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Abstract	In the United States, 10% of all adolescents suffer from a chronic illness (Blum, 1992; Krementz, 1989; Millstein & Litt, 1990). In total, approximately one million children have a chronic illness that affects	

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Anxiety Disorders in Children with Chronic Health Problems

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Lara J. Farrell, Caroline Donovan, Cynthia M. Turner,
and John R. Walker

In the United States, 10% of all adolescents suffer from a chronic illness (Blum, 1992; Krementz, 1989; Millstein & Litt, 1990). In total, approximately one million children have a chronic illness that affects daily life (Perrin & MacLean, 1988) and another ten million have somewhat less serious physical illnesses (Haggerty, 1984). A chronic illness is defined as “one that lasts for a substantial period of time or that has sequelae that are debilitating for a long period of time” (Perrin, 1985, p. 2). Chronic illnesses are associated with a wide range of sequelae and impairment including pain and discomfort, school absences, activity disruptions, poorer social competence, higher use of medication and health care visits, as well as increased risk for both internalizing and externalizing problems (e.g., Cadman, Boyle, Szatmari, & Offord, 1987; Gortmaker, Walker, Weitzman, & Sobel, 1990; Jackson & Vessey, 2004).

It is well established that comorbidity among medical conditions is common (Dewa & Lin, 2000), and the presence of multiple disorders in clinical samples equates to greater impairment in functioning (Ormel et al., 1994). The co-occurrence of mental disorders with chronic medical conditions

is of particular significance, given that the comorbidity of mental and medical conditions has been reported as high within both general population samples (Neeleman, Ormel, & Bijl, 2001) and primary care samples (Berardi et al., 1999), and that these comorbidities lead to excessive impairment and disability (Sullivan, LaCroix, Baum, Grothaus, & Katon, 1997). The presence of a medical condition appears to in fact increase the likelihood of experiencing a mental health problem, with research demonstrating higher rates of both anxiety and mood disorders in samples of people with medical problems compared to the general population (Patten et al., 2005; Scott et al., 2007). Interestingly, recent research has indicated that a great deal of the disability and functional impairment that occurs with chronic health problems, is accounted for more so by anxiety and depression than by features/symptoms of chronic medical conditions (Kessler, Ormel, Demler, & Stang, 2003; Sullivan et al., 1997).

Anxiety disorders are among the most common mental health problem affecting adults (Demyttenaere et al., 2004; Kessler, Chiu, Demler, & Walters, 2005) and children alike (Kendler, Neale, Kessler, Heath, & Eaves, 1992; Mattison, 1992; Pollock, Rosenbaum, Marrs, Miller, & Biederman, 1995), with current estimates indicating as many as 1 in 6 youth experiencing clinical anxiety (Boyd, Kostanski, Gullone, Ollendick, & Shek, 2000). Anxiety disorders during childhood tend to be chronic and unremitting in course

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(i.e., Aschenbrand, Kendall, Webb, Safford, & Flannery-Schroeder, 2003; Cole, Peeke, Martin, Truglio, & Seroczynski, 1998), and are predictive of other psychiatric disorders later in life (Last, Perrin, Hersen, & Kazdin, 1996; Woodward & Fergusson, 2001); including the development of depression in adolescence and adulthood (Brady & Kendall, 1992; Cole et al., 1998; Orvaschel, Lewinsohn, & Seeley, 1995; Pine, Cohen, Gurley, Brook, & Ma, 1998; Pollack et al., 1996; Seligman & Ollendick, 1998), personality psychopathology and suicidality in young adulthood (Brent et al., 1993; Rudd, Joiner, & Rajab, 2004), and an increased risk for substance abuse disorders in late adolescence and adulthood (Christie et al., 1988; Greenbaum, Prange, Freidman, & Silver, 1991; Kessler et al., 1996).

The experience of anxiety and the associated symptoms of excessive worry, physiological arousal, psychosomatic complaints, and avoidance of specific situations (to name a few), not surprisingly causes significant disruption to life for children and youth. Anxious children and youth frequently experience substantial disruption and difficulties in their peer and social relationships (e.g., Chansky & Kendall, 1997; Strauss, Forehand, Smith, & Frame, 1986), in their academic achievement (e.g., Kessler, Foster, Saunders, & Stand, 1995; King & Ollendick, 1989), and often experience concurrent psychosocial difficulties such as immaturity, attention and concentration problems, oversensitivity, low self-esteem, and low social competence (Ialongo, Edelsohn, Werthamar-Larsson, Crockett, & Kellam, 1994; Kashani & Orvaschel, 1990; Kendall, Cantwell, & Kazdin, 1989; Strauss, Frame, & Forehand, 1987).

Research from clinical and community studies suggest that children with anxiety disorders, also frequently present with chronic illnesses and physical conditions, such as asthma (e.g., Feldman, Ortega, McQuaid, & Canino, 2006; Hasler et al., 2005; Ortega et al., 2003), respiratory problems (e.g., Harter, Conway, & Merikangas, 2003; Koltek, Wilkes, & Atkinson, 1993), gastrointestinal (GI) problems (e.g., Campo et al., 2004), chronic headaches (e.g., Egger, Costello, Erkanli, & Angold, 1999) and diabetes (e.g., Kovacs,

Goldston, Obrosky, & Bonar, 1997). Results from numerous epidemiological studies have highlighted this positive association between the presence of an anxiety disorders diagnosis and self-reported physical disorders (e.g., Goodwin & Stein, 2002; Sareen, Cox, Clara, & Asmundson, 2005). Results from a large study by Scott et al. (2007) using the World Mental Health Surveys data, consisting of results from 19 general surveys collected across 17 countries, revealed that both anxiety and depression independently and comparably related to a wide range of chronic physical conditions. Results further suggested that the presence of *comorbid* anxiety and depression was associated with increased risk for experiencing a number of co-occurring physical medical conditions. Given the profound negative impact that both chronic medical conditions and anxiety disorders have independently on a child's life, the impact of comorbid medical conditions and anxiety disorders is likely to be considerable – for the child and family alike. Research suggests that such comorbidity certainly complicates functioning, as well as disease outcomes, leading to poorer quality of life (Kessler et al., 2003; Sareen et al., 2006; Scott et al., 2007).

A recent study by Chavira, Garland, Daley, and Hough (2008) investigated the impact of medical comorbidity on mental health and functional health outcomes among children with anxiety disorders. This study included a sample of children who were recruited randomly from one of five public health care sectors in San Diego, who had at least one anxiety diagnosis with a physical illness ($N=77$) or without a physical illness ($N=73$), as well as youth with at least one physical illness but no anxiety disorder ($N=438$). Psychiatric diagnoses were assessed with standardized interviews, whilst the child's health, emotional and behavioral functioning were assessed using standardized self-report measures. Results of this study demonstrated that at least half of children with anxiety disorders also had a comorbid physical illness – allergies and asthma being the most common. Furthermore, children with anxiety disorders who had a comorbid physical illness exhibited greater levels of emotional problems, more somatic complaints, and more

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school and social functional impairment than anxious children without a physical illness and children with physical illness alone. Parents of children in the comorbid group also reported greater caregiver strain than the other two groups (Chavira et al., 2008). The results of this study provide evidence of the considerable impairment associated with comorbid anxiety and medical problems, and highlight the need to understand the impact of comorbidity on functioning and management regimes.

The nature of the relationship and comorbidity between anxiety disorders and chronic medical conditions is not well understood. The relationship is likely to be reciprocal, in so much as the presence of both anxiety and physical illness will impact on each other in ways that are likely to precipitate and/or exacerbate symptoms of both conditions. There are a number of hypotheses proposed in the literature (e.g., Chavira et al., 2008; Katon, Richardson, Lozano, & McCauley, 2004; Sareen et al., 2006) that may account and explain the higher than expected comorbidity between anxiety and health complaints. First, it may be that the experience of a clinical anxiety disorder leads to increased risk for health/medical complaints, or exacerbation of symptoms through either biological mechanisms (i.e., changes in hormonal systems, autonomic nervous system activity; Sareen et al., 2006), and/or psychological processes, such as biases in symptom perception (e.g., real or perceived bodily symptoms), or deficits in coping/approach behaviors (e.g., self care/seeking assistance); or via a combined effect of biological/psychological processes (e.g., immune deficiency as a result of chronic worry and/or excessive avoidance behaviors). Second, the presence of a medical complaint or condition may precipitate or maintain anxiety and anxiety disorders. For example, the experience of chronic health complaints, reliance on medication/s, and/or frequent hospitalizations may lead to increased fear about safety, and about being away from parents and/or home, leading to increased avoidance of school/separation from parents. Furthermore, the experience of frequent bodily symptoms and pain associated with illness, may lead to increased scanning and hypervigilance

regarding bodily symptoms, leading to increased anxiety and panic responses in relation to both normal bodily changes, as well as symptoms of pain and illness. Third, a mediating variable may explain the relationship between these co-occurring conditions, such that an anxiety disorder may precede a substance use disorder, which in turns leads to a physical health condition; or conversely, medication for treatment of a physical complaint may exacerbate anxiety symptoms (Sareen et al., 2006). Finally, common genetic, environmental (e.g., poverty, childhood adversity; Katon et al., 2004; Kessler et al., 2005) and personality factors (Goodwin & Stein, 2002) may explain the co-occurrence of anxiety and medical conditions (see Sareen et al., 2006).

This chapter will focus on three disabling medical conditions of childhood – asthma, GI problems and diabetes – which are each associated with anxiety and anxiety disorders at higher than expected rates. The chapter will review each of these conditions, their association/relationship with childhood anxiety, and implications for management.

Anxiety and Asthma in Children

Asthma is recognized as the most common chronic illness of childhood, with a prevalence of between 7 and 10% (Centers for Disease Control and Prevention, 1998; Weitzman, Gortmaker, Sobol, & Perrin, 1992). Epidemiological research suggests that the prevalence of this disabling condition in childhood is on the rise (Burney, Chinn, & Rona, 1990; Weitzman et al., 1992), and both morbidity and mortality associated with this disease are increasing, particularly in children and youth (Weiss, Gergen, & Wagener, 1993). Whether this documented increase in prevalence and parallel disability are due to better detection of disease, increased public awareness, longer-lasting episodes or a true increase in incidence remains unclear. What is clear, however, is that more children and youth worldwide are suffering from asthma than ever before, with more frequent hospitalizations, increased disability, and more reported deaths as a result of this

chronic illness. Approximately 25% of people with asthma are thought to experience severe symptoms (Pleis & Lethbridge-Çejku, 2006), and generally speaking, asthma accounts for the leading cause of hospitalization among children.

Research examining comorbidity associated with asthma, has found that there is a higher incidence of psychiatric disorders among severely asthmatic children ,compared to healthy controls (e.g., Mrazek, Anderson, & Strunk, 1985; Strunk & Mrazek, 1985). This condition in childhood is responsible for more school absenteeism than any other chronic illness (Bloom & Cohen, 2007), therefore having a profoundly negative impact on a child's life across multiple domains including academic, social and psychological adjustment. Greater attention and understanding of emotional disturbances co-occurring with childhood asthma is critical, as the impact of such disorders may exacerbate asthma symptoms, reduce compliance with asthma management, and consequently complicate diagnosis and prognosis.

Asthma in Childhood

Asthma is a chronic respiratory disease, characterized by a reversible inflammatory condition of the bronchial airways. Symptoms associated with this airway obstruction, include chest tightness, coughing, and wheezing (National Heart, Lung, and Blood Institute [NHLB], 2007), and for the majority of children, symptoms are typically episodic, whereby complete reversal of symptoms is the norm until another episode is triggered. The onset of asthma for most patients begins early in life, with etiological models typically describing a complex interplay between genetic risk factors and environmental exposures as predisposing and precipitating factors in the development and maintenance of this disease. It is widely accepted that asthma has a strong genetic component; however, the specific role of genetics in the development of asthma like so many other disorders, remains a complex issue (NHLB, 2007). What is better understood is the role of two major environmental factors as being pivotal in the development, persistence, and possibly severity of

asthma: airborne allergens and viral respiratory infections (see NHLB, 2007 for a review).

Various emotions also play a role in the onset of asthma symptoms, such as crying, laughing, or yelling, through the onset of rapid breathing that simultaneously occurs during these emotional states. Not surprisingly, the experience of having an asthma attack is also frequently associated with increased anxiety and fear, which in turn leads to increased heart rate, breathing and hypoventilation in some cases, further exacerbating asthma. The relationship between anxiety and asthma is in fact bi-directional, in that anxiety can also trigger asthmatic reactions. The association between anxiety and asthma is an interesting one, and is indeed one of the most studied of the psychiatric comorbidities of asthma. Asthmatic patients who also experience anxiety have been found to have decreased physical and emotional functioning; poorer control of their asthma symptoms (Lehrer, Feldman, Giardino, Song, & Schmaling, 2002); and greater health care utilization (ten Brinke, Ouwerkerk, Bel, & Spinhoven, 2001), leading these sufferers to be a particularly disabled and high-risk sub-group.

