

Cognitive behavioral therapy for comorbid pediatric functional gastrointestinal disorders and anxiety: Systematic review and clinical applications

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Abstract

Pediatric Functional Gastrointestinal Disorders (p-FGID) comprise one of the most common chronic conditions impacting global health. Conceptualized as gut-brain communication disorders, p-FGID are often exacerbated by and contribute to significant anxiety as well as functional impairment. Cognitive behavioral therapy is the gold standard psychosocial treatment for anxiety spectrum disorders. Prior research demonstrates a bidirectional link between p-FGID and anxiety symptoms, recommending CBT as the first line of treatment for both. While exposure is the potent ingredient for anxiety treatment, exposure is under-investigated in the treatment of p-FGID. The present brief systematic review synthesizes existent literature to describe the impact of CBT on p-FGID and anxiety symptoms in youth. The researchers systematically screened articles (n=23) located via Embase, Medline, and PsychINFO search. Eight studies meeting inclusion criteria were included for the final review. Three themes characterized the selected articles: (1) the impact of CBT on p-FGID symptoms, (2) the impact of CBT on health-related disability in youth with p-FGID, and (3) the impact of CBT on concurrent anxiety symptoms in youth with p-FGID. Key findings are summarized and implications for treatment are identified.

Keywords: Child, Adolescent, FGID, CBT, Exposure

Introduction

Pediatric functional gastrointestinal disorders (p-FGID) are a widespread health concern in pediatric populations, impacting an estimated 256 million children globally [1]. Research reveals that without extensively available effective treatment approximately 50% of afflicted children experience enduring symptoms throughout development [2-3]. Psychological comorbidity accounts for a substantial portion of impairment in many children with p-FGID, who are 3-5 times more likely to report anxiety than healthy peers [4-6]. Despite considerable investments in healthcare, children continue to suffer. Health practitioners currently face the challenge of identifying an effective treatment to restore wellbeing to millions of children worldwide.

This systematic review aims to help physicians and other healthcare providers identify effective psychosocial interventions for pediatric patients diagnosed with functional gastrointestinal disorders (p-FGID). The article fulfills this purpose through several means. First, disorders of the gut brain communication are described. Second, the relationship between p-FGID and anxiety is discussed. Third, treatment options are outlined. Fourth, a systematic review evaluating the research pertaining to cognitive behavioral therapy for p-FGID symptoms, anxiety, and the impact on quality-of-life metrics forms the core of the article. Special attention is focused on the role of exposure-based procedures. A user-friendly typology of CBT for p-FGIDs based on the available research concludes the systematic review.

Disorders of gut-brain communication

Broadly characterized by disrupted communication between the gut and the brain, p-FGID occur without physical abnormalities or identifiable biological origin [7]. Lack of clear biological etiology complicates diagnosis and treatment, contributes to misunderstandings, and prevents reliable prediction of symptoms [8-9]. Successful treatment of p-FGID requires a comprehensive understanding of the etiology and maintenance of symptoms. Clear conceptualization is achieved within a framework addressing biological, psychological, and social factors which shape the expression, development, and prognosis of p-FGID symptoms. The gut-brain axis (GBA) explains the interconnections between biopsychosocial processes and symptoms of illness.

The GBA effectively synthesizes information from the nervous and endocrine systems [10]. These systems regulate arousal, digestion, metabolism, and excretory processes. Repeated occurrence of gastrointestinal symptoms followed by adverse consequences teaches children with p-FGID to become hypervigilant toward pain cues and somatic sensations [11]. Learning processes prime children with p-FGID to react strongly to physical discomfort. When children experience GI pain or uneasiness, their bodies' sympathetic nervous systems are activated to respond to possible threats [9]. Prolonged nervous system activation disrupts typical neural and neuroendocrine communication along the GBA. Fragmented communication further exacerbates GI symptoms such as nausea, stomach pain, and constipation [12]. Children respond to these sensations by avoiding stimuli that could increase the risk of GI symptoms [13]. Well-meaning caregivers often enable avoidance by providing accommodations (e.g., permitting school absences or providing reassurance) [6]. Accommodation temporarily alleviates distress but limits activities of daily living, increasing disability impact and fear.

