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Cognitive-behavioral Treatment of Persistent Functional Somatic Complaints and Pediatric Anxiety: An Initial Controlled Trial

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Abstract

Background—Children and adolescents who seek medical treatment for persistent physical distress often suffer from co-occurring anxiety disorders. Treatment options for this impaired population are limited. This study tests the feasibility and potential efficacy of a cognitive-behavioral intervention targeting pain and anxiety for youth with impairing functional physical symptoms and anxiety disorders presenting to pediatricians for medical care.

Methods—Children and adolescents (aged 8–16) experiencing somatic complaints, without an explanatory medical disorder (i.e., functional), were recruited from primary care and specialty (gastroenterologists and cardiologists) pediatricians. Forty children, primarily with gastrointestinal symptoms, who met criteria for a co-occurring anxiety disorder, were randomly assigned to a cognitive-behavioral treatment addressing pain and anxiety, *Treatment of Anxiety and Physical Symptoms* (TAPS), or to a waiting-list control.

Results—TAPS was found to be an acceptable treatment for this population and was superior to the waiting-list condition. Eighty percent of children in TAPS were rated as treatment responders by independent evaluators compared with none of the controls. Overall, self- and parent ratings indicated reductions in children's somatic discomfort and anxiety following intervention. TAPS participants maintained clinical gains three months following treatment.

Conclusions—The study supports the feasibility and preliminary efficacy of a cognitive-behavioral intervention targeting co-occurring physical distress and anxiety in youth presenting for medical treatment. Such an approach has the potential to exert broad impact on children's dysfunction and to minimize exposure to invasive, ineffective, and costly medical procedures and treatments.

Keywords

children; anxiety; treatment; functional; somatic symptoms

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Introduction

Stomach pain, headaches, and other somatic symptoms are common childhood occurrences.[1–2] The majority are functional, defined as having no identifiable structural or biochemical abnormalities to explain the symptoms. [3–4] Although common and medically benign, some children's physical discomfort is persistent, and has a debilitating impact on their long-term academic and social functioning.[2,5–7] These youngsters often seek repeated medical consultations and treatment,[8–10] and undergo excessive, invasive and costly diagnostic procedures.[11] Such high medical utilization may be partially sustained by the lack of efficacious interventions.[12–15]

Given the individual and societal costs, it is important to understand the psychological factors that may contribute to the development and maintenance of impairing somatic symptoms. The literature has demonstrated a robust association of anxiety and functional physical complaints in children seeking medical care. [16–18] Recent estimates indicate that about 50 to 80% of children with chronic abdominal pain seen in pediatric gastroenterology clinics meet criteria for anxiety disorders,[17,19–20] and a study of 27 youngsters with noncardiac chest pain from pediatric cardiology found that 15 (56%) had anxiety diagnoses.[18] A recent study of 132 youngsters with abdominal pain seen in pediatric gastroenterology,[7] found elevated levels of self-reported anxiety and depression discriminated children who improved rapidly (less than 2 months) from those with more persistent pain. Providing tailored interventions for this subgroup of children with anxiety and functional physical symptoms may improve their outcomes.[16]

Pharmacological treatments (i.e., selective serotonin reuptake inhibitors) have been shown to be effective for reducing anxiety in youth[21]. However, the frequent gastrointestinal side effects associated with SSRIs[22], possibly due to the large number of serotonin receptors in the GI tract[23], limit their clinical value for children seeking treatment for physical discomfort. The literature supports the use of cognitive-behavioral strategies (e.g., relaxation, distraction, and parent contingency management) for reducing the severity and frequency of headache and abdominal pain in children and adolescents.[24–27]The clinical import of this approach is uncertain since these studies did not assess anxiety and/or excluded children with psychiatric disorders. Although focusing solely on pain management may be sufficient for youth without co-morbid psychiatric symptoms, children with psychopathology may require a more targeted treatment that addresses these symptoms. [28] Given the frequent co-occurrence of anxiety, and the well-documented efficacy of exposure-based therapies for anxiety disorders,[29–32] testing systematic interventions with the substantial subgroup of children with functional physical distress and anxiety seems warranted.[17,33]