Comorbid Anxiety and Asthma in Children

It is now well established that patients with asthma, especially children, are more likely to experience psychological problems, particularly anxiety disorders (Bussing, Burket, & Kelleher, 1996; Vila, Nollet-Clemencon, de Blic, et al., 1999). There are now numerous studies that have documented the higher than expected prevalence of anxiety in asthmatic children (e.g., Brown, Khan, & Mahadi, 2000; Campbell et al., 1995; Carr, Lehrer, Rausch, & Hochron, 1994; Davis, Russ, & MacDonald, 2002; Goodwin & Pine, 2002; Kolbe, Fergusson, Vamos, & Garrett, 2002; Pollack et al., 1996; Shavitt, Gentil, & Mandetta, 1992), with reported clinical anxiety symptoms or disorders in asthmatic samples ranging from 13% (e.g., Brown et al., 2000) to 52% (Nascimento et al., 2002). Bussing et al. (1996) demonstrated that 43.2% of 37 children with asthma in an

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outpatient community clinic met criteria for an anxiety disorder based on clinician interviews, vs. 19.4% of 25 healthy controls. Similarly, Vila, Nollet-Clemencon, de Blic, et al. (1999) and Vila, Nollet-Clemencon, de Blic, Mouren-Simeoni, and Scheinmann (2000) reported more than one third of children with asthma also experienced an anxiety disorder, which was significantly higher than the rates reported in children with diabetes (Vila, Nollet-Clemencon, Vera, et al., 1999), and healthy controls (Vila et al., 2000). A longitudinal study by Craske, Poulton, Tsao, and Plotkin (2001) following children from ages 3 to 21 years also found an earlier experience of asthma predicted the development of agoraphobia and/or panic disorder by ages 18–21 years.

Recently, an Australian longitudinal study examined asthma and anxiety in a cohort of 5,135 children from the Mater University Study of Pregnancy and its outcomes (MUSP; Alati et al., 2005). This study is particularly interesting, in that the analyses of this longitudinal data specifically explored the causal direction of the comorbidity between asthma and anxiety. Asthma symptoms and internalizing behavior were evaluated by maternal reports when the children were 5 and 14 years of age. Consistent with the literature, asthma and internalizing symptoms were significantly associated in cross-sectional analyses at 5 and 14 years. In prospective analyses, after excluding children with asthma at 5 years, internalizing symptoms at age 5 were not associated with the presence of asthma symptoms at 14 years. This study offers strong preliminary evidence for a casual pathway between early asthma experiences, and the development of anxiety symptoms later in life; however, there does not appear to be a causal pathway between early anxiety and later onset of asthma over this time period at least.

Elevated anxiety and depression have been reported to be positively related to asthma severity in children (Mrazek, 1992), suggesting that the experience of having one of these disorders results in increasing symptoms in the other. For children with asthma, who also experience clinical anxiety, there appears to reduced effectiveness of asthma treatments; perhaps through

reduced compliance with the treatment regime, or because the emotional state of anxiety itself has a direct effect on autonomic reactions and pulmonary functions, directly affecting asthma symptoms and severity (Miller & Wood, 1997). Increasing our understanding of the relationship between anxiety and asthma would likely lead to improvements in management of both disorders, decreased health care utilization, and better prognosis for those affected.

Treatment Implications for Comorbid Asthma and Anxiety in Children

Psychological factors, particularly anxiety and fear, play a role in the experience, exacerbation and prognosis of asthma in children and youth. To date, there is very little research examining the role of psychological interventions in asthma management; however, interventions that target patients' knowledge, beliefs and behaviors are likely to improve compliance, management and long-term prognosis. Intervention programs typically rely on education delivered in various ways including by health care staff (e.g., Hendricson et al., 1994), peer education (Persky et al., 1999), and innovative approaches using multimedia and computer-based programming (e.g., Bartholomew et al., 2000). Individualized programming based on an assessment of patient functioning, family functioning, psychiatric comorbidity, and levels of motivation and compliance have so far been neglected.

Medical treatment for asthma focuses on four treatment targets; (1) medication to control inflammation and prevent chronic symptoms; (2) medications to treat acute asthma symptoms and attacks as they occur; (3) identification and avoidance of asthma triggers (i.e., environmental – such as allergens or psychological – such as stressors, anxiety, heightened emotional distress); and (4) monitoring of *peak flow*. Measurement of *peak flow* gives an idea of how narrow or obstructed a person's airways are by measuring the maximum (or peak) rate at which they can blow air into a peak flow meter after a deep breath. Peak flow monitoring helps measure how

much, and when, the airways are changing. Research, however, has so far demonstrated that measuring peak flow, while potentially a useful treatment target used to inform assessment and monitor patient symptoms/flare-ups, is rarely practiced by patients (Cote, Cartier, Malo, Rouleau, & Boulet, 1998; Redline, Wright, Kattan, Kerckmar, & Weiss, 1996; Verschelden, Cartier, L'Archeveque, Trudeau, & Malo, 1996) and has not been supported by empirical evidence to improve outcomes over symptoms monitoring (e.g., Charlton, Charlton, Broomfield, & Mullee, 1990; Reeder, Dolce, Duke, Raczyński, & Bailey, 1990; Turner, Taylor, Bennett, & Fitzgerald, 1998). Psychological adjuncts to asthma management that might improve effectiveness of asthma treatment, enhance functioning and quality of life, and reduce associated anxiety and emotional disturbance include; (1) asthma education, (2) symptom perception training, and (3) cognitive-behavioral therapy (CBT).

One of the most important interventions for asthma management is education. The NHLBI's (1997) guidelines emphasize that asthma education plans should include; (a) individualized written action plans for medication management, and instructions for when to seek health care; (b) information regarding basic facts about asthma, and medications used to treat asthma; (c) teaching methods for self-monitoring asthma symptoms, including the use of *peak flow* monitoring; (d) teaching techniques for using inhalers, and how to avoid allergens; (e) devising a daily self-management plan for controlling symptoms; and (f) teaching how to use an asthma diary for self-monitoring and effective self-management. Asthma education has been demonstrated to be cost effective for both children (Greineder, Loane, & Parks, 1999) and adults (Taitel, Kotses, Bernstein, Berstein, & Creer, 1995), to reduce symptoms and improve self-management skills (e.g., Kotses et al., 1995; Vazquez & Buceta, 1993; Wilson et al., 1996), and to increase self-efficacy and locus of control (Tieffenberg, Wood, Alonso, Tossutti, & Vicente, 2000; Wigal et al., 1993).

Symptom perception training is a behavioral treatment focussed on improving the patient's accuracy of perception of airway sensations.

Many asthmatic patients fail to effectively discriminate between changes in their airways, or perceive accurate severity of their symptoms, which can lead to near-fatal asthma attacks. A few studies have demonstrated that through biofeedback approaches, patient's perceptions of their airway performance can be improved (e.g., Harver, 1994; Stout, Kotses, & Creer, 1997), although the research in this field remains preliminary. Lehrer et al. (2004) recently evaluated the effectiveness of heart rate variability (HRV) biofeedback as an adjunctive treatment for asthma in a randomized controlled trial. In this controlled study of 94 patients who were treated with HRV biorhythm, results indicated specific treatment effects including reduced asthma severity, less reliance on medication and general improvement in pulmonary function. The researchers concluded that biofeedback therapy may help reduce the use of steroid medication. In children with asthma, one recent study has examined the relationship of anxiety and asthma severity to symptom perception. Chen, Hermann, Rodgers, Oliver-Welker, and Strunk (2006) found that higher trait anxiety was associated with heightened symptom perception (controlling for pulmonary function) at baseline, while greater asthma severity on the other hand, was associated with blunted symptom perception (controlling for pulmonary function). Effective management of asthma relies on accurate perception of symptoms, hence symptom perception training is likely an important adjunct to an asthma intervention program – particularly for those patients with secondary anxiety and/or increased asthma severity. Furthermore, given that both asthma and anxiety are associated with changes in respiratory symptoms, training in *discrimination* between asthma onset and anxiety symptoms is warranted for those patients with comorbid anxiety and asthma to improve self-management of both conditions (see Lehrer, 1998).

CBT may be an effective adjunct to asthma treatment, through addressing treatment-interfering illness representations (Sperry, 2009). Sperry (2009) defines *illness representations* as, “an individual's constellations of perceptions and beliefs about a particular disease – understanding of it and its symptoms, cause, time or illness

duration, impact or consequences, curability, and ability to control it" (Sperry, 2009, p. 109). Illness representations are likely to be associated with treatment compliance, self-management of symptoms, and behavioral responses to environmental and psychological triggers to asthma. Addressing illness representations and symptom perception through CBT approaches may provide improved outcomes for asthma management. In terms of comorbid anxiety symptoms and disorders, CBT is indicated as an evidence-based approach to treatment (see Silverman, Pina, & Viswesvaran, 2008), and may involve education, relaxation training, cognitive therapy targeting unhelpful thinking styles, and behavior therapy targeting exposure to fears and increasing approach behaviors. To the best of the authors' knowledge, there are no published controlled trials of CBT for comorbid asthma and anxiety in children and/or youth.

Sperry (2009) proposes a *combined integrative treatment* approach for asthma, which includes all four of the traditional medical treatment targets (described above), as well as lifestyle modification and psychological adjuncts to treatment described above. This integrative approach to treatment involves four phases of intervention, starting with (1) a thorough biopsychosocial assessment (developing a patient profile and illness profile, screening of psychiatric comorbidities, and developing an asthma symptom diary); (2) intervention planning, based on assessment of illness representations and symptom perceptions, as well as assessment of functional capacity; (3) intervention implementation, including psychoeducation, symptom perception training, relaxation interventions, medication management action plans, and cognitive behavioral therapy to target both asthma treatment compliance and management, as well as psychiatric comorbidities such as anxiety and panic; and finally (4) intervention monitoring, which includes ongoing reviews of asthma symptom diaries, patients medical charts and laboratory tests, and patient progress with regard to compliance, symptom reduction and functionality. An integrative treatment approach such as this is likely to be beneficial in terms of asthma management, anxiety

reduction and general improvement in quality of life and functionality. Research is needed to evaluate the efficacy of an integrated treatment approach, such as the protocol proposed by Sperry (2009) and the effectiveness of the specific components of treatment.

There is considerable evidence for an association between pediatric asthma and anxiety, with mounting research indicating poorer outcomes, greater health care utilization, and reduced functioning and quality of life for these patients (Lehrer et al., 2002). Greater understanding of the relationship between these chronic disorders of childhood is sorely needed to inform research, practice and treatment guidelines. Increasing community and practitioner awareness of the higher than expected co-occurrence of these disorders, developing efficient and reliable approaches to *screening*, and forming multi-disciplinary intervention programs for management, is crucial to effectively assisting children and families dealing with comorbid asthma and anxiety.

Functional Gastrointestinal Disorders in Children and Adolescents

The umbrella term of functional gastrointestinal disorders (FGIDs) refers to a variety of conditions which have chronic or recurrent GI symptoms (e.g., abdominal pain, nausea, vomiting, bloating, dyspepsia, diarrhea, constipation) as their main feature (Drossman, 2006). A FGID is diagnosed when the symptoms cannot be attributed to a known physical (anatomical) or physiological (hormonal or other body chemistry) cause.

Research into medically unexplained GI symptoms in childhood has been complicated by the wide variety of terms given to GI conditions, such as recurrent abdominal pain (RAP), childhood irritable bowel syndrome (IBS), functional bowel disorders, and functional abdominal pain (FAP). Historically, these terms have been ambiguous with regard to clinical definitions, and they have often not been mutually exclusive with regard to current classification of symptoms (Varni et al., 2006).

In an effort to provide standardized definitional criteria for classification of childhood FGIDs, available evidence and expert consensus resulted in the Rome II criteria for childhood FGIDs (Rasquin-Weber et al., 1999; Thompson, 2006), and more recently the Rome III criteria (Hyman et al., 2006; Rasquin et al., 2006). These criteria identify 17 FGIDs of childhood. The disorders are classified first by age range, with separate conditions recognized in infants/toddlers to those recognized in children/adolescents aged 4–18 years (Hyman et al., 2006; Rasquin et al., 2006). Within each age group, FGIDs are then classified by area of symptom location (e.g., abdominal, bowel) or symptom pattern (e.g., regurgitation, vomiting, colic, diarrhea, constipation, pain). The Rome III criteria require the presence of GI symptoms at least once per week for at least 2 months in order to make a diagnosis. In addition to symptom presentation, diagnosis requires loss of daily functioning or additional somatic symptoms (e.g., headache, limb pain), or both. The Rome criteria purposefully exclude RAP from its diagnostic classification, because criteria for RAP were considered too general and pediatric patients with RAP often met Rome criteria for other disorders (Varni et al., 2006).

GI disorders in young people are associated with significant functional impairment, including poor school attendance, decreased physical activity, extensive health service utilization, and family disruption (Campo, Jansen-McWilliams, Comer, & Kelleher, 1999; Walker, Garber, & Greene, 1993). Over a longer term, evidence suggests that childhood GI problems are predictive of adult abdominal pain and IBS, as well as anxiety and depressive disorders in adulthood (Campo, Di Lorenzo, & Chiappetta, 2001; Hotopf, Carr, Mayou, Wadsworth, & Wessely, 1998; Mulvaney, Lambert, Garber, & Walker, 2006; Walker & Heflinger, 1998).

Despite the difficulties inherent in labels such as RAP, pain-related disorders appear to be the most frequently studied of the GI conditions of childhood, particularly in relation to psychiatric comorbidity, and abdominal pain is widely considered to be one of the most common reasons for referral to primary care services and

gastroenterology clinics (Starfield et al., 1980). Medically unexplained abdominal pain may affect as many as 10–24% of children and adolescents (Garber, Walker, & Zeman, 1991; Hyams, Burke, Davis, Rzepski, & Andrulonis, 1996).

Anxiety in Children with GI Problems

There is increasing evidence to show that young people with GI problems have more symptoms of anxiety and depression than healthy controls (e.g., Egger et al., 1999; Hyams et al., 1996). Garber, Zeman, and Walker (1990) looked at rates of emotional disorders (anxiety or depression) using structured diagnostic interviews in children (8–17 years) with RAP with no identifiable physical cause, compared with children with RAP with an identified organic cause, children with psychiatric disorders, and healthy control children. All children in the RAP group met criteria for at least one DSM-III emotional disorder. The rates of disorder in both groups of children with abdominal pain were significantly higher than that in the healthy control group, and not significantly different to rates found in the psychiatric group. Rates of emotional disorder in RAP children remained even when the somatic symptoms related to RAP were controlled for. Interestingly, mothers of children with RAP reported significantly higher levels of anxiety and depression than mothers of children with organic pain or healthy children.

