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Cognitive Behavioural Therapy for Pediatric Chronic Pain:

The Problem, Research, and Practice

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Abstract

The purpose of this paper is to outline the rationale and use of cognitive-behavioural therapy (CBT) for the treatment of pediatric chronic pain. The paper begins by demonstrating the scope and impact of the problem of pediatric chronic pain. It then provides an overview of the framework of CBT for pediatric chronic pain and standard treatment components are outlined. A summary of the current state of research and its efficacy is provided. The paper concludes by providing outcome data from a specific example of a CBT group for pediatric recurrent abdominal pain. Future directions for research in this area are discussed.

Cognitive Behavioural Therapy for Pediatric Chronic Pain: The Problem, Research, and Practice

Cognitive Behavioural Therapy for Pediatric Chronic Pain: Overview

Chronic pain in adults is recognized as a serious public health problem, which has debilitating physical and psychological effects for the individual (Dersh, Polatin, & Gatchel, 2002; Fishbain, Cutler, Rosomoff, & Rosomoff, 1997; McWilliams, Cox, & Enns, 2003), as well as enormous costs to society (Phillips, Main, Buck, Aylward, Wynne-Jones, & Farr, 2008). Given the negative impact of chronic pain in adulthood, it is important for researchers and healthcare professionals to also focus on earlier developmental periods when chronic pain often first emerges. Chronic pain poses serious threats to development across a wide range of domains. As such, chronic pain is increasingly conceptualized as being a developmental health problem (Palermo, 2000; Palermo & Chambers, 2005; Perquin et al., 2000; Roth-Isigkeit, Thyen, Raspe, Stoven, & Schumucker, 2004) with the potential for long-lasting negative effects that can follow children throughout their lives (Fearon & Hotopf, 2001). Although prevalence rates vary across research studies and are often dependent on the time period of reporting, there is consensus that chronic and recurrent pains are common among children and adolescents (e.g., median prevalence rates ranging from 11% - 38%) and tend to occur more frequently among girls than boys (King, Chambers, Huguet, MacNevin, McGrath, & Parker, in press). Epidemiological studies indicate that approximately 25% of children report being currently affected by chronic pain, defined as recurrent or continuous pain for more than 3 months (Perquin et al., 2000). Rates for adolescence vary depending on the type of pain being examined, with prevalence rates for pain experienced on a weekly

or more frequent basis ranging from 13.6-22.2% for stomachache to 26.2-31.8% for headache across different age groups (Stanford, Chambers, Biesanz, & Chen, 2008). The most frequently reported pains among children and adolescents are headache, lower limb pain, and abdominal pain (Huguet & Miró, 2008; Perquin et al., 2000; Roth-Isigkeit et al., 2004). Although the existence of chronic pain is relatively common among pediatric populations, the severity and impact of this pain varies considerably. For example, Huguet and Miró (2008) found that while 37.3% of children reported having chronic pain (continuous or recurrent pain lasting for at least 3 months), only 5.1% of them had moderate or severe chronic pain problems defined as heightened pain-related disability. Indeed, children with chronic pain are increasingly being recognized as a heterogeneous group who differ in the degree of functional impact that their pain causes. Nevertheless, early intervention with children before their pain becomes severe could prevent problems from becoming increasingly entrenched.

The Impact of Pediatric Chronic Pain

The impact of chronic pain on children may be pervasive. Children and adolescents with chronic and recurrent pains suffer negative and sometimes debilitating effects across nearly every domain of functioning including physical functioning (e.g., obesity; Wilson, Samuelson, & Palermo, 2010), psychological functioning (Fichtel & Larsson, 2002; Palermo, 2000), cognitive and school functioning (Dick & Pillai Riddell, 2010), sleep disturbances (e.g., Gagliese & Chambers, 2007; Huntley, Campo, Dahl, & Lewin, 2007), social and peer relationships (Forgeron et al., 2010), and family functioning (Lewandowski, Palermo, Stinson, Handley, & Chambers, 2010). As outlined, chronic pain can have a negative impact on children's quality of life and psychological

