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# **Parental Involvement in Remotely Delivered CBT Interventions for Anxiety Problems in Children and Adolescents: A Systematic Review**

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Additional information is available at the end of the chapter

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## **Abstract**

**Introduction:** Remotely delivered interventions for childhood anxiety disorders (e.g., delivered via telephone, Internet, computer, serious games, or apps) are efficient in mental health problems, surpassing concerns in the dissemination of evidence-based treatment. The present study aims to conduct a systematic review of parental involvement in remote cognitive-behavioral therapy (CBT) interventions for child anxiety disorders. The main objectives are (1) to present the state of the art of existent knowledge on parental involvement in remotely delivered CBT interventions for anxiety disorders in children and adolescents and (2) to propose a conceptual model which could be considered in designing effective remotely delivered interventions for anxious youth.

**Research methods:** Two independent raters conducted comprehensive systematic searches of electronic databases (PsychInfo, Cochrane, PubMed, Scopus, Web of Science) up to April 10, 2016. We have included eight remote CBT interventions and presented their characteristics.

**Conclusion:** Parental involvement in remotely delivered CBT interventions for child anxiety treatment is important to consider; however, more randomized controlled trials need to be conducted. Tailoring such interventions according to child-parent factors, child-parent relationship quality, and treatment preferences has been suggested. Finally, a new conceptual model has been proposed, which could guide future research.

**Keywords:** anxiety, child, remote, CBT

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## 1. Introduction

Anxiety disorders are the most widespread mental health problems in children and adolescents, affecting approximately 117 million of youths, with a worldwide prevalence of any anxiety disorder of 6.5% [1]. Anxiety disorders in youths are associated with a high burden of disease, being the second leading cause of disability-adjusted life years and years lived with disability rates, after major depressive disorder for girls, and the third leading cause of disability for boys, after major depressive disorder and conduct disorder [2]. Childhood anxiety disorders often persist in adulthood [3], becoming a chronic condition, so that anxious children turn into anxious adults with impaired functioning in several psychosocial domains [4].

## 2. Evidence-based treatments for child and adolescent anxiety

### 2.1. Existent treatments

At present, according to mental health guidelines [5], the first-line treatment delivered in youth anxiety disorders is cognitive-behavioral therapy (CBT), which is an efficient intervention for youths [6]. However, a high number of youths are unresponsive to treatment (40%) [6]. Even though evidence-based treatments exist, there are many problems in reaching these populations: trained therapists, costs, rural areas, or stigma associated with going to a mental health clinic. Due to current problems in disseminating evidence-based treatments, remotely delivered interventions have emerged and proved to be efficient treatments for multiple conditions, both in adults [7] and in youth populations [8].

#### 2.1.1. Remote treatment for child anxiety

There is a wide variety of remotely delivered treatments for child and adolescents with anxiety disorders [9]. Remote interventions can be delivered over Internet, computer, telephone, SMS, mobile apps, videoconferences, serious games, and virtual reality devices. In the last years, there has been a surge in such interventions due to people's greater access to technology.

##### 2.1.1.1. Internet-delivered interventions

Internet-delivered CBT interventions (iCBT) are those treatments in which the content of the treatment is presented online (for a synthesis of iCBT interventions see [10]). There is evidence that iCBT is an efficient intervention for anxiety disorders in youths of all ages, from preschoolers to adolescents. Namely, in a pilot study conducted on children with specific phobias, iCBT was efficient in reducing the main symptoms [11]. The same protocol was tested in a randomized controlled trial (RCT) for children with anxiety disorders and seemed to be an efficient treatment [12]. Also, iCBT treatments considerably reduced social phobia in a sample group of adolescents [13]. A feasibility study showed that iCBT delivered in a tailored format was an efficient treatment in a sample group of adolescents with mixed anxiety disorders [14]. These results were also sustained by an RCT conducted on children with mixed anxiety disorders

[15]. Other studies bring evidence that iCBT treatments for children can be as effective as golden standards, i.e., face-to-face CBT delivered in a clinic [16]. Online-delivered CBT is also efficient in anxious preschool children, albeit it is delivered mostly as a parenting intervention [17, 18].

#### *2.1.1.2. Computerized interventions*

Computerized CBT interventions (cCBT) are often delivered over CD-ROMs. Several trials have shown that cCBT are efficient interventions with comparable results to face-to-face treatments [19]. In an adolescent sample of anxious youths, cCBT delivered over 12 weeks was more efficient than waiting control [20]. When compared with treatment as usual (TAU), cCBT interventions are associated with better outcomes than TAU [21].