Similar findings were reported by Dorn et al. (2003). Children with RAP ($N=15$) were assessed with a structured interview and anxiety disorders were highly prevalent. Fifty percent of the RAP group met diagnostic criteria for a lifetime anxiety disorder. Of note, the majority of these children had not received mental health assistance, and only four young people had received outpatient treatment for a psychological disorder. This is consistent with previous findings that childhood psychiatric/emotional disorders are frequently unrecognized, and that families frequently do not seek mental health services even when they are recommended (Gardner et al., 1999; Horwitz, Leaf, Leventhal, Forsyth, & Speechley, 1992).

Some authors have suggested that approximately 80% of children presenting with RAP in primary care services will meet criteria for an anxiety disorder, and more than 40% will meet criteria for a depressive disorder (e.g., Campo, Bridge et al., 2004).

In addition to anxiety being highly prevalent in children with medically unexplained GI conditions, anxiety symptoms and disorders are also more prevalent in first degree relatives. For example, a number of studies have found that parental anxiety is associated with GI symptoms in childhood and with the persistence of childhood GI symptoms over time (e.g., Garber et al., 1990; Hotopf et al., 1998; Walker, Garber, & Greene, 1994). There is some evidence to suggest that parental anxiety may even be predictive of the later development of childhood GI symptoms, which suggests a possible causal role (Ramchandani, Stein, Hotopf, Wiles, & The Alspac Study Team, 2006). Family members of adults with a history of childhood RAP are more likely to suffer from generalized anxiety disorder (GAD) than those of controls, but are no more likely to suffer from FGIDs (Campo et al., 2001). In addition to increased anxiety in parents of young people with GI symptoms, recent evidence suggests that siblings of children with GI symptoms may report significantly greater levels of emotional and behavioral symptoms than siblings of healthy comparison children (Guite, Lobato, Shalon, Plante, & Kao, 2007).

There are a number of potential explanations for the high levels of comorbidity between anxiety symptoms/disorders and GI symptoms/disorders in young people. These include unidirectional causal models (e.g., anxiety causes GI symptoms or vice versa) and shared vulnerability models (e.g., anxiety and GI symptoms share risk factors) (Hyams & Hyman, 1998; Merikangas & Stevens, 1997). Clearly, with high levels of anxiety also evident in parents, genetic risk factors are important to consider (e.g., Hettema, Neale, & Kendler, 2001). Recent research has also found that children who display anxious behaviors elicit certain behaviors from parents/adult caregivers (Hudson, Doyle, & Gar, 2009). Clearly further prospective research is required in order to better

understand risk and vulnerability factors, and the inter-relationships between them.

Treatment Implications for GI Symptoms and Anxiety in Children

The number of psychological treatment outcome studies for childhood FGIDs has grown considerably over the 15 years (e.g., Ball, Shapiro, Monheim, & Weydert, 2003; Bury, 1987; Edwards, Finney, & Bonner, 1991). The majority of these studies evaluate treatment efficacy by looking at pain outcomes (e.g., frequency, intensity, and remission of pain), as well as number of missed activities (e.g., school absences), and medical utilization. Psychological interventions have evaluated a variety of strategies, including psychoeducation, behavioral/contingency management, relaxation, biofeedback, and individual or family-based CBT (see Brent, Lobato, & LeLeiko, 2008 for a review). The methodology of these studies vary considerably, ranging from case reports to randomized controlled trials incorporating multiple methods and standardized outcome measures. Although one study by Edwards et al. (1991) did not demonstrate improved pain outcomes with psychological intervention, all other studies have demonstrated a positive effect, and none have demonstrated negative effects. Given the accumulating evidence, the American Academy of Pediatrics Subcommittee on Chronic Abdominal Pain in Children have recently rated CBT as an "efficacious" treatment (American Academy of Pediatrics, 2005). Unfortunately, none of these studies included measures of anxiety symptoms/disorders.

While it is unlikely that the studies described above resulted in improvements in GI symptoms and daily functioning but not anxiety, to the authors' knowledge, only one study to-date has sought to look at treatment outcomes for anxiety symptoms/disorders comorbid with GI symptoms in young people (Campo, Perel, et al., 2004). This study evaluated the efficacy of citalopram (an SSRI) in the treatment of abdominal pain. Twenty-five clinically referred youth (7–18 years) with abdominal pain participated in a 12-week,

flexible-dose, open-label trial. Eighteen participants (72%) were diagnosed with a comorbid anxiety disorder at baseline. The primary outcome measure was the Clinical Global Impression Scale-Improvement (GCI-I), and secondary measures included self- and parent-reports of pain, anxiety, and depression. Results revealed that 21 participants (84%) could be classified as treatment responders, with ratings on all outcome measures improving significantly over the course of treatment compared with baseline. Only six of the 21 young people who completed treatment (29%) and nine of the original 25 (36%) continued to meet criteria for an anxiety disorder at post-treatment.

This study is the first to intentionally examine effects of treatment on anxiety disorders in young people with GI symptoms. It highlights the importance of including comorbid psychiatric symptoms and disorders in the design of clinical trials of intervention for GI disorders of childhood (Lydiard & Falsetti, 1999). The cross-sectional design of the study precludes the conclusion that improvements in GI symptoms can be attributed to successfully treating the psychiatric disorder, although it does pave the way for randomized controlled trials of psychological interventions (e.g., CBT) focused on the treatment of both GI symptoms and anxiety symptoms/disorders. Psychological interventions also offer an alternative to some of the challenges in using SSRIs in the treatment of FGIDs such as the lack of information concerning the optimal duration of treatment and the rate of return of symptoms when medication treatment is discontinued. The common side effects of weight gain and decreased sexual functioning in adults at least may be a barrier to the use of these treatments in some children and adolescents (Graff, Walker, & Bernstein, 2009).

GI conditions in childhood are highly prevalent, associated with high rates of medical utilization, school absence, functional impairment, and personal and familial distress. There is a high level of comorbidity between GI conditions and anxiety symptoms and disorders in young people, and in first degree relatives. It is encouraging that researchers are beginning to include

measures of anxiety (and depression) in studies of childhood GI conditions. However there is substantial scope for improvement in this area, particularly with regard to better understanding the nature of the association, and in the identification and treatment of comorbid psychiatric disorders. It is highly likely that psychological treatments already demonstrated to be efficacious for childhood GI conditions (i.e., CBT) might be helpful in achieving symptom relief and/or remission in childhood anxiety, and vice versa. There is a strong case for psychological treatments to be offered to children with FGIDs as part of routine care, as they offer the potential to decrease or eliminate psychological and/or physical symptoms, provide young people with sustainable pain management and coping skills, and perhaps ultimately, be a cost-effective solution (Campo et al., 2004). Clinical research trials in this area would be welcome.

Anxiety and Diabetes in Children

The implications of a child being diagnosed with diabetes, has changed dramatically over the decades. Prior to the discovery of insulin in 1922, a childhood diagnosis of diabetes amounted to a death sentence. Today, it is rare for child to die from diabetes. However, the life of a child with diabetes remains far from easy for a number of reasons. In order to fully understand the psychological implications of juvenile diabetes, it is important to have some awareness of the medical underpinnings and potential medical consequences of the disease.

Diabetes in Children

There are many subtypes of diabetes sharing the common underlying problem of too much glucose in the blood either due to inadequate production of insulin or insulin resistance (Rubin & Peyrot, 2001). Type 1 Diabetes Mellitus (T1DM), is a subtype of diabetes whereby insulin is not produced by the pancreas usually due to pancreatic cell destruction (Craig, Hattersley, &

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Donaghue, 2006). Because the pancreas is unable to produce insulin naturally, children with T1DM are completely dependent upon exogenous insulin that is either injected multiple times per day, or is released via an insulin pump (Boland, Grey, Oesterle, Fredrickson, & Tamborlane, 1999). Although it accounts for approximately 90% of childhood and adolescent diabetes, T1DM is relatively rare and occurs in approximately 0.02% of young people under 14 years (Craig et al., 2006; Daneman, 2009).

Type 2 Diabetes Mellitus (T2DM) occurs due to insulin resistance, and in the USA and Europe, occurs almost exclusively in overweight or obese youth (Rosenbloom, Silverstein, Amemiya, Zeitler, & Klingensmith, 2008). Although previously rare in children and adolescents, the incidence of T2DM is increasing along with the increase in overweight and obese young people. T2DM can sometimes be managed by changes to diet and exercise regimes in conjunction with insulin injections. T2DM in young people most frequently occurs after age 10 years, with the mean age of onset being 13.5 years (Rosenbloom et al., 2008). Much of the research investigating pediatric diabetes has been concerned with T1DM due to the higher incidence level within the child and adolescent population. Thus, the discussion below relates to young people with T1DM unless otherwise specified.

Diabetes can lead to a myriad of serious medical complications if the diabetic regime is not rigorously adhered to: visual impairment and blindness, renal failure and hypertension, pain, paresthesiae, muscle weakness, autonomic dysfunction, cardiac disease, peripheral vascular disease and stroke (Donaghue, Chiarelli, Trotta, Allgrove, & Dahl-Jorgensen, 2007). Less commonly, diabetes is associated with hypothyroidism, hyperthyroidism, Coeliac Disease, vitiligo, Addison's Disease, and limited joint mobility (Kordonouri et al., 2007). Furthermore, a number of the abovementioned complications may come together to increase the risk of gangrene and consequent amputation of lower limbs (Rubin & Peyrot, 1999). Although the medical complications listed here are relatively rare in childhood and adolescence, early markers of these problems may present themselves

only a few years after diabetes onset (Donaghue et al., 2007). Thus, in order to prevent future serious medical complications, adherence to the medical regime for diabetes is essential during childhood.

Medical Treatment

The main goal of medical treatment for diabetes is the maintenance of blood glucose at levels that are as normal as possible. Too much glucose in the blood (hyperglycemia) not only increases the risk of diabetic-related complications, but in those with T1DM, can increase until ketoacidosis (a build up of ketones in the blood) occurs, a condition that is potentially fatal (Rubin & Peyrot, 2001). Hyperglycemia can result from underdosing, forgetting insulin injections or oral medications, overeating or infections (Drotar, Witherspoon, Zebracki, & Peterson, 2006). In contrast, too little glucose in the blood (hypoglycemia) can occur when too much insulin is delivered, if the child overeats, or when substantial physical activity is engaged in (Drotar et al., 2006). In its mild form, hypoglycemia results in shakiness, sweating and rapid heartbeat (Rubin & Peyrot, 2001). In its more severe form, hypoglycemia can affect brain function and lead to headache, confusion and unconsciousness (Rubin & Peyrot, 2001).

The burden of treatment for young people with diabetes is large. Children with diabetes spend a significant portion of their day engaged in treatment tasks, with one study demonstrating that 56.9 ± 27.8 min/day are spent on the diabetic medical regime (Ziaian et al., 2006). Young persons with diabetes must monitor their blood glucose levels by using a glucometer multiple times per day. This process involves their pricking their finger to draw blood, and placing the blood on a strip that is then inserted inside the glucometer to secure a reading. They must then calculate the dose of insulin required according to the reading they receive, and inject the required dose usually into either the stomach or thigh. Additionally, children with diabetes must be acutely aware of what they eat, and must engage in sufficient exercise activity to assist in the maintenance of

normal-level blood glucose. The medical management of childhood diabetes is therefore complex and burdensome to the diabetic children and their families.

Psychological Impact of Diabetes

Given the above description of the medical treatment regime required for diabetic children, and the potential medical consequences of the disorder, the question really should not be “why do young people with diabetes experience psychological problems?” but rather “why wouldn’t they?” Not surprisingly, many children diagnosed with T1DM develop adjustment problems and other psychological disorders. Kovacs, Ho, and Pollock (1995) found that of 92 children newly diagnosed with T1DM, 33 developed an adjustment disorder, and five developed other clinical-level psychiatric disorders in response to diagnosis. The adjustment disorder was found to continue for an average of 3 months, and all children were found to eventually recover from it. However, those who initially developed an adjustment disorder were much more likely to go on to develop a psychiatric diagnosis (mainly depressive and anxiety disorders) during the following 5-year period. Similarly, a longitudinal study by Kovacs et al. (1997) of 8–13 year-old children newly diagnosed with T1DM, found that 47.6% developed a psychiatric diagnosis of some kind over the following 10-year period, with the time of highest risk being in the first year following diagnosis. Of those who developed a psychiatric diagnosis, 26.1% developed a depressive disorder, 19.6% developed an anxiety disorder (most frequently GAD), and 16.3% developed a behavioral disorder. More recently, Northam, Matthews, Anderson, Cameron, and Werther (2005) found that 37% of Australian adolescents met criteria for a psychiatric disorder 10 years following their initial diagnosis of T1DM, a rate approximately double that in the larger Australian community. Depression, anxiety, and eating disorders were each present in 17% of the participants, and almost 20% exhibited a behavioral disorder. Furthermore, approximately two thirds

of the adolescents had two or more psychiatric diagnoses, with females and older participants being at higher risk for developing a psychiatric disorder of some kind.

Adolescence appears to be a particularly turbulent time for young people with diabetes, with adjustment and psychiatric problems peaking during this period. A recent study has found that although prepubescent children with diabetes report minimal differences with respect to quality of life, internalizing and externalizing problems compared to their nondiabetic peers, adolescents report significantly more psychological problems, and a lower quality of life (Nardi et al., 2008). Furthermore, adolescence is also a peak time for deterioration in glycemic control, or the degree to which blood sugar levels are stabilized (Court, Cameron, Berg-Kelly, & Swift, 2008). Glycemic control difficulties during adolescence may be partially attributable to the biological changes that occur during puberty, such as endocrine changes and weight gain (Amiel, Sherwin, Simonson, Lauritano, & Tamborlane, 1986). Indeed, many diabetic males, and to an even greater extent females, become overweight during adolescence (Bryden et al., 2001).