wellbeing and if issues related to chronic pain are not addressed, they may follow children throughout their lives (Fearon & Hotopf, 2001). For example, Stanford and colleagues (2008) investigated various factors believed to impact developmental trajectories of recurrent pains. Psychological factors such as anxiety and depression were found to be important predictors of recurrent headache, stomachache, and backache longitudinal trajectories. Specifically, those children with higher levels of anxiety and depression and lower levels of self-esteem at ages 10 and 11 years had higher levels of chronic pain issues over time. Additionally, child pain catastrophizing (i.e., a negative cognitive–affective response to anticipated or actual pain) has been found to be a robust predictor of several clinical pain-related outcomes, including pain severity, pain-related activity interference, and disability. Moreover, reductions in pain catastrophizing have been found to predict pre- to post-treatment reductions in pain severity (for a review see Quartana, Campbell, & Edwards, 2009). Research suggests that the relationship between chronic pain and psychological factors is complex and interdependent with chronic pain predicting psychological disturbances (Knook et al., 2011), and psychological functioning leading to increased risk for the development, maintenance, and exacerbation of chronic pain over time (Stanford et al., 2008).

Given the powerful role of parents on children’s socialization and adjustment, it is not surprising that research has demonstrated that chronic pain tends to run in families, and children’s and parents’ pain complaints are highly related (Apley, 1975; Ehde, Holm, & Metzger, 1991; Goodman, McGrath, & Forward, 1997; Turkat, Kuczmierczyk, & Adams, 1984; Zuckerman, Stevenson, & Bailey, 1987). Whereas biological and genetic factors likely play an important role in determining familial influences on pain,

consideration of psychosocial and family variables that may impact children's pain experiences is also important. It is thought that family factors influence pediatric chronic pain through parental modeling and social learning (Chambers, 2002). Moreover, children's pain behaviour is often inadvertently reinforced by parental responses to children's pain through operant conditioning processes of positive and negative reinforcement (e.g., increased attention toward pain-related behaviours; see Chambers, 2002). In order to fully conceptualize family factors in pediatric chronic pain, Palermo and Chambers (2005) proposed an integrative model to capture the complex relations between individual (e.g., parental reinforcement), dyadic (e.g., parent-child interactions) and family variables. The model also accounts for the mediating/moderating role of individual child factors (e.g., psychological functioning and individual coping) in child pain and functional disability, which can influence children's vulnerability to parental responses to, and reinforcement of, pain (Williams, Blount & Walker, 2011). Taken further, this framework could provide a useful way to conceptualize not only children's experience of pain but also how that pain could be effectively treated, by targeting the various factors involved in the development and maintenance of pain and functional disability. Similarly, other integrative frameworks involving psychological and social variables have been proposed as models of care for children and adolescents with chronic pain (Kozlowska, Rose, Khan, Kram, Lane, & Collins, 2008). Given the important role of psychological and familial factors in chronic pain in children, psychological treatments that target children's cognitions and behaviour as well as parental responses hold particular promise for reducing the far-reaching impact of pediatric chronic pain by targeting not only pain, but also the psychological and social variables that drive it.

Cognitive Behavioural Therapy: Overview

CBT for chronic pain in children aims to equip children and their parents with a range of coping strategies to deal directly with pain, as well as the functional impairment associated with chronic pain. In addition, it targets and attempts to modify environmental factors that reinforce and maintain pain behaviours. The CBT framework focuses on the interrelationships between thoughts, feelings, and behaviours in the development and maintenance of pain. Maladaptive thoughts (e.g., “my stomach hurts too much to do anything”) that serve to drive negative emotions and pain perpetuating behaviours are replaced with more adaptive thoughts (e.g., “I might have some pain, but I can still visit friends”), thereby leading to the adoption of behaviours that do not perpetuate pain. This is achieved through coping skills training for children and parent training, with the involvement of parents considered important for treatment success. Although aspects of treatment are designed to teach children skills to help manage their pain, a major focus of treatment is to improve children’s functioning and reintegration into their daily activities (e.g., school and social activities) *despite* their pain. In this way, there is often a shift towards acceptance of pain, which facilitates children’s engagement in activities that were previously avoided, despite the presence of pain. This is in contrast to recommendations for acute pain, such that avoidance and temporary withdrawal from activity engagement can sometimes be adaptive in the short-term. Treatment sessions are typically delivered over the course of 8 weeks; however, the duration of treatment can vary considerably across studies and treatment teams. CBT can also be delivered in isolation or in combination with other treatments from a multidisciplinary team (e.g., medication management, physiotherapy, etc.). Although CBT is used as a treatment for

pediatric chronic pain, it is also an evidence-based treatment for other psychological disorders that have been found to maintain pain (e.g., anxiety, depression; James, Soler, & Weatherall, 2009; Weersing & Brent, 2003).