Based on this potential clinical value, we adapted Kendall's empirically-supported Coping Cat intervention for child anxiety disorders [29–30,33] to include a more direct treatment focus on the chronic and impairing physical symptoms in children seeking medical care. To thoroughly address physical discomfort and its interference, the modified intervention, referred to as Treatment of Anxiety and Physical Symptoms (TAPS), was expanded to: (1) incorporate the biopsychosocial model of pain and a more extensive discussion of the link between physical sensations and emotions; (2) emphasize the relationship between somatic symptoms and anxiety through daily monitoring of contexts in which pain and anxiety occur; (3) apply cognitive restructuring to illness-specific worries (e.g., I will have stomach pain on the train, I worry that the doctor is missing a medical disease, my pain is uncontrollable); (4) broaden exposure to target avoidance associated with physical discomfort and increase tolerance of pain (e.g., participating in physical activities, eating feared foods, attending school with pain, going places with limited access to bathrooms);

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and (5) increase parental involvement to decrease avoidance related to pain and reinforce active coping.[34–35]

The current paper examines the feasibility and potential efficacy of TAPS in a waiting list controlled trial of 40 children and adolescents with functional physical complaints (primarily gastrointestinal symptoms) and co-occurring anxiety disorders who presented to general and specialty pediatricians. It was predicted that children who receive TAPS would demonstrate significant improvement in anxiety and somatic symptoms compared to the waiting list control, and that treatment gains would be maintained three months following treatment.

Methods

Recruitment

Screening—Children and adolescents with functional somatic complaints, ages 8 to 16, were recruited over two years from pediatric primary care and specialty physicians (gastroenterologists and cardiologists). All physicians were asked to provide the research team's contact information to parents of children with any type of somatic symptoms without an explanatory disease process. In addition, study information letters were mailed monthly from pediatric specialty offices to families with negative medical findings.

One hundred thirty-five families contacted the research team (n = 89 direct physician referrals and n = 46 from mailings). Of the 135, 120 (89%) parents completed a brief telephone screening assessing social, generalized, and separation anxiety in their child. Parents endorsing positive anxiety symptoms were offered further evaluation (n = 80, 67%). Of these, 56 (70%) agreed to participate in an initial assessment to determine their child's eligibility for the study.

Baseline Assessment—The evaluation was conducted in-person either at the pediatrician's office or the mental health outpatient center. Parents and children were interviewed separately, by the same evaluator, using the *Anxiety Disorders Interview Schedule for DSM-IV: Parent and Child Versions (ADIS-IV-C/P)*.[36] Youth with a DSM-IV principal (most impairing) anxiety diagnosis were enrolled excepting principal obsessive-compulsive disorder or posttraumatic stress disorder. Children receiving psychiatric medication for more than six months were included provided it remained stable during the study's intervention phase; no one was excluded on this basis. Youth who were taking regular medication for somatic complaints (i.e., antacids) were also included in the study. Changes in medication regimen were permitted due to the continued presence of active physical symptoms despite long-term use and several past attempts with various over-the-counter agents (e.g. laxatives, antigas). Of the 56 families evaluated for eligibility, 41 (73%) met study criteria. Of the 15 who were not appropriate: eight did not receive an anxiety diagnosis and seven had more impairing disorders (e.g., eating disorder, OCD). Forty of the 41 eligible subjects (98%) agreed to participate. The one refuser noted scheduling difficulties.

Participants

Participants were 40 children and adolescents, ages 8 to 16 years, with functional physical complaints (primarily gastrointestinal symptoms) and a principal anxiety disorder. Twenty-six were referred from pediatric gastroenterology, nine from general pediatricians, and five from pediatric cardiology. Average age was 12.4 years (SD = 2.6). The majority were female (n = 26, 65%) and identified themselves as White (72.5%). Of the remaining, approximately 15% indicated they were Hispanic, 10% some other race, and 2.5% African-

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American. All families lived in New York City and its surrounding suburbs. Yearly family income ranged from $31,000 to over $120,000.

