Benchmarked effectiveness of family and school involvement in group exposure therapy for adolescent anxiety disorder

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ABSTRACT

Although cognitive-behavioral therapy (CBT) is an effective treatment for adolescents with anxiety disorders, the majority remain impaired following treatment. We developed a group CBT program (RISK) with high degrees of exposure practice and family and school involvement delivered in a community-based setting and investigated its effectiveness. The treatment involved adolescents (N = 90), with a primary diagnosis of anxiety disorder (82%) or obsessive-compulsive disorder (18%), and their families who received 38 hours of group treatment over 10 weeks. Diagnostic status and symptom severity were assessed at pre- and post-treatment, and a 12-month follow-up and benchmarked against previous effectiveness studies. Our results showed that, at post-treatment, the RISK-treatment was comparably effective as benchmarks on measures of diagnostic status, parent-rated measures, adolescent-rated measures, and clinician-rated measures. At 12-month follow-up all outcomes were superior to benchmarks, including the proportion of participants in remission (79.5%, 95% Highest Posterior Density Interval [74.7, 84.2]), indicating that the RISK-treatment enhanced effectiveness over time. The combination of group format, a high degree of exposure practice, and school and family involvement is a promising format for real-world settings that may help sustain and increase treatment effectiveness. Trial registered at helsetforskning.etikkom.no (reg. nr. 2017/1367).

1. Introduction

Anxiety disorders are common in the developmental stage of adolescence (12–18 years of age), with a prevalence rate of 4%-8% (Essau et al., 2018; Vizard et al., 2018). Anxiety disorders during adolescence inhibit the ability to seek autonomy and enter adulthood because they negatively affect social interaction, the development of independent living skills and educational outcomes (Swan et al., 2018). Furthermore, these impairments can continue into adulthood if left untreated (Swan & Kendall, 2016). Given the prevalence and negative impact of anxiety disorders in adolescents it is an important challenge to design interventions that provide short- and long-term effectiveness in routine-care clinical settings.

The best-established treatment for child and adolescent (2–19 years of age) anxiety disorders is cognitive-behavioral therapy (CBT), which has shown effect in specialized settings (i.e., efficacy) and in routine-care settings (i.e., effectiveness) in several meta-analyses (Whiteside et al., 2020; Wergeland et al., 2020; James et al., 2020). Regarding outcomes in routine-care settings, Wergeland et al. (2020) describe the outcomes of 29 studies on CBT for anxiety conducted in clinical routine-care or school healthcare settings. These outcomes were based on studies that primarily included children (Mean age = 9.9 years, SD = 1.7), with only 2 studies having a mean age above 12 years (Boddon et al., 2008, van Steenels & Bogels, 2015). The treatments were delivered individually or in groups, lasted 4–20 hours (M = 12.6, SD = 4.6) and included moderate to high degrees of family involvement. The
results indicate that at post-treatment, half of the children and adolescents were not in remission (loss of all anxiety diagnoses), and at follow-up one-third were not in remission.

The importance of treatment outcome research focusing on adolescents specifically has been highlighted by a recent meta-analysis by Baker et al. (2021). This meta-analysis presented 15 studies on CBT for adolescent anxiety, with 4 studies with adolescents receiving treatment in routine clinical care. The treatments were delivered individually or in groups, lasted 4–24 hours and parents were included in 7 of the studies. The results indicated that at post-treatment, two-thirds of adolescents were not in remission. These disconcerting results may be considered in light of the characteristics of adolescents in contrast to children, which include more severe symptoms, more difficulty attending school and higher rates of social anxiety disorder (SAD) (Waite & Creswell, 2014). Notably, SAD is associated with poorer treatment response (Hudson & Creswell, 2014) and predicts a greater risk of relapse after treatment (Ginsburg et al., 2010). Based on the above-mentioned observations, it has been recommended that interventions should be designed specifically for adolescents to handle more severe symptoms, more difficulty attending school and higher rates of SAD (Waite & Creswell, 2014). When questioning adolescents themselves, they are interested in interventions that are effective, do not interfere with participation and attendance in school, are intensive (i.e., longer sessions) and interventions with varied activities (Persson et al., 2017).

To address severe symptoms and improve the effectiveness of treatments for child and adolescent anxiety, several approaches have been investigated. The majority of these approaches have focused on increasing exposure practice, which is consistently associated with improved treatment effects (Whiteside et al., 2020). Additionally, a substantial amount of research has investigated the effect of modifying the type and amount of family involvement (Manassis et al., 2014; Sigurvinssdottir et al., 2020). The importance of involving parents is that they may reduce treatment dropout, increase treatment adherence and enhance trust and communication between parents and adolescents, which are known are protective factors against anxiety in adolescents (Ebbert et al., 2019; de Haan et al., 2013; Lee et al., 2019). Despite the potential benefits of involving parents, results on effectiveness are inconsistent, with a Cochrane review suggesting no added benefit (James et al., 2020). However, several studies suggest that parental involvement increases treatment effectiveness insofar as the treatment focuses on increasing the overall exposure practice (Breinholst et al., 2012; Manassis et al., 2014; Whiteside et al., 2020). A promising format for exposure enhancing parental involvement is the multi-family group. Lau et al. (2010) employed such a format in an effectiveness study setting for children (age 6–11 years) and included in-session exposure practice in two-thirds of the treatment sessions, which is substantially more than the average one of five sessions (Wergeland et al., 2020). As a result, Lau et al. (2010) demonstrated effectiveness with a remission rate of 65% at post-treatment.