Cognitive Behavioural Therapy: Components

Psychoeducation.

Parents and children are given information about the prevalence and nature of chronic pain (e.g., using the Gate Control Theory of Pain [Melzack & Wall, 1965] to describe how psychological factors can increase or decrease pain perception). An overview of various pain management techniques (discussed in further detail below) is provided. Importantly, parents and children are given the message that the pain is real despite not often having an organic etiology. This is essential in order to validate their experiences given that families are often disenfranchised in their quest for a “medical” explanation. Furthermore, chronic pain has been considered a specific medical problem in and of itself as opposed to a symptom associated with a medical disorder (Zeltzer, Bursch, & Walco, 1997).

Self-monitoring.

Children and parents are typically asked to keep track of the frequency and intensity of the child’s pain and the interference it causes. This type of monitoring serves two purposes. First, it can be used to help identify environmental (e.g., tests at school) and internal (e.g., anxiety) triggers that may precede the onset of a pain episode and therefore be a target of treatment. Second, it may be used to monitor progress. Monitoring progress is important throughout treatment so that children and parents can recognize improvements in pain episodes and functioning as treatment progresses. Even

if treatment does not progress rapidly, monitoring pain can help children identify that there are times when they are not in pain. Although monitoring of pain itself is frequently used in the initial stages of treatment, the focus often shifts to monitoring and decreasing interference in children's lives (e.g., social and academic activities) as treatment progresses. It should be noted that not all clinicians agree on the use of self-monitoring as part of CBT for chronic pain because of the belief that it can cause children and parents to focus too much on pain symptoms. Nevertheless, the use of self-monitoring should be considered for inclusion in CBT protocols using clinical judgment to determine its appropriateness for particular families.

Coping skills training for children.

Children are taught a number of coping strategies for managing their pain and consistent practice of these skills outside of treatment sessions is emphasized. Skills are taught in a developmentally appropriate way and are often explained using metaphors and imagery that resonate with children. These skills include: diaphragmatic breathing (i.e., "belly breathing"); progressive muscle relaxation, which is the systematic tensing and relaxing of various muscle groups (e.g., tensing the hands by "squeezing lemons to make lemonade"); guided imagery (e.g., going to your "favorite place"); replacement of negative pain-perpetuating cognitions (e.g., "I can't do anything when I hurt") with positive self-talk (e.g., "I am going to be the boss of my pain and not let it get in my way!"); distraction and alternative activities to take children's focus off of the pain (e.g., listening to music, playing a game); self-reinforcement by children rewarding themselves when they attempt to cope with their pain or persist with daily activities despite their pain.

Parent training.

Parents are critically important in treatment and support their children on their journeys toward independent pain management and functional living. Parents are taught strategies based on behavioural/operant principles that are aimed at decreasing children's pain behaviours and fostering their independent coping. This is achieved through the use of differential attention whereby increased parental attention is given to children when they attempt to use coping strategies to manage their pain or demonstrate "well behaviours" such as engaging in social activities despite their pain (e.g., "shine your spotlight of attention when children are not showing pain behaviours"). Conversely, parents are instructed to limit their attention when children exhibit nonverbal and verbal pain behaviours. This is essential given how frequently children look to their parents for reassurance when in pain, which can inadvertently reinforce and maintain pain (Chambers, Craig, & Bennett, 2002). In addition to their attention, parents are encouraged to remove environmental reinforcers of children's pain behaviours. For example, if children are in too much pain to go to school, parents are encouraged to limit pleasurable activities (e.g., television, special treats, etc.). Parents assume a "coach" role whereby they encourage children to independently use their coping strategies and persist with daily activities despite their pain. The importance of modeling "well behaviours" and active coping themselves and differentiating between pain behaviours and other complaints that require medical intervention is emphasized. Additionally, common treatment components may also include recommendations pertaining to sleep hygiene, school refusal behaviours, and healthy lifestyle routines (e.g., nutrition, exercise, etc.).