Parents reported seeking medical treatment for their children due to various physical symptoms, with the majority indicating stomach pain (92.5%) or nausea (45%). Other frequent somatic complaints were diarrhea or constipation (30%), headaches (32.5%), and chest pain or discomfort (25%). According to parents, children experienced multiple physical complaints (M = 3.0, SD = 1.3), with the majority endorsing discomfort at least several times weekly. Mean age of onset was reported to be 9.8 years (SD = 3.3). Sixty percent of children had suffered with these symptoms for at least 2 years. Half were on medication for GI-related somatic complaints, most commonly acid blocking medications (70%). See Table 1 for a summary of presenting physical complaints.

The distribution of principal anxiety diagnoses were as follows: 14 (35%) with separation anxiety disorder, 11 (27.5%) with social anxiety disorder, 10 (25%) with generalized anxiety disorder, 4 (10%) with specific phobia, and 1 (2.5%) with anxiety disorder not otherwise specified. Children's principal anxiety disorders were moderately severe with a mean of 5.7 (SD = 1.0, range = 4 to 7) on a 0 to 8 clinical rating scale. The majority of youth (n = 31, 77.5%) had comorbid psychiatric diagnoses. Other anxiety disorders were most prevalent (n = 30, 75%). More than half of the sample (52.5%) missed school reportedly due to anxiety, with a mean of 10.1 (SD = 8.9) absences over the past year. Most had never received mental health treatment for anxiety (77.5%). One control participant reported being on a stable regimen of psychotropic medication for anxiety during the nine months prior to baseline and throughout the waiting period (Escitalopram and nightly Alprazolam for sleep). See Table 1 for summary.

Procedures

Study Groups—Participants were randomly assigned to either TAPS (n = 20) or a waiting list control (n = 20) using a table of random numbers with predetermined assignment to ensure equal group numbers. The two groups did not differ significantly on any demographic, somatic, or psychiatric characteristics except, compared to controls, the treated group had a significantly higher severity rating (on a scale of 0 to 8) for their principal anxiety diagnosis (M = 6.2, SD = 1.0 for TAPS and M = 5.3, SD = 0.8 for control), t (38) = 3.2, $p < .01$, and greater rate of comorbid disorders (95% for TAPS and 60% for control), $\chi^2 = 7.0$, $p < .01$. However, the number of comorbid diagnoses did not differ significantly across groups (M = 1.8, SD = 0.9 for TAPS and M = 1.1, SD = 1.2 for control).

Treatment of Anxiety and Physical Symptoms (TAPS): TAPS is a 10-week systematic intervention that jointly addresses anxiety and physical symptoms through identifying contexts in which symptoms occur and interact, and applying relaxation, cognitive restructuring and exposure exercises to target fears related to physical pain and anxiety-inducing situations. It consists of 12 individual sessions (approximately 45–60 minutes each) with 3 parent meetings following the individual sessions (45 minutes each) conducted over 10 weeks. Following treatment completion, two monthly boosters are conducted.

TAPS was conducted by Ph.D. level clinical psychologists trained in CBT. Families were provided with the option of receiving the intervention either at their pediatric medical office or a mental health outpatient clinic. Seven families opted for treatment at the medical office and the remainder at the clinic. Treatment attendance was excellent, with 97% percent for child sessions and 95% for parent sessions. Fourteen of 20 treated participants attended both booster sessions, one participant attended one booster session, and the remaining five did not attend any booster sessions.

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Waiting list control: Given this preliminary stage of treatment evaluation, we chose a waiting list as the control group in order to obtain an initial estimate of potential efficacy. Because this was a medical treatment-seeking population, the waiting period was limited to eight weeks due to ethical concerns. In addition, control participants were offered intervention immediately following postassessments.