To avoid interfering with adolescents’ school participation, and address any difficulties attending school, CBT for adolescent anxiety could potentially benefit from involving school personnel (e.g., teachers, school nurses) in treatment. In addition to practical help, school personnel could, similar to parent involvement, increase engagement in exposure practice. The school environment is also important because adolescents spend a large amount of time in this setting and often report that school is where their disability is most profound (Beidas et al., 1.32), and their parents, recruited from two community clinics for child and adolescent mental health between 2017 and 2019. Participants were informed about the study during routine intake procedures or after clinical evaluation suggesting the presence of an anxiety disorder. Parents and adolescents were invited to participate in the study if the adolescents met the Diagnostic and Statistical Manual of Mental Disorders 4th edition (American Psychiatric Association, 1994) criteria for a primary anxiety disorder (e.g., separation anxiety disorder, social anxiety disorder [SAD], specific phobia, panic disorder with or without agoraphobia, agoraphobia, generalized anxiety disorder, or
obsessive-compulsive disorder (OCD) as assessed by the Anxiety Diagnostic Interview Schedule Child and Parent version (ADIS-C/P) (Silverman & Albano, 1996). The diagnostic criteria from DSM-IV were chosen because the ADIS-5 has not yet been translated to Norwegian. Exclusion criteria for the study were as follows: the presence of a developmental or psychotic disorder, current self-harm behavior or suicidal ideation, concurrent participation in psychological treatment, a psychopharmacological treatment that had not been stable for 6 months before study enrollment, receiving CBT within the past 12 months, or not attending school more than 50% of the time over the previous month. In the exclusion criteria, a developmental disorder was defined as meeting criteria for a diagnosis of mental retardation or pervasive developmental disorder. The exclusion based on developmental disorder, psychotic disorder, current self-harm or suicidal ideation was not part of the study design per se but due to procedures at the clinic, which dictated that such disorders should be treated before anxiety disorders. The school attendance exclusion criterion was due to practical concerns about the school personnel involvement in the treatment. Only one participant was receiving concurrent psychopharmacological treatment (Methylphenidate). Recruitment and attrition are described in Fig. 1.

Fig. 1. Consolidated Standards of Reporting Trials (CONSORT) flow diagram.
2.2. Measures

2.2.1. Primary outcome measure

The ADIS-IV-C/P (Silverman & Albano, 1996) was employed to determine the adolescents’ diagnostic status. The ADIS-IV-C/P is a semi-structured interview administered separately to the adolescent and parents and has excellent reliability (Silverman et al., 2001). Diagnoses were semi-structured interview administered separately to the adolescent and parents. The diagnostic interviews were conducted and rated by participating clinicians. Efforts were made to ensure that assessments after treatment were not completed by clinicians who had delivered treatment within a group. Despite these efforts, 20% of participants were assessed by a clinician from the group they participated in. All interviews were videotaped, and a random selection of 20% of the interviews at pre- and post-treatment, and at the 12-month follow-up were re-rated by trained independent expert raters (one clinical psychologist, one child psychiatrist, and one clinical social worker) masked to the original assessors’ rating. The inter-rater reliability on CSR, using Cronbach’s α was 0.91, 0.94, and 0.97 for primary, secondary, and tertiary diagnoses, respectively.

2.2.2. Secondary outcome measures

The child and parent version of the Spence Children’s Anxiety Scale (SCAS-C/P) (Spence, 1998) was used to assess adolescents anxiety symptoms. The SCAS includes 38 items rated on 4-point Likert scales, yielding a maximum score of 114. Spence (1998) reported a six-month test-retest reliability of 0.71 and significant correlations with other anxiety measures. In the current sample, the SCAS-C showed excellent reliability (Cronbach’s α = 0.90), and the SCAS-P showed good reliability (Cronbach’s α = 0.87).

The severity measure of the Clinical Global Impression (CGI-S) (Guy, 1976) scale was used to assess clinician-rated global impairment and functioning as rated by clinicians delivering the treatment. The CGI-S evaluates the severity of the patient’s illness and comprises seven items ranging from 1 (normal) to 7 (extremely ill). The CGI-S is significantly correlated with self-reported measures of anxiety, depression, everyday functioning, and quality of life (Zaider et al., 2003). In this study, the CGI-S showed excellent reliability (split-half coefficient = .92).