#### *2.1.1.3. Intervention delivered via mobile phones, smartphones*

The usability of two mobile CBT interventions (mCBT) has been investigated so far, with future RCTs still required. In a pilot study, the feasibility of SmartCAT, a smartphone-enhanced child anxiety program used as a complementary tool to a brief CBT intervention, was investigated [22]. SmartCAT consists of a smartphone app, a therapist portal, and a two-way communication connection between them. Data on the usability of this intervention show that the app was frequently used during the first week, while the level of usage decreased during treatment, the compliance rate was high, and it was considered easy to use. Parents reported a high level of satisfaction with the intervention. Mayo Clinic Anxiety Coach [23] is a self-help application on iOS, consisting of three modules: Self-Evaluation, Psychoeducation, and Exposure. It was downloaded by approximately 169 children, aged between 5 and 17, and used multiple times (4–20 times). The first module (self-assessment) was used more than the other two. The Pesky gNATs mobile app [24] is a free access tool, available for iPhone and Android phones and tablets, which can be used by children in order to generalize contents learnt in therapy sessions. This app has not yet been tested in RCT, or in feasibility trials.

#### *2.1.1.4. Serious games*

In a two-armed RCT, Dojo, a videogame targeting anxiety symptoms in teenagers (aged 11–15) was compared with a control game, Rayman [25]. No differences were found between the two conditions. Treasure Hunt is a CBT game delivered over six levels, which was liked by children and rated as helpful by therapists [26]; however, no RCT has had its efficacy tested compared to control conditions. MindSpace is a CBT game for children aged 7–12 diagnosed with anxiety disorders [27]. Pesky gNATs [24] is a computer game and an online app designed to be used as a complementary tool in therapy. There are seven levels in which the anxious child learns CBT concepts. However, the efficacy of Pesky gNATs has not been investigated so far in experimental or controlled settings.

#### *2.1.1.5. Teleconferencing/chat*

Telepsychiatry refers to psychiatric applications using videoconferencing communication. The TeleLink Mental Health Program (TeleLink) is a feasible manner in which children with mental

health problems from remote areas can be treated [28]; supervision-based telepsychiatry for therapists can also be delivered [29].

#### 2.1.1.6. SMS/e-mail

'Reach Out, Rise Up' is a text message intervention that significantly reduced anxiety and depression scores in a sample group of youths [30]. The intervention consisted of sending three text messages each week, for a period of 10 weeks: one message regarding psychoeducation content, one challenge related to the content learnt, and an inspirational message.

#### 2.1.1.7. Interventions delivered via virtual environments, virtual reality

Virtual reality (VR) represents a set of technologies that allow an individual to interact in real time with a 3D virtual environment. There are many interventions in virtual reality delivered for children and adolescents with anxiety disorders. In a feasibility study on VR therapies for social phobia in children, parents, children, and therapists rated such environments as acceptable and useful tools [31]. St-Jacques [32] compared a combined in vivo with VR exposure with exposure in vivo for children with arachnophobia, in order to investigate differences in motivation levels in children. There were no differences between the two conditions in terms of motivation; however, there were several interactions with parts of the treatment. Gutiérrez-Maldonado [33] tested VR exposure for children with school phobia in a sample group of children aged between 10 and 15, compared with no treatment. Despite the fact that school-related fears diminished considerably, general anxiety was not changed.

## 2.2. Parental involvement in offspring's treatment

There is mixed evidence regarding parental involvement in child CBT treatment, while there is proof that parental involvement does not add significantly to a child's therapy [6, 34], recent studies show that parental involvement in child therapy is associated with better outcomes in terms of remission rates at follow-up [35]. In a study focusing on in-session as well as out-session activities, there emerged some differences (high involvement in the former, low in the latter) that could stand for possible explanations for the mixed findings regarding added benefits of parental involvement in child anxiety treatment [36]. So far, no qualitative or quantitative approaches have been conducted in order to investigate/summarize parental involvement in remotely delivered CBT interventions with anxious children and adolescents. Such an approach is needed due to the fact that there are many remote interventions targeting mental health problems in youths which differ in several characteristics. Apart from characteristics related to the number of modules/sessions delivered, content, multimedia presentations, therapists involved (with or without clinician guidance), there are also differences with regard to parental involvement. While in several studies on remote CBT interventions, parents are mentioned only because they are the legal caregivers of the youth and they offer parental consent on their child's involvement in treatment, and are sometimes involved in the youths' mental health assessments (self-reports and clinician assessments) at the beginning and end of treatment, in other trials parents are actively involved in youth therapy. In these trials, parents read materials, help their children cope with anxiety, and have phone sessions with

clinicians. However, it is unclear whether parents should be involved in youth remote CBT anxiety treatment.

### *2.2.1. Aim/objectives*

The main objectives of the current review are: (1) to offer the state of the art of existent knowledge on parental involvement in remotely delivered CBT interventions for anxiety disorders in children and adolescents and (2) to propose a conceptual model which could be considered in designing effective remotely delivered interventions for anxious youth.