Assessments—Participants were evaluated at baseline and within one week following the intervention or the waiting period, thus postassessment timing could differ up to two weeks between groups. Trained Ph.D. level psychologists, who were uninvolved in treatment delivery and blind to participants' study condition, conducted all clinical assessments. In addition, families were instructed not to disclose whether or not they had received intervention. Since the wait-list controls were provided with treatment following post-assessment evaluations, only TAPS subjects completed 3-month follow-ups. Assessments included independent evaluator ratings, self-report inventories, and parent ratings.

Measures

Parent Survey on Demographics, Presenting Physical Complaints, and Service Use—Parents completed a questionnaire that assessed demographic information, as well as a comprehensive list of questions on the frequency and severity of children's physical complaints, and medical and mental health service use.

Anxiety Diagnosis and Severity—Children and parents were interviewed separately using the *Anxiety Disorders Interview Schedule for DSM-IV: Parent and Child Versions (ADIS-IV-CP)*[36], a semistructured interview with established reliability and convergent validity. Independent evaluators (IE) assigned composite diagnoses and clinician severity ratings (CSR) on a 0–8 scale with higher ratings indicating greater severity. A score of 4 or greater is required for diagnosis. Introductory questions were added about presenting physical complaints including their location, frequency, intensity, duration, and associated impairment.

Child and Parent Pain Ratings—Overall physical symptom severity was measured using self- and parent reports of pain on an 8-point Likert scale (0 = no pain to 8 = extreme pain).

The Gastrointestinal Symptoms Factor of the *Children's Somatization Inventory (CSI).*[2]—The *CSI* is a 35-item self-report scale of psychophysiological symptoms that has demonstrated excellent reliability and validity. Youngsters rate how much each symptom has bothered them in the past two weeks on a 5-point Likert scale ranging from 0 (not at all) to 4 (a whole lot). Factor analysis has generated four factors: conversion symptoms, cardiovascular symptoms, gastrointestinal symptoms, and bodily pain/weakness [2, 37] with similar items loading on each factor. We only examined the impact of treatment on the GI factor because it was most relevant to the physical complaints experienced by this sample.

Clinical Response—At post-assessment, clinical improvement was rated by blind IEs on the 8-point *Clinical Global Impression Scale – Improvement* (*CGI-I*)[38] scale based on child and parent clinical interviews. Only participants who were rated as clinically improved or much improved in both areas of dysfunction (anxiety and physical symptoms) were considered treatment responders.

Overall Functioning—Global functioning was rated by blind IEs using the *Children's Global Assessment Scale* (CGAS) [39], a 100-point scale with 1 being most impaired and 100

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being least impaired, A CGAS Score of 41–50 indicates a moderate degree of interference in functioning in most social areas or severe impairment of functioning in one area whereas a score of 61–70 indicates generally functioning well with some difficulty in a single area.

Treatment Acceptability—TAPS children and their parents rated treatment credibility.[40] Following an explanation of the treatment rationale at the first session with children and parents, they rated two questions on a 4-point scale (0–3), *How much does this program make sense to you for helping decrease children's physical discomfort?* and *How sure are you that this program will help you (your child) experience less physical discomfort?* Responses were averaged for separate parent and child credibility scores.

Following intervention, parents of treated children (n = 20) also completed four treatment satisfaction questions concerning views of therapist concern and skill, overall satisfaction with the program, and likelihood of recommending the intervention, on a 5-point Likert scale (range = 1 to 5) with higher ratings indicating more satisfaction. In addition, treated children completed three items on a 5-point Likert scale (range = 1 to 5) that rated perceived therapist concern as well as satisfaction with and benefit from the intervention.

Data Analysis

Of the 40 participants, there was only one study drop-out from the wait-list control. Two additional control participants completed the post-assessment diagnostic interviews, but did not complete the self- or parent-report measures. Therefore, at post-assessment, IE ratings are missing for one control subject, and self- and parent-report measures are missing for three of 20 controls. All post-treatment and three month follow-up assessments (n = 20) were completed for treated subjects.