2.3. Procedure

Participants were recruited from two community-based clinics for child and adolescent mental health that are part of the general national health services in Norway. Potential participants were contacted if there was an indication of a primary anxiety disorder in the referral letter or after a clinical evaluation suggesting the presence of a primary diagnosis of anxiety disorder. Eligibility was ascertained in three steps: (a) participants were contacted by phone by a study coordinator and screened for self-injurious behavior, suicidal ideation, and school attendance. Potentially eligible participants were (b) informed about the research project and asked to participate. Those who agreed met with a clinician (RISK-therapist) for initial screening and received information about the RISK-treatment. Finally, (c) participants met for an assessment with a participating clinician where ADIS-C/P and other study measures (SCAS-C/P, CGI-S) were completed. After treatment and at 12-month follow-up sessions adolescents met a participating clinician to complete ADIS-C/P, SCAS-C/P, and CGI-S. Assessments after treatment completion were planned in an effort to avoid adolescents being assessed by clinicians who had delivered therapy within their group.

Treatment completion was defined as having participated >50% of the intervention. This low threshold to be categorized as a completer was set based on considerations of the intensive nature of the treatment and what we considered essential aspects of treatment. Out of 38 hours of treatment 24 hours are spent in 4 intensive exposure days, which are considered essential. Therefore a limit was set such that completers must have attended at least one of these. Written informed consent was obtained for the entire sample, and the study was approved by the Regional Ethics Committee for research with human subjects (reg. nr. 2017/ 1367).

2.4. Treatment

The multi-family group CBT for anxiety disorders was based on general CBT principles and developed specifically for the study. The treatment was conducted in groups of five to eight families (mean group size: 7 families). In total, 14 groups received treatment during the study period. The treatment consisted of 12 sessions, lasting 38 hours over 10 weeks (including two 1.5-hour sessions with school personnel). Participating families were invited to attend 2-hour follow-up booster sessions at 3-, 6-, and 12-months post-treatment. The RISK-treatment included standard CBT-based interventions for child and adolescent anxiety. Further, the treatment included a high degree of self-conducted and therapist/family/peer-facilitated exposure practice, parental participation, and adolescents’ school personnel involvement (see Table 1 for treatment description). A distinctive aspect of the RISK-treatment was in sessions 5, 6, 9, and 10. During these sessions, four hours were dedicated to exposure practice by the adolescents in locations outside the clinic (e.g., at school, in the shopping center, on a bus). In these sessions, adolescents were paired with parents other than their own and a group clinician. Clinicians would manage smaller groups of 1–3 adolescents and their accompanying parents as they went outside the clinic. The mixing of families allowed the adolescents and parents to practice the techniques learned in earlier sessions without being affected by existing family dynamics. This process aimed to maximize the time spent by the adolescents performing exposure practice and, to an equal degree, help parents become more confident in their ability to assist in conducting exposure practice. Another distinctive feature of the RISK-treatment was the involvement of school personnel. The amount and type of school personnel involvement varied as per the needs of individual adolescents. For some adolescents, their anxiety symptoms were not visible in the school setting, and school personnel mainly aided in the logistics of planning day-to-day schoolwork around the treatment, given that sessions took place during school hours. For other adolescents, their anxiety symptoms were primarily experienced in the school setting; thus, school personnel played a much more active role in planning, facilitating, and conducting exposure practice with the adolescents.

2.5. Clinicians, clinics, and assessors

Participating clinicians (N = 20) were employed at one of two community-based clinics. The clinics service a population of 76,000 children and adolescents between the ages of 0 and 18 in rural and urban areas of southern Norway. Due to changing employment or taking leave from work, eight of the initial cohort of 12 study clinicians were replaced during the study period, leaving a total of 20 clinicians (70% female) who served as RISK-therapists during the trial. Each group session included four clinicians. The clinicians had 11.8 years of experience, on average, in child and adolescent mental health care (SD = 7.9, range = 2–30). The clinicians comprised different professional back- grounds, including six clinical psychologists, six social workers, four nurses specialized in psychiatry, two child psychiatrists, one pediatrician, and one schoolteacher. They volunteered for the study and conducted treatments as part of their ordinary workload.

Training of clinicians was conducted through participation in workshops and supervision. Eleven of the clinicians had formal education in CBT but received the same amount of training and supervision as those with no formal education. In preparation for delivering the study intervention, clinicians took part in three training workshops, each
### Table 1
Treatment description.

| Time (hours) | Intervention                                                                 | % of time within session |
|--------------|------------------------------------------------------------------------------|--------------------------|
| Together     | Adolescent only group Parent only group | 1.5                      | 50% | Psychoeducation for parents and school personnel |
| Session 1    | 0 0 1.5                                                       | Planning 50%              |
| Session 2    | 1.5 1 1                                                       | Psychoeducation for adolescents and parents, with emphasis on exposure practice and accommodation 33% |
|              | 1.5 1 1                                                       | Cognitive restructuring 33% |
|              | 1.5 1 1                                                       | targeting beliefs about exposure practice and accommodation Exposure practice performed collectively 23% |
|              | 1.5 1 1                                                       | Homework planning 10%     |
|              | 1.5 1 1                                                       | Cognitive restructuring focusing on thought distortions Exposure practice performed collectively Homework planning 45% |
|              | 1.5 1 1                                                       | Homework planning 10%     |
|              | 1.5 1 1                                                       | Psychoeducation about performing behavioral experiments and troubleshooting exposure practice Exposure practice performed as behavioral experiments Homework planning 20% |
|              | 1.5 1 1                                                       | Homework planning 10%     |
|              | 1.5 1 1                                                       | Preparation 10%           |
|              | 1.5 1 1                                                       | Exposure practice with adolescents paired with a parent to other participating adolescents under clinician supervision Homework planning 10% |
|              | 1.5 1 1                                                       | See session 5             |
|              | 1.5 1 1                                                       | Psychoeducation for adolescents, parents, and guests Cognitive restructuring Exposure practice Homework planning 33% 33% 23% 10% |
|              | 1.5 1 1                                                       | 45%                       |