## **3. Method**

The current systematic review has been conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [37].

### **3.1. Inclusion and exclusion criteria**

We included only (a) randomized controlled trials with (b) remotely delivered (c) cognitive-behavioral interventions for (d) youths (children and adolescents), with (e) either a primary diagnosis and/or elevated symptoms of anxiety, which also involved (f) parents in the intervention.

We excluded trials in which the intervention did not include parental involvement in the treatment, the protocol was not CBT-oriented, or if the intervention was delivered exclusively for parents or conducted with adult participants. Also, trials in which the primary disorder was not anxiety, or targeted a primary medical condition, were excluded. Studies analyzing secondary data, systematic reviews/theoretical synthesis of literature, and feasibility studies were excluded. We selected only those studies published in English. There was no limitation regarding the year of publication.

### **3.2. Search strategy**

Electronic databases (PsychInfo, PubMed, Scopus, Web of Science) were consulted by two independent assessors up to April 10, 2016. We combined various terms related to the means of delivery, with terms pertaining to anxiety, as well as various terms indicating CBT treatments, and terms germane to children and adolescents. Finally, all these terms were combined with those related to randomized controlled trials. The reference lists of pertinent papers and meta-analyses published on the subject were screened in order to identify potentially relevant articles. We repeated the search on July 25, 2016, to double-check and identify whether new articles had been published since the first search.

### **3.3. Quality assessment**

We assessed the quality of the studies included using the Risk of Bias' tool, developed by Cochrane Collaboration [38]. We included the following sources of bias: random sequence

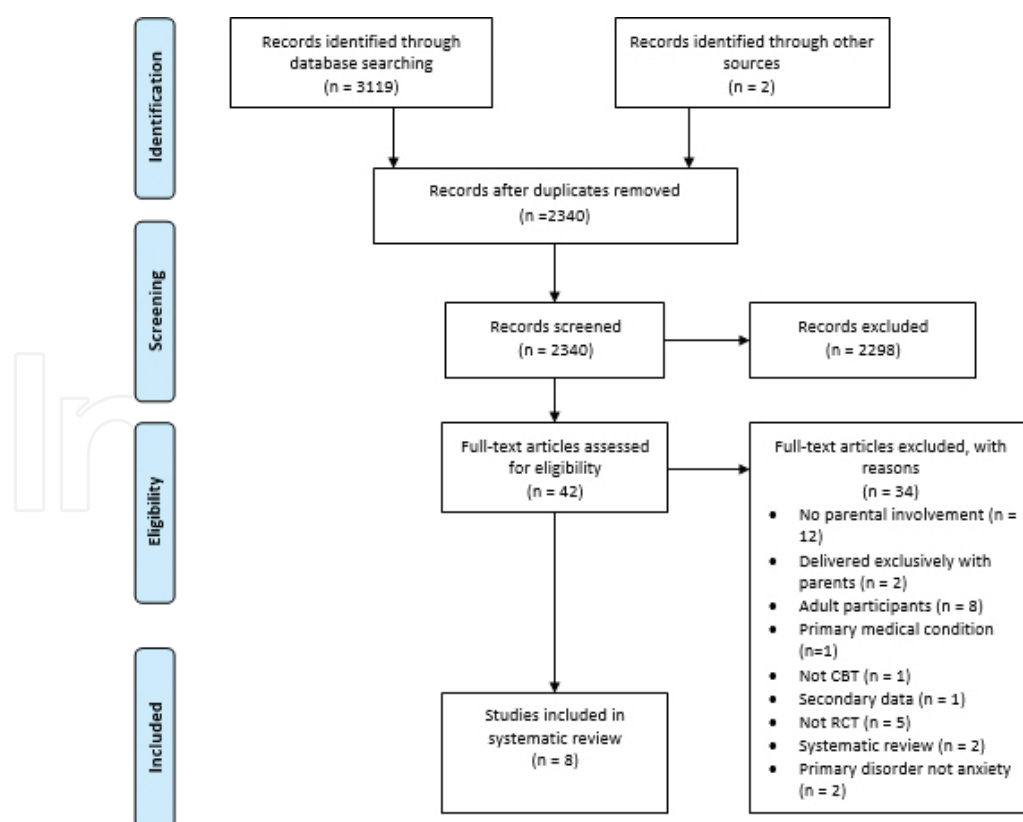


generation (selection bias), allocation concealment (selection bias), blinding outcome assessments (detection bias), and the incomplete outcome data (attrition bias). We did not include blinding of participants and personnel (performance bias) due to the fact that in remotely delivered treatments, most of the time, the therapists involved cannot be blinded regarding patients' allocation.