Pediatric p-FGID and anxiety

Notably, anxiety and avoidance are more reliable predictors of health-related quality of life than physical symptoms in children with p-FGID [14,15]. Avoidance is a typical response to catastrophic interpretations of somatic symptoms that often accompany anxiety and p-FGID. The maintaining factors of p-FGID and anxiety are overlapping and intertwined. Practitioners must address anxiety-related cognitions and behaviors concurrent with GI distress to optimize treatment outcomes. Interrupting a vicious cycle of brain-gut miscommunication is imperative in preventing irreversible physical and psychological damage.

Treatment options

To this end, interventions require the capacity to effectively address multiple concurrent p-FGID symptoms and accompanying anxiety. Healthcare services frequently fall short of such aims. Multiple analyses illustrate weak support for medical or dietary treatments for pediatric IBS, indicating limited efficacy [1]. Avoidance of foods, while part of many prescribed elimination diets, is often excessive and may increase risk of restrictive eating or malnutrition [16,17]. To support healthy development, treatment should target excessive avoidance behaviors. Furthermore, current standard medical interventions do not fully address psychosocial factors associated with p-FGID, such as impaired social and emotional functioning and anxiety behaviors.

Meta-analyses summarizing years of research documenting

the efficacy of psychosocial interventions suggest that behavioral healthcare should become the first line of treatment for p-FGID [18-22]. Psychological interventions are not only less invasive and less expensive than medical interventions, but they also address the stressors which maintain p-FGID within a biopsychosocial framework. At present, the best supported modality is cognitive behavioral therapy (CBT). Multiple studies demonstrate that CBT with standard medical care (SMC) for p-FGID is at least as effective as intensive medical care and is the first line of intervention for pediatric anxiety [23-24]. Thus, CBT is selected for the focus of this review.

CBT for pediatric p-FGID most commonly incorporates psychoeducation about the relationship between p-FGID symptoms and stress, emotional regulation skills, cognitive restructuring, relaxation techniques, parent coaching, behavioral activation, and exposure [23,25]. Overlap between interventions targeting anxiety and those targeting GI symptoms makes CBT an attractive choice for comorbid presentations.

Research objectives

Recent research focused on dismantling CBT protocols has found exposure to be incredibly effective in treating anxiety, above and beyond cognitive restructuring, relaxation, and mindfulness [26,27]. Exposure appears beneficial in decreasing symptoms of highly comorbid pain-related disorders, including p-FGID [28]. Concerningly, while exposure to avoided situations is a critical component of effective CBT for anxiety, it is underutilized and under-investigated as an intervention for pediatric p-FGID. The following systematic review seeks to address this gap by synthesizing existing data on the treatment of p-FGID and comorbid anxiety symptoms. Therefore, the following review aims to address a critical gap in the literature by answering the following questions:

- What is the impact of the CBT for p-FGID on GI symptoms?
- What is the impact of the CBT for p-FGID on anxiety symptoms?
- What is the impact of the exposure for p-FGID on anxiety symptoms?
- What is the impact of the CBT for p-FGID on quality of life and functional disability?

Methods

CENTRAL, MEDLINE, and PsychINFO databases were used to identify all randomized controlled trials pertinent to the effect of CBT on p-FGID symptom severity and co-occurring anxiety published since 2016. For this review, "anxiety" is defined as symptoms of anxiety co-occurring with p-FGID and "p-FGID" as any disorders of gut-brain interaction defined by the Rome Foundation criteria ROME-III and ROME-IV or as characterized by Apley's criteria for recurrent abdominal pain [7,29,30]. Boolean terms "OR" and "AND" were used to allow the inclusion of synonyms and link terms to conduct a thorough review. The final search string employed comprised of ((pediatric OR paediatric OR child* OR youth OR adolescent NOT adult) AND (cognitive behavioral therapy OR cognitive behavioural therapy OR CBT OR cognitive therapy OR behavioural therapy) AND (functional gastrointestinal OR disorders of gut-brain interaction OR recurrent abdominal pain OR functional abdominal pain OR functional abdominal pain not otherwise

specified OR irritable bowel syndrome OR abdominal migraine OR functional dyspepsia OR functional defecation OR constipation OR non-retentive fecal incontinence OR functional nausea OR functional vomiting OR aerophagia OR cyclical vomiting)). Filters restricted results by participant age (7-18 years), language (English), and publication type (peer-reviewed article). Articles that failed to address the relationship between p-FGID and anxiety or comprised case studies with comorbid chronic health concerns were excluded. Twenty-three articles were identified, 8 of them met inclusion criteria for this review.