Note. Sessions 5, 6, 9, and 10 follow the same format. In these sessions, the adolescents perform exposure practice with parents other than their own. This process is conducted to allow parents and adolescents to practice learned skills without getting disrupted by pre-existing interpersonal dynamics. In session 7, the adolescents are encouraged to invite guests who are important to them to the therapy. These guests receive psychoeducation similar to that received by parents and the adolescents in session 2.

lasting two days. Supervision was conducted by the program developer, who either took part in a treatment group or provided monthly supervision based on videotaped sessions. Fidelity to treatment was achieved through the training of clinicians, ongoing supervision, and the use of a treatment manual.

Six clinicians were trained in the administration of the ADIS-C/P interview. These were 2 clinical psychologists, 2 nurses specialized in psychiatry, 1 child psychiatrist and 1 social worker. The training was achieved through a two-day workshop seminar that included training in scoring and administration. The workshop was delivered by a licensed ADIS-C/P rater. All but one of the clinicians selected to conduct the ADIS interview had extensive prior experience with its use.

### Table 1 (continued)

| Time (hours) | Intervention                                                                 | % of time within session |
|--------------|------------------------------------------------------------------------------|--------------------------|
| Session 8    | Cognitive restructuring Exposure practice Homework planning 45% 10%          |
| Session 9    | 4 1 1                                                       | See session 5             |
| Session 10   | 4 1 1                                                       | See session 5             |
| Session 11   | 1.5 1 1                                                       | Exposure practice Planning and acknowledging progress 80% 20% |
|              | 1.5 1 1                                                       | Planning collaboration between parents and teachers 100% |
| Total        | 25 10 13                                                      |                          |

2.6. Data analysis

To compare findings to benchmarks a Bayesian analysis of informative hypotheses was performed (Gu et al., 2018). This approach was chosen because it would allow information on which alternative hypotheses (i.e., inferiority, equivalence) were most probable if the hypothesis of superiority was not supported (Gu et al., 2018). The planned sample size was 102 based on the estimation method by Schönbrodt et al. (2017). The estimation was based on a power of 0.80, with a minimal effect of 50% remission at post-treatment in expectation of a 20% treatment dropout.

The overall amount of missing information was 10%, with 56% of cases containing missing information. Missing data was primarily due to treatment dropouts and, to a lesser degree, an incomplete response at the item-level by treatment completers. There was no indication of any pattern of missingness in the data, and Little’s test of missing completely at random (MCAR) indicated that the data were not different from MCAR (p = .23). Missing data for all variables were accommodated using multiple imputations, with 50 imputed datasets. All analyses were performed using the intent-to-treat principle unless otherwise specified.

Bayesian sensitivity analyses were performed to investigate the effect of assumptions about nesting of variables (i.e., by group, site, clinician),
normality, inclusion of outliers and differences between assessors (same-
group clinician vs. not same-group). These indicated that the analyses 
were consistent across different assumptions of nesting, normality, 
and inclusion of outliers and that there was no difference in outcome be-
tween assessors. Thus, all participants were included in the analysis, and 
the simpler model of no clustering effect was employed for analyses. As 
recommended for Bayesian procedures (Depaoli & van de Schoot, 2017), 
we also assessed how robust results were to different priors, and found 
that results were similar across different priors.

For all outcomes, the posterior distribution simulation was per-
formed using Metropolis-Hastings Monte Carlo (Hastings, 1970), 
applying three chains, 12,500 burn-ins, and 50,000 iterations. Every 
fifth iteration was used to avoid autocorrelation on measures with few 
observed instances. Convergence and stability of simulations were 
checked using the Gelman-Rubin statistic. Inferential statistics were the 
posterior probability, the Bayes factor for the alternative over the null 
(BF10), and the highest posterior density interval (HPD). The posterior 
probability describes the probability of a certain hypothesis. The BF10 
describes the weight of evidence for one hypothesis over another and 
allows for a three-logic interpretation, indicating the following: (a) there 
is evidence for the alternative hypothesis, (b) there is evidence for the 
null, or (c) there is not much evidence for one over the other hypothesis 
(Dienes & McLauchlan, 2018). A BF10 above 3/1 or below 1/3 was 
considered evidence for one hypothesis over another. The HPD describes 
the interval where the true parameter has a 95% probability, with values 
closer to the center being more probable.

