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ORIGINAL ARTICLE

Preventing the Onset of Anxiety Disorders in Offspring of Anxious Parents: A Six-Year Follow-up

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Abstract

This study examined the effects of a family-based intervention Coping and Promoting Strength (CAPS) relative to a control condition, information-monitoring (IM), to prevent the onset of anxiety disorders in offspring of anxious parents six years after their initial assessment. One hundred thirty six families participated in the original randomized trial; 113 (83%) completed the one time follow-up assessment. Presence of anxiety disorders and severity of symptoms in offspring were assessed by masked evaluators using the Anxiety Disorders Interview Schedule; parents and offspring also completed questionnaires assessing offspring anxiety. Using the intention to treat sample from the original trial, Cox regression models showed significant intervention main effects in the rate of onset of anxiety disorders from baseline to follow-up (anxiety disorder: hazard ratio (HR) = 2.55, 95% CI: 1.54, 4.21) but growth curves suggest effects occurred within the first year after program completion. No group differences were found in the cumulative incidence of anxiety disorders at the six-year follow-up. Additional intervention appears needed to maintain the initial positive effects long-term to reduce the risk for downstream disability. Clinical Trials Registration: NCT00847561

Key Words Anxiety Disorders · Prevention · Follow up · Family-based

Pediatric anxiety disorders are common, impairing, and costly [1, 2]. The most recent meta-analysis (25 family aggregation studies, 7,285 offspring) concluded that offspring of parents with an anxiety disorder are more likely to meet criteria for an anxiety disorder relative to parents without an anxiety disorder with the risk ratio estimated to be 1.76, with parental generalized anxiety and panic disorders conferring an increased risk [3]. Family aggregation studies and prior meta-analyses also report higher risk for offspring of parents with an anxiety disorder [4, 5] with offspring of parents who meet criteria for an anxiety disorder being four times more likely to have an anxiety disorder compared to offspring whose parents have no disorder. Taken together, these data suggest that targeting this high-risk population for the prevention of disorder onset may lower the social, academic, economic, and familial burden associated with pediatric anxiety disorders.

A growing literature examining the effectiveness of psychosocial preventive interventions (universal, targeted, and indicated models) for anxiety disorders in youth shows promising results. Meta-analyses [6–10] conclude that anxiety prevention interventions, which are largely school-based and target youth with elevated anxiety symptoms, have a modest but significant effect size (e.g., pooled standardized mean difference—0.3). No consistent moderators of intervention response have been identified. Data from these meta-analyses generally conclude that the effects of interventions diminish over time.

With respect to anxiety prevention programs specifically targeting offspring of anxious parents (the target population in the current study), we were able to locate only one published study, conducted in the United Kingdom. Cartwright-Hatton and colleagues [11] examined the feasibility of a one-session group parenting intervention. In this study, 100 parents with children ages 3–9 years old

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were randomized to receive the intervention ($n=51$) or a treatment as usual control condition (TAU; $n=49$). Results at a 12 month follow up indicated that 60.5% of offspring in TAU met criteria for an anxiety diagnosis compared to 51.5% in the intervention group (no statistical significance tests were conducted and there was no long-term follow-up). No moderators of intervention response were identified.

Our research team developed and tested the efficacy of the Coping and Promoting Strength Program (CAPS), a psychosocial family-based intervention designed to prevent the onset of anxiety disorders in youth whose parents have an anxiety disorder [12]. Specifically, CAPS consists of 8 weekly 60-min sessions and three optional monthly booster sessions. Clinicians meet with each family individually. The intervention [12] targets theory-based modifiable child and parent risk factors such as child social avoidance/withdrawal, maladaptive cognitions, and deficits in problem-solving skills, and anxiety-enhancing parenting behaviors (e.g., modeling of anxiety, overcontrol/overprotection). Intervention strategies are based on core components of cognitive behavioral therapy for youth with anxiety disorders. For the first two sessions, therapists meet with parents alone; the remaining sessions include all interested family members. In our randomized controlled trials, the control condition, referred to as Information-Monitoring (IM) included a free 36-page pamphlet containing information about anxiety disorders and treatments published by the American Psychological Association. The pamphlet did not include detailed information about the anxiety reduction strategies included in the Coping and Promoting Strength Program. Families assigned to the IM condition did not meet with a therapist but were expected to complete all assessments after their baseline evaluation. IM families were offered CAPS after they completed a 1 year follow up.