Relapse prevention.

In the later phases of treatment, parents and children are taught general problem solving strategies that can be applied in the event of reemergence of pain or other stressful or potentially pain-triggering situations (e.g., a friend moving away, transitioning to a new classroom, onset of puberty, etc.).

Homework.

As with any CBT program, homework is considered to be a crucial ingredient for treatment efficacy. Children and parents are encouraged to practice the skills learned in sessions through completion of weekly homework assignments. At the beginning of each session, homework is typically reviewed in order to increase adherence, as well as to review concepts that were previously taught in treatment. Homework typically involves practicing skills learned in treatment between sessions. This serves to maintain motivation throughout treatment and enhance treatment gains through generalization of skills to children's daily lives.

Efficacy of CBT for Pediatric Chronic Pain

Early systematic reviews on the effects of CBT and other psychological interventions (e.g., relaxation training with and without biofeedback) for the management of chronic pain in children concluded that these interventions were largely efficacious in reducing pain severity for children with chronic headaches, but that evidence was lacking for other chronic pain conditions (Eccleston, Morley, Williams, Yorke, & Mastroyannopoulou, 2002; Eccleston, Yorke, Morley, Williams, & Mastroyannopoulou, 2003). Follow-up reviews examining the use of CBT for recurrent abdominal pain concluded that while most available studies lacked the methodological rigor to make concrete conclusions regarding its efficacy, the large and consistent positive effects of

CBT on measures of pain severity provided evidence that it may be a useful intervention for this population (Huertas-Ceballos, Logan, Bennett, & McArthur, 2008).

More recent Cochrane reviews of randomized-controlled trials for children with chronic pain have confirmed a large positive effect for psychological interventions (e.g., behavioural relaxation-based treatments with or without biofeedback and cognitive behavioural therapy including cognitive coping, coping skills training, and parent operant strategies) in reducing pain intensity when compared to no-treatment control conditions (Eccleston, Palermo, Williams, Lewandowski, & Morley, 2009a; Palermo, Eccleston, Lewandowski, Williams, & Morley, 2010). These positive effects on pain intensity were found in children with recurrent abdominal pain and headache, two of the most commonly reported chronic pain conditions in children (Huguet & Miró, 2008; Perquin et al., 2000; Roth-Isigkeit et al., 2004). Studies that utilized CBT specifically were found to result in large and clinically significant pain reductions (defined as 50% or greater reductions in pain), with an odds ratio of 4.13 (95% CI 2.61-6.54) compared to no-treatment control groups across all chronic pain conditions. In other words, children with chronic pain who received CBT were 4 times more likely to have significantly reduced pain levels as compared to children who received no treatment. These recent reviews also examined the impacts of CBT on pain-related disability and emotional functioning, with evidence to date suggesting that the effects of CBT (and psychological interventions in general) were small and non-significant (Eccleston et al., 2009a; Palermo et al., 2010). However, these authors argued that no solid conclusions could be made at this point regarding these secondary outcomes because of the small number of studies that included these outcomes, differing measures used across studies, and limitations of measurement

regarding these variables (Palermo, Long, Lewandowski, Drotar, Quittner, & Walker, 2008; Palermo et al., 2010). In contrast, recent reviews of CBT for chronic pain in adults (excluding headache) have found that it is not only efficacious in reducing pain, but also in decreasing functional disability and increasing emotional functioning at 6 to 12 months follow-up when compared to other active treatments (Eccleston, Williams, & Morley, 2009b). This suggests that future CBT treatment protocols and research examining their efficacy should include specific measures of functional disability and emotional functioning before and after treatment to build this evidence base. In addition, more evidence is needed to examine whether these types of measures are sensitive to change following clinical interventions (Palermo et al., 2008).