For dichotomous outcomes, Bayesian logistic regression was 
employed. Prior distributions for regression coefficients were diffuse 
normal with a mean of 0.5. For continuous outcomes, Bayesian linear 
regression was used with diffuse normal priors with a mean of 0 for 
coefficients.

Secondary analyses were conducted to examine the effect of the 
primary anxiety disorder type on treatment outcomes. Bayesian multi-
nomial logistic regression was used for dichotomous outcomes, and 
Bayesian repeated-measures ANOVA for continuous outcomes. Both the 
direct and interaction effects were assessed.

2.7. Benchmarking and reliable change

Tests against benchmarks were performed using Bayesian equiva-
ience tests (Kluglisk et al., 2005) and Bayesian analysis of informative 
hypotheses (Gu et al., 2018). Three hypotheses were tested: (a) the 
observed value is bigger than the benchmark (Hbigger), (b) the observed 
value is equal to the benchmark (Hequal), and (c) the observed value is 
smaller than the benchmark (Hsmaller). Results were reported as the 
prior probability of each hypothesis. Benchmarks were selected to 
assess the clinical comparable effectiveness of the intervention and 
normative equivalence.

Benchmarks for clinical equivalence were based on a meta-analysis 
of the effectiveness of CBT for child and adolescent anxiety disorders 
in routine-care settings (Wergeland et al., 2020). It is important to note 
that this benchmark included children (age < 12), and thus differs from 
the current study sample. However, few effectiveness studies in routine 
clinical care have been conducted with only adolescents (Baker et al., 
2021), and those studies that include adolescents generally having lower 
levels of remission from all anxiety disorders than observed in the 
benchmark meta-analysis. Thus, the benchmark meta-analysis was 
chosen because of its comprehensiveness and that it allowed a conser-
vative estimate of the current studies’ relative effectiveness.

In the benchmark meta-analysis, the proportion of children and ad-
olescents in remission from all anxiety disorders was estimated at post-
treatment (k = 27, 50.7%; CI 95%: 45.3-56.2) and follow-up (mean 
length = 10.7 months, k = 22, 69.4%, CI 95%: 64.1-74.3). Benchmarks 
for other outcomes were based on studies included in the meta-analysis 
by Wergeland et al. (2020). In raw change scores the benchmarks at 
pot-treatment were for SCAS-P 4.2-11.9, for SCAS-C 6.7-13.0, for CGI-S 
0.9-2.2 and for CSR of primary diagnosis 0.5-3.2. At follow-up bench-
marks were for SCAS-P 10.8-16.1, for SCAS-C 6.7-16.6 and for CSR 
of primary diagnosis 1.1-3.8. No benchmark was available for CGI at 
follow-up. Normative equivalence was defined as scores corresponding 
to T-scores of less than 60 on the SCAS-C/P and the CGI-S score of 2 SD 
below pre-treatment mean.

Reliable change index (RCI) and clinically significant change were 
used to assess clinically significant change on the SCAS-C/P and CGI-S 
(Jacobson & Truax, 1991). Reliable change was defined as RCI > 1.96. No participants experienced a reliable change in a negative di-
rection. Thus, reliable change is only described as present or not. When 
RCI scores indicated reliable improvement, and the score on the 
outcome measure was within the normative equivalence the adoles-
cent was considered to have a clinically significant change.

3. Results

3.1. Sample characteristics

The participants were 90 adolescents (77% female) and their par-
ents. Social anxiety disorder (SAD) was the most prevalent primary 
anaxiety disorder (52.4%). Comorbidity was high, with 72.9% of the 
participants having one and 35.3% having two or more comorbid dis-
orders. The total proportion of adolescents who met diagnostic criteria 
for anxiety diagnoses was as follows: SAD (67.7%), separation anxiety 
disorder (10%), generalized anxiety disorder (22.2%), panic anxiety 
and/or agoraphobia (27.7%), specific anxiety disorder (11.1%), 
obsessive-compulsive disorder (27.8%). There were no significant dif-
fences in the severity of outcome measures (CSR, CGI-S, SCAS-C/P) 
between sexes at pre-treatment (all comparisons between sex, p > .05).

There were no significant differences between groups on outcomes 
after treatment and follow-up (all comparisons of group as predictor of 
outcome, p > .05) and nesting individuals within groups or clinics did 
not change the results of analysis. At post-treatment adolescents rated on 
a scale from 1–10 how sure (1 = not sure, 10 = very sure) they would be 
in recommending the RISK-treatment to a friend struggling with anxiety. 
This measure indicated the treatment to be acceptable by adolescents (M 
= 7.1, SD = 2.0, Median = 8). All adolescents had at least one adult from 
school partake in psychoeducation. Among the school personnel, 76.5% 
were actively involved in the treatment. On parent-rated measures of 
school personnel’s ability to follow through on treatment aims, the 
majority were rated as very good (24.9%) or good (45.3%). Only 4.8% of 
parents rated school personnel as poorly or very poorly (see Table 2 
for further description of participant characteristics).