In the original efficacy study [13], 136 eligible families were randomized (1:1) to receive CAPS or IM. Assessments occurred at baseline, 8 weeks after baseline (post intervention) and at 6 and 12 months after the target date of the post intervention assessment. Evaluations were conducted by masked evaluators. The results of survival analysis indicated that the onset of anxiety disorders for children in IM was 6.6 times higher compared to children in CAPS during the 12 month period [hazard ratio (HR) = 6.60 (95% CI: 2.00, 21.82); $p=0.002$]. Cumulatively, 5.26% of offspring in CAPS compared to 30.65% in IM developed an anxiety disorder by the one-year assessment [13]. The intervention effects were not moderated by child age or child gender for the onset of anxiety disorders in either CAPS or IM. However, there were significant or marginally significant interaction effects with the baseline anxiety symptoms when examining anxiety symptoms at each of the post randomization assessments, suggesting that the benefit of the intervention was stronger for those with higher, compared to lower, baseline anxiety symptoms.

The current study presents results of a six-year naturalistic follow-up of offspring randomized in this efficacy trial (i.e., a one-time follow up assessment that occurred approximately 72 months after initial randomization). Specifically, we examined the cumulative incidence of anxiety and other psychiatric disorders as well as the rate of disorder onset (using Cox proportional hazards survival analysis) in CAPS relative to IM. Our primary hypothesis was that offspring randomly assigned to CAPS, relative to IM, would have a lower cumulative incidence of anxiety and other psychiatric disorders and a slower rate of disorder onset from baseline through the-six-year follow-up assessment. We also examined the intervention effects on mean scores of anxiety symptoms between CAPS and IM at the six-year follow up assessment. An additional analysis examined change in anxiety symptoms and disorders overtime to better understand the trajectory of these primary outcomes by group (i.e., from baseline in the original efficacy RCT to the six-year follow up). Finally, to explore for whom the intervention was most efficacious on incidence and rate of disorder onset, a select number of baseline moderators including child age, gender, and child anxiety severity; parent primary anxiety disorder (i.e., generalized anxiety disorder versus other anxiety disorder), and parent symptoms of psychopathology were examined. In addition, parent current (i.e., assessed at the six-year follow up) involvement with mental health treatment and current levels of psychopathology were examined in exploratory analyses as moderators.

Method

Participants

One hundred thirty six volunteer families participated in the original trial (70 randomized to CAPS and 66 to IM). Original inclusion criteria were: (1) at least one parent with a current anxiety disorder and (2) offspring (ages 6–13 years) who did not meet criteria for a current anxiety disorder. At baseline, both offspring and parent diagnoses were determined using the age appropriate version of the Anxiety Disorders Interview Schedule (DSM-IV versions). None of the offspring met criteria for an anxiety disorder. Parents with an anxiety disorder who were randomized in the original efficacy study included 107 mothers and 29 fathers (these parents completed the questionnaires on themselves and their offspring). The three most frequent primary diagnoses among these parents were: generalized anxiety disorder ($n=94$), panic disorder ($n=17$) and social phobia ($n=16$). See Ginsburg et al.[13] for additional details on the original sample and methods.

Offspring enrolled in this follow-up study were 113 of the original sample (83%; child mean age 15.81 years, range 13 to 21; 58% female; 78% White; see Fig. 1 Consort diagram). Tables 1 and 2 display additional demographic and clinical characteristics of those in CAPS and IM and those enrolled in the follow-up compared to those who did not.

Measures

Presence of anxiety and other psychiatric disorders and associated symptom severity were assessed using the age appropriate version of the Anxiety Disorders Interview Schedule (ADIS) for ages 18 and over [14] and for ages 17 and younger [15]. The ADIS interviews are the gold standard assessment tools for determining anxiety disorders and are well validated. The ADIS yields both a diagnosis (present/absent) as well as a clinical severity rating (CSR) that ranges from 0–8; scores of four or higher are indicative of a clinical disorder. CSR scores represent the degree of impairment and interference in functioning associated with a specific disorder. Independent evaluators (IEs) were rigorously trained prior to seeing study participants and supervised by a senior child psychiatrist (MAR) who reviewed all diagnoses and clinical severity ratings. IEs and supervisor remained masked to intervention condition throughout the study. Consistent with the original trial, the sum of the Clinical Severity Ratings across all anxiety and other psychiatric disorders was used as a measure of symptom severity/impairment. The ADIS was administered at all time-points (i.e., baseline, 8 weeks, 6 months, 12 months, and 72 months).