Given that many children are unable to access therapists trained in CBT (Stallard, Udwin, Goddard, & Hibbert, 2007), researchers have also examined the relative efficacy of alternative forms of administration of psychological treatments. For example, a number of studies (Griffiths & Martin, 1996; Kroner-Herwig, & Denecke, 2002; Larsson & Melin, 1986; McGrath et al., 1992) have compared the effects of self-administered versus therapist-administered psychological interventions (including CBT) with results suggesting that both forms of administration are efficacious (Eccleston et al, 2009a; Palermo et al., 2010). More recently, this has led to the development of a number of web-based computerized CBT programs for children with chronic pain. To date, researchers have examined the efficacy of these web-based programs in recurrent headache (Connelly, Rapoff, Thompson, & Connelly, 2006), recurrent abdominal pain (RAP; Trautmann & Kroner-Herwig, 2008), and a combination of headache, RAP, and musculoskeletal pain (Hicks, von Baeyer, & McGrath, 2006; Palermo, Wilson, Peters,

Lewandowski, & Somhegyi, 2009). Available evidence suggests that web-based CBT interventions are efficacious in reducing pain intensity (Velleman, Stallard, & Richardson, 2010) and have comparable effects to more traditional face-to-face interventions (Eccleston et al., 2009a; Palermo et al., 2010) lending support for creative and alternative approaches of treatment delivery.

Although current evidence suggests that CBT is efficacious in reducing pain intensity for children with chronic pain conditions such as headache and RAP, there are a number of gaps in the literature. First, there is a lack of methodologically rigorous research examining the use of CBT with different chronic pain populations. Given that various forms of CBT have been implemented for a number of pediatric pain conditions such as sickle cell disease (Gil et al., 2001), fibromyalgia (Kashikar-Zuck, Swain, Jones, & Graham, 2005), musculoskeletal pain (Palermo et al., 2009), and complex regional pain syndromes (Lee et al., 2002), more evidence is needed regarding its' relative efficacy across chronic pain conditions. Second, there is relatively little research directly comparing CBT to other psychological and pharmacological interventions for chronic pain, making it difficult to draw conclusions regarding the relative efficacy of different treatment modalities. For example, the most recent reviews of randomized-controlled trials concluded that because the vast majority of the research to date has compared psychological interventions (e.g., CBT, relaxation, biofeedback) to no-treatment control groups, no conclusions can be drawn regarding the relative efficacy of different psychological interventions on pain intensity (Eccleston et al., 2009a; Palermo et al., 2010). Furthermore, as previously mentioned, little is known about the optimal length of CBT approaches, or which specific treatment components are necessary for effectively

treating children with chronic pain. For example, randomized controlled trials of CBT approaches for chronic headache in children have ranged from two 90-minute sessions delivered in a group format (Barry & von Baeyer, 1997) to ten 60-minute individual sessions (Sartory, Müller, Metsch, & Pothmann, 1998). Therefore, treatment dismantling studies of CBT for pediatric chronic pain are needed to further understand how to provide the most optimal treatment for these children and their families. Finally, although pain severity is often included as an outcome in RCTs examining the efficacy of CBT for pediatric chronic pain, little is known about the impact CBT on important secondary outcomes (e.g., parent behaviors, functional disability, emotional functioning). Nevertheless, despite the considerable heterogeneity in the implementation of CBT for chronic pain and the pain conditions it has been applied to, available evidence supports the efficacy of CBT in reducing pain severity for children with chronic pain.

CBT for Chronic Pediatric Pain in Practice: Group-administered CBT for Recurrent Abdominal Pain

Not only are CBT programs for chronic pain effective, they are relatively easy to implement. The following section will describe a group-based CBT program for children with RAP and their families based on standard CBT treatment components (see Robins & Robins, 2005; Chambers, Holly, & Eakins, 2004) that is run through the Pediatric Health Psychology Service at our tertiary care children's hospital. The program is delivered in a group format over the course of 6-weeks with one 1.5-hour treatment session per week. Children between the ages of 8 and 12 years with RAP are referred to the program through the hospital's Gastroenterology Clinic and Psychology Service, as well as through physicians and posters in the community. Each year, the program is developed

and facilitated by a group of mid-level PhD students at a partnering university under the supervision of a PhD-level clinician. Additional supervision for the group is provided by a pre-doctoral resident based at the children's hospital. The program therefore offers a needed clinical service as well as provides a unique learning opportunity for Clinical Psychology doctoral students and residents.