3.1.1. Treatment non-completion

Ten participants (11.1%) were defined as treatment non-completers. 
Reasons for treatment discontinuation were as follows: (a) finding 
treatment too demanding (n = 7), (b) personal disagreement involving 
another participant (n = 1), (c) finding distance to treatment too far (n = 
1), and (d) receiving an offer for individual therapy with a private 
practitioner (n = 1). See Fig. 1 for the participant flowchart. Post hoc 
comparisons of completers and non-completers showed no pre-
treatment differences (BF10 < 1) for participants’ age, sex, amount of 
previous therapy, number and severity of anxiety disorders, comorbid 
disorder, or symptom severity (SCAS-C/P, CGI-S).
3.3. Secondary Analyses

3.3.1. Symptom measures

Decrease in adolescent-rated anxiety symptoms (SCAS-C) was equivalent to benchmark at post-treatment (Posterior probability; \( H_{\text{equal}} = 0.48, H_{\text{Bigger}} = 0.51 \)) and at follow-up (Posterior probability; \( H_{\text{equal}} = 0.92, H_{\text{Bigger}} = 0.05 \)). Decrease in severity of primary anxiety disorder and clinician-rated symptom severity was superior to benchmarks at post-treatment (posterior probability; \( H_{\text{Bigger}} \approx 1.00 \)). Benchmarks were not available for clinician-rated symptom severity, but decrease in severity of primary anxiety disorder continued to be superior to benchmark at follow-up (posterior probability; \( H_{\text{Bigger}} \approx 1.00 \)) (see Table 4 for further description).

3.3.2. Clinical significance

Only the adolescents in the clinical range at pre-treatment were included in the analyses of clinically significant change. The proportions of adolescents in the clinical range at pre-treatment were SCAS-C (71.8%), SCAS-P (76.1%), and CGI-S (100%). At post-treatment the sample showed equivalence to the normative benchmark on SCAS-C and CGI (\( BF_{10} > 150 \)), thus indicating that there was >150 times more support for the hypothesis that the sample was equal to the normative benchmark than there was support for the hypothesis that it was not equal. At post-treatment there was a slight tendency toward normative equivalence on SCAS-P (\( BF_{10} = 2.02 \)). At 12-month follow-up the sample showed normative equivalence on SCAS-C, SCAS-P, and CGI (\( BF_{10} > 150 \)). Further details on reliable change and clinical significance can be found in Table 5.

3.3.3. Exploratory analyses

A diagnosis of social phobia negatively predicted remission relative to other diagnoses (\( OR = 0.91, 95\% \text{ HPD [0.80, 0.99]}, BF_{10} = 4.61 \)) and loss of primary diagnosis (\( OR = 0.90, 95\% \text{ HPD [0.81, 0.99]}, BF_{10} = 5.04 \)). There were no other direct or interaction effects of diagnosis on the CSR, SCAS-P, SCAS-C, and CGI-S (highest \( BF_{10} = 0.18 \)) outcome measures (Table 6 describes the full remission by primary anxiety disorder).

Exploratory validity checks were performed to assess the impact of the amount of therapy given in addition to RISK-treatment. Information was gathered from public health records on the number of therapy sessions attended before beginning the RISK-treatment and between post-treatment and the follow-up. The number of treatment sessions given before RISK was not associated with change in the probability of remission at post-treatment (\( OR = 1.01, 95\% \text{ HPD [0.98, 1.03]} \)) or follow-up (\( OR = 0.99, 95\% \text{ HPD [0.97,1.02]} \)). The study was conducted at a public health community clinic, and thus participants could not be denied treatment between post-treatment and follow-up. Additional therapy sessions between post-treatment and follow-up were offered if the participating adolescents expressed a need for further help. There was a substantial difference in the number of additional sessions between those who were in remission at the 12-month follow-up and those who were not \((n(90) = 7.9, BF_{10} = 1.55e+11)\), indicating that each additional therapy session predicted a lower probability of remission (\( OR = 0.90, 95\% \text{ HPD [0.87,0.93]} \)).

Among those who achieved remission by the follow-up, 87.5% \((n = \ldots \text{remitters})\) had more therapy sessions than those who did not achieve remission \((n = \ldots \text{non-remitters})\).

### Table 3

Remission and loss of diagnoses.

| Diagnosis                                    | Post-treatment | Benchmark<sup>a</sup> | 12-month follow-up | Benchmark<sup>a</sup> |
|----------------------------------------------|----------------|------------------------|---------------------|------------------------|
| Free of all anxiety disorder (ITT)           | 42.30          | 37.63, 47.04           | 2.00%               | 0%                     | 98%                   | 79.52                 | 74.71, 84.16           | 0%                     | 0%                     |
| Free of all anxiety disorder (complete case) | 41.60          | 30.50, 52.60           | 59.3%               | 3%                     | 38%                   | 85.90                 | 78.10, 93.70           | 0%                     | 0%                     |
| Free of primary anxiety disorder (ITT)       | 43.10          | 38.80, 47.30           | -                   | -                      | -                     | 81.60                 | 78.30, 84.90           | -                      | -                      |
| Free of primary anxiety disorder (complete case) | 40.50 | 29.60, 51.40           | -                   | -                      | -                     | 85.90                 | 78.10, 93.70           | -                      | -                      |

Note. Intention to Treat (ITT). Benchmarks were not performed on the loss of primary disorder as these were not available. ITT \((N = 90)\), complete case \((N = 85)\).