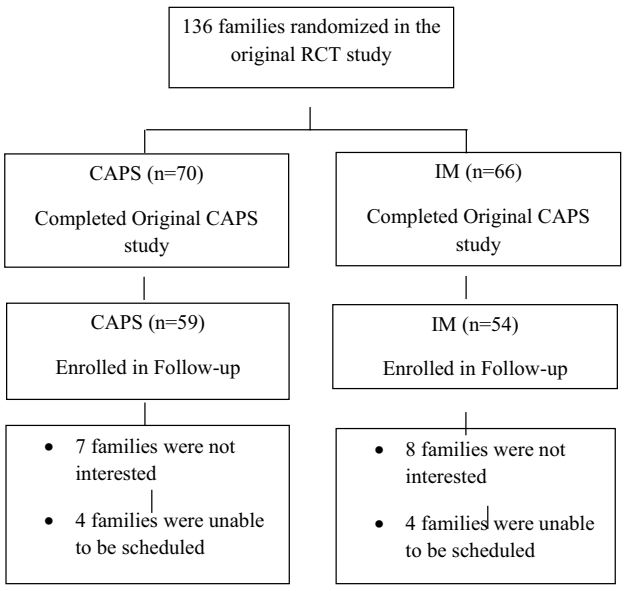

Fig. 1 Consort Diagram

Table 1 Comparison of demographics and baseline clinical characteristics of CAPSLE participants originally assigned to CAPS and IM conditions

Characteristics	CAPS (n = 59)	IM (n = 54)	p-value
	Mean (SD)	Mean (SD)	
Child age (years)	15.74 (1.88)	15.87(1.94)	0.712
Parent age (years)	40.31(4.67)	41.89(5.11)	0.087
SCARED-C	20.66(11.45)	18.78(15.11)	0.457
SCARED-P	18.53(11.64)	17.09(10.67)	0.496
CAPS ADIS Anx CSR	8.03(4.41)	7.59(3.76)	0.570
BSI-Global severity index	0.98(0.55)	1.02(0.68)	0.732
	N (%)	N (%)	
Gender (female)	39 (66.10%)	27 (50.90%)	0.083
Ethnicity (Hispanic/Latino)	6 (10.17%)	4 (7.40%)	0.606
Race (white)	49 (83.05%)	46(85.19%)	0.757
Parents married	41(87.23%)	34 (77.27%)	0.213
Parental income > 80,000	41 (87.23%)	36 (85.71%)	0.834

CAPSLE Child Anxiety Prevention Study Long-term Extension, *CAPS* Coping and Promoting Strength, *IM* information monitoring control, *ADIS SCR* anxiety disorder interview schedule clinical severity score, *SCARED* Screen for Child Anxiety and Related Emotional Disorders, *C* child report, *P* parent repot, *BSI* Brief Symptom Iinventory

The Screen for Child Anxiety Related Emotional Disorders (SCARED) [16], completed by both child and parent, is a 41 item questionnaire assessing a broad range of child anxiety symptoms consistent with the DSM-IV and is appropriate for youth ages 7–17. Items are rated on a three-point Likert-type scale: zero (not true or hardly ever true) to two (very true or often true) and a total score ranges from 0–82,

Table 2 Comparisons between CAPSLE and non-CAPSLE participants on demographics and baseline clinical characteristics

Characteristics	CAPSLE (n = 113)	Non-CAPSLE (n = 23)	p-value
	Mean (SD)	Mean (SD)	
Child age (years)	8.72 (1.77)	8.57 (1.99)	0.715
Parent age (years)	41.06(4.92)	39.36(5.25)	0.146
SCARED-C	19.05(11.02)	18.15(12.72)	0.731
SCARED-P	17.84(11.16)	17.72(11.82)	0.964
CAPS ADIS CSR	7.82 (4.10)	8.26 (5.83)	0.666
BSI-Global Severity Index	1.00(0.61)	0.98(0.56)	0.878
	N (%)	N (%)	
Gender (female)	65 (57.5%)	11 (47.8%)	0.393
Race (white)	94 (83.2%)	21 (91.3%)	0.326
Parents married	102(90.27%)	19(82.61%)	0.285
Parental income > 80,000	88 (77.9%)	19 (82.6%)	0.632

CAPSLE Child Anxiety Prevention Study Long-term Extension, *CAPS* Coping and Promoting Strength, *IM* information monitoring control

higher scores reflect higher levels of anxiety. The SCARED was administered at all time-points (i.e., baseline, 8 weeks, 6 months, 12 months, and 72 months). In the current study, Cronbach's alphas for the SCARED ranged from 0.90 to 0.95 for parent report and from 0.89 to 0.94 for child report across the five assessments. For youth over 17 years old, this measure was not administered ($n = 16$).

The Brief Symptom Inventory (BSI) [17], a widely used 53-item measure, completed by parents, was used to assess parents' own distress associated with symptoms of psychopathology (e.g., depression, anxiety, hostility). In the current study, the Global Severity Index of the BSI, representing global distress at baseline and the six-year follow-up, was used and examined as a moderator of intervention effects. Cronbach's alpha was 0.95 and 0.97 at the baseline and follow up respectively.