Groups were compared using chi-square tests and t-tests for independent samples. Chi-square analyses were conducted to evaluate child's diagnostic outcomes and responder status across groups. The Mantel-Haenszel χ^2 test was used to compare post-intervention comorbidity rates, controlling for baseline comorbidity.[41] For continuous measures, analysis of covariance (ANCOVA), adjusting for baseline levels, was employed. Since missing data were limited and this is a small initial pilot study, completer analyses were conducted. In addition, we explored the potential impact of baseline group differences in severity (*ADIS-IV-C/P* CSR) and comorbidity rates on between group post-treatment comparisons by including them as covariates in all analyses. (All results remained unchanged and are available from the first author.) Effect sizes were calculated by dividing the difference in change between groups by the baseline standard deviation for the entire sample. The criteria proposed by Cohen were applied, in which 0.2 reflects a low effect size, 0.5 average, and 0.8 high.[42]

Since most of the sample had been referred for GI distress, we also explored the benefit of TAPS for the eight children with other physical complaints (e.g., chest pain, headaches) by examining their response rates and post-treatment means relative to their respective groups. Finally, as only TAPS intervention group participated in follow-up assessments, paired sample t-tests were used to examine maintenance of treatment gains from post-intervention to the 3-month follow-up.

Results

Treatment Acceptability

Following the first treatment session that consisted of a biopsychosocial model of pain and treatment rationale, children and parents rated their treatment expectations on a 0 to 3 scale.

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Child (M = 2.5, SD = 0.6) and parent (M = 2.7, SD = 0.4) perception of the intervention's credibility was high.

On a scale of 1 to 5, parents reported high satisfaction with the therapist (M = 4.9, SD = 0.4 for therapist concern and M = 4.9, SD = 0.4 for therapist skill) and with the intervention (M = 4.9, SD = 0.4), and all parents reported that they would recommend the program. Similarly, children reported high satisfaction with the therapist (M = 4.8, SD = .4) and program (M = 3.8, SD = 1.2). Children also indicated high treatment benefits (M = 4.1, SD= 1.0).

Posttreatment Outcomes

Table 2 presents a summary of baseline and post-assessment values for all outcomes.

Principal Anxiety Diagnosis—Among TAPS participants, 9 of 20 (45%) no longer met criteria for their principal anxiety disorder, compared to 0 of the 19 controls, $\chi^2(1) = 11.1$, $p \leq .001$.

Principal Anxiety Disorder Severity (CSR)—Adjusting for baseline values, at post-treatment, children who received TAPS reached clinically subthreshold levels compared to controls who remained moderately severe.

Comorbidity—Thirty-one of 40 participants had a comorbid diagnosis at baseline (n = 19 for TAPS intervention and n = 12 for control). Controlling for baseline comorbidity, the intervention significantly reduced the occurrence of comorbid diagnoses at post-assessment ($\chi^2_{\text{Mantel-Haenszel}} = 7.5$, df = 1, $p < .01$). Among children in the intervention group who had baseline comorbidity, 11 (58%) no longer had diagnoses at post-assessment, while all control children retained them. In addition, at post-assessment, the overall number of comorbid disorders for the TAPS group was significantly reduced relative to controls (Adj M = 0.3, SE = 0.2 for TAPS and Adj M = 1.4, SE = 0.2 for control, $F(36) = 21.7$, $p < .001$).

Child and Parent pain ratings—At post-assessment, relative to controls who rated their pain as moderately severe, TAPS children endorsed substantially lower ratings of minimal discomfort. Similar to their children, at post-assessment, parents in TAPS described their children's physical discomfort as minimal relative to control parents who indicated pain of moderate severity.

Gastrointestinal Symptoms Factor of the *CSI*—Treated children rated their gastrointestinal symptoms as significantly less "bothersome" following treatment compared to controls, $p < .05$.

Global Functioning (*CGAS*)—Based on IE ratings, overall functioning was statistically superior for children in TAPS compared to those in waiting list. Mean values on the *CGAS* indicated that treated children were functioning generally well with some difficulty in a single area, while control children had more variable functioning across several areas.