Results

This review details the present efficacy of CBT for p-FGID and co-occurring anxiety. Four primary themes emerge from the literature review: the impact of CBT on (1) p-FGID symptoms, (2) anxiety symptoms, and (3) quality of life with (4) exposure as a mediator for all three outcome variables. Findings are summarized below.

P-FGID symptoms

Five of the 8 articles reported greater improvement in p-FGID (functional abdominal pain, irritable bowel syndrome, and functional dyspepsia) symptoms than comparison control groups consisting of SMC with or without psychoeducation [31-34]. Pain rating scales, quality of life inventories, somatization symptoms, and gastrointestinal symptom self-report measures were the primary outcome measures used to determine reductions in symptomology.

In randomized controlled trials comprising 530 children, multiple researchers reported substantial reductions in pain frequency and symptom severity [31-34]. Bonnert and colleagues [31] discovered that children receiving CBT experienced large reductions in IBS symptoms and modest reductions in visceral sensitivity and pain frequency. Across outcomes, post-treatment p-FGID symptoms were significantly less in children assigned to SMC than those assigned to the CBT intervention. Similarly, Lalouni and colleagues [32] claimed that providing children with P-FGID with just 10 sessions of CBT led to a marked improvement in GI symptoms and visceral sensitivity exhibiting modestly and moderately (respectively) larger effects than SMC alone.

Recent research supports the use of CBT for p-FGID with evidence of significantly larger reductions in pain frequency [33]. Children who receive targeted CBT appear more likely to experience symptom alleviation than those were provided with SMC alone. Warschburger and colleagues [35] detail somewhat opposing findings in a study of 127 children with FAP, describing that children receiving CBT endorsed a reduction in pain intensity and duration but not pain frequency. Notably, the latter study [35] conducted follow-up measures at 3 months and 12 months following treatment, with differences in pain intensity emerging 12 months following intervention. Furthermore, the two studies [33,35] utilize different pain frequency and severity measures and vary slightly in protocol, with only the latter utilizing exposure as an intervention. While exposure may reduce pain-related avoidance, it may also increase the opportunity for eliciting GI symptoms. Provided that CBT protocols highlight pain management and reappraisal, intervention may be more effective in producing adaptive pain coping than reducing pain frequency. While exposure may reduce pain-related avoidance it may also increase opportunity for eliciting GI symptoms.

Interestingly, in a study of 101 children, CBT elicited greater symptom alleviation than SMC only in children with high pain-related disabilities [34]. A floor effect may explain the limited change in children with lower symptom severity. These promising results suggest that CBT benefits children with poor responses to SMC, who are known to be at greater risk of disability and poorer quality of life.

In the remaining 3 of the 8 articles selected, no differences in p-FGID symptoms between CBT and SMC groups were discovered [36-38]. Several factors may explain these contrasting findings. First, Palermo and colleagues [36] utilized pain intensity as the only direct symptom measure. Similarly, in prior studies, pain intensity did not respond to CBT [33]. However, GI symptom severity and pain frequency seemingly respond more to CBT than SMC alone [33,35]. Palermo and colleagues [36] also report that CBT elicited no marked change over SMC in the frequency of pain disruption of daily activities. Notably, the researchers did not include exposure as a treatment component [36]. Exposure is critical in re-engaging patients in avoided activities. Variations between CBT protocols for p-FGID in research protocols may account for inconsistent results.

Levy and colleagues [37] study of 316 children with FAP concluded that there was no difference in pain intensity, pain frequency, and symptom severity across children receiving educational and support remotely, internet-delivered CBT, and CBT in person following intervention. Interestingly, children who received internet-delivered CBT endorsed improvements in physical quality of life with CBT exhibiting a small but significant effect on outcomes, suggesting that internet delivered CBT is a viable approach to augmenting standard care [37] It is unclear why these improvements were not replicated in the in-person CBT treatment group [37]. Similarly, Cunningham and colleagues [38] found no reduction in IBS pain severity but did identify improvements in pain-related disability. Measurement variability across studies complicates interpretation of the impact of CBT on pain, symptom severity, and symptom impact. Thus, distress and functioning should be examined across a variety of health-related variables.