Psychiatric Treatment Form, developed by the study team, was administered only at the six-year follow-up by a research assistant to capture mental health service use over the follow-up period. Service use was coded as yes/no reflecting whether the offspring accessed mental health services at any time between their last study evaluation and their follow-up visit and was used as a control variable.

Procedures

For the original efficacy study, families were recruited through advertisements in local newspapers, mailings to local physicians and psychiatrists, community flyers, and radio advertisements. Interested families called study staff and completed a telephone screen assessing key inclusion criteria (e.g., offspring age and absence of diagnosis). Based on the phone screen, potentially eligible families were invited for an in-person baseline diagnostic assessment. Both parent and offspring were interviewed with the age appropriate version of the ADIS to determine parent and offspring diagnoses. Eligible families were randomized 1:1 to CAPS or IM. All randomized families were expected to complete assessments, administered by interviewers masked to intervention condition and reviewed by a senior child psychiatrist, approximately 8 weeks after randomization, and at a 6 and 12 month follow-up.

For the current 6-year follow-up study, families from the original trial were contacted via letter, social media outlets, and phone. Families expressing interest completed a written informed consent and then were expected to complete an in-person evaluation (23% of follow up evaluations were conducted over the phone) during which all measures were expected to be completed. Prior to enrollment, and after complete description of the study, parents/guardians and adult participants provided written informed consent and offspring under 18 years old provided assent. The university institutional review board approved the study.

Following each evaluation, the IE presented the case to a senior-level child psychiatrist (MAR) to arrive at a consensus diagnosis. Families were compensated $200 per assessment.

Data Analytic Plan. Preliminary analyses assessed differences on baseline variables between: (1) follow-up families assigned to CAPS vs IM, and (2) families who enrolled in the follow up study and those who did not, using t-tests (for continuous variables) or χ^2 tests (for categorical variables). We examined the cumulative incidence of anxiety and other psychiatric disorders (i.e., meeting criteria for a disorder at any time from baseline through the 6-year follow-up) using logistic regression. We examined the rate of disorder onset using Cox proportional hazards survival analysis, which estimated the ratio of the hazard rate of youth in the IM versus CAPS that developed disorders since baseline. A significantly larger hazard ratio (HR) indicates that youth in IM had a faster rate of developing disorders than youth in CAPS. In this analysis, participants who indicated a disorder at any assessment since baseline were considered as uncensored cases (i.e., we know when the disorder occurred) even if they were not enrolled in the follow-up study; those who did not complete the follow-up assessment and did not develop a disorder in the original trial were considered missing data. We then investigated intervention effects on mean differences for anxiety severity and other psychiatric severity (i. e. ADIS CSR scores) and child anxiety symptoms (i.e., SCARED scores) at the 6-year follow-up with analysis of covariance (ANCOVA). The corresponding baseline covariates, baseline child ADIS CSR anxiety scores, child age, child gender, race (white vs. others), parental psychopathology, and interim service use were included as covariates in these analyses. To examine patterns in the trajectory of anxiety symptoms over time, we used all of the 5 assessments and conducted multigroup piecewise growth curve modeling to compare the equivalence of the trajectories of ADIS CSR anxiety severity, ADIS CSR psychiatric severity, and parent and child report SCARED scores over time across groups, examining whether the effects of CAPS and IM after the intervention respectively, persisted, faded, or increased over time and whether the growth patterns differed by group. Specifically, other than the intercept factor for modeling variation of the initial (i.e., baseline) scores, we included two pieces of slope factors for each group: one for an upward or a downward shift immediately after the intervention (i.e., from baseline to post intervention) and one for an additional linear growth after (from post intervention to 6-year follow-up). A difference on the first but not the second slope factor would support a maintenance model. A pattern in which the second slope factor differed across groups would support either the increasing effects model

or the fading effects model, depending on the shape of the growth trajectories in the two groups.

Finally, we explored potential moderators of the intervention effects on incidence and rate of disorder onset. Moderators examined included baseline child ADIS CSR anxiety severity, child age, child gender, and parental baseline primary anxiety disorder (GAD versus non-GAD), parent psychopathology (at baseline and at follow up), and parent current involvement with mental health treatment. For significant moderated effects, we probed simple effects and investigated at what level of the moderator (e.g., at ± 1 SD for high and low levels of the moderator; male vs. female) the two conditions differed significantly [18].

The intention-to-treat approach was applied for evaluating intervention effects, making use of all available data for all individuals. Mplus eight [19] was used for all outcome evaluations and the full information maximum likelihood estimation was the default method to handling missing data.