Responder Status *(CGI-I)*—Based on independent evaluations, 16 (80%) of 20 children who participated in TAPS were classified as treatment responders versus none of the controls, $\chi^2(1) = 25.8$, $p < .001$.

Effect Sizes—Large intervention effects were observed for anxiety disorders severity, child and parent pain ratings, and overall functioning, with a more modest effect on child-ratings of GI symptoms.

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Response of Children with Non-GI Presenting Complaints (chest pain and headache)

Eight of the 40 participants (n = 5 in TAPS and n = 3 controls) identified chest pain or headaches as their chief complaint to their referring physician; six of them also reported secondary gastrointestinal distress. Similar to findings in the larger sample, the IE classified all 5 TAPS children as treatment responders versus none of the controls. Post-treatment means on all outcome measures for these eight children were virtually identical to those of their respective groups. (Values are available from the first author).

Three-month Follow-up

All 20 TAPS participants completed the 3-month follow-up. As shown in Table 3, overall results suggest that the intervention group maintained clinical gains with some indications of continued improvement. Two additional intervention group participants no longer met criteria for their principal anxiety disorders at follow-up. Also, of the eight TAPS participants retaining comorbid diagnoses after treatment, half no longer met criteria at follow-up.

Discussion

The present study is an initial controlled pilot study reporting on the feasibility and potential efficacy of a psychosocial intervention for youngsters with persistent functional physical complaints and co-occurring anxiety disorders presenting for medical treatment. The retention and attendance rates in the treatment group, as well as parents' and children's high credibility and satisfaction ratings, support the feasibility of engaging initially reluctant families seeking medical care and implementing psychosocial intervention. Furthermore, this investigation suggests that a modified, empirically-based intervention for anxiety disorders, expanded to address pervasive somatic distress, may be effective for ameliorating children's anxiety and long-standing physical impairment. Treatment effects appeared similar across differing types of somatic complaints (e.g., chest pain and headaches). In addition, evaluations of treated participants suggest that clinical gains were maintained three months following intervention. These preliminary findings hold significant public health relevance given the high rates of co-occurring functional physical complaints and anxiety disorders in youth presenting for medical care, lack of effective treatment options, and associated disability and costs.

Relative to the physical complaints often reported in psychiatric samples of anxious youth (e.g., restlessness, blushing, fatigue, stomach aches),[43–44] our clinical impression is that our sample of anxious children seeking medical care experienced more pervasive, chronic, and disabling somatic distress. Two small studies have demonstrated considerable overlap in psychiatric and somatic symptoms between youngsters with recurrent abdominal pain seen in pediatric GI and clinically referred anxious youth.[19–20] However, assessing the chronicity, impairment, and medical use associated with physical complaints may better distinguish these clinical groups. The majority of our co-morbid sample suffered from multiple physical complaints lasting several years associated with school absences and missed activities. Repeated medical consultations and costly diagnostic procedures (e.g., endoscopy), as well as medication use without symptom relief, were characteristic of these cases. Many of these children experienced pervasive pain without a predictable pattern that went beyond physiological arousal directly linked to fear-provoking situations. Therefore, traditional anxiety protocols that address somatic distress simply as a manifestation of anxiety may not be sufficient for children seeking medical intervention for physical symptoms. Adapting these interventions to directly target the unique interference caused by persistent physical discomfort may enhance treatment effects for pediatric populations. A

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future comparison of the expanded TAPS protocol to a "pure" anxiety protocol would inform this issue.

Although promising, a challenge to implementation was that families were seeking treatment for physical rather than psychological symptoms, and viewed the impairment as related to a medical condition. Thus, it was important to address families' uncertainty about the credibility of a psychological explanation for children's physical discomfort. The expansion of TAPS, which focused on and validated children's pain, seemed to engage families and enhance the acceptability of psychological intervention. The merit of this approach was further supported by parents' and children's high credibility and satisfaction ratings, lack of study drop out, and high treatment attendance..