Although biological changes are likely to be at least partially responsible for adolescent problems with glycemic control, poor treatment adherence during this period is also likely to contribute (Court et al., 2008). For instance, the weight gain experienced by many young people during puberty may lead to the development of disorderly eating practices (and/or eating disorders) that interfere substantially with glycemic control. Similarly, “normal” adolescent concerns, such as not wishing to appear different from peers, striving for increased autonomy, and the introduction of alcohol into the social context, serve to decrease adherence to the diabetic regime and reduce glycemic control. Furthermore, there is some evidence that adolescents who think negatively about their friends’ and peers’ reactions to their medical regime are more likely to anticipate difficulties with their diabetic regime adherence, which in turn leads to increased stress, and subsequently poorer glycemic control (Hains, Berlin, Davies, Parton, & Alemzadeh, 2006; Hains et al., 2007).

Thus, the poor glycemic control evident in adolescence may be due to a complex interplay of biological, psychological and social factors.

Anxiety in Children with Diabetes

As noted above, many children with diabetes develop psychological problems, with anxiety disorders being highly prevalent (Northam et al., 2005), and GAD being the most common anxiety disorder experienced. Indeed, approximately 12% of diabetic youngsters have been found to suffer with GAD (Kovacs et al., 1997). With respect to risk factors associated with the development of anxiety disorders in diabetic youth, both diabetes-related hospitalizations, and pre-existing psychological problems have been found to increase the likelihood of developing an anxiety disorder (Kovacs et al., 1997). Indeed, Kovacs et al. (1997) found that children with a psychiatric disorder prior to the onset of diabetes were 3.51 times more likely to develop a new anxiety disorder after onset. Furthermore, young people who perceive their diabetes to have affected their lives, tend to subsequently experience more anxiety (Skinner & Hampson, 2001).

It is important for people working with young diabetic people to be aware of areas that they may see as particularly worrisome, so that efforts may be made to assess, and consequently reduce either clinical or sub-clinical levels of anxiety. Rubin and Peyrot (2001) have identified a number of areas that young people with diabetes tend to find stressful. First, the restrictions to a youngster's diet are difficult for both the young person and their family. Birthday parties and other school and social activities can be stressful for the diabetic child, as he or she is unable to eat sweets and other foods high in sugar that can lead to hyperglycemia. By not partaking of these foods, the child may not only feel deprived, but may also become anxious that he or she is behaving in a way that is different to their peers.

Second, Rubin and Peyrot (2001) suggest that there can be considerable stress concerning the monitoring of blood glucose levels. The unpredictable nature of blood glucose levels is a

constant source of frustration and stress to diabetic people of all ages. There are times when, despite doing everything "right," glucose levels are too high or too low, and glycemic control is difficult to attain and sustain. The glucose monitoring (finger prick) itself, can also be painful and stressful to diabetic children, leading to considerable anxiety and behavioral problems surrounding it.

Third, Rubin and Peyrot (2001) report that young people can become very stressed about the taking of insulin itself. There is the more obvious concern, and in some cases phobia, of inserting the needle into the skin. For some children, this is a painful process that requires a certain level of skill to achieve. Furthermore, many children fear giving themselves too much insulin, and subsequently inducing hypoglycemia. Indeed, Amillategui, Mora, Calle, and Giralt (2009) found that one of the main concerns advocated by children about their diabetes, was their ability to recognize hypoglycemia and to self-administer their insulin.

Finally, Rubin and Peyrot (2001) suggest that the process of diabetes management can lead to conflict with both health professionals and caregivers that can be stressful and anxiety-provoking for young persons. The developing independence of adolescence, the fear associated with injection, the deprivation of childhood-related foods, and the concern regarding being "different" to their peers, are but a few reasons that young diabetic persons may resist the diabetic regime, or at least become distressed about it, and subsequently engage in conflict with those who are trying to help them.

It is clear from the above discussion that children with diabetes experience significant stress and anxiety concerning their disorder, and that anxiety disorders (particularly GAD) are highly prevalent. Those working with diabetic youngsters should assess for anxiety related to restriction of diet, the monitoring of blood glucose levels, insulin injections, hyperglycemia, and conflict regarding the diabetic medical regime. A thorough assessment of anxiety in these areas will better inform the treatment plan and subsequently increase the likelihood of treatment success.

Metabolic Control and Anxiety

A meta-analytic review conducted by Anderson et al. (2002) concluded that anxiety disorders were significantly associated with hyperglycemia in adults with diabetes. Furthermore, there is evidence that in adults, anxiety is a significant risk factor for T2DM that is not mediated by traditional risk factors such as single-status, physical inactivity, smoking, low educational level, high triglycerides level, low HDL cholesterol level or central obesity (Engum, 2007). The mechanism by which anxiety may have its effect on reduced glycemic control however, remains a topic of debate and continuing research. Some suggest that anxiety may interfere with self-care and adherence to the diabetic regime, which in turn may affect glycemic control (Rubin & Peyrot, 2001). Others suggest that biological processes associated with anxiety, such as heightened sympathetic nervous system reactivity and cortisol levels may lead to glycemic control problems (Hoehn-Saric & McLeod, 1988; Schlotz, Schulz, Hellhammer, Stone, & Hellhammer, 2006). Whether it is through treatment adherence, biological processes, or a combination of the two, it would seem that in adults, there is a relationship between anxiety and poorer glycemic control.

In young people, evidence for a negative association between anxiety and glycemic control is less clear. There has been relatively little research conducted with young people in this area, and the few studies that have investigated the relationship (e.g., Grey, Cameron, & Thurber, 1991; Maronian, Vila, Robert, & Mouren-Simeoni, 1999) have failed to find a significant association. Methodological problems associated with the studies in question may partially explain the null results (Dantzer, Swendsen, Maurice-Tison, & Salamon, 2003). However, there may also be other explanations for the lack of association that are specific to children. For instance, if adherence to the diabetic regime influences the relationship between anxiety and glycemic control, the fact that parents remain in relative control of their children with respect to diet, exercise, and the monitoring of blood glucose levels, may lessen the association. Furthermore, the effect of cortisol on glycemic control has its effect through insulin resistance

(Reinehr & Andler, 2004), which is problematic for the much less prevalent (in children) T2DM rather than T1DM. Clearly, more research is required in this area before firm conclusions can be drawn.

In discussing the relationship between anxiety and glycemic control, Dantzer et al. (2003) suggest that anxiety may be seen as both a consequence of diabetes and as an indication that the child is not adapting well to the disease in terms of factors such as coping strategies. Indeed, the stress and coping literature may be of relevance and assistance to the understanding and reduction of anxiety in children with diabetes. A study by Peyrot, McMurray, and Kruger (1999) found that, in adults, an anxious, emotional style of coping was associated with an increase in stress, lower adherence to the diabetic regime, and reduced glycemic control. Similarly, it has been found that adolescents using avoidant or withdrawal coping strategies, have less glycemic control at 2- and 3-year follow-up (Seiffge-Krenke & Stemmler, 2003), and that adolescents using active coping strategies have better glycemic control (Graue, Wentzel-Larsen, Bru, Hanestad, & Sovir, 2004).

Treatment

There is a paucity of research investigating the treatment of anxiety disorders in diabetic children specifically, and to the authors' knowledge, there have been no randomized controlled trials conducted with this population. Rose, Firestone, Heick, and Faught (1983) investigated the usefulness of anxiety management training on the diabetic regulation of five adolescents with poor glycemic control. The results suggested that although the adolescents did not report significant decreases in anxiety, diabetic control improved significantly. Similarly, Moore, Geffken, and Royal (1995) reported a behavioral intervention aimed at reducing the distress of two diabetic children aged 11 and 13 years during self-injection. The authors found a substantial reduction in the amount of time needed for injections and in the levels of anticipatory distress.

Most research conducted on the psychological treatment of young people with diabetes, involves

multi-component treatment strategies aimed at a variety of treatment outcomes. Diabetic regime adherence and glycemic control are frequently targeted in these interventions, although the components of the individual treatment strategies vary considerably. There are a number of excellent recent reviews on psychological interventions for chronic illnesses generally (e.g., Beale, 2006; Kahana, Drotar, & Frazier, 2008) and diabetes specifically (e.g., Drotar et al., 2006; Hampson et al., 2000; Plante & Lobato, 2008). In their review of behavioral interventions for adolescents with T1DM, Hampson et al. (2000) found that, contrary to their hypotheses, the mean effect size for psychosocial and self-management outcomes was smaller than for metabolic outcomes. However, when they removed two studies finding very strong results for metabolic outcome that they deemed "outliers," there were no significant differences. Furthermore, when they assessed the four studies that examined both psychosocial and metabolic outcomes, the effects for psychosocial variables were stronger.

It is advocated here, that when treating a diabetic young person with clinical anxiety disorders, that the clinician adhere to empirically validated CBT strategies for the particular anxiety disorder under consideration. However, it is also advocated here, that he take into consideration diabetes-specific anxieties such as those discussed above, in the assessment, conceptualization and treatment of anxiety in diabetic young people. For instance, psychoeducation should not only include information pertaining to anxiety, but also to information regarding the ways in which anxiety might lead to difficulties in treatment adherence and glycemic control. Below are some specific points that a clinician might like to pay particular attention to, with respect to the assessment and treatment of anxiety in diabetic youngsters. Specifically, it is important that the clinician assess thoroughly for, and subsequently include if necessary, in the conceptualization and treatment of:

- GAD, aiming to elucidate both diabetic and nondiabetic related worries that the child may be having.
- Weight-related anxiety and eating disorders, particularly with adolescents.

- Anxiety related to diet. In particular, anxiety related to appearing "different" from peers with respect to eating practices.
- Anxiety related to pain associated with the glucose monitoring (finger-prick) procedure.
- Anxiety related to the possible medical complications that may result from diabetes.
- Injection phobia.
- Anxiety related to appearing different to peers with respect to self-injection.
- Fear of hypoglycemia and hyperglycemia.
- Anxiety related to conflict with caregivers and health professionals.

Diabetes is a serious medical condition that requires specialist and burdensome medical attention. In addition to the deleterious consequences of anxiety that indiscriminately affect children with and without diabetes, there is the additional concern that anxiety might affect glycemic control in the diabetic child. Thus, the detection, assessment and treatment of anxiety in children with diabetes is extremely important.

Considerations in Assessing and Treating Anxiety in the Context of Chronic Health Conditions

Psychosocial treatments (such as various approaches to CBT, Chorpita, 2007; Rapee, Wignall, Hudson, & Schniering, 2000), and in more recent years pharmacotherapy (The Research Unit on Pediatric Psychopharmacology Anxiety Study Group, 2007; Walkup et al., 2008), have been well established as treatments for anxiety disorders in childhood and adolescence. It is unlikely that these treatments will be found to be ineffective in cases in which there are comorbid health problems. Cognitive behavioral approaches in particular have been applied to a wide range of health problems in addition to anxiety (Andrasik & Schwartz, 2006; White, 2001).

While many mental health specialists are comfortable treating anxiety problems in children, some may be less comfortable dealing with anxiety with other chronic health conditions. Similarly, health professionals who provide services for chronic health problems in children,

may be less comfortable in dealing with comorbid anxiety problems. In both cases, clinicians may not develop a comprehensive approach to treatment – hoping that the problem will be handled by someone more familiar with the presence of comorbid disorders. Often there is not a service provider available, who is more familiar with dealing with anxiety in the context of the health problems, so we encourage mental health specialists to familiarize themselves with approaches to these problems. The materials in the previous sections covered many specific concerns in children with asthma, diabetes, and functional gastro-intestinal disorders. In this final section, suggestions for the mental health specialist treating the various health problems that may present with comorbid anxiety problems are considered.

Assessment

Many of the readers will be familiar with cognitive behavioral assessment of anxiety problems. In our experience, there are a number of additional questions to consider in assessing anxiety problems (not limited to anxiety disorders) in the context of comorbid medical conditions. Below are questions useful as part of a comprehensive assessment:

- What is the parents' and child's understanding of the medical condition?
- What is the history of the medical condition, treatment, and attempts to cope with the situation on the part of the child and the parents?
- What is the history of the anxiety problem and attempts to cope on the part of the child and the parents? How does this relate to the medical condition?
- How is the child functioning in terms of school performance, relationships with family members, and relationships with other children?
- Are there other problems or life stresses for the child or the family that should be considered?
- Are there actions the child and or parents need to take to manage the health problem? Are these carried out effectively? Is the child developing age appropriate independence in managing the problem?

- What is the relationship between the symptoms (the medical condition), and important environmental factors? Assessment may involve using diaries or a similar approach to assess the symptoms and their relationship to other important factors, such as school attendance, interpersonal stress, parent responses, and cognitive variables.
- Are there areas of excessive avoidance related to the health or anxiety problem?
- Has the child withdrawn unnecessarily from some normal activities due to anxiety or the health problem? In some cases there may be a neglect of the development of the very important peer relationships and friendships that are an important developmental task of childhood.
- Are there excessive safety behaviors on the part of the child or the parent? One example is excessive checking of health status.
- Does the child engage in excessive reassurance seeking? What is the parents' response to this situation?
- Are there indications of excessive health care utilization? Do the parents have a good understanding of when it is appropriate to seek health services?
- What are the areas of strength that should be considered in planning?
- What are the child's goals for the situation?
- What are the parents' goals?

Treatment

A first step is to become familiar with the nature of the health problem. It is much easier to establish a case formulation and intervention plan (Nezu, Nezu, & Lombardo, 2004) when there is a good understanding of the health problem. One reliable source of information about health problems is discussion with colleagues with expertise in the area. There are also excellent resources for clinicians who may not have had extensive experience with a specific health problem previously (e.g., Beers, 2003; Beers & Berkow, 2006). In considering approaches to the treatment of health-related anxiety in children and adolescents, Furer, Walker, and Stein (2007) suggested additional principles that are particularly important.

