):
1.Obsessive Compulsive Disorder.sh.
For Age group (Concept 2):
2. exp ADOLESCENT PSYCHOLOGY/or exp ADOLESCENT PSYCHOTHERAPY/or exp ADOLESCENT PSYCHOPATHOLOGY/or Adolescent.mp. or exp ADOLESCENT PSYCHIATRY/ADOLESCENT PSYCHIATRY.sh.
3. child.mp. or exp CHILD PSYCHOPATHOLOGY/or exp CHILD PSYCHOTHERAPY/or exp CHILD PSYCHIATRY/or exp CHILD PSYCHOLOGY/CHILD PSYCHOLOGY.sh.
4. Infant.mp.
5. 2 or 3 or 4
For Study Design (Concept 3)
6. Randomized Controlled Trial.mp.
7. Randomi#ed Control* Trial*.mp.
8. "2000".md.
[md = methodology code, 2000.md = Treatment Outcome/ Randomized Clinical Trial]
9. exp Random Sampling/ or Random Allocation.mp.
10. exp "Sampling (Experimental)"/
11. Double Blind Method.mp.
12. Single Blind Method.mp.
13. exp Clinical Trials/ or Controlled Clinical Trial.mp.
14. (clin* adj25 trial*).mp. [mp=title, abstract, heading word, table of contents, key concepts]
15. ((singl* or doubl* or tripl*) adj25 (blind* or mask* or dummy*)).mp. [mp=title, abstract, heading word, table of contents, key concepts]
16. Placebos.mp. or exp PLACEBO/
17. exp Experimental Design/
18. Comparative Study.mp.
19. Evaluation Studies.mp.
20. exp Followup Studies/ or Follow-up Studies.mp.
21. (control* or prospective* or volunteer*).mp. [mp=title, abstract, heading word, table of contents, key concepts]
22. ("0400" or "0430" or "0450" or "0830" or "1200").md.
[md = methodology codes, 0400 = Empirical Study, 0430 = Followup Study, 0450 = Longitudinal Study, 0830 = Systematic Review, 1200 = Meta Analysis
23. or/6-22
Combining all 3 concepts:
24.1 and 5 and 23
25. Limits were applied: articles published in the last 5 years (2004 and 2009)

Scopus was searched using the following terms:

For Health Condition (Concept 1):
1. TITLE-ABS-KEY-AUTH(obsess* OR compuls*)
For Age Group (Concept 2):
2. TITLE-ABS-KEY-AUTH(child* OR adolesc* OR juvenil* OR school* OR pediatri* OR paediatri*)
For Study Design (Concept 3):
3. ALL(Randomi?ed Control* Trial*) OR ALL(Random Sampl* OR Random Allocat*) OR ALL(Sampl* AND Experimental) OR ALL(Double Blind Method) OR ALL(Single Blind Method) OR ALL(Clinical Trial* OR Control* Clinical Trial) OR ALL(Placebo*) OR ALL(Experimental Design) OR ALL(Comparative Stud*) OR(Follow?up Stud*) OR ALL(Prospective OR Volunteer*) AND ALL(humans NOT animals)

Combining all three phases
4. #1 AND #2 AND #3
5. Limits were applied: articles published in the last 5 years (2004 and 2009)

FEEDBACK

Query regarding peer review process - Cook

Summary

Feedback: I just need to know if the article about CBT for OCD in children and adolescents is peer-reviewed as I am using this very useful information in an assignment.

Reply

All review manuscripts are peer reviewed by two general editors, a statistical editor and two external peer-reviewers prior to being accepted for publication.

Contributors

The Cochrane Depression, Anxiety and Neurosis Group Editorial Team.

WHAT'S NEW

Last assessed as up-to-date: 2 March 2009.

29 October 2009	New search has been performed	New studies added

HISTORY

Protocol first published: Issue 3, 2004

Review first published: Issue 4, 2006

28 February 2009	New search has been performed	Converted to new review format
22 August 2006	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

O'Kearney - developed the focus of the review; prepared the protocol (background and objectives, types of studies etc); developed the quality assessment and data extraction forms; selected studies to be reviewed; rated the selected studies; extracted data from the studies; contributed to the analysis and write-up of the review.

Anstey - contributed to the protocol write-up; contributed to the development of the methods; rated all of the selected studies; extracted the data from the selected studies; contributed to the analysis and write-up of the review.

von Sanden and Hunt - identified the background research; developed the search strategy; selected the studies to be reviewed; undertook the searches; undertook the handsearches; selected the studies for the data extraction and assisted with the quality rating; contributed to the write-up of the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- Department of Psychology, The Australian National University, Australia.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

Adolescent; Behavior Therapy [*methods]; Cognitive Therapy; Obsessive-Compulsive Disorder [*therapy]; Randomized Controlled Trials as Topic

MeSH check words

Child; Humans