Results

Descriptive Analyses and Evaluation of Group Differences

No significant differences on demographic, parent or child clinical characteristics were found between follow-up families originally assigned to CAPS versus IM (see Table 1) or between families who enrolled in the follow-up and those who did not (see Table 2).

Cumulative Incidence and Rate of Onset of Anxiety and Other Psychiatric Disorders

The cumulative incidence of anxiety disorders from baseline to the 6-year follow-up was 51.67 and 57.89% of offspring in CAPS and IM respectively and 61.29 and 61.40% in CAPS and IM respectively for *any* psychiatric disorder. Logistic regression indicated that these rates were not statistically different between CAPS and IM after controlling for the baseline covariates (B = −0.79, *SE* = 0.45, $z = -1.74$, $p = 0.083$; B = −0.52, *SE* = 0.46, $z = -1.12$, $p = 0.262$). The most common disorders in offspring, across both conditions, were generalized anxiety disorder (34.78%), social anxiety disorder (27.19%), attention deficit hyperactivity disorder (20.87%), major depressive disorder (14.16%), separation anxiety disorder (7.89%), persistent depressive disorder/dysthymia (5.31%) obsessive–compulsive disorder (3.54%), and enuresis (3.51%). Cox regression models showed significant intervention main effects (see Fig. 2) with the rate of onset faster in IM compared to CAPS for anxiety disorders (HR = 2.55, 95% CI: 1.54, 4.21; B = 0.94, *SE* = 0.26, $z = 3.66$, $p < 0.001$) and onset of other psychiatric disorders (HR = 2.69, 95% CI: 1.67, 4.33; B = 0.99, *SE* = 0.24, $z = 4.06$, $p < 0.001$).

Mean Differences in Symptoms for CAPS and IM

None of the ANCOVAS for the main effect comparisons of anxiety outcomes at the follow-up assessment were statistically significant. That is, on average the IE report of ADIS CSR total anxiety scores (B = 0.52, *SE* = 0.64, $z = 0.80$,

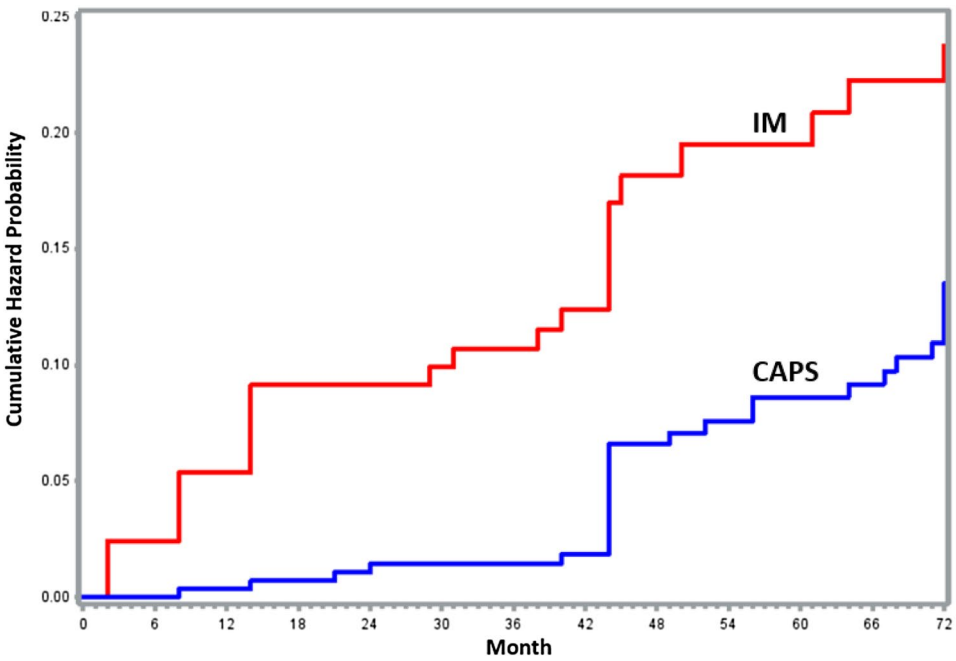

Fig. 2 Plot of the cumulative hazard curves for the onset of anxiety disorder separately for CAPS and IM over the 6-year follow-up period by month, controlling for covariates

$p = 0.423$), ADIS CSR total psychiatric diagnosis scores (B = 0.42, $SE = 0.32$, $z = 1.32$, $p = 0.186$, as well as parent and child reports of SCARED (B = −0.26, $SE = 1.93$, $z = -0.14$, $p = 0.892$; B = −0.44, $SE = 2.58$, $z = -0.17$, $p = 0.864$, respectively) were not different between CAPS and IM conditions at the follow-up visit.