Family Involvement

Parents are especially important in helping a child to deal with the challenges of a health problem. Assessment and treatment planning should involve a consideration of the overall family situation, and how this may influence the child's experiences. In the case of younger children, the main focus may be to work with the parents, so that they can support effective coping in the child with the health problem and with anxiety. There are excellent resources available for parents to help their children cope with anxiety and these may be used to assist with treatment (Manassis, 2008; Rapee, Spence, Cobham, & Wignall, 2008). The developers of the Positive Parenting Program (Triple P, Sanders, 2008) have been adapting their parent support materials to deal with particular health problems such as obesity (risk of diabetes) and developmental disabilities (Roberts, Mazzucchelli, Studman, & Sanders, 2006).

Collaboration Among Health Professionals

Parents and children are assisted in their coping with health problems when there is good collaboration among professionals. The mental health professional can develop a more effective intervention if there is communication with other health care providers involved in a child's treatment. This communication may help in problem solving (below), and in clearing up any sources of misunderstanding (which are common in dealing with health problems).

A Problem-Solving Approach

The systematic approach to problem solving that has been developed as part of many CBT approaches is very helpful in dealing with health problems and related anxiety (Nezu et al., 2004). What are appropriate approaches to deal with symptoms? When is avoidance appropriate and when is it excessive? How can a child explain a health problem to adults and peers if necessary? Working with parents and children on problem solving, and in rehearsing the solutions that are developed can be very effective. For example, it may take repeated behavioral rehearsal, with occasional booster sessions, for a child to develop

confidence in using an inhaler for asthma, an epipen for severe allergic reactions, and in explaining health problems and procedures to peers and significant adults.

School Involvement

In many cases, it is important to include school or childcare staff in assessment and treatment planning. If there is a health problem seen at the school (e.g., allergies, migraine headaches, GI problems, problems with dietary control), it is important that the school is fully informed, and a plan developed for how the staff can manage problems that are likely to arise. Related to this, is the importance of assisting the child or adolescent to be involved in a normal school program. Problems with somatization are often a factor in school refusal (Egger, Costello, & Angold, 2003). Research on school refusal (e.g., Kearney, 2001) suggests that the longer a child is away from a normal school program, the more difficult it is to return. It is, therefore, a high priority to help the child and family to maintain as normal as possible a school routine while coping with health problems. The approaches developed in treating school refusal (Heyne & Rollings, 2002; Kearney, 2001) may be helpful for children who have difficulty with school attendance related to health problems.

How Sick is Sick Enough to Stay Home or to Leave School?

One dilemma that parents may face is when to allow a child to stay home from school. It is difficult to know just how ill a child is feeling. While many parents develop guidelines regarding this issue, some children will test the rules. Staying home may be more interesting and fun than going to school. Rather than engaging in debates about "Are you sick enough to stay home from school?" a helpful approach is to establish a routine in the home for sick days. So, if a child is ill, it is appropriate for them to rest quietly in their bedroom. We discourage the use of TV during school hours, and the practice of watching more television on out-of-school days than on school days. (Some children sleep late on these days and then watch extra television in the evenings.) In order for a child to pass the time on a sick day, we encourage

reading or doing homework. Evening activities or visits from friends may be canceled on days when a child is not in school, and reinstated when the child is back in school. (These rules can be adjusted for the child who is away from school for an extended time due to health problems. In these cases it may be desirable to encourage social activities.) The kind of *sick day* routine described above is not meant as a punishment for staying home, but, rather, it describes a reasonable routine that could be followed if a child were away from school with a bad cold. When these family rules and routines are established, it is important to communicate them to others who will be providing childcare, and to the school if required to be part of the program.

Waiting for Specialist Visits or Medical Tests

Occasionally a family may be waiting for specific consultations or tests in order to have a better understanding of a health problem. The family may take the approach of suspending normal behavioral expectations while waiting for more information. This may cause difficulty over time with getting back to normal routines. It is best to encourage the child and family to have as normal a routine and school attendance as possible during these periods. Even children with very serious health problems tend to do better if they continue to be involved in normal activities as much as possible, including school activities.

Modeling Healthy Behavior in the Family

Children learn to deal with common health problems through experiences in the family. Parents teach children how to handle common health problems (headaches, stomach aches, colds, flu) through their examples. They can assist their child to develop age-appropriate self-reliance and confidence (teaching a child self-care skills and how to deal with common problems in a relaxed way). It is important for children to learn that experiencing a variety of aches, pains, and illnesses is normal. They should have the opportunity to ask questions, and express their concerns about these symptoms. At the same time, children

benefit from continuing to stay as involved as possible in normal activities while they are dealing with health problems. Much of the disability caused by health problems relates to excessive avoidance and disengagement from the positive activities of life.

References

- Alati, R., O'Callaghan, M., Najman, J. M., Williams, G. M., Bor, W., & Lawlor, D. A. (2005). Asthma and internalizing behaviour problems in adolescence: A longitudinal study. *Psychosomatic Medicine*, 67, 462–470.
- American Academy of Pediatrics, & North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition. (2005). Chronic abdominal pain in children [commentary]. *Pediatrics*, 115, 370–381.
- Amiel, S., Sherwin, R., Simonson, D., Lauritano, A., & Tamborlane, W. (1986). Impaired insulin action in puberty. A contributing factor to poor glycemic control in adolescents with diabetes. *New England Journal of Medicine*, 315, 1273–1280.
- Amillateguì, B., Mora, E., Calle, J. R., & Giralt, P. (2009). Special needs of children with type 1 diabetes at primary school: Perceptions from parents, children, and teachers. *Pediatric Diabetes*, 10, 67–73.
- Anderson, R. J., Groot, M. D., Grigsby, A. B., McGill, J. B., Freedland, K. E., Clouse, R. E., et al. (2002). Anxiety and poor glycemic control: A meta-analytic review of the literature. *International Journal of Psychiatry in Medicine*, 32, 235–247.
- Andrasik, F., & Schwartz, M. S. (2006). Behavioral assessment and treatment of pediatric headache. *Behavior Modification*, 30, 93–113.
- Aschenbrand, S. G., Kendall, P. C., Webb, A., Safford, S. M., & Flannery-Schroeder, E. (2003). Is childhood separation anxiety disorder a predictor of adult panic disorder and agoraphobia? A seven-year longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 1478–1485.
- Ball, T. M., Shapiro, D. E., Monheim, C. J., & Weydert, J. A. (2003). A pilot study of the use of guided imagery for the treatment of recurrent abdominal pain in children. *Clinical Pediatrics (Phila)*, 42, 527–532.
- Bartholomew, L. K., Shegog, R., Parcel, G. S., Gold, R. S., Fernandez, M., Czyzewski, D. I., et al. (2000). Watch, discover, think, and act: A model for inpatient education program. *Patient Education and Counseling*, 39, 253–268.
- Beale, I. L. (2006). Scholarly literature review: Efficacy of psychological interventions for pediatric chronic illnesses. *Journal of Pediatric Psychology*, 31, 437–451.
- Beers, M. H. (Ed.). (2003). *The Merck manual of medical information: Second home edition*. Rathway: Merck Publishing.

1603 [AU7]

1597
1598
1599
1600
1601
1602

1603
1604
1605
1606
1607
1608
1609
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1636
1637
1638
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1650

- 1651 Beers, M. H., & Berkow, R. (Eds.). (2006). *The Merck*
1652 *manual of diagnosis and therapy* (8th ed.). Rahway:
1653 Merck Publishing.
- 1654 Berardi, D., Ceroni, G. B., Leggieri, G., Rucci, P., Ustun,
1655 B., & Ferrari, G. (1999). Mental, physical and func-
1656 tional status in primary care attenders. *International*
1657 *Journal of Psychiatry in Medicine*, 29, 133–148.
- 1658 Bloom, B., & Cohen, R. (2007). Summary health statistics
1659 for U.S. children: National Health Interview Survey,
1660 2006. National Center for Health Statistics. *Vital*
1661 *Health Statistics*, 10, 1–79.
- 1662 Blum, R. W. (1992). Chronic illness and disability in ado-
1663 lescence. *Journal of Adolescent Health*, 13, 364–368.
- 1664 Boland, E. A., Grey, M., Oesterle, A., Fredrickson, L., &
1665 Tamborlane, W. V. (1999). Continuous subcutaneous
1666 insulin infusion. *Diabetes Care*, 22, 1779.
- 1667 Boyd, C. P., Kostanski, M., Gullone, E., Ollendick, T. H.,
1668 & Shek, D. T. (2000). Prevalence of anxiety and
1669 depression in adolescents: Comparison with world-
1670 wide data. *Journal of Genetic Psychology*, 161,
1671 479–492.
- 1672 Brady, E., & Kendall, P. C. (1992). Comorbidity of anxi-
1673 ety and depression in children and adolescents.
1674 *Psychological Bulletin*, 111, 244–255.
- 1675 Brent, M., Lobato, D., & LeLeiko, N. (2008). Psychological
1676 treatments for pediatric functional gastrointestinal dis-
1677 orders. *Journal of Pediatric Gastroenterology and*
1678 *Nutrition*, 48, 13–21.
- 1679 Brent, D. A., Perper, J. A., Moritz, G., Allman, C., Friend,
1680 A., Roth, C., et al. (1993). Psychiatric risk factors for
1681 adolescent suicide: A case control study. *Journal of*
1682 *the American Academy of Child and Adolescent*
1683 *Psychiatry*, 32, 521–529.
- 1684 Brown, E. S., Khan, D. A., & Mahadi, S. (2000).
1685 Psychiatric diagnoses in inner city outpatients with
1686 moderate to severe asthma. *International Journal of*
1687 *Psychiatry in Medicine*, 30, 319–327.
- 1688 Bryden, K. S., Peveler, R. C., Stein, A., Neil, A., Mayou,
1689 R. A., & Dunger, D. B. (2001). Clinical and psycho-
1690 logical course of diabetes from adolescence to young
1691 adulthood. *Diabetes Care*, 24, 1536.
- 1692 Burney, P., Chinn, S., & Rona, R. (1990). Has asthma
1693 prevalence increased in children? Evidence from the
1694 national study of health and growth 1973–86. *British*
1695 *Medical Journal*, 300, 1306–1310.
- 1696 Bury, R. G. (1987). A study of 111 children with recurrent
1697 abdominal pain. *Australian Paediatric Journal*, 23,
1698 117–119.
- 1699 Bussing, R., Burket, R. C., & Kelleher, E. T. (1996).
1700 Prevalence of anxiety disorders in a clinic-based sample
1701 of pediatric patients. *Psychosomatics*, 37, 108–115.
- 1702 Cadman, D., Boyle, M., Szatmari, P., & Offord, D. R.
1703 (1987). Chronic illness, disability, and mental and
1704 social well-being: Findings of the Ontario Child
1705 Health Study. *Pediatrics*, 79, 805–813.
- 1706 Campbell, D. A., Yellowlees, P. M., McLennan, G.,
1707 Coates, J. R., Frith, P. A., Gluyas, P. A., et al. (1995).
1708 Psychiatric and medical features of near fatal asthma.
1709 *Thorax*, 50, 254–259.
- Campo, J. V., Bridge, J., Ehmann, M., Altman, S., Lucas, A.,
Birmaher, B., et al. (2004). Recurrent abdominal pain,
anxiety, and depression in primary care. *Pediatrics*,
113, 817–824.
- Campo, J. V., Di Lorenzo, C., & Chiappetta, L. (2001).
Adult outcomes of pediatric recurrent abdominal pain:
Do they just grow out of it? *Pediatrics*, 108, E1.
- Campo, J. V., Jansen-McWilliams, L., Comer, D. M., &
Kelleher, K. J. (1999). Somatization in pediatric pri-
mary care: Association with psychopathology, func-
tional impairment, and use of services. *Journal of the*
American Academy of Child and Adolescent
Psychiatry, 38, 1093–1101.
- Campo, J. V., Perel, J., Lucas, A., Bridge, J., Ehmann, M.,
Kalas, C., et al. (2004). Citalopram treatment of pedi-
atric recurrent abdominal pain and comorbid internal-
izing disorders: An exploratory study. *Journal of*
American Academy of Child Adolescent Psychiatry,
43, 1234–1242.
- Carr, R. E., Lehrer, P. M., Rausch, L. L., & Hochron, S. M.
(1994). Anxiety sensitivity and panic attacks in an
asthmatic population. *Behaviour Research and*
Therapy, 32, 411–418.
- Centers for Disease Control and Prevention. (1998).
Forecasted state-specific estimates of self-reported
asthma prevalence. *Morbidity and Mortality Weekly*
Report, 47, 1022–1025.
- Chansky, T. E., & Kendall, P. C. (1997). Social expecta-
tions and self-perceptions in anxiety-disordered children.
Journal of Anxiety Disorders, 11, 347–363.
- Charlton, I., Charlton, G., Broomfield, J., & Mullee, M. A.
(1990). Evaluation of peak flow and symptoms only
self-management plans for control of asthma in general
practice. *BMJ: British Medical Journal Association*,
301, 1355–1359.
- Chavira, D. A., Garland, A. F., Daley, S., & Hough, R.
(2008). The impact of medical comorbidity on mental
health and functional health outcomes among children
with anxiety disorders. *Journal of Developmental and*
Behavioral Pediatrics, 29, 394–402.
- Chen, E., Hermann, C., Rodgers, D., Oliver-Welker, T., &
Strunk, R. C. (2006). Symptom perception in child-
hood asthma: The role of anxiety and asthma severity.
Health Psychology, 25, 389–395.
- Chorpita, B. (2007). *Modular cognitive-behavior therapy*
for childhood anxiety disorders. New York: The
Guilford Press.
- Christie, K. A., Burke, J. D., Regier, D. A., Rae, D. S.,
Boyd, J. H., & Locke, B. Z. (1988). Epidemiological
evidence for early onset of mental disorders and higher
risk of drug abuse in young adults. *American Journal*
of Psychiatry, 145, 971–975.
- Cole, D. A., Peeke, L. G., Martin, J. M., Truglio, R., &
Seroczynski, A. D. (1998). A longitudinal look at the
relation between depression and anxiety in children
and adolescents. *Journal of Consulting and Clinical*
Psychology, 66, 451–460.
- Cote, J., Cartier, A., Malo, J. L., Rouleau, M., & Boulet,
L. P. (1998). Compliance with peak expiratory flow