## 4. Results

### 4.1. Literature search

The literature search resulted in 3121 records. After removing duplicates, we screened the titles and abstracts of 2340 papers. Of these, 2298 papers were rejected and we further read the full text of 42 papers. Thirty-four papers were rejected due to the following reasons: no parental involvement ( $n = 12$ ), interventions delivered exclusively with parents of anxious children ( $n = 2$ ), delivered only with adult participants ( $n = 8$ ), targeting a primary medical condition ( $n = 1$ ), not CBT ( $n = 1$ ), secondary analysis ( $n = 1$ ), not RCT ( $n = 5$ ), systematic reviews ( $n = 2$ ), primary disorder not anxiety ( $n = 2$ ). Subsequently, a total of eight RCTs were included in the synthesis. **Figure 1** presents the flowchart describing the inclusion of studies.



**Figure 1.** Flow diagram of study selection process.

Study name Country	Condition	N % female participants	M <sub>age</sub> (SD) Age range	Diagnosis	Program	Adherence	Parental involvement	Parents characteristics	Therapist
Infantino et al., 2016 Australia	Audio- based vs WL	24 Children (54% girls)	7.25 (.49) 5-11	SAD (16.67%) SoP (25%) GAD (33.33%) SP (16.67%) OCD (8.03%)	Turnarou nd 10 lessons (20-30 min) over 5 weeks	No dropouts no missing data	-listen (together with the family or independ ly) -familiarize with core CBT in order to assist the child -offered two CDs (psychoeduc ation, praise, problem- solving strategies)	66.66% audio group parent completed university Age mothers 40.17 (1.18) fathers 43.42 (1.67) 66.66% from high income > 100.000\$	No therapist contact
Khanna & Kendall, 2010 SUA	cCBT vs individual CBT, CESA	49 Children (32% girls)	10.1 7-13	GAD (57.1%) SP (16.3%) SAD (14.3%) SP (8.1%) PD (4%)	Camp Cope-A- Lot 12 sessions (35 min)	The 45 remaining participants completed all 12 sessions within 15 weeks of their first session.	-2 parent sessions conducted by the coach while youth worked independ ly on Levels 3 & 7	No data on parents provided	A coach involved in exposure sessions (first 6 are completed independ ently, next 6 completed assisted by the therapist)
March et al., 2009 Australia	iCBT vs CBT face- to-face vs CESA	73 Children (54% girls)	9.45 (1.37) 7-12	SAD (32.5%), SoP (37.5%), GAD (20%), SP (10%)	BRAVE for Children — ONLINE 10 weekly 60 min sessions (child) 6 60 min sessions (parent) 2 booster sessions The Chase Worries Away intervent ion 11 sessions 2 booster session	Post-test 60% parents 33.3 % child Follow-up 72.3% parents 62% child	-parent sessions focused on core CBT	22.5% mothers 20.6% fathers completed university 21.1% iCBT 31,1% WL high income >100.000 \$ Age mothers 41.75 (5.34) fathers 44.78 (6.25)	Weekly contact 2 telephone contacts automated e-mails
McGrath et al., 2011 Canada	tCBT vs TAU	Anxiety sample 91 Children (64.15% girls)	8.82 (1.69) 6-12	28% tCBT 24.4% from control had comorbid disorders	The Chase Worries Away intervent ion 11 sessions 2 booster session	95% for session 86% for video 90% for skill implement ation	-Coaches reinforced the handbook and video content with the parent and/or child, helped the family solve problems, and provided encouragem ent	32% parents from tCBT 24.4% from control completed university 18% >55.000\$ Age 19-46	Telephone sessions from a coach (40 min)



Spence et al., 2011 Australia	iCBT vs CLIN vs WL	115 (59.13% girls)	13.98 (1.63) 12-18	GAD (48%) SoP (35%) SAD (13%) SP (4%)	BRAVE for Teenagers— ONLINE 10 weekly 60 min sessions (adolescents) 5 60 min sessions (parent) 2 booster sessions	79% parents 57 % adolescents	- parent sessions focused on core CBT + parenting strategies	46% fathers, 56% mothers completed university	15 min telephone call after session 5 to guide in exposure Monitors progress Sends e-mails after each session Automated e-mails
Storch et al, 2015 SUA	cCBT vs TAU	100 (44% girls)	9.82 (1.82) 7-13	GAD (44.9 %) PD (2%) SAD (18.4 %) SoP (26.5 %) SP (8.2 %)	Camp Cope-A-Lot 50-60 min sessions 12 weeks		- psychoeducation and parental support on sessions 3 & 7	51% parents graduated college 22.2% high income > 90.000\$	Coach involved in exposure sessions
Vigerland et al, 2016 Sweden	iCBT vs WL	93 (55% girls)	10.1 (1.7) 8-12	GAD (22%) PD (5%) SAD (32%) SoP (10%) SP (31%)	11 modules delivered over 10 weeks	83% families completed the first 9 modules 63% completed at least one of the two maintenance modules	-had to complete 7 modules containing information on how to help their anxious child	Ages 31-60 43.1 (5.3) 67% had a university degree	Online contact (written messages, written feedback on worksheets) telephone calls
Wuthrich et al., 2012 Australia	cCBT vs WL	43 (62.79% girls)	15.17 (1.11) 14-17	GAD (37.5%) SoP (50%) SAD (4.2%) OCD (10.5%) SP (10.5%) ANOS (0%)	Cool Teens 12 weeks 8 modules (30 min)	98.4% telephone call compliance rate	-parental involvement decided by the adolescent - assisting parents with handouts of CBT core strategies -telephone sessions	60% high family income >80.000\$	Telephone sessions with adolescent and parent