Prior to beginning treatment, an intake assessment is conducted with children and their parents to examine the frequency, intensity, and duration of their pain as well as their appropriateness for the treatment group (e.g., ensuring that RAP is their primary complaint). Additionally, parents and children complete a variety of validated questionnaires to assess functional disability (Functional Disability Index; FDI; Walker & Greene, 1991), parental encouragement of illness-related behaviours (Illness Behavior Encouragement Scale; IBES; Walker & Zeman, 1992) and emotional and behavioural functioning (Behavior Assessment Scale for Children, Second Edition; BASC-2; Reynolds & Kamphaus, 2004). Finally, children complete a self-report survey containing ratings of the frequency, duration, and intensity of stomachaches as well as the perceived effectiveness of any medications that they were taking.

Treatment is formatted so that children and parents attend concurrent treatment sessions in separate rooms and then typically meet at the end of each session to briefly review the material covered in the groups. Each year, half of the student therapists co-lead the parent group, while the other half co-lead the children's group. Although specific treatment details vary slightly year-by-year based on input from student therapists, core components of CBT for chronic pain are always included.

In the children's group, the initial treatment session focuses on psychoeducation related to RAP and how treatment will help children deal with pain when it arises. It is stressed to children that the point of treatment will not be to "cure" their pain, but rather to better equip them to effectively cope with pain. Children are provided with pain diaries in this session to monitor their RAP symptoms throughout treatment. Specific coping skills such as deep breathing, progressive muscle relaxation, distraction, and guided imagery are then taught in the first several weeks of treatment. In the middle of treatment, children are introduced to the CBT model of RAP and the connection between thoughts, feelings, and behaviours. The focus of this portion of treatment is to educate children on how their own thoughts, emotions, and behaviours can affect their experience of pain. After the introduction of the CBT model, treatment focuses on helping children understand the concept of cognitive distortions (described as "unhelpful thoughts") and identify the types of unhelpful thoughts they have, which can make it more difficult for them to manage their pain. Children are encouraged to challenge these unhelpful thoughts and replace them with more realistic or "helpful" thoughts. In the final weeks, children are introduced to the idea of positive self-talk and taught to notice the positive aspects of how they deal with their RAP as well as positive aspects of their day-to-day lives. The goal of the final session is to help children focus on all of the skills that they learned to help them deal with their pain and plan for how they will continue to use these skills after treatment has ended. At the start of treatment, children are provided with a workbook and each week they are given handouts of session materials. At the beginning of each session, pain diaries are reviewed and there is a group discussion of homework from the previous week. Led by the student therapists, children are asked to practice new skills acquired

during each session through group discussion and activities. At the end of each session, children are assigned homework to practice the skills learned that week.

Similar to children, in the initial session, parents are provided with psychoeducation about pain and an overview of treatment components. During this session, it is emphasized that pain is real despite often not having an organic explanation. This is important given that only a small percentage of children with RAP have an identified organic illness to account for the pain (Scharff, Lecihner, & Rappaport, 2003). The importance of psychological factors (e.g., mood, anxiety, self-control) in influencing pain is highlighted. Parents are encouraged to assume the role of “coaches” to help their children learn to cope with, and independently manage, their own pain. Early in treatment, parents are taught behavioural principles such as operant processes of negative and positive reinforcement, differential attention, and modeling in promoting “well behaviours” (e.g., praising children when they attempt to cope with their pain) and discouraging “unwell behaviours” (e.g., keeping children home from school when they have pain). Parents are encouraged to allocate specific brief times to talk about pain with children, in order to minimize the frequency of attending to pain behaviours while still acknowledging pain at designated times. However, this does not mean that parents are trained to invalidate or not acknowledge their child’s pain but rather they are encouraged to decrease the frequency with which attention is given to pain complaints. The importance of parents’ own mental and physical health is highlighted and suggestions for their self-care are provided. Parents are also encouraged to model adaptive coping and healthy-behaviours themselves.