Anxiety symptoms

CBT is the gold standard treatment for pediatric anxiety, which often accompanies pediatric p-FGID [39]. Three of the 8 articles [31,32,38] explored symptoms of non-specific anxiety while 4 articles [33,35-37] investigated treatment outcomes for pain-specific anxiety. In 2 of the 3 studies examining general symptoms of anxiety [28,38], researchers reported significant efficacy of CBT over SMC alone, with CBT demonstrating a moderate effect on anxiety symptoms. In Cunningham's [38] study children provided CBT for p-FGID exhibited about twice as much as reduction in scores on the Screen for Child Anxiety Disorders (SCARED) as children supported with SMC alone (33% vs 16.5%; CBT) [38]. Bonnert and colleagues [31] measured anxiety in adolescents similarly endorsed reductions in anxiety following CBT as measured via the Spence Children's Anxiety Scale. Researchers concluded that CBT had a small but significant effect on anxiety according to parents but not adolescents. Comparisons in anxiety between adolescents receiving CBT versus SMC approached but did not reach statistical significance ($p = 0.081$) [31]. Notably, Bonnert and colleagues utilized a longer follow up period than other researchers and only examined treatment in patients with IBS [31]. Thus, not only may

booster sessions be necessary to maintain gains from CBT for some patients, treatment efficacy likely varies across p-FGID presentation. All but one of the reviewed studies [33] detail outcomes for pain-specific anxiety, researchers identified that CBT effectively reduced pain-catastrophizing or pain-specific anxiety [35-37]. Researchers identified significant reductions in parent-reported pain anxiety and pain catastrophizing, beyond that observed in those receiving SMC with or without attention control. However, Levy and colleagues [37] found that while parents reported moderate reductions in pain catastrophizing, children reported no difference following intervention. Finally, the remaining study, discerned no change in pain-catastrophizing, however pain-catastrophizing results were obtained only from children and not parents [33]. Future research should be directed at identifying sources of discrepancies between child and parent report and implications for long-term outcomes.

Quality of life

Notably, 7 of the 8 studies with quality of life and functional disability outcomes reported that CBT was more effective than SMC in reducing functional disability and improving quality of life after treatment [31-36,38]. The only study that reported no difference in quality of life compared to SMC following CBT was that conducted by Nieto and colleagues [33] which did not explicitly include exposure in the treatment protocol. While the effects of CBT vary by protocol and across different populations, results are most consistent for improved quality of life and engagement in daily activities.

Exposure

Despite exposure being an important ingredient in addressing fear-related avoidance and resulting disability, exposure was only utilized in 4 [31,32,35,37] of the 8 randomized controlled trials identified for this review. All of these studies documented greater improvement in anxiety symptoms associated with CBT per child or parent report, while 3 [31,35,37] of the 4 found CBT to produce improvement in p-FGID symptoms beyond that of SMC. In comparison, only 2 of the 4 studies that did not include exposure found improvement in anxiety [36,37]. Interestingly, the outcomes examined in studies which did not include exposure highlighted pain-related anxiety only or did not measure any form of anxiety [33,34,36,37]. Likewise, only 2 of the 4 studies that did not utilize exposure found CBT to produce added alleviation of p-FGID symptoms beyond that of SMC [33,34]. The current sample size limits what conclusions can be drawn.

However, given the chronic course of p-FGID, continued research should address the potential impact of exposure on improving quality of life and increasing or maintaining functional ability in children with pediatric p-FGID.

Strengths and limitations

Between study heterogeneity of criteria employed across research studies (Apley, ROME-III, and ROME-IV) and variation of CBT components employed across research protocols reflects variation observed in practice but may further obscure efficacy of CBT. These factors are likely to impact treatment outcomes. Research predominately focuses on patients with functional bowel (e.g., IBS) and pain-related (e.g., FAP) disorders, while many diagnoses such as functional esophageal (e.g., functional heartburn) and gastroduodenal (e.g., functional nausea) are underrepresented. More randomized controlled trials are needed to identify the added benefit

of CBT for these populations.