*Note.* cCBT =computerized cognitive-behavioral therapy; tCBT=telephone-based cognitive-behavioral therapy; iCBT= Internet-delivered cognitive-behavioral therapy; WL = waitlist; TAU = treatment as usual; GAD = generalized anxiety disorder; PD = panic disorder; SAD = separation anxiety disorder; SoP=social phobia; SP = specific phobia; OCD = obsessive compulsive disorder; ANOS = anxiety disorder without other specifications

**Table 1.** Characteristics of the studies included.

## 4.2. Study characteristics

A summary of the characteristics of the studies included (number of participants, age, type of remote intervention, parental involvement) is described in **Table 1**.

#### *4.2.1. Types of interventions*

March et al. [15] tested the efficacy of an iCBT intervention for child anxiety disorders. BRAVE for Children-ONLINE consisted of ten sessions for children delivered over 10 weeks, combined with six sessions delivered for parents. Booster sessions were also conducted at the end of the treatment in order to prevent relapses and to consolidate learnt skills. This intervention was delivered with therapist support; however, there was only minimal involvement, namely weekly online contact and two telephone sessions (description of the program and guidance on exposure). The credibility of the program was high; nevertheless, there was moderate satisfaction with the treatment, both in child and in parent ratings. Adherence, defined as the number of participants that completed the entire intervention, was between 33.3% (children) and 60% (parents), while at the 6-month follow-up this was higher, namely 62% (children) and 72.3% (parents).

Spence [16] investigated the efficacy of BRAVE for adolescents-ONLINE, compared with clinical-based treatment and wait-list. Adolescents had to complete ten sessions, while their parents completed five sessions. iCBT had similar outcomes to face-to-face treatment delivered in a clinic. Adherence was between 39% (adolescents) and 66% (parents). At the 12-month follow-up, 57% adolescents and 79% parents had completed all modules. There was moderate satisfaction with the treatment for both adolescents and parents; however, parents from the clinical condition reported a higher degree of satisfaction.

McGrath [39] compared a telephone-based CBT intervention with usual care for anxious children and found significant effects 240 days after the intervention had finished, with no effects after 120 days. The 'Chase Worries Away' intervention consisted of eleven CBT sessions plus two booster sessions in which a coach delivered the intervention by telephone. Parental involvement is not clearly described in this study, even though it is stated that telephone sessions with a coach were delivered with the family.

In a cCBT intervention, Wuthrich et al. [20] tested the Cool Teens program and found it to be an efficient intervention for adolescents with anxiety disorders. The intervention was delivered over 12 weeks and consisted of eight modules (30 min each) delivered on a CD-ROM. The intervention was delivered with clinician guidance, as there were several telephone sessions between therapist and adolescents, and therapist and parents. Significant improvements in anxiety outcomes were reported in clinician-rated instruments (41% did not meet primary anxiety diagnostic criteria and 23.5% did not meet criteria for no anxiety disorder on post-treatment, compared with no participants from control and 20% at follow-up), as well as in parent and child self-reports. Parental involvement in treatment was decided by the adolescent and consisted of offering handouts on CBT principles and telephone sessions.

Vigerland et al. [12] tested the efficacy of an iCBT treatment program compared with WL. The intervention consisted of 11 modules delivered over 10 weeks and involved both children (four modules) and parents (seven modules). The intervention was clinician-guided, with therapist contact delivered through written feedback and telephone. Satisfaction with the program was moderate in both parent and child ratings. Adherence to the program was not very high, given the mean number of modules completed by the families (9.7, SD 1.8, range 4–11), with 83% of

families completing the first nine modules and 63% completing at least one of the two maintenance modules.

Infantino [40] tested the efficacy of an audio intervention delivered in a clinic. The intervention was delivered over 5 weeks and consisted of ten lessons with a 20- to 30-min duration. Satisfaction with the treatment was moderate to high for both children and their parents. In terms of adherence, there were no missing data and no dropouts. At postassessment, several children from the intervention group no longer met criteria for their primary anxiety diagnosis, compared with participants from the control group (58.3 vs 16.7%). At the 3-month follow-up, 66.67% of the children from the audio condition were free from their primary diagnosis and 41.67% were free of any anxiety diagnosis.