<sup>a</sup> The Highest Posterior Density (HPD) describes the interval with a 95% probability of the true parameter value.

<sup>b</sup> Benchmarking describes the probability that the observed measure is equal to \( H_{\text{equal}} \), larger than \( H_{\text{Bigger}} \), and smaller than \( H_{\text{Smaller}} \) results described in (Wergeland et al., 2020).
had received no additional therapy, 8.0% (n = 6) had received one to five additional therapy sessions, and 4.5% (n = 3) had received more than five additional therapy sessions. The additional treatment received by those in remission was primarily CBT and exposure-oriented booster sessions. The additional treatment received by those not in remission was highly varied and included the following: trauma-informed supportive therapy approach without known trauma (n = 7), eclectic supportive therapy and collaboration with school (n = 5), systemic family therapy and collaboration with schools (n = 5), CBT-oriented booster sessions (n = 1).

4. Discussion

This study evaluated the effectiveness of an enhanced group CBT treatment (RISK) for adolescent anxiety disorders, including intensive therapist/family/peer-assisted exposure therapy with family member and school personnel involvement. At post-treatment and at the 12-month follow-up, 41.6% and 85.9%, respectively, of those who completed treatment were free of all anxiety diagnoses. This substantial increase in effectiveness, from post-treatment to the 12-month follow-up, was due to receiving additional therapy. Only 12.5% of those who achieved remission at the follow-up received any additional therapy, with the majority (8%) receiving five or fewer additional sessions. Benchmarking against a meta-analysis of CBT for child and adolescent anxiety disorder (Wergeland et al., 2020) indicated equivalence on symptom measures (SCAS-C: Posterior probability; $H_{\text{Equal}} = 0.62$, SCAS-C: Posterior probability; $H_{\text{Equal}} = .48$) but inferiority on measures of remission at post-treatment (Posterior probability; $H_{\text{Smaller}} = .98$). However, at the 12-month follow-up, there was a 99.99% probability that the treatment was superior to the benchmark on remission measures. Similarly, parent- and adolescent-reported anxiety outcomes and the clinical global impression showed the same trend of increased effectiveness over time. In addition to the effectiveness of treatment it was found that treatment attrition rate (11.1%) was lower than the benchmark (Anxiety = 12.6%, OCD = 13.4%, Wergeland et al., 2020), and may be understood in light of the high degree of parental involvement (de Haan et al., 2013). In line with the low attrition rate, adolescents indicated at post-treatment that they would recommend RISK to a friend struggling with anxiety. Overall, the results indicate that the treatment was effective and acceptable for adolescents with a range of anxiety disorders and OCD.

In line with expectations and previous research, the current sample had a higher average age and had higher rates of SAD as primary diagnosis (52.4%) than the benchmark that included children (proportion with SAD in benchmark: 17%-39%). Thus, it is not unexpected that treatment did not outperform benchmark at post-treatment, given that higher age and SAD are associated with poorer outcomes (Ginsburg et al., 2018, Hudson et al., 2015, Manassis et al., 2002). However, outcomes on remission were better than those expected from studies that only included adolescents (Baker et al., 2021). Thus, it is promising that the current sample of adolescents achieved results comparable to other effectiveness studies that targeted a younger population with SAD (7–13 years of age; Martinsen et al., 2009; Villablo et al., 2018). Despite the comparability, age and diagnostic composition may explain why the treatment did not show an enhanced effect relative to the benchmark at post-treatment.

The enhanced treatment effect was visible at the 12-month follow-up. Results at this time demonstrated a substantial improvement in the probability of achieving remission (99.99% for treatment vs. 94.6% for benchmark). The Bayes Factor ($BF_{\text{Posterior}}$) for remission at follow-up was 4.85, indicating a substantial increase in the evidence for the treatment effect. The highest posterior density (HPD) interval for remission at follow-up was [70.2%, 96.1%], with a posterior probability of 99.99%. This strong evidence for the treatment effect suggests that the enhanced CBT treatment is effective and acceptable for adolescents with anxiety disorders and OCD.
across diagnoses relative to post-treatment. At the 12-month follow-up, the effectiveness was superior to the benchmark on diagnostic measures and adolescent-rated anxiety measures. Additionally, only one adolescent relapsed between post-treatment and the follow-up. The treatment effect sustainability is particularly promising given that many adolescents relapse in the long-term after treatment completion, with age and SAD predicting a greater risk of relapse (Ginsburg et al., 2018).