Like children, parents are taught about the CBT framework and the role that cognitions play in maintaining and exacerbating pain and pain behaviours. The same thinking patterns and strategies to challenge unhelpful thoughts are taught to parents as well as children. In order to complement children's newly acquired skills, parents are concurrently taught coping skills (e.g., belly breathing, progressive muscle relaxation, challenging unhelpful thoughts) so that they can facilitate their children's practice of these skills for homework. During the final sessions, relapse prevention and problem solving are covered and parents are encouraged to identify upcoming pain-triggering situations in order to prepare for and avoid potential setbacks. Recommendations pertaining to sleep hygiene, school refusal behaviours, and healthy lifestyle routines (e.g., nutrition, exercise, etc.) are also provided. Sessions are interactive in nature and parents are encouraged to provide personal examples and respond to vignettes to facilitate their learning and engagement with material. Although parents are asked to encourage children's coping, their involvement in their children's self-management of pain is reduced over the course of treatment to encourage children to independently manage their own pain. Parents are also provided with their own workbooks at the beginning of treatment and given handouts of session materials each week. They are also provided with a list of evidence-based resources for managing children's chronic pain, which complement the skills learned in treatment sessions.

CBT for Chronic Pediatric Pain in Practice: Preliminary Outcome Evaluation

As part of the evaluation of the program each year, children and parents were asked to complete questionnaires before and after treatment. In order to provide an opportunity to assess the effectiveness of this group, these questionnaires allowed for

examination of pre-post changes in children's functional disability, pain symptoms and parent behaviours upon termination of treatment. Finally, at the end of treatment, children and parents were asked to complete general feedback forms that contained questions regarding perceived quality of treatment. For example, whether or not families thought that treatment was effective, what the most helpful components of treatment were, and what could be done to improve upon treatment delivery.

The following section will outline the results of the program evaluation combining pre and post data collected over the course of four separate RAP treatment groups. Data presented is from 16 families who provided consent for their data to be used for the purposes of this paper, attended at least four sessions of the CBT group (which covered all of the core CBT components outlined above), and had a child who was between 8 and 12 years of age. Ethical approval was obtained from the IWK Health Centre Research Ethics Board.

The groups were comprised of 63% girls and the mean age of children was 9.69 years ($SD = 1.30$). The parent group was predominantly comprised of mothers (94 %) and on average families attended 5.06 ($SD = .68$) treatment sessions. Prior to starting treatment, 53% of the participants reported that they had been experiencing stomachaches for more than three years, and slightly more than half (57%) were currently taking medication for their pain. The majority of children (63%) reported that they had experienced 7 or more stomachaches over the previous three months, with stomachaches typically lasting less than an hour (75% of children) and an average pain rating of 6.09 ($SD = 2.04$) on an 11-point Likert scale (range: 0= "no pain", 10 = "worst pain possible"). See Table 1 for a summary of RAP symptoms before and after treatment.

Following treatment, the majority of children (73%) reported less than 7 stomachaches in the previous month. Duration of stomachaches decreased slightly, with 80% of children reporting that their average stomachache lasted less than one hour. Children also reported a significant reduction in pain intensity for their average stomachache following treatment ($t [12] = 2.52, p < .05$; see Table 1.). Additionally, all but one child reported that they had not taken any medication for their stomachaches in the final month of treatment. Although children's functional disability related to their stomachaches did not change during treatment ($t [14] = .99, p = .34$), parents' reinforcement of pain encouraging behaviours reduced significantly ($t [11] = 3.11, p < .05$).

In terms of feedback regarding participation in the program, the majority of children (73%) reported that their pain had gotten better since they began the program, with 86% reporting that they felt their ability to do something helpful when they were in pain had improved and no children reporting being unhappy that they had taken part in the group (e.g., "I enjoyed coming here. It was a big help"). Children were asked to indicate the strategies that they found to be most helpful with 57% reporting belly breathing to be most helpful and 44% reporting distraction to be most helpful. Parents reported similar positive feedback with 87% reporting that their child's pain had gotten better since the beginning of treatment, and all parents reporting that their ability to deal with their child's pain had improved. In addition, all parents felt that their child's ability to deal with their pain had also improved since beginning the group (e.g., "Very worthwhile opportunity, especially seeing the benefits that my child is already experiencing"). Of the strategies learned in treatment, parents reported cognitive

strategies (64%; “The ability to manage his pain through positive thinking”) and relaxation techniques (50%; “Receiving the (relaxation) CD was very helpful because it gave (my child) a tool to help herself”) to be most helpful.