- 1769 monitoring in home management of asthma. *Chest*,
1770 113, 968–972.
- 1771 Court, J. M., Cameron, F. J., Berg-Kelly, K., & Swift, P.
1772 G. F. (2008). Diabetes in adolescence. *Pediatric*
1773 *Diabetes*, 9, 255–262.
- 1774 Craig, M. E., Hattersley, A., & Donaghue, K. (2006).
1775 ISPAD clinical practice consensus guidelines 2006–
1776 2007: Definition, epidemiology and classification.
1777 *Pediatric Diabetes*, 7, 343–351.
- 1778 Craske, M., Poulton, R., Tsao, J., & Plotkin, D. (2001).
1779 Paths to panic disorder/agoraphobia: An exploratory
1780 analysis from age 3 to 21 years in an unselected birth
1781 cohort. *Journal of the American Academy of Child and*
1782 *Adolescent Psychiatry*, 40, 556–563.
- 1783 Daneman, D. (2009). State of the world's children with
1784 diabetes. *Pediatric Diabetes*, 10, 120–126.
- 1785 Dantzer, C. C., Swendsen, J., Maurice-Tison, S., &
1786 Salamon, R. (2003). Anxiety and depression in juve-
1787 nile diabetes: A critical review. *Clinical Psychology*
1788 *Review*, 23, 787–800.
- 1789 Davis, T., Russ, C., & MacDonald, G. (2002). Screening
1790 and assessing adult asthmatics for anxiety disorders.
1791 *Clinical Nursing Research*, 11, 173–189.
- 1792 Demyttenaere, K., Bruffaerts, R., Posada-Villa, J.,
1793 Gasquet, I., Kovess, V., Lepine, J. P., et al. (2004).
1794 Prevalence, severity, and unmet need for treatment of
1795 mental disorders in the World Health Organization
1796 World Mental Health Surveys. *Journal of American*
1797 *Medical Association*, 291(21), 2581–2590.
- 1798 Dewa, C. S., & Lin, E. (2000). Chronic physical illness,
1799 psychiatric disorder and disability in the workplace.
1800 *Social Science and Medicine*, 51, 41–50.
- 1801 Donaghue, K., Chiarelli, F., Trotta, D., Allgrove, J., &
1802 Dahl-Jorgensen, K. (2007). ISPAD Clinical Practice
1803 Consensus Guidelines 2006–2007: Microvascular and
1804 macrovascular complications. *Pediatric Diabetes*, 8,
1805 163–170.
- 1806 Dorn, L. D., Campo, J. C., Thato, S., Dahl, R. E., Lewin,
1807 D., Chandra, R., et al. (2003). Psychological comor-
1808 bidity and stress reactivity in children and adolescents
1809 with recurrent abdominal pain and anxiety disorders.
1810 *Journal of American Academy of Child and Adolescent*
1811 *Psychiatry*, 42, 66–75.
- 1812 Drossman, D. A. (2006). The functional gastrointestinal
1813 disorders and the Rome III process. *Gastroenterology*,
1814 130, 1377–1390.
- 1815 Drotar, D., Witherspoon, D., Zebracki, K., & Peterson, C. C.
1816 (2006). *Psychological interventions in childhood*
1817 *chronic illness*. Washington: American Psychological
1818 Association.
- 1819 Edwards, M. C., Finney, J. W., & Bonner, M. (1991).
1820 Matching treatment with recurrent abdominal pain
1821 symptoms: An evaluation of dietary fiber and relax-
1822 ation treatments. *Behavior Therapy*, 22, 257–267.
- 1823 Egger, H. L., Costello, E. J., & Angold, A. (2003). School
1824 refusal and psychiatric disorders: A community study.
1825 *American Academy of Child and Adolescent*
1826 *Psychiatry*, 42, 797–807.
- 1827 Egger, H., Costello, J. E., Erkanli, A., & Angold, A.
1828 (1999). Somatic complaints and psychopathology in
children and adolescents: Stomach aches, musculoskeletal
pains and headaches. *Journal of the American*
Academy of Child and Adolescent Psychiatry, 38,
852–860.
- Engum, A. (2007). The role of depression and anxiety in
onset of diabetes in a large population-based study.
Journal of Psychosomatic Research, 62, 31–38.
- Feldman, J. M., Ortega, E. N., McQuaid, E. L., & Canino,
G. (2006). Comorbidity between asthma attacks and
internalising disorders among Puerto Rican children at
one-year follow-up. *Psychosomatics*, 47, 333–339.
- Furer, P., Walker, J. R., & Stein, M. B. (2007). *Treating*
health anxiety and fear of death. New York:
Springer.
- Garber, J., Walker, L. S., & Zeman, J. L. (1991).
Somatization symptoms in a community sample of
children and adolescents: Further validation of the
Children's Somatization Inventory. *Psychological*
Assessment, 3, 588–595.
- Garber, J., Zeman, J., & Walker, L. S. (1990). Recurrent
abdominal pain in children: Psychiatric diagnoses and
parental psychopathology. *Journal of the American*
Academy of Child and Adolescent Psychiatry, 29,
648–656.
- Gardner, W., Murphy, M., Childs, G., Kelleher, K.,
Pagano, M., & Jellinek, M. (1999). A brief pediatric
symptom checklist with psychosocial problem sub-
scales. *Ambulatory Child Health*, 5, 225–236.
- Goodwin, R., & Pine, D. (2002). Respiratory disease and
panic attacks among adults in the U.S. *Chest*, 122,
645–650.
- Goodwin, R. D., & Stein, M. B. (2002). Generalized anxi-
ety disorder and peptic ulcer disease among adults in
the United States. *Psychosomatic Medicine*, 64,
862–866.
- Gortmaker, S. L., Walker, D. K., Weitzman, M., & Sobel,
A. M. (1990). Chronic conditions, socioeconomic
risks, and behavioral problems in children and adoles-
cents. *Pediatrics*, 85, 267–276.
- Graff, L. A., Walker, J. R., & Bernstein, C. N. (2009).
Depression and anxiety in inflammatory bowel dis-
ease: A review of comorbidity and management.
Inflammatory Bowel Disease, 15, 1105–1118.
- Graue, M., Wentzel-Larsen, T., Bru, E., Hanestad, B. R.,
& Sovir, O. (2004). The coping styles of adolescents
with type 1 diabetes are associated with degree of
metabolic control. *Diabetes Care*, 27, 1313–1317.
- Greenbaum, P. E., Prange, M. E., Freidman, R. M., &
Silver, S. E. (1991). Substance abuse prevalence and
comorbidity with other psychiatric disorders among
adolescents with severe emotional disturbances.
Journal of the American Academy of Child and
Adolescent Psychiatry, 30, 575–583.
- Greineder, D. K., Loane, K. C., & Parks, P. (1999). A ran-
domized controlled trial of a pediatric asthma outreach
program. *Journal of Allergy and Clinical Immunology*,
103, 2436–2440.
- Grey, M., Cameron, M. E., & Thurber, F. W. (1991).
Coping and adaptation in children with diabetes.
Nursing Research, 40, 144–149.

- 1889 Guite, J. W., Lobato, D. J., Shalon, L., Plante, W., & Kao,
1890 B. T. (2007). Pain, disability, and symptoms among
1891 siblings of children with functional abdominal pain.
1892 *Journal of Developmental and Behavioural Pediatrics*,
1893 28, 2–8.
- 1894 Haggerty, R. J. (1984). Foreword: Symposium on chronic
1895 disease in children. *Pediatric Clinics of North America*,
1896 31, 1–2.
- 1897 Hains, A. A., Berlin, K. S., Davies, W. H., Parton, E. A., &
1898 Alemzadeh, R. (2006). Attributions of adolescents
1899 with type 1 diabetes in social situations: Relationship
1900 with expected adherence, diabetes stress, and meta-
1901 bolic control. *Diabetes Care*, 29, 818–822.
- 1902 Hains, A. A., Berlin, K. S., Davies, H., Smothers, M. K.,
1903 Sato, A. F., & Alemzadeh, R. (2007). Attributions of
1904 adolescents with type 1 diabetes related to performing
1905 diabetes care around friends and peers: The moderat-
1906 ing role of friend support. *Journal of Pediatric*
1907 *Psychology*, 32, 561–570.
- 1908 Hampson, S. E., Skinner, T. C., Hart, J. O., Storey, L.,
1909 Gage, H., Foxcroft, D., et al. (2000). Behavioral inter-
1910 ventions for adolescents with type 1 diabetes: How
1911 effective are they? *Diabetes Care*, 23, 1416.
- 1912 Harter, M. C., Conway, K. P., & Merikangas, K. R. (2003).
1913 Associations between anxiety disorders and physical
1914 illness. *European Archives of Psychiatry and Clinical*
1915 *Neuroscience*, 253, 313–320.
- 1916 Harver, A. (1994). Effects of feedback on the ability of
1917 asthmatic subjects to detect increases in the flow-
1918 restrictive component to breathing. *Health Psychology*,
1919 13, 52–62.
- 1920 Hasler, G., Gergen, P. J., Kleinbaum, D. G., Ajdacic, V.,
1921 Gamma, A., Eich, D., et al. (2005). Asthma and panic
1922 in young adults: A 20-year prospective community
1923 study. *American Journal of Respiratory and Critical*
1924 *Care Medicine*, 171, 1224–1230.
- 1925 Hendricson, W. D., Wood, P. R., Hidalgo, H. A., Kromer,
1926 M. E., Parcel, G. S., & Ramirez, A. G. (1994).
1927 Implementation of a physician education intervention:
1928 The Childhood Asthma Project. *Archives of Pediatric*
1929 *and Adolescent Medicine*, 148, 595–601.
- 1930 Hettema, J. M., Neale, M. C., & Kendler, K. (2001).
1931 A review and meta-analysis of the genetic epidemiology
1932 of anxiety disorders. *American Journal of Psychiatry*,
1933 158, 1568–1578.
- 1934 Heyne, D., & Rollings, S. (2002). *School refusal*. Oxford:
1935 BPS Blackwell.
- 1936 Hirshfeld-Becker, D. R., & Biederman, J. (2002). Rationale
1937 and principles for early intervention with young chil-
1938 dren at risk for anxiety disorders. *Clinical Child and*
1939 *Family Psychology Review*, 5, 161–172.
- 1940 Hoehn-Saric, R., & McLeod, D. R. (1988). The peripheral
1941 sympathetic nervous system: Its role in normal and
1942 pathologic anxiety. *Psychiatric Clinics of North*
1943 *America*, 11, 375–386.
- 1944 Horwitz, S. M., Leaf, P. J., Leventhal, J. M., Forsyth, B.,
1945 & Speechley, K. N. (1992). Identification and manage-
1946 ment of psychosocial and developmental problems
1947 problems in community-based, primary care pediatric
1948 practices. *Pediatrics*, 89, 480–485.
- Hotopf, M., Carr, S., Mayou, R., Wadsworth, M., & 1949
Wessely, S. (1998). Why do children have chronic 1950
abdominal pain, and what happens to them when they 1951
grow up? Population based cohort study. *British* 1952
Medical Journal, 316, 1196–1200.
- Hudson, J. L., Doyle, A. M., & Gar, N. (2009). Child and 1954
maternal influence on parenting behaviour in clini- 1955
cally anxious children. *Journal of Clinical Child and* 1956
Adolescent Psychology, 38, 256–262.
- Hyams, J. S., Burke, G., Davis, P. M., Rzepski, B., & 1957
Andrulonis, P. A. (1996). Abdominal pain and irritable 1958
bowel syndrome in adolescents: A community-based 1959
study. *Journal of Paediatric*, 129, 220–226.
- Hyams, J. S., & Hyman, P. E. (1998). Recurrent abdominal 1960
pain and the biopsychosocial model of medical prac- 1961
tice. *Journal of Pediatrics*, 133, 473–478.
- Hyman, P. E., Milla, P. J., Benninga, M. A., Davidson, G. 1962
P., Fleisher, D. F., & Taminiau, J. (2006). Childhood 1963
functional gastrointestinal disorders: Neonate/toddler. 1964
Gastroenterology, 130, 1519–1526.
- Ialongo, N., Edelsohn, G., Werthamar-Larsson, L., 1965
Crockett, L., & Kellam, S. (1994). The significance 1966
of self-reported anxious symptoms in first-grade 1967
children. *Journal of Abnormal Child Psychology*, 22, 1968
441–455.
- Jackson, P. L., & Vessey, J. A. (2004). *Primary care of the* 1969
child with a chronic condition. St. Louis: Mosby.
- Kahana, S., Drotar, D., & Frazier, T. (2008). Meta-analysis 1970
of psychological interventions to promote adherence 1971
to treatment in pediatric chronic health conditions. 1972
Journal of Pediatric Psychology, 33, 590–611.
- Kashani, J. H., & Orvaschel, H. (1990). A community 1973
study of anxiety in children and adolescents. *American* 1974
Journal of Psychiatry, 147, 313–318.
- Katon, W. J., Richardson, L., Lozano, P., & McCauley, E. 1975
(2004). The relationship of asthma and anxiety disor- 1976
ders. *Psychosomatic Medicine*, 66, 349–355.
- Kearney, C. (2001). *School refusal behaviour in youth*. 1977
Washington: American Psychological Association.
- Kendall, P. C., Cantwell, D. P., & Kazdin, A. E. (1989). 1978
Depression in children and adolescents: Assessment 1979
issues and recommendations. *Cognitive Therapy and* 1980
Research, 13, 109–146.
- Kendler, K. S., Neale, M. C., Kessler, R. C., Heath, A. C., 1981
& Eaves, L. J. (1992). Major depression and general- 1982
ized anxiety disorder. Same genes, (partly) different 1983
environments? *Archives of General Psychiatry*, 49, 1984
716–722.
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. 1985
(2005). Prevalence, severity, and comorbidity of 1986
12-month DSM-IV disorders in the national comor- 1987
bidity survey replication. *Archives of General* 1988
Psychiatry, 62, 617–627.
- Kessler, R. C., Foster, J., Saunders, W. B., & Stand, P. E. 1989
(1995). Social consequences of psychiatric disorders I: 1990
Educational attainment. *American Journal of* 1991
Psychiatry, 152, 1026–1032.
- Kessler, R. C., Nelson, C. B., McGonagle, K. A., Edlund, 1992
M. J., Frank, R. G., & Leaf, P. J. (1996). The epidemi- 1993
ology of co-occurring addictive and mental disorders: 1994
2005
2006
2007
2008