To understand the observed sustainability of remission and the delayed increase in the treatment effect at the follow-up, it may be useful to consider how family and school support affected treatment adherence. Treatment adherence is an important predictor of treatment outcome for anxious adolescents and is promoted through adult support (Lee et al., 2019). However, when treatment ends, an important aspect of adult support to adherence, namely the clinician, is removed. The partial transfer of control to parents and school personnel performed in the treatment may have helped sustain the adult support system, thus maintaining treatment adherence. In addition to maintaining treatment adherence, parental involvement may also have improved trust and communication within families, which is a protective factor against anxiety in adolescents (Ebbert et al., 2019).

An important implication of the findings relates to the transdiagnostic group format. Such a format is advantageous in routine-care settings, where there may not be enough patient flow or resources to offer disorder-specific treatments for all types of anxiety disorders. Additionally, the group format allows multiple adolescents to gain access to therapists qualified in exposure therapy. Moreover, it also allows for longer sessions. This implication is important since time-constraints and limited therapist qualifications are primary reasons why exposure interventions are not performed in routine-care settings (Pittig et al., 2019). Notwithstanding the advantages of transdiagnostic group CBT, previous studies have found disorder-specific CBT to yield superior outcomes (Reynolds et al., 2012). This finding has led some to argue that disorder-specific CBT should be the preferred format, especially for SAD (Spence & Rapee, 2016) and OCD (Freeman et al., 2018). This study serves as a counterargument to such notions, showing effectiveness across a range of disorders, including SAD and OCD.

Some limitations of the current study should be noted. One such limitation is the study design, which did not include any control condition or randomization. Due to the lack of a control condition, it is not possible to conclude to what extent improvements can be attributed to the RISK-treatment. However, it is possible to conclude that improvements cannot be attributed to treatment other than RISK since assessments of previous therapy and additional therapy received during the follow-up were obtained from patient records. These assessments indicated that improvement in outcomes was not related to previous therapy or receiving extra therapy between post-treatment and the 12-month follow-up. Another limitation was the lack of formal assessment of clinician fidelity to treatment. This limitation also restricts the extent to which improvements can be attributed to the RISK-treatment. Although no formal assessment of clinician fidelity was performed, several measures were taken to ensure clinician fidelity. These measures included training before beginning intervention, using a detailed therapist manual, and constant supervision during the study period. A third limitation is that clinicians assessing diagnostic status post-treatment also participated as treatment providers. Therefore, the assessors may have been biased in their rating. However, 20% of diagnostic interviews were re-assessed by independent raters and excellent reliability was observed.

In addition to the above-mentioned limitations, another caveat of the RISK-treatment is the number of hours and clinician resources required for this treatment. On one hand the 38 hours of RISK seems much more costly than the 4–24 hours observed in other treatments for adolescents (Baker et al., 2021), and it may not be possible to conduct RISK in all settings. On the other hand, the intervention elements that require extra time and clinicians (i.e., longer sessions, intensive treatment, extensive parental and school involvement) were those that aimed at enhancing treatment effects for adolescents specifically. The enhanced effect was achieved and the additional time and resources allowed for transdiagnostic groups that are beneficial in routine-care settings. Additionally, the treatment format allowed for 9 clinicians with no prior education and training in CBT to deliver effective treatments, which is important given the limited access to CBT clinicians. Given the costs of adolescent anxiety, RISK may be a viable treatment, particularly in cases with SAD or when previous treatment has not been beneficial.

Considering the above-mentioned, future research is needed to investigate the cost-effectiveness of RISK, and how to implement such interventions in different settings with the aim of maintaining effectiveness while reducing resources needed. In relation to this, it will be important to investigate the potential for RISK to be offered as a first-line treatment for SAD. Currently, work has begun on modifying the RISK-treatment to a digital self-help platform, and modifying RISK to be delivered by school personnel in a shorter format. In Norway, 31 schools have received training in this shorter format, and are offering the intervention. At this time, RISK is still implemented as standard care in the community clinic where the study was conducted. These preliminary results suggest that RISK has the potential to be implemented across different settings. However, questions remain regarding the effectiveness of variations of RISK and important moderators such as adolescents’ motivation that may vary under different circumstances. Thus, further research into variations of RISK is needed in the development of stepped care and tailoring interventions to target specific needs.

In conclusion, this trial provides support for the use of multi-family, multi-disorder group CBT for adolescent anxiety disorder that includes high exposure to feared situations and high levels of parental and school involvement. A particularly promising result was that only one of the participating adolescents who achieved remission at post-treatment relapsed during the follow-up period, and many participants who had not achieved remission at post-treatment achieved remission during the follow-up period. Furthermore, it provides proof-of-concept that this approach is feasible within routine-care clinics and effective across a range of included diagnoses. Further research should evaluate the described approach in a randomized controlled design to further investigate its potential in a stepped care approach.

CRediT authorship contribution statement

Thomas B. Bertelsen: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. Gro Janne Wergeland: Writing – review & editing, Supervision. Tine Nordgreen: Writing – review & editing, Supervision. Joseph A. Himle: Writing – review & editing, Supervision. Åshild Tellefsen Håland: Writing – original draft, Writing – review & editing, Supervision, Conceptualization, Resources, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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