Khanna and Kendall [19] tested the efficacy of the Camp Cope-A-Lot program, a cCBT intervention, compared with individual face-to-face CBT and computer-assisted education support and attention condition (CESA). In terms of satisfaction with the treatment, there were no differences in child ratings for cCBT and individual CBT conditions. In parent ratings, there were no differences between the three conditions, albeit there were slight tendencies to prefer cCBT and individual CBT over CESA.

Storch et al. [21] tested the efficacy of Camp Cope-A-Lot in a sample group of anxious children, compared with treatment as usual. The intervention consisted of 12 sessions delivered weekly, with the first six sessions delivered exclusively on the computer, while the other six sessions involved clinician guidance. Therapist helped children and their parents in exposure to fearful stimuli sessions. There was high satisfaction with the treatment reported by parents and children.

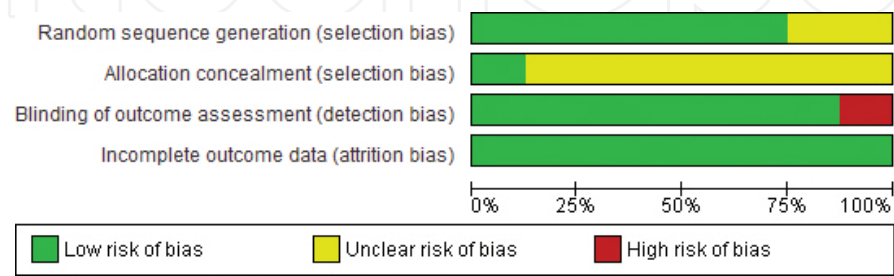


**Figure 2.** Risk of bias summary: review authors’ judgments about each risk of bias item for each study included.

4.2.2. Quality assessment

**Figures 2** and **3** illustrate the quality of the studies included. Most of these studies reported an adequate random sequence generation (n = 6), although in several studies the selection bias risk was unclear (n = 2). Only in one study was the allocation assignment concealed by sealed

double envelopes, while in the other studies allocation concealment was unclear (n = 7). In most of the studies, there were blind assessors (n = 7), while in one study there was a high risk of detection bias. There was no evidence of attrition bias, as there were either no missing data, or adequate statistical methods (intent-to-treat analysis) were used in order to control the effects of missing data. Only one of the studies included met all four of the quality criteria, while most of the trials included met two or three criteria. Two independent reviewers conducted the assessments of study quality with a high inter-rater agreement for each of the sources of risk. Disagreements were resolved via discussions until reaching consensus.



**Figure 3.** Risk of bias graph: review authors' judgments about each risk of bias item presented as percentages across all studies included.

4.2.3. Description of interventions (duration, modules)

We included three computerized interventions [19–21], three CBT interventions delivered over the Internet [12, 15, 16], one audio intervention [40], and one intervention delivered through telephone [39]. Youths from the studies included were aged between 5 and 17, with more female participants (54%). Children and adolescents included in the studies were diagnosed either with generalized anxiety, social anxiety, panic disorder, separation anxiety or with specific phobias, and presented mixed comorbidities (anxiety disorders, mood disorders, or externalizing disorders). Each intervention consisted of several module/lessons/sessions that ranged between 8 and 12, lasting between 20 and 60 min, and delivered between 5 and 12 weeks. Seven interventions also included a therapist/clinician, while one intervention did not include therapist guidance [40]. As we included only CBT interventions, the content was similar in each of the sessions, consisting of: psychoeducation, relaxation and breathing exercises, cognitive strategies (self-talk and cognitive restructuring), problem-solving, exposure, contingency management, and relapse prevention. The content of the interventions was presented in entertaining ways, such as text on slides, handbooks, photographs, videos, games, cartoon animation, quizzes, or audio stories of fictional characters.