- 2009 Implications for prevention and service utilization. 2068
- 2010 *American Journal of Orthopsychiatry*, 66, 17–31. 2069
- 2011 Kessler, R. C., Ormel, J., Demler, O., & Stang, P. E. 2070
- 2012 (2003). Comorbid mental disorders account for the 2071
- 2013 role impairment of commonly occurring chronic phys- 2072
- 2014 ical disorders: Results from the national comorbidity 2073
- 2015 survey. *Journal of Occupational and Environmental* 2074
- 2016 *Medicine*, 45, 1257–1266. 2075
- 2017 King, N. J., & Ollendick, H. (1989). Children's anxiety 2076
- 2018 and phobic disorders in school settings: Classification, 2077
- 2019 assessment and intervention issues. *Review of* 2078
- 2020 *Educational Research*, 59, 431–470. 2079
- 2021 Kolbe, J., Fergusson, W., Vamos, M., & Garrett, J. (2002). 2080
- 2022 Case-control study of severe life threatening asthma 2081
- 2023 (SLTA) in adults: Psychological factors. *Thorax*, 57, 2082
- 2024 317–322. 2083
- 2025 Koltek, M., Wilkes, T., & Atkinson, M. (1993). The preva- 2084
- 2026 lence of posttraumatic stress disorder in an adolescent 2085
- 2027 inpatient unit. *Canadian Journal of Psychiatry*, 43, 2086
- 2028 64–68. 2087
- 2029 Kordonouri, O., Maguire, A. M., Knip, M., Schober, E., 2088
- 2030 Lorini, R., Holl, R. W., et al. (2007). ISPAD Clinical 2089
- 2031 Practice Consensus Guidelines 2006–2007: Other 2090
- 2032 complications and associated conditions. *Pediatric* 2091
- 2033 *Diabetes*, 8, 171–176. 2092
- 2034 Kotses, H., Bernstein, I. L., Berstein, D. I., Reynolds, R. 2093
- 2035 V. C., Korbee, L., Wigal, J. K., et al. (1995). A self- 2094
- 2036 management program for adult asthma: I. Development 2095
- 2037 and evaluation. *Journal of Allergy and Clinical* 2096
- 2038 *Immunology*, 95, 529–540. 2097
- 2039 Kovacs, M., Goldston, D., Obrosky, D. S., & Bonar, L. K. 2098
- 2040 (1997). Psychiatric disorders in youths with IDDM: 2099
- 2041 Rates and risk factors. *Diabetes Care*, 20, 36. 2100
- 2042 Kovacs, M., Ho, V., & Pollock, M. H. (1995). Criterion 2101
- 2043 and predictive validity of the diagnosis of adjustment 2102
- 2044 disorder: A prospective study of youths with new- 2103
- 2045 onset insulin-dependent diabetes mellitus. *American* 2104
- 2046 *Journal of Psychiatry*, 152, 523–528. 2105
- 2047 Kremetz, J. (1989). *How it feels to fight for your life*. 2106
- 2048 Boston: Little Brown. 2107
- 2049 Last, C. G., Perrin, S., Hersen, M., & Kazdin, A. E. (1996). 2108
- 2050 A prospective study of childhood anxiety disorders. 2109
- 2051 *Journal of the American Academy of Child and* 2110
- 2052 *Adolescent Psychiatry*, 35, 1502–1510. 2111
- 2053 Lehrer, P. M. (1998). Emotionally triggered asthma: A 2112
- 2054 review of research literature and some hypotheses for 2113
- 2055 self-regulation therapies. *Applied Psychophysiology* 2114
- 2056 *and Biofeedback*, 23, 13–41. 2115
- 2057 Lehrer, P. M., Feldman, J., Giardino, N., Song, H., & 2116[AU8]
- 2058 Schmalzing, K. (2002). Psychological aspects of 2117
- 2059 asthma. *Journal of Consulting and Clinical Psychology*, 2118
- 2060 70, 691–711. 2119
- 2061 Lehrer, P. M., Vaschillo, E., Vaschillo, B., Lu, S. E., 2120
- 2062 Scardella, A., Siddique, M., et al. (2004). Biofeedback 2121
- 2063 treatment for asthma. *Chest*, 126, 352–361. 2122
- 2064 Lydiard, R., & Falsetti, S. (1999). Experience with anxi- 2123
- 2065 ety and depression treatment studies: Implications for 2124
- 2066 designing IBS clinical trials. *American Journal of* 2125
- 2067 *Medicine*, 107, 65S–73S. 2126
- Manassis, K. (2008). *Keys to parenting your anxious* 2068
- child*. New York: Barron's Educational Series. 2069
- Maronian, S., Vila, G., Robert, J. J., & Mouren-Simeoni, 2070
- M. C. (1999). Troubles DSM-IV, équilibre métabo- 2071
- lique et complications somatiques dans le diabète 2072
- insulino-dépendant de l'enfant et de l'adolescent. 2073
- Annales Médico-Psychologiques*, 157, 320–331. 2074
- Mattison, R. E. (1992). Anxiety disorders. In S. R. Hooper, 2075
- G. W. Hynd, & R. E. Mattison (Eds.), *Child psychopa-* 2076
- thology: Diagnostic criteria and clinical assessment* 2077
- (pp. 179–202). Hillsdale: Erlbaum. 2078
- Merikangas, K. R., & Stevens, D. E. (1997). Comorbidity 2079
- of migraine and psychiatric disorders. *Neurologic* 2080
- Clinics*, 15, 115–123. 2081
- Miller, B. D., & Wood, B. L. (1997). Influence of specific 2082
- emotional states on autonomic reactivity and pulmo- 2083
- nary function in asthmatic children. *Journal of the* 2084
- American Academy of Child and Adolescent* 2085
- Psychiatry*, 36, 669–677. 2086
- Millstein, S. G., & Litt, J. F. (1990). Adolescent health. In 2087
- S. S. Feldman & G. R. Elliott (Eds.), *At the threshold:* 2088
- The developing adolescent* (pp. 431–456). Cambridge: 2089
- Harvard University Press. 2090
- Moore, K. E., Geffken, G. R., & Royal, G. P. (1995). 2091
- Behavioral intervention to reduce child distress during 2092
- self-injection. *Clinical Pediatrics*, 34, 530–534. 2093
- Mrazek, D. A. (1992). Psychiatric complications of pedi- 2094
- atric asthma. *Annals of Allergy*, 69, 285–290. 2095
- Mrazek, D., Anderson, I., & Strunk, R. (1985). Disturbed 2096
- emotional development of severely asthmatic pre- 2097
- school children. *Journal of Child Psychology and* 2098
- Psychiatry*, 4, 81–94. 2099
- Mulvaney, S., Lambert, W. E., Garber, J., & Walker, L. S. 2100
- (2006). Trajectories of symptoms and impairment for 2101
- pediatric patients with functional abdominal pain: A 2102
- 5-year longitudinal study. *Journal American Academy* 2103
- of Child and Adolescent Psychiatry*, 45, 737–744. 2104
- Nardi, L., Zucchini, S., D'Alborton, F., Salardi, S., Maltoni, 2105
- G., Bisacchi, N., et al. (2008). Quality of life, psycho- 2106
- logical adjustment and metabolic control in youths with 2107
- type 1 diabetes: A study with self- and parent-report 2108
- questionnaires. *Pediatric Diabetes*, 9, 496–503. 2109
- Nascimento, I., Nardi, A. E., Valenca, A. M., Lopes, F., 2110
- Messasalma, M., Nascentes, R., et al. (2002). 2111
- Psychiatric disorders in asthmatic outpatients. 2112
- Psychiatry Research*, 110, 73–80. 2113
- National Heart Lung and Blood Institute. (2007). *Expert* 2114
- panel report 3 (EPR3): Guidelines for the diagnosis* 2115
- and management of asthma*. Retrieved from [http://](http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm) 2116[AU8]
- www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm 2117
- Neeleman, J., Ormel, J., & Bijl, R. V. (2001). The distribu- 2118
- tion of psychiatric and somatic ill health: Associations 2119
- with personality and socioeconomic status. 2120
- Psychomatic Medicine*, 63, 239–247. 2121
- Nezu, A., Nezu, C. M., & Lombardo, E. (2004). *Cognitive-* 2122
- behavioral case formulation and treatment design: A* 2123
- problem-solving approach*. New York: Springer. 2124
- Northam, E. A., Matthews, L. K., Anderson, P. J., 2125
- Cameron, F. J., & Werther, G. A. (2005). Psychiatric 2126

- 2127 morbidity and health outcome in type 1 diabetes – per-
2128 spectives from a prospective longitudinal study.
2129 *Diabetic Medicine*, 22, 152–157.
- 2130 Ormel, J., Von Korff, M., Üstün, B., Pini, S., Korten, A.,
2131 & Oldehinkel, T. (1994). Common mental disorders
2132 and disability across cultures. *Journal of the American*
2133 *Medical Association*, 272, 1741–1748.
- 2134 Ortega, A. N., McQuaid, E. L., Canino, G., Ramirez, R.,
2135 Fritz, G. K., & Klein, R. B. (2003). Association of
2136 psychiatric disorders and different indicators of asthma
2137 in island Puerto Rican children. *Social Psychiatry and*
2138 *Psychiatric Epidemiology*, 38, 220–226.
- 2139 Orvaschel, H., Lewinsohn, P. M., & Seeley, J. R. (1995).
2140 Continuity of psychopathology in a community sam-
2141 ple of adolescents. *Journal of the American Academy*
2142 *of Child and Adolescent Psychiatry*, 34, 1525–1535.
- 2143 Patten, S. B., Beck, C. A., Kassam, A., Williams, J. V.,
2144 Barbui, C., & Metz, L. M. (2005). Long-term medical
2145 conditions and major depression: Strength of associa-
2146 tion for specific conditions in the general population.
2147 *Canadian Journal of Psychiatry*, 50, 195–202.
- 2148 Perrin, J. M. (1985). Introduction. In N. Hobbs & J. M.
2149 Perrin (Eds.), *Issues in the care of children with*
2150 *chronic illness: A sourcebook on problems, services,*
2151 *and policies* (pp. 1–10). San Francisco: Jossey-Bass.
- 2152 Perrin, J. M., & MacLean, W. E., Jr. (1988). Children with
2153 chronic illness: The prevention of dysfunction.
2154 *Pediatric Clinics of North America*, 35, 1325–1337.
- 2155 Persky, V., Coover, L., Hernandez, E., Contreras, A.,
2156 Slezak, J., Piorkowski, J., et al. (1999). Chicago com-
2157 munity-based asthma intervention trial: Feasibility of
2158 delivering peer education in an inner-city population.
2159 *Chest*, 116, 216S–223S.
- 2160 Peyrot, M., McMurray, J. F., & Kruger, D. F. (1999). A
2161 biopsychosocial model of glycemic control in diabe-
2162 tes: Stress, coping and regimen adherence. *Journal of*
2163 *Health and Social Behavior*, 40, 141.
- 2164 Pine, D. S., Cohen, P., Gurley, D., Brook, J., & Ma, Y.
2165 (1998). The risk for early-adulthood anxiety and
2166 depressive disorders in adolescents with anxiety and
2167 depressive disorders. *Archives of General Psychiatry*,
2168 55, 56–64.
- 2169 Plante, W. A., & Lobato, D. J. (2008). Psychosocial group
2170 interventions for children and adolescents with type 1
2171 diabetes: The state of the literature. *Children's Health*
2172 *Care*, 37, 93–111.
- 2173 Pleis, J. R., & Lethbridge-Çejku, M. (2006). Summary
2174 health statistics for U.S. Adults: national health inter-
2175 view survey, 2005. *Vital Health Statistics*, 10, National
2176 Center for Health Statistics.
- 2177 Pollack, M. H., Otto, M. W., Sabatino, S., Majcher, D.,
2178 Worthington, J. J., McArdle, E. T., et al. (1996).
2179 Relationship of childhood anxiety to adult panic disor-
2180 der: Correlates and influence on course. *American*
2181 *Journal of Psychiatry*, 153, 376–381.
- 2182 Pollock, R., Rosenbaum, J., Marrs, A., Miller, B., &
2183 Biederman, J. (1995). Anxiety disorders of childhood:
2184 Implications for adult psychopathology. In M. H.
2185 Pollack & M. W. Otto (Eds.), *Psychiatric clinics of*
North America (pp. 745–766). Philadelphia: W.B.
Saunders.
- Ramchandani, P. G., Stein, A., Hotopf, M., Wiles, N. J., &
The Alspac Study Team. (2006). Early parental and
child predictors of recurrent abdominal pain at school
age: Results of a large population-based study. *Journal*
of American Academy of Child Adolescent Psychiatry,
45, 729–736.
- Rapee, R., Spence, S., Cobham, V., & Wignall, A. (2008).
Helping your anxious child: A step by step guide for par-
ents (2nd ed.). Oakland: New Harbinger Publications.
- Rapee, R. M., Wignall, A., Hudson, J. L., & Schniering,
C. A. (2000). *Treating anxious children and adoles-*
cents: An evidence based approach. Oakland: New
Harbinger Publications.
- Rasquin, A., Di Lorenzon, C., Forbes, D., Guiraldes, E.,
Hyman, J. S., & Walker, L. S. (2006). Childhood func-
tional gastrointestinal disorders: Child/adolescent.
Gastroenterology, 130, 1527–1537.
- Rasquin-Weber, A., Hyman, P. E., Cucchiara, S., Fleisher,
D. R., Hyams, J. S., Milla, P. J., et al. (1999). Childhood
functional gastrointestinal disorders. *Gut*, 45(Suppl 2),
II60–II68.
- Redline, S., Wright, E. C., Kattan, M., Kercsmar, C., &
Weiss, K. (1996). Short-term compliance with peak flow
monitoring: Results from a study of inner city children
with asthma. *Pediatric Pulmonology*, 21, 203–210.
- Reeder, K. P., Dolce, J. J., Duke, L., Raczynski, J. M., &
Bailey, W. C. (1990). Peak flow meters: Are they moni-
toring tools or devices? *Journal of Asthma*, 27,
219–227.
- Reinehr, T., & Andler, W. (2004). Cortisol and its relation
to insulin resistance before and after weight loss in
obese children. *Hormone Research*, 62, 107–112.
- Roberts, C., Mazzucchelli, T., Studman, L., & Sanders,
M. R. (2006). Behavioral family intervention for chil-
dren with developmental disabilities and behavioral
problems. *Journal of Clinical Child Adolescent*
Psychology, 35, 180–193.
- Rose, M. I., Firestone, P., Heick, H. M., & Faight, A. K.
(1983). The effects of anxiety and management train-
ing on the control of juvenile diabetes mellitus. *Journal*
of Behavioral Medicine, 6, 381–395.
- Rosenbloom, A. L., Silverstein, J. H., Amemiya, S.,
Zeitler, P., & Klingensmith, G. J. (2008). Type 2 diabe-
tes mellitus in the child and adolescent. *Pediatric*
Diabetes, 9, 512–526.
- Rubin, R. R., & Peyrot, M. (1999). Quality of life and
diabetes. *Diabetes/Metabolism Research and Reviews*,
15, 205–218.
- Rubin, R. R., & Peyrot, M. (2001). Psychological issues
and treatments for people with diabetes. *Journal of*
Clinical Psychology, 57, 457–478.
- Rudd, M. D., Joiner, T. E., & Rajab, M. H. (2004). *Treating*
suicidal behavior (2nd ed.). New York: Guilford
Press.
- Salkovskis, P. M. (1985). Obsessional-compulsive prob-
lems: A cognitive-behavioural analysis. *Behaviour*
Research and Therapy, 23, 571–583.