Trajectories of Anxiety Symptoms Over Time

Table 3 summarizes the multigroup comparisons of the growth factors (intercept, change from baseline to post intervention, linear growth after the post intervention assessments) on ADIS CSR anxiety and other psychiatric severity as well as parent and child reports of SCARED scores. We presented the means of the growth factors across the intervention groups and the differences of the means. Although both groups improved from baseline to post intervention, the reduction of ADIS CSR anxiety severity was significantly larger for children in the CAPS group (B = −6.71, $SE = 0.89$, $p < 0.001$) compared with those in the IM group (B = −2.11, $SE = 0.85$, $p = 0.013$; difference = −4.60; 95% CI: −7.01, −2.19). On the other hand, an additional significant reduction occurred for the IM group (B = −0.16, $SE = 0.03$, $p < 0.001$) but not for the CAPS group (B = −0.01, $SE = 0.03$, $p = 0.71$) from post intervention to six -year follow-up (difference = 0.15; 95% CI: 0.06, 0.23). Figure 3 illustrates the piecewise growth models for the two groups. Similar patterns of trajectories occurred for parent report of SCARED (i.e., significantly larger reduction from baseline to post intervention for the CAPS group; but significant reduction from post intervention to 6-year follow-up only for the IM group). For CSR psychiatric severity, although offspring in the CAPS group had a significantly larger reduction than those in the IM group (Table 3) from baseline to post intervention, their severity scores significantly increased over time from post intervention to the six-year follow-up while the change for offspring in the IM group was not significant.

Exploratory Analyses for Moderation Effects

We examined the moderation effects of baseline child anxiety severity (using ADIS CSR scores), child age, child gender, and parental baseline primary anxiety disorder (GAD versus non-GAD), parent psychopathology (at baseline and at follow up), and parent current involvement with mental health treatment on the incidence and rate of

Table 3 Multiple group comparisons on the piecewise growth factors (N = 136)

Variable	Group	Mean (SE) – intercept factor (baseline score)	Mean (SE) – slope 1 (pre to post change)	Mean (SE) – slope 2 (post to 6-year trend)
CSR anxiety severity	CAPS	7.986** (0.539)	−6.709 ** (0.892)	−0.012 (0.032)
	IM	7.803** (0.526)	−2.110* (0.849)	−0.160** (0.028)
	CAPS-IM difference	0.183 (0.754)	−4.599** (1.232)	0.148** (0.043)
CSR psychiatric severity	CAPS	8.729** (0.582)	−7.266** (0.923)	0.169** (0.041)
	IM	8.985** (0.565)	−2.021* (0.902)	−0.046 (0.0140)
	CAPS-IM difference	−0.256 (0.811)	−5.245** (1.291)	0.215** (0.057)
Parent report SCARED	CAPS	18.451** (1.368)	−10.972** (2.228)	−0.014 (0.085)
	IM	17.146** (1.338)	−2.031 (2.745)	−0.273** (0.070)
	CAPS-IM difference	1.305 (1.914)	−8.941* (3.535)	0.259* (0.110)
Child report SCARED	CAPS	20.155** (1.407)	−13.573** (2.970)	−0.017 (0.109)
	IM	17.887** (1.360)	−12.050** (2.282)	−0.060 (0.088)
	CAPS-IM difference	2.268 (1.957)	−1.523 (3.745)	0.042 (0.140)

**p < 0.01; *p < 0.05. Piecewise growth modeled partitioned growth processes in two phases – one for modeling the change from baseline to post intervention and one for modeling the linear trend from post intervention to 6-year follow-up assessment.