The current data reviewed demonstrates considerable promise for delivering CBT to patients diagnosed with most common presentations of p-FGID. However, many physicians and other healthcare professionals may be understandably unfamiliar with this powerful psychosocial approach. Accordingly, the next section provides a short profile of CBT for pediatric patients diagnosed with p-FGID.

A Brief Typology of CBT for Youth with p-FGID and Anxiety

In the following paragraphs, several core elements which form the CBT landscape are delineated. Case conceptualization, therapeutic stance variables, components of session structure, and modular treatment design are explained. Finally, applications of the treatment modules to pediatric patients diagnosed with p-FGID and anxiety are noted.

Case conceptualization

The proper implementation of CBT is rooted in case conceptualization.⁴⁰ Fortunately, the biopsychosocial model is completely congenial with CBT [41]. Two key features are unique to a CBT case conceptualization: the hierarchical organizational model (HOM) and the content-specificity hypothesis. The HOM delineates the relationship between automatic thoughts, underlying assumptions, and schemas/core beliefs [42]. The connection between these cognitive layers is typically illustrated via concentric circles (**Figure 1**). The tiers vary in terms of their levels of implicit biases and accessibility to them, situational specificity, as well as the link to emotional intensity. Automatic thoughts represent situationally specific stream of conscious judgments, conclusions, attributions, explanations as well as images that lie at the outermost periphery and are tied to emotional arousal. The middle ring contains underlying assumptions which are cross-situational rules that are far more implicit, difficult for patients to access, and yoked to much greater emotional intensity. Core beliefs represent basic views of oneself, others, and the world that energize attention, encoding, retention, and recall [43]. These deep-seated cognitive structures evolve over time and become entrenched in young adulthood and beyond [44]. Therefore, core beliefs are much more determinative in transitional age youth (21-27 years).

The CSH outlines the specific cognitive content that characterizes particular emotional states [45]. Each major mood state is associated with a distinctive cluster of cognitions (**Table 1**). The CSH enables clinicians to surveil the most emotionally meaningful thoughts and then work to modify them.

Therapeutic stance

CBT involves adopting an idiomatic stance marked by collaborative empiricism, guided discovery, and flexible practice within faithful adherence to the theoretical model [46]. Collaborative empiricism refers to establishing a partnership between pediatric patients, their families, and clinicians which is transparent, authentic, and guided by quantifiable goals. Collaboration relates to creating a shared vision for treatment. The empiricism part of the equation pertains to measuring progress in observable and understandable ways. A major goal of collaborative empiricism is to remove the mystery from psychotherapy and minimize power imbalances.