The availability of effective treatments will be crucial to improving the clinical management of these youngsters. The literature documents that standard care is costly and inadequate, [8,11] with psychiatric disorders rarely identified or referred for treatment.[45–46] Consistent with this description, the majority of our participants had never accessed mental health services despite years of impairment and multiple psychiatric diagnoses. Collaboration between pediatricians and mental health specialists seems critical to identifying youth with psychiatric disorders and facilitating access to appropriate treatment. An integrative treatment approach, [47–48] including an initial clinical evaluation of the relevant biological, psychological, and social influences, and recommended interventions related to these factors, may be an optimal model for treatment delivery for children with complex medical and psychological comorbidities.

Limitations

One limitation is that we were unable to collect data on the number of families who were informed about the study by physicians but never telephoned study staff. Thus, parents who contacted us may reflect a biased sample of those who are more accepting of psychosocial treatments. In addition, we used a waiting list control to obtain an initial estimate of potential treatment efficacy on functional somatic distress, which does not control for non-specific treatment effects. However, a pure placebo response is unlikely since most families had received substantial medical attention. The study is also limited by the absence of extended follow-up and validated pain and functional disability measures (e.g., Abdominal Pain Indexand the Functional Disability Inventory). [49–50] We also did not systematically assess service utilization which is essential to documenting cost-effectiveness of treatment. Finally, the generalizability of findings is limited by a homogenous population recruited from an urban New York area, the majority of patients being middle-class and Caucasian.

Conclusions

Children's persistent functional physical complaints are associated with marked disability, as well as invasive and costly diagnostic tests. Anxiety disorders often co-occur, yet they are rarely identified and mental health treatment is the exception. Implementing an exposure-based systematic intervention, jointly targeting physical distress and anxiety may improve children's functioning and ultimately, may minimize unnecessary medical interventions.[17] Future work should document the specific and long-term efficacy of this intervention compared to alternate treatments and using ecologically-valid outcomes such as school absence, functional disability and medical costs. To enhance accessibility, future dissemination efforts should focus on evaluating computer-based intervention with less therapist contact in pediatric practice. This may be a particularly promising avenue given the recent findings documenting the efficacy of therapist-assisted computer-based cognitive-behavioral intervention for anxiety in youth[51]. It will also be important to test stepped or stratified care models to increase availability, efficiency, and cost-effectiveness of

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psychosocial treatment implementation in medical settings. Such models stand to improve clinical care of youth with psychiatric disorders in the presence of persistent functional physical complaints across pediatric specialties and primary care settings.

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Table 1

Presenting Physical Complaints and Psychiatric Diagnoses

Characteristic	**TAPS (*n* = 20)**		**WL (*n* = 20)**		**Total (*n* = 40)**	
Most common presenting physical complaints					*n*	*(%)*
Stomach pain	19	(95)	18	(90)	37	(92.5)
Nausea or vomiting	9	(45)	9	(45)	18	(45)
Diarrhea or constipation	7	(35)	6	(30)	13	(32.5)
Headaches	5	(25)	8	(40)	13	(32.5)
Chest pain or discomfort	5	(25)	5	(25)	10	(25)
Number of physical complaints,						
Mean (SD), Range (1–6)	2.9	(1.5)	3.1	(1.1)	3.0	(1.3)
Frequency of physical discomfort in last month						
At least daily	6	(30)	5	(25)	11	(27.5)
Several times weekly	9	(45)	14	(70)	23	(57.5)
Weekly to biweekly	5	(25)	1	(5)	6	(15)
Duration of physical discomfort						
Up to 1 year	6	(30)	6	(30)	12	(30)
1 to 2 years	5	(25)	6	(30)	11	(27.5)
More than 2 years	9	(45)	8	(40)	17	(42.5)
Principal disorder						
Separation Anxiety Disorder	8	(40)	6	(30)	14	(35)
Social Anxiety Disorder	7	(35)	4	(20)	11	(27.5)
Generalized Anxiety Disorder	3	(15)	7	(35)	10	(25)
Specific Phobia	2	(10)	2	(10)	4	(10)
Anxiety Disorder, not otherwise specified	0	(0)	1	(5)	1	(2.5)
Current comorbid diagnosis (present)	19	(95)	12	(60)	31	(77.5)
Comorbid anxiety disorders	18	(90)	12	(60)	30	(75)
Comorbid mood disorders	5	(25)	1	(5)	6	(15)
Other comorbid disorders	1	(5)	3	(15)	4	(10)
No. of comorbid diagnoses						
Mean (SD), Range (0 – 4)	1.8	(.85)	1.1	(1.2)	1.4	(1.8)