- 2245 Sanders, M. R. (2008). Triple P-positive parenting program
2246 as a public health approach to strengthening parenting.
2247 *Journal of Family Psychology*, 22, 506–517.
- 2248 Sareen, J., Cox, B. J., Clara, I., & Asmundson, G. J. G.
2249 (2005). The relationship between anxiety disorders
2250 and physical disorders in the U.S. national comorbidity
2251 survey. *Depression and Anxiety*, 21, 193–202.
- 2252 Sareen, J., Jacobi, F., Cox, B. J., Belik, S., Clara, I., &
2253 Stein, M. B. (2006). Disability and poor quality of life
2254 associated with comorbid anxiety disorders and physical
2255 conditions. *Archives of Internal Medicine*, 166,
2256 2109–2116.
- 2257 Scott, K. M., Bruffaerts, R., Tsang, A., Ormel, J., Alonso,
2258 J., Angermeyer, M. C., et al. (2007). Depression-
2259 anxiety relationships with chronic physical conditions:
2260 Results from the World Mental Health surveys. *Journal*
2261 *of Affective Disorders*, 103, 113–120.
- 2262 Seiffge-Krenke, I., & Stemmler, M. (2003). Coping with
2263 everyday stress and links to medical and psychosocial
2264 adaptation in diabetic adolescents. *Journal of*
2265 *Adolescent Health*, 33, 180–188.
- 2266 Seligman, L. D., & Ollendick, T. H. (1998). Comorbidity
2267 of anxiety and depression in children: An integrative
2268 review. *Clinical Child and Family Psychology Review*,
2269 1, 125–144.
- 2270 Shavitt, R. G., Gentil, V., & Mandetta, R. (1992). The
2271 association of panic/agoraphobia and asthma.
2272 Contributing factors and clinical implications. *General*
2273 *Hospital Psychiatry*, 14, 420–423.
- 2274 Silverman, W. K., Pina, A. A., & Viswesvaran, C. (2008).
2275 Evidence-based psychosocial treatments for phobic
2276 and anxiety disorders in children and adolescents.
2277 *Journal of Clinical Child and Adolescent Psychology*,
2278 37, 105–130.
- 2279 Skinner, T. C., & Hampson, S. E. (2001). Personal models
2280 of diabetes in relation to self-care, well-being, and
2281 glycemic control. *Diabetes Care*, 24, 828.
- 2282 Sperry, L. (2009). *Treatment of chronic medical condi-*
2283 *tions*. Washington: American Psychological
2284 Association.
- 2285 Starfield, B., Hoekelman, R. A., McCormick, M., Benson,
2286 P., Mendenhall, R. C., Moynihan, C., et al. (1980).
2287 Who provides health care to children and adolescents
2288 in the United States? *Pediatrics*, 74, 991–997.
- 2289 Stout, C., Kotses, H., & Creer, T. L. (1997). Improving
2290 perception of airflow obstruction in asthma patients.
2291 *Psychosomatic Medicine*, 59, 201–206.
- 2292 Strauss, C. C., Forehand, R., Smith, K., & Frame, C. L.
2293 (1986). The association between social withdrawal
2294 and internalizing problems of children. *Journal of*
2295 *Abnormal Child Psychology*, 14, 525–535.
- 2296 Strauss, C. C., Frame, C. L., & Forehand, R. (1987).
2297 Psychosocial impairment associated with anxiety in
2298 children. *Journal of Clinical Child Psychology*, 16,
2299 235–239.
- 2300 Strunk, R. C., & Mrazek, D. A. (1985). *Clinical issues*
2301 *related to asthma death*. In: Presented to the University
2302 of Colorado school of medicine pediatric grand rounds,
2303 Denver, Colorado.
- Sullivan, M., LaCroix, A., Baum, C., Grothaus, L., &
Katon, W. (1997). Functional status in coronary artery
disease: A one-year prospective study of the role of
anxiety and depression. *American Journal of Medicine*,
103, 348–356.
- Taitel, M. A., Kotses, H., Bernstein, L., Berstein, D. I., &
Creer, T. L. (1995). A self-management program for
adult asthma: II. Cost-benefit analysis. *Journal of*
Allergy and Clinical Immunology, 95, 672–676.
- ten Brinke, A., Ouwerkerk, M. E., Bel, E. H., & Spinhoven, P.
(2001). Similar psychological characteristics in mild
and severe asthma. *Journal of Psychosomatic*
Research, 50, 7–10.
- The Research Unit on Pediatric Psychopharmacology
Anxiety Study Group. (2007). Fluvoxamine for the
treatment of anxiety disorders in children and adoles-
cents. *New England Journal of Medicine*, 344,
1279–1285.
- Thompson, G. W. (2006). The road to Rome.
Gastroenterology, 130, 1519–1526.
- Tieffenberg, J. A., Wood, E. I., Alonso, A., Tossutti, M. S.,
& Vicente, M. F. (2000). A randomized field trial of
ACINDES: A child-centred training model for chil-
dren with chronic illnesses (asthma and epilepsy).
Journal of Urban Health, 77, 280–297.
- Turner, M. O., Taylor, D., Bennett, R., & Fitzgerald, J. M.
(1998). A randomized trial comparing peak expiratory
flow and symptoms self-management plans for patients
with asthma attending a primary care clinic. *American*
Journal of Respiratory and Critical Care Medicine,
157, 540–546.
- Varni, J. W., Lane, M. M., Burwinkle, T. M., Fontaine, E.,
Youssef, N. N., Schwimmer, J., et al. (2006). Health-
related quality of life in pediatric patients with irri-
table bowel syndrome: A comparative analysis.
Developmental and Behavioral Pediatrics, 27,
451–458.
- Vazquez, M. I., & Buceta, J. M. (1993). Effectiveness of
self-management programmes and relaxation training
in the treatment of bronchial asthma: Relationships
with trait anxiety and emotional attack triggers.
Journal of Psychosomatic Research, 37, 71–81.
- Verschelden, P., Cartier, A., L'archeveque, J., Trudeau, C.,
& Malo, J. L. (1996). Compliance with and accuracy
of daily self-assessment of peak expiratory flows
(PEF) in asthmatic subjects over a three month period.
European Respiratory Journal, 9, 880–885.
- Vila, G., Nolle-Clemencon, C., de Blic, J., Falissard, B.,
Mouren-Simeoni, M., & Scheinmann, P. (1999).
Assessment of anxiety disorders in asthmatic children.
Psychosomatics, 40, 404–413.
- Vila, G., Nolle-Clemencon, C., de Blic, J., Mouren-
Simeoni, M. C., & Scheinmann, P. (2000). Prevalence
of DSM IV anxiety and affective disorders in a pediatric
population of asthmatic children and adolescents.
Journal of Affective Disorders, 58, 223–231.
- Vila, G., Nolle-Clemencon, C., Vera, M., de Blic, J.,
Jouvent, R., Mouren-Simeoni, M. C., et al. (1999).
Prevalence of DSM IV disorders in children and

- 2363 adolescents with asthma versus diabetes. *The Canadian*
2364 *Journal of Psychiatry*, 44, 562–569.
- 2365 Walker, L. S., Garber, J., & Greene, J. W. (1993).
2366 Psychosocial characteristics of recurrent childhood
2367 pain: A comparison of children with recurrent abdom-
2368 inal pain, organic illness, and psychiatric disorders.
2369 *Journal of Abnormal Psychology*, 102, 248–258.
- 2370 Walker, L. S., Garber, J., & Greene, J. W. (1994). Somatic
2371 complaints in pediatric patients: A prospective study
2372 of the role of negative life events, child social and aca-
2373 demic competence, and parental somatic symptoms.
2374 *Journal of Consulting and Clinical Psychology*, 62,
2375 1213–1221.
- 2376 Walker, L. S., & Heflinger, C. A. (1998). Quality of life
2377 predictors in outcome in pediatric/abdominal pain
2378 patients: Findings at initial assessment and 5-year fol-
2379 low up. In D. Droter (Ed.), *Measuring health-related*
2380 *quality of life in children and adolescents: Implications*
2381 *for research and practice* (pp. 237–252). Mahwah:
2382 Lawrence Erlbaum Associates.
- 2383 Walkup, J. T., Albano, A. M., Piacentini, J., Birmaher, B.,
2384 Compton, S. N., Sherrill, J. T., et al. (2008). Cognitive
2385 behavioral therapy, sertraline, or a combination in
2386 childhood anxiety. *New England Journal of Medicine*,
2387 359, 2753–2766.
- 2388 Weiss, K. B., Gergen, P. J., & Wagener, D. K. (1993).
2389 Breathing better or wheezing worse? The changing
2390 epidemiology of asthma morbidity and mortality.
2391 *Annual Review of Public Health*, 14, 491–513.
- Weitzman, M., Gortmaker, S. L., Sobol, A. M., & Perrin,
J. M. (1992). Recent trends in the prevalence and
severity of childhood asthma. *Journal of American*
Medical Association, 268, 2673–2677.
- White, C. A. (2001). *Cognitive behaviour therapy for*
chronic medical problems: A guide to assessment and
treatment in practice. New York: Wiley.
- Wigal, J. K., Stout, C., Brandon, M., Winder, J. A.,
McConaughy, K., Creer, T. L., et al. (1993). The
knowledge, attitude, and self-efficacy asthma ques-
tionnaire. *Chest*, 104, 239–254.
- Wilson, S. R., Latini, D., Starr, N. J., Fish, L., Loes, L. M.,
Page, A., et al. (1996). Education of parents of infants
and very young children with asthma: A developmen-
tal evaluation of the wee wheezers program. *Journal*
of Asthma, 33, 239–254.
- Woodward, L. J., & Fergusson, D. M. (2001). Life course
outcomes of young people with anxiety disorders in
adolescence. *Journal of the American Academy of*
Child and Adolescent Psychiatry, 40, 1086–1093.
- Yellowlees, P. M., Alpers, J. H., Bowden, J. J., Bryant, G.
D., & Ruffin, R. E. (1987). Psychiatric morbidity in
patients with chronic airflow obstruction. *The Medical*
Journal of Australia, 146, 305–307.
- Ziaian, T., Sawyer, M. G., Reynolds, K. E., Carbone, J. A.,
Clark, J. J., Baghurst, P. A., et al. (2006). Treatment
burden and health-related quality of life of children
with diabetes, cystic fibrosis and asthma. *Journal of*
Paediatrics and Child Health, 42, 596–600.

Author Queries

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Queries	Details Required	Author's Response
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