Measurement-based care (MBC) is embedded within

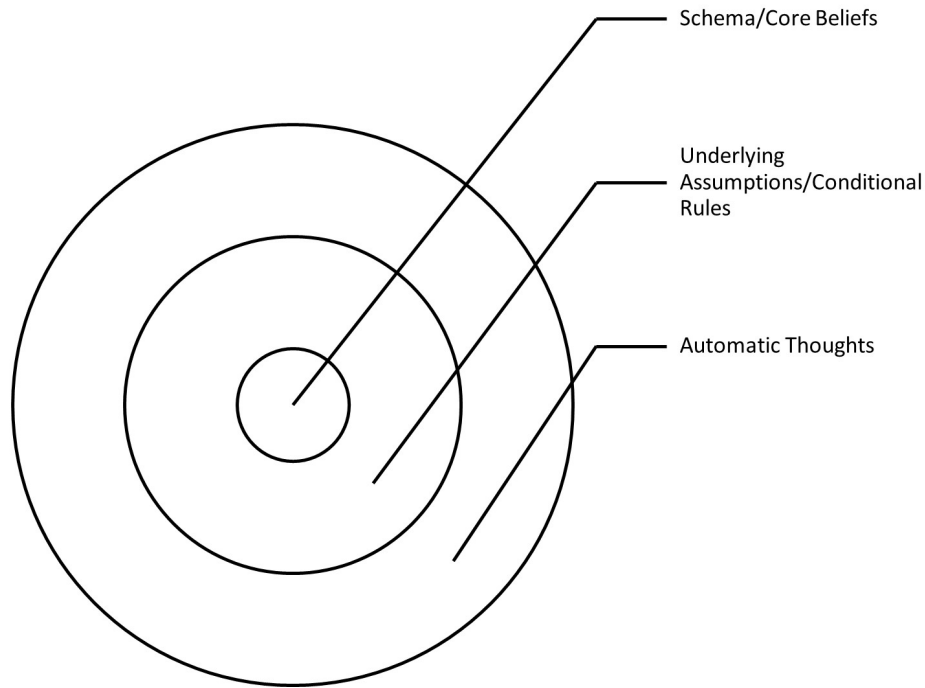


Figure 1. Hierarchical Organizational Model.

Table 1. Content-specificity hypothesis.	
Mood State	Cognitive content
Depression	Negative view of self Negative view of others/experiences Negative view of future
Anxiety	Overestimation of the probability of danger/threat Overestimation of the magnitude of danger/threat Ignoring rescue factors Neglect of coping resources
Panic	Catastrophic misinterpretation of normal bodily sensations
Social anxiety	Fear of negative evaluation
Anger	Hostile attributional bias Labelling the other Violation of personal imperatives Sense of unfairness

collaborative empiricism. Periodic monitoring of progress at recurrent intervals represents the essence of MBC [47]. The frequency of these assessments may occur at multiple intervals (e.g., every 2 weeks, 4 weeks, etc). Since these measures are administered repeatedly, they should not be a burden to either the patient or the clinician. Anxious symptoms in patients diagnosed with p-FGID are a specific focus of this review. Accordingly, the Screen for Childhood Anxiety Related

Emotional Disorders (SCARED) is a suitable metric [48].

Guided discovery enables young patients to evaluate the accuracy of their automatic thoughts and cast doubt on their misinterpretations [42]. Empathy, Socratic dialogues, and behavioral experiments form the nucleus of guided discovery. In this way, youth build a platform upon which base their conclusions.

Practicing flexibility while remaining faithful to the treatment model is the third axiomatic stance [49]. The theoretical is robust and enables a variety of interventions. Flexibility allows clinicians to make real-time adjustments and respond to patients' individual presentations.

Session structure

Adhering to the characteristic session structure is a signature clinical practice [46]. Mood check-ins, agenda setting, processing therapeutic content, homework assignments and eliciting feedback/summaries are session structure's core elements. Mood check-ins provide brief baseline assessment and could include scores from standardized metrics (e.g., the SCARED). Agenda setting sets the stage for the session enabling clinicians and patients to collaboratively identify treatment targets and allocate time for addressing them. Once these targets are named, various modular procedures are applied. Homework assignments follow and refer to out-of-session tasks that facilitate generalization between clinical encounters. Sessions conclude with eliciting feedback from the youth/caregivers (e.g., What was helpful? What was unhelpful?) as well as a summary. For younger patients, asking the youth to give the session a title or lesson is recommended [50].

Modular design and delivery

Psychoeducational methods provide pediatric patients with relevant information about their diagnoses, potential treatment options, and treatment course [51]. As Friedberg and Paternostro noted, psychoeducation yields various benefits such as heightened motivation, help-seeking, and self-empowerment as well as decreasing stigma [51]. For patients with p-FGID and comorbid anxiety, psychoeducation likely focuses on the biopsychosocial model, the brain-gut axis, anxiety, and CBT.

Basic behavioral tasks include techniques such as relaxation, mindfulness, behavioral activation/pleasant activity scheduling, and contingency management [52]. Relaxation is one of the most frequently used interventions [53]. Typically, these procedures range from relatively simple methods such as controlled diaphragmatic breathing (e.g., Belly Breathing) to more complex inventions (Progressive Muscle Relaxation). Mindfulness techniques are increasingly employed [54]. Both mindfulness and relaxation procedures are well-suited to mitigate the autonomic hyperarousal common in comorbid p-FGID and anxiety.