Summary

Pediatric chronic pain is a prevalent and often debilitating reality with potentially long-lasting effects that can follow individuals throughout life (Fearon & Hotopf, 2001). CBT for pediatric chronic pain has emerged as an evidence-based treatment with increasing support for its use in standard group and individual formats as well as alternative forms of treatment delivery such as web-based programs (Eccleston et al., 2009a; Palermo et al., 2010; Velleman, Stallard, & Richardson, 2010). The CBT group outlined in the current paper provides an example of a typical CBT intervention for pediatric chronic pain. Consistent with research in the field, this program was found to reduce pain intensity during treatment, but did not significantly reduce functional disability (Eccleston et al., 2009a; Palermo et al., 2010). In addition to decreases in pain intensity, parent illness encouraging behaviours were also reduced following this treatment group. Results also provide evidence that children and parents who take part in a CBT group for chronic pain report a stronger sense of self-efficacy regarding their abilities to cope with pain.

Despite recent advances in the area of CBT for pediatric chronic pain, there are important avenues for future research. Although CBT protocols emphasize improving children’s functioning as a treatment goal, there is a lack of evidence to support whether functional disability significantly decreases following treatment (Eccleston et al., 2009a; Palermo et al., 2010). Furthermore, little research has examined the effects of CBT for

pediatric chronic pain on parent behaviours, which are believed to play a central role in the maintenance of children's pain. Given the importance of functional disability in determining the severity of chronic pain (Hunfeld et al., 2001) as well as the powerful role of parental reinforcement and modeling in influencing children's pain behaviours (Chambers, 2002), these represent important outcomes for empirical inquiry. In addition, while research has demonstrated the effectiveness of psychological interventions in general in the treatment of pediatric chronic pain, there is little research comparing CBT to other active psychological or pharmacological treatments. Furthermore, research to date has not investigated the differential efficacy of the various components of CBT for pediatric chronic pain. This may be an important area for future research, as there is some debate regarding the efficacy of specific components included in most CBT protocols (e.g., self-monitoring of pain symptoms). Similarly, CBT protocols may need to be revised in light of emerging evidence to support new treatment approaches for the treatment of pediatric chronic pain (e.g., acceptance-based treatments; Wicksell, Melin, Lekander, & Olsson, 2009).

In conclusion, pediatric chronic pain is a widespread health problem and CBT continues to emerge as one of the most effective treatments by teaching self-management and coping skills to children and parents and reducing pain intensity. The short-term CBT treatment group for recurrent abdominal pain presented in this paper can be used as a model for other treatment programs. By equipping developing children and their families with the skills necessary to engage in their lives despite pain, CBT holds promise for preventing the impact of chronic pain from persisting into adulthood.

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Table 1.

Recurrent Abdominal Pain Symptoms Before and After Treatment.

Variable	Before Treatment		After Treatment	
	<i>M or %</i>	<i>SD</i>	<i>M or %</i>	<i>SD</i>
Duration (% of children with stomachaches that last less than one hour)	75%	-	80%	-
Pain intensity during an average stomachache (Scores range from 0-10)	6.09	2.04	5.10*	2.21
Taking medication for stomachaches (% Yes)	57%	-	7%	-
Functional Disability	20.87	9.08	18.87	13.97
Parental Encouragement of Illness Behaviour	17.83	5.67	13.75*	4.71

Notes. Statistics are presented as means and standard deviations or percentage of individuals classified as having a certain characteristic before and following treatment. Functional disability is based on total scores from the FDI (Walker & Greene, 1991). Parental encouragement of illness behaviour is based on total scores from the IBES (Walker & Zeman, 1992). * $p < .05$.