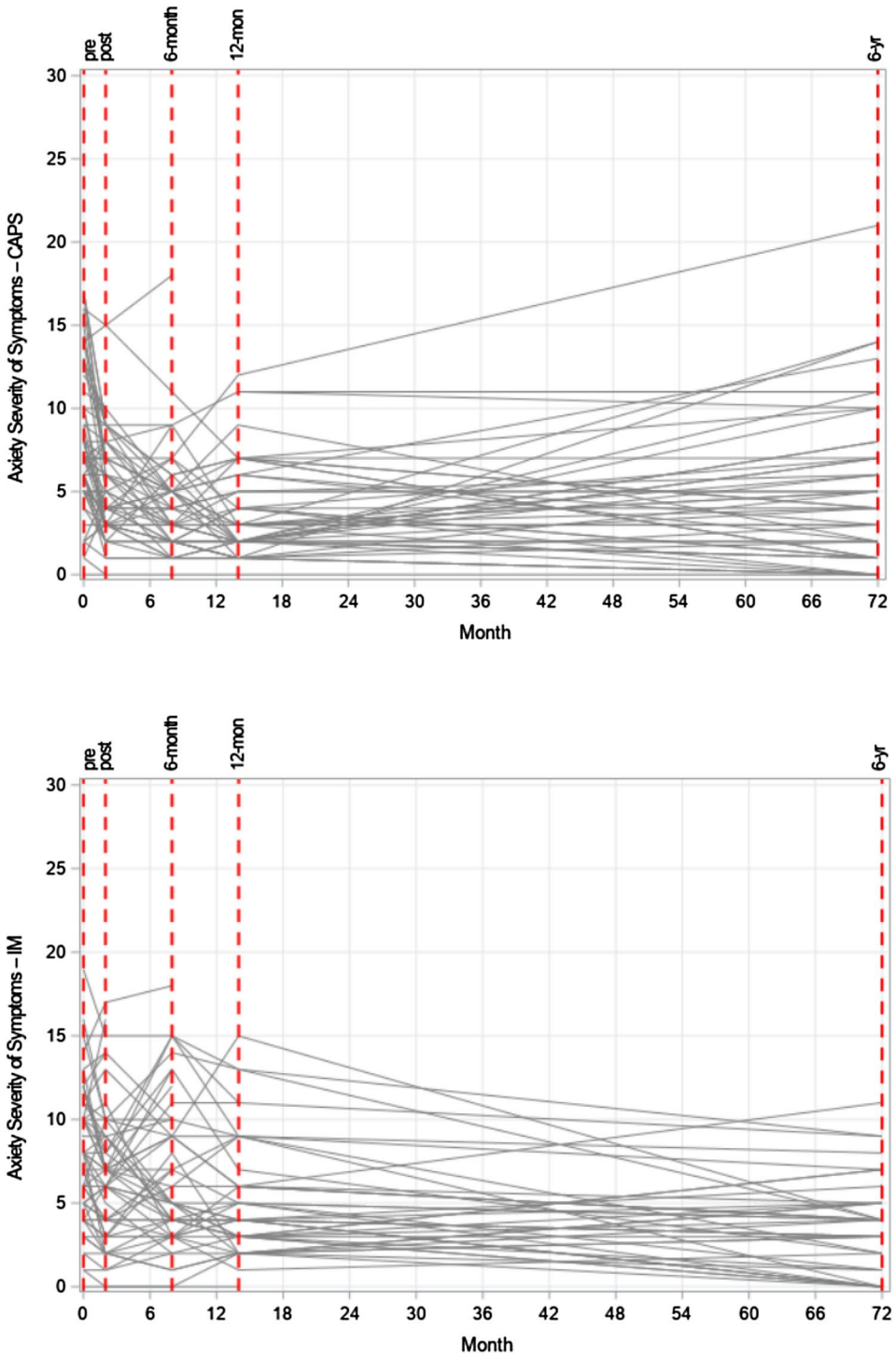

Fig. 3 Mulitgroup piecewise growth trajectories of anxiety severity in CAPS and IM groups

onset of anxiety and other psychiatric disorders. We found one significant moderation effect. Baseline offspring ADIS CSR anxiety severity scores moderated the intervention effect on the rate of onset of other psychiatric disorders (B = 0.16, $SE = 0.06$, $z = 2.59$, $p = 0.01$). Simple effect analyses comparing offspring in IM and CAPS, indicated a HR of 4.76 [95% CI: 2.56, 9.48; $p < 0.001$] for developing psychiatric disorders for offspring who had high (i.e., + 1 SD) baseline ADIS CSR anxiety severity scores, while the HR was 1.07 [95% CI: 0.43, 2.63; $p = 0.88$] for offspring who had low (i.e., −1 SD) baseline ADIS CSR anxiety severity scores. This suggests that offspring with higher anxiety severity at baseline were more likely to develop psychiatric disorders earlier in IM compared to CAPS. No other moderators were statistically significant.

Discussion

Familial aggregation studies have established that offspring of parents who have an anxiety disorder are at an elevated risk for developing anxiety and other psychiatric disorders [3]. Previously, the *Coping and Promoting Strength Program*, an 8-week, psychosocial, family-based intervention designed for this target population, reduced the incidence of anxiety disorders by 30% over a 1-year period relative to a control condition [13]. The current study, which included 83% of the original sample, represents a 6-year follow-up. Findings indicated that the hazard ratios of the cumulative onset of anxiety and all psychiatric disorders in IM were approximately two and a half times that of CAPS. However, the majority of reduction in the incidence rate and reduction in anxiety symptoms in CAPS were observed in the first year after the program was received.