Behavioral activation/pleasant activity scheduling involve planning activities that amplify positive affectivity and minimize avoidance. These interventions serve two vital clinical functions: increasing the probability of positive reinforcement and decreasing withdrawal or isolation. These procedures are indicated when the anxiety and p-FGID contribute to loss of pleasure and reduction in heretofore enjoyable activities.

Contingency contracts are structured behavioral agreements used to boost desirable behaviors and reduce unwanted ones [25]. These pacts specify the target behaviors and consequences which follow successful compliance [41]. Often, these procedures are implemented as star charts, sticker schemes, and/or token systems. Contingency contracts are deployed in several instances with pediatric patients diagnosed with p-FGID and anxiety. They may be directed toward increasing children and adolescents' approach behavior to situations they avoid, prompting greater adherence to a

nutrition regime, and reinforcing patients' use of coping strategies.

Cognitive restructuring focuses on re-engineering young patients' thought content and reasoning processes [25,41]. Typically, problem-solving, self-instruction, and rational analysis comprise this module. Self-instructional and rational analysis techniques are applied when pediatric patients' thoughts are inaccurate. Problem solving is initiated when there are no distortions in their thinking, but rather when their appraisals are accurate and they need cope with/adapt to distressing situations. Often, in patients diagnosed with p-FGID anxiety, catastrophizing, intolerance of uncertainty, ignoring of coping resources, and pessimism are the targets for self-instruction and rational analysis.

Exposure procedures are essential in treating anxiety [26,40,55,57]. Exposures are present-oriented, graduated emotional evocative encounters with formerly avoided distressing circumstances that result in new learning which increases perceived control and changes unproductive attitudes [56]. More specifically, "the experiential approach exposes the patient to experiences that are in themselves powerful enough to change misconceptions" [43]. A recent review concluded that 88% of the most powerful studies on pediatric anxiety treatment included exposure [55]. Not surprisingly, when exposure is omitted from the treatment protocol, CBT's effectiveness is severely compromised [57].

Exposures are set up in a graduated fashion via hierarchies with each rung representing a higher intensity level. Each step begins with the patient making a prediction about what might happen. Then, a hierarchy item is encountered and patients' levels of distress, cognitions, behavior, and physiological responses are mindfully observed as well as recorded. After the exposure ends, patients compare what they experienced to what they predicted to disconfirm their expectations and create new approach behaviors. Typical targets for exposure would include overall intolerance of uncertainty, pain experiences, catastrophic images of urgency to defecate, worries about embarrassment, and/or calamitous predictions when experiencing normal sensations of gut motility. Graduated exposure is also frequently implemented imaginably (i.e., in the mind's eye) with patients diagnosed with p-FGID's. For example clinicians can guide patients through imaginal exposures of experiencing symptoms while at school and then assign the in-vivo exposure of going to school with an upset stomach [28]. Utilizing a variety of exposure options allow clinicians to work within constraints of time-limited therapy. Provided proper psychoeducation, parents can help children continue to make progress on exposure hierarchies between sessions.

Conclusion

P-FGID and anxiety frequently occur together are a leading health issues amongst pediatric populations worldwide [2-6]. As highlighted by the biopsychosocial model, treatment of comorbid anxiety symptoms is vital to disrupting underlying factors which maintain and exacerbate p-FGID related impairment [41]. Current literature identifies CBT as one of the most promising first line of treatment for both anxiety and p-FGID concerns [26-28]. Despite high concurrence rates, CBT protocols for p-FGID often leaves out critical interventions for anxiety such as exposure. Literature describes that exposure is not only a key ingredient in targeting anxiety, but also in reducing pain-related disability and improving health-related quality of life [31-36,38]. Recent trajectories suggest

that rates for both pediatric and anxiety disorders will continue to grow in upcoming years [58,59]. Clinicians will need to be prepared to identify maintaining factors and appropriate interventions to effectively support youth and families suffering from concurrent p-FGID and anxiety. Recognizing the relationship between anxiety and p-FGID-related impairment enhances case conceptualization and allows clinicians to select effective transdiagnostic interventions. This systematic review and treatment guide summarizes bench science and provides a bridge to bedside practice to enhance conceptualization and treatment of co-occurring p-FGID and anxiety.

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