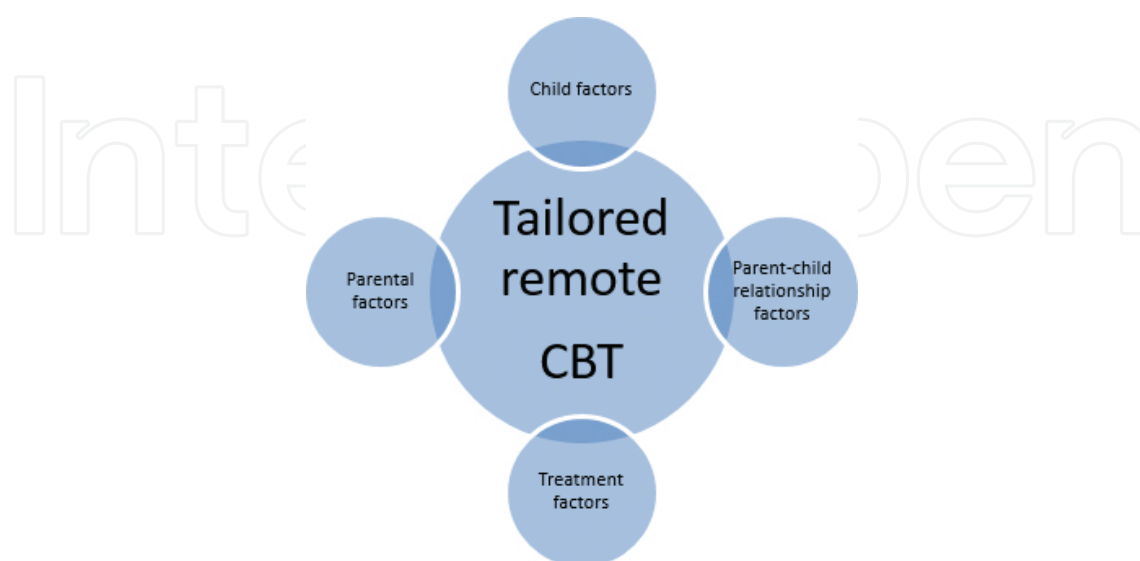
All the interventions were conducted in highly developed countries: Australia (n = 4), USA (n = 2), Canada (n = 1), Sweden (n = 1). Four of the studies included compared a remotely delivered intervention with waiting list control [12, 16, 20, 40], two of the previous studies also compared remote intervention with psychoeducation [15, 19], two studies compared it with treatment as usual [21, 39], and in three studies, remotely delivered interventions were also compared with face-to-face CBT [15, 16, 19].

#### 4.2.4. Parental involvement

Not all the studies reported demographic characteristics of the parents included, albeit most of the mothers and fathers included had completed higher education (university studies) and had a high annual income (expressed in several studies as more than 100,000\$). Studies differed slightly in what parental involvement meant, as while several interventions are described as a combination of parent and child treatment, in which parents have to also read several modules independently, in other interventions parents are involved only in two sessions in which psychoeducation is offered. In most of the interventions, parents learn core CBT principles and strategies in order to comprehend how to help their children to acquire the skills learnt in therapy and to assist them effectively when they encounter situations in which they can become anxious.

### 5. Conceptual model—how to design effective remotely delivered interventions for anxious youth

Parental involvement in remotely delivered CBT interventions needs to have a sound scientific background. Despite what is currently done in trials in which parents are involved in children's treatment programs as an add-on tool, many aspects need to be considered when designing efficient remote CBT interventions for children and adolescents with parental involvement. We have not been able to find any trial in which a remote intervention delivered solely for children is compared with a control condition involving both parent and child. Also, none of the studies included assessed factors related to changes in parent variables (anxiety or comorbidities, and mechanisms of change, such as parental cognitions). Therefore, it remains unclear whether parents should be included in remote CBT interventions and, if included, what parental involvement means. Is parental involvement in child anxiety remote treatment



**Figure 4.** Conceptual model for designing tailored remotely delivered CBT interventions with parental involvement.



a component that needs to be present throughout the treatment or are there some important timelines in which parental involvement could be associated with greater success of the therapy (exposure sessions, generalizability of learnt skills, homework compliance)? Should parents be involved in child treatment as a function of the comorbidities their offspring present? Several factors that are proposed for consideration when involving parents in youth anxiety remote CBT are presented in **Figure 4**.

Efficient remote CBT interventions need to take into consideration an important aspect that is often not considered: tailoring or personalizing an intervention according to patients' unique characteristics. Designing efficient interventions for children needs to take into account aspects related to: parents, children, parent-child relationship, and treatment.

### **5.1. Child factors**

Several socio-demographic characteristics (age, gender) can be considered when designing remote interventions for anxious children and adolescents. Unique mental health symptoms and disorderly clinical presentations (anxiety and comorbidities) should be tackled with a focus on tailored and transdiagnostic remote treatments. Evidence coming from literature on adults shows that transdiagnostic and tailored iCBT interventions are efficient in reducing main anxiety and depression problems, as well as in improving quality-of-life outcomes (Păsărelu et al., manuscript in preparation). Also, focusing on mechanisms of change (cognitive distortions/errors) and testing theories on which treatments are based can help us design evidence-based treatments.