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Table 2

Baseline and Post-treatment Ratings for TAPS and Waiting-list Control

	Baseline				Post-Treatment						
	TAPS (*n* = 20)		WL (*n* = 20)		TAPS (*n* = 20)		WL (*n* = 19)				
Variable	***n***	**(%)**	***n***	**(%)**	***n***	**(%)**	***n***	**(%)**	**χ^2 or *F(df)*[a]**		
Principal anxiety disorder[b] (present)	20	(100)	20	(100)	11	(55)	19	(100)	11.1	(1)**	
Treatment responder[c]											
CGI-I	--	--	--	--	16	(80)	0	(0)	25.8	(1)**	
	(*n* = 20)		(*n* = 20)		(*n* = 20)		(*n* = 17)				
	M	(SD)	M	(SD)	M[d]	(SE)	M[d]	(SE)			Effect size
Principal diagnosis CSR (0–8)	6.2	(1.0)	5.3	(.8)	3.3	(.3)	5.6	(.3)	23.7	(1, 36)**	3.2
Self-ratings											
Pain (0–8)	3.6	(2.0)	3.9	(2.2)	1.6	(.4)	3.9	(.4)	16.3	(1, 34)**	1.0
GI-CSI (0–24)	8.7	(5.5)	8.7	(6.2)	4.5	(.8)	7.1	(.8)	5.3	(1, 34)*	.6
Parent ratings											
Pain (0–8)	4.3	(2.0)	4.5	(1.9)	2.3	(.4)	4.0	(.4)	8.8	(1, 34)*	.8
Independent evaluator ratings											
CGAS (1–100)	55.2	(9.1)	54.8	(10.0)	67.2	(2.1)	57.1	(2.1)	11.9	(1, 36)**	1.0

Note. TAPS = Treatment of Anxiety and Physical Symptoms program group. WL = waiting-list control group. Clinical Global Impressions – Improvement – Independent Evaluator. GI-CSI = Gastrointestinal Factor of Children's Somatization Inventory. CGAS = Children's Global Assessment Scale.

[a] Post-treatment completer analyses.

[b] Principal anxiety disorder present based on ADIS rating of 4 or above.

[c] Responder: Clinical Global Impression Scale (CGI-I) ratings of 1, 2, or 3.

[d] Post-treatment means adjusted for baseline values.

* $p < .05$.

** $p < .001$.

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Table 3

TAPS Group at 3-Month Follow-Up

	Post-Treatment (*n* = 20)		Follow-up (*n* = 20)			
Variable	***n***	**(%)**	***n***	**(%)**		
Principal diagnosis (present)	11	(55)	9	(45)		
Any comorbid diagnosis (present)	8	(40)	5	(25)		
	M	(SD)	M	(SD)	*t(1)*	*p*[a]
Principal diagnosis severity rating (0 – 8)	3.6	(1.7)	3.1	(1.9)	1.9	.07
Self-ratings						
Pain (0–8)	1.6	(1.5)	1.7	(1.7)	−.65	.53
GI-CSI (0–24)	4.3	(5.4)	4.0	(4.2)	.49	.63
Parent ratings						
Pain (0–8)	2.3	(1.6)	2.0	(1.4)	.88	.39
Independent evaluator ratings						
CGAS (1–100)	67.3	(12.2)	71.0	(11.1)	−1.8	.09

Note. TAPS = Treatment of Anxiety and Physical Symptoms program group. WL = waiting-list control group. GI-CSI = Gastrointestinal Factor of Children's Somatization Inventory. CGAS = Children's Global Assessment Scale.

[a]None were significant.