A majority of offspring, approximately 52–58%, in both intervention groups met criteria for an anxiety disorder between baseline and the 6-year follow up and there were no intervention group differences in the cumulative incidence of anxiety disorders or severity of anxiety symptoms. These rates of anxiety disorders however, are higher than the 20% national life-time prevalence data [20] and higher than cross sectional prevalence data from family aggregation of anxiety studies which indicate approximately one third of offspring meet criteria for an anxiety disorder [3]. The higher prevalence rates relative to the general population are expected given the high-risk nature of the current sample (i.e., at least one parent met criteria for an anxiety disorder). The higher prevalence relative to cross sectional familial aggregation rates likely reflects the cumulative lifetime prevalence in this population, which increased as offspring transitioned from childhood to early adulthood.

Consistent with meta-analyses examining the impact of interventions for offspring of parents affected with other psychiatric disorders [21], the current study showed that while short-term effects of CAPS, the preventive intervention, were positive and significant, these effects diminished over time. The reasons for the dilution of effects over time in the current study are unknown but may include limited practice of intervention skills over time. For instance, studies indicate that practice (e.g., completing homework) of cognitive behavioral strategies such as exposure is associated with better outcomes [22]. Examination and encouragement of ongoing practice of skills learned in CAPS is recommended for future studies.

Over the six-year time frame, the youth in this study likely experienced significant developmental stressors as they transitioned to high school, college or independent living which may also have increased anxiety. Over time, offspring may have also experienced a greater number of negative life events, and more negative life events have been associated with poorer long-term outcomes for youth with anxiety disorders [23]. Such events increase one's sense of vulnerability and increased external locus of control, both of which are associated with higher levels of anxiety [24]. Finally, as youth in this study aged, there was likely a shifting away from parental monitoring, supervision and support of autonomy (all components emphasized in the original family-based intervention) and a greater reliance on peers (who were not involved in the intervention). Regardless of the reasons for the dilution of effects over the six years, these findings highlight a need for augmenting this brief preventive intervention (e.g., with additional booster sessions, alternative interventions, an expanded initial intervention, intermittent reminders delivered via technology) in order to sustain its positive impact. Studies examining the familial transmission of anxiety [25] indicate a strong environmental component, which suggests that such psychosocial interventions hold the promise of reducing risk over time.

Analyses that examine predictors, moderators, and mediators of disorder onset may inform these additional intervention strategies as well as identify subgroups of offspring who might benefit more from preventive interventions. Toward this end, the current study explored several moderators of intervention response. Consistent with our prior study [13] offspring with higher baseline anxiety were more likely to develop psychiatric disorders over the follow-up period if they were randomized to the IM condition, suggesting that elevated symptoms in offspring should trigger referral to evaluation and intervention. In contrast, none of the other examined variables were found to moderate outcomes. The absence of moderators is consistent with findings from meta-analyses examining interventions to prevent the onset of disorders in high-risk offspring [21]. This finding may be due to limited statistical power or a true absence of subgroup findings. Additional research on other potential moderators is warranted.

The results of this study should be interpreted in the context of several limitations. By design, randomization was lost after the 1-year follow-up. Thus, the internal validity may have been threatened due to the naturalistic study design. Interim service use (and several other variables) were controlled statistically to address this potential confound but many other threats remain a possibility. The participants were volunteers and homogeneous (white, high income, two parent families), thus limiting the generalizability of findings.

In sum, findings from this study reveal that a brief family-based preventive intervention can slow the timing of the incidence of anxiety and other psychiatric disorders

in offspring over a 6-year period (with the greatest reduction seen in the first year of receiving the intervention). The cumulative incidence rate of disorder onset in this high-risk population was high (55% on average), highlighting the needs and opportunities for early intervention in this population. One approach may be to incorporate routine and ongoing "family check-ups" for adults with children who present with a psychiatric disorder to better identify and intervene as needed to lower the risks to their offspring. This model is consistent with a family psychiatry approach advocated by Hudziak and colleagues [26] which emphasizes the use of a comprehensive family-based assessment to guide the use of evidenced-based health promotion prevention and intervention for the entire family.

Summary

Offspring of adults with anxiety disorders are at a higher risk for developing anxiety disorders relative to their peers whose parents do not struggle with anxiety. A prior study found that an 8-week psychosocial family-based intervention designed to prevent the onset of anxiety disorders in youth whose parents have an anxiety disorder reduced the 1-year incidence of anxiety disorders in offspring by 30% compared to a control condition. The current study examined the benefits of this intervention at a six-year follow up. Findings suggest the brief family-based psychosocial intervention showed the greatest promise in preventing onset of disorder within the first year after program completion and that additional intervention is needed to maintain the positive effects long-term to reduce the risk for downstream disability.

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Compliance with Ethical Standards

Conflict of Interest The authors have no conflicts of interest to disclose.

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