### **5.2. Parental factors**

Several factors related to parents that have been investigated so far are: parental psychopathology, several socio-demographic factors related to parents (gender, education, income, and family structure), parenting styles, and parental accommodation. Parental psychopathology is related to treatment outcomes in anxious children [41], via family functioning and caregiver strain [42]. It appears that gender and several personality characteristics (extraversion) can influence online counseling, help-seeking [43]. Parental behaviors and parental cognitions have also been related to CBT outcomes [44, 45], with CBT treatment for anxious youth successfully changing parent-related variables (parenting, cognitions). Family accommodation for anxiety, defined as the involvement of parents in an anxious youth's efforts to avoid anxiety-provoking activities/situations, is another important factor that should be considered. There is evidence that individual CBT delivered with anxious youths has an effect on parental accommodation [46]; however, much research needs to be conducted regarding this aspect.

### **5.3. Parent-child relationship**

Parent-child relationship is an important variable that has to be considered when designing family interventions, as it is related to treatment outcomes [47]. Relationship quality, family conflicts, and familial dysfunction (for a review of parental involvement in CBT see [48]) should be assessed and considered when designing parental involvement in remote CBT.



### 5.4. Treatment factors

Several factors related to treatment are: attitudes (expectations, credibility, myths/erroneous information, concerns about remote CBT, treatment preferences), treatment compliance, in- and out-session behaviors [36]. In a study investigating parental attitudes toward cCBT, it becomes apparent that parents are positive about using such interventions to help their anxious child. Except for parental demographic factors, clinical factors, and engagement with technology, knowledge of cCBT treatments is a great predictor of cCBT usage [49]. Indeed, information on e-therapies can influence attitudes toward these treatments [50]. Also, despite the fact that children have high levels of computer usage, they are skeptical when it comes to using cCBT and, generally, their parents exhibit more positive attitudes regarding cCBT treatments [51]. Designing online intervention according to patients' preferences is associated with large reductions in anxiety outcomes, according to a preliminary study in which participants could choose which modules to attend from an iCBT intervention [52].

## 6. Discussion

The present study aims to present the current evidence on remote CBT interventions delivered for anxious children and adolescents with parental involvement. The systematic review includes eight papers in which remotely delivered interventions have been described. Interventions delivered over the computer (CD-ROM), Internet, telephone, and video were tested against waiting lists, psychoeducation, treatment as usual, and face-to-face CBT. Parental involvement in most of the papers included was directed to teaching parents how to help their children or adolescents deal with situations triggering anxiety and to help their offspring to better acquire the core CBT elements they learn in therapy.

We then proposed a conceptual model in which several factors (parent-, child-, parent-child relationship, treatment-related) were considered in order to design efficient CBT remote interventions for youths with anxiety disorders.

This review should be interpreted considering several limitations. First, we included a small number of studies. Second, the majority of studies included were computerized and Internet CBT interventions. Future studies should test the efficacy of remote CBT interventions in randomized controlled trials. Also, the investigation into mechanisms of change is a major limitation in all these studies, and future research should investigate such factors. We found no study comparing family-based remote CBT with child-based remote CBT, and such studies should be designed in order to have a clear picture of the role of parental involvement in these treatments. What are the implications of involving parents in remote treatments in terms of outcomes, adherence to treatment, and cost-effectiveness? Also, aspects related to when parents should be involved in anxious youths' treatment are unclear, as there is no study investigating the efficacy of only involving parents in exposure sessions, for example, compared with interventions in which parents are involved in all sessions. Parental predictors (demographics, psychopathology, parenting) of successful remote CBT interventions should be investigated in order to guide future developments in this area of research.

In conclusion, our systematic review raises several directions for future research on parental involvement in remote CBT interventions for anxious children and adolescents.

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## Appendix

Search strategy on PsychInfo

1. "Internet" OR "Internet-based" OR "Internet delivered" OR "web" OR "web based" OR "online" OR "computer-based" OR "computerized" OR "computerized" OR "mobile" OR "eHealth" OR "technology" OR "technology-based" OR "telephone" OR "smart-phone" OR "tablet" OR "app" OR "apps" OR "application" OR "serious game" OR "gamifying" OR "gamified" OR "remote" OR "virtual reality" OR "VR".
2. "anxiety" OR "anxious" OR "social anxiety" OR "social phobia" OR "separation anxiety" OR "phobia" OR "phobic" OR "panic" OR "generalised anxiety" OR "generalized anxiety".
3. "child" OR "children" OR "pediatric" OR "adolescent" OR "teen" OR "youth".
4. "CBT" OR "cognitive behavioral therapy" OR "cognitive behaviour therapy" OR "treatment" OR "intervention" OR "therapy" OR "self-help" OR "program" OR "iCBT" OR "cCBT" OR "eTherapy".
5. "randomised trial" OR "randomized trial" OR "controlled trial" OR "randomization" OR "randomization" OR "random assigned" OR "controlled" OR "trial" OR "RCT".
6. 1 AND 2 AND 3 AND 4 AND 5 AND 6.

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