Original Research Article

Psychological interventions for the management of Pediatric Chronic Pain

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ABSTRACT

Background: Pain is a frequent experience during childhood. Paediatric Chronic pain (PCP) is defined as recurrent or continuous pain for more than 3 months. It can affect virtually all aspects of the child's and family's life and is also a burden on the medical healthcare system. Wide scale access to effective psychologically based pain management treatments remains a challenge for many children who suffer with pain. The aim of the study was to look at the impact of psychological interventions on the management of Paediatric Chronic Pain in terms of pain intensity and functionality in children and adolescents visiting a tertiary care setup in Haryana.

Methodology: The study followed a single arm pre-post design. The sample consisted of 18 children and adolescents in the age range of 8-14 years, with at least one parent. After baseline assessment with Visual Analogue Scale (VAS) and Functional Disability Inventory (FDI), weekly one-hour sessions for 8 weeks were provided during the intervention phase consisting of Pain Neuroscience Education (PNE), relaxation training, parent training in operant strategies and cognitive strategies. This was followed by a post intervention assessment.

Results: there was a reduction of more than 50% in the post-intervention ratings on measures of pain intensity and functionality (significant at $p<.001$ compared with pre-intervention data)

Conclusion: Following a psychotherapeutic management process of PCP results in pain reduction and increased functional capacity in children and adolescents.

Keywords: Chronic pain, recurrent pain, functional restoration, psychotherapy, paediatric pain

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INTRODUCTION

Every child will experience pain at one time or another, either as a primary concern or as a manifestation of an underlying medical or psychological condition. This is best understood within a biopsychosocial framework [1]. Pain treatment is considered an obligation under the right to health as a basic human right as stated by the international human rights law and the International Association for Study of Pain (IASP) [2-3]. When the same pain recurs or persists over a period of at least 3 months, this is considered to fall beyond the point of expected natural healing and is categorized as Chronic Pain [4]. It has a staggering prevalence of 20%-35% world over with headache, recurrent abdominal pain and lower limb pain being the most common [5-10]. Despite this paediatric pain remains under diagnosed and consequently undertreated [11]. Literature data show that children with chronic pain often encounter significant delays between their initial pain complaints and the time they eventually consult a psychologist, which is surrounded by various barriers [12]. This could be because attitudes towards pain depend on culture and religion among other factors [13]. Asian cultures believe showing pain to be a weakness and children in pain may have been taught not to express their concerns. Supernatural beliefs and visit to faith healers are also a common practice. Also, in low to middle income countries like India, when available, specialized care for pain tends to be clustered around cities and are therefore unavailable to rural and suburban communities. There is a dearth of research in the Indian context on paediatric pain and more so with respect to the interventions for the same. In view of the above, the aim of the present study was to study the impact of psychological interventions on the management of Paediatric Chronic Pain in terms of pain intensity and functionality in children and adolescents visiting a tertiary care setup in Haryana.

METHODOLOGY

Study Design

The study followed a single arm pre-post intervention design conducted at a tertiary care hospital in Haryana between January 2019 to December 2019.

Participants: 18 children and adolescents in the age range of 8-14 years with at least one parent. Participants with medical conditions explaining chronic pain and comorbid conditions like seizures, mental retardation, conduct disorder, autism or significant problem behaviour reported by parents were excluded. None of the participants were on regular medication for the reported symptoms of pain. Ethical guidelines were followed; assent was taken from all the children and adolescents and informed consent was taken from their parents. A total of 101 paediatric referrals (age range 8-14 years) were received from paediatricians and psychiatrists during the one-year period. Of these, 43 were diagnosed cases of PCP. Among these, 21 reported recurrent abdominal pain, 14 reported headache and 8 reported chest pain as the primary symptom. At the time of the baseline assessment, the sample consisted of 43 children with one parent or both parents. This was followed by weekly one-hour sessions for 8 weeks. At the time of the post intervention assessment, the number of participants reduced to 18 with one or both parents due to some participants dropping out (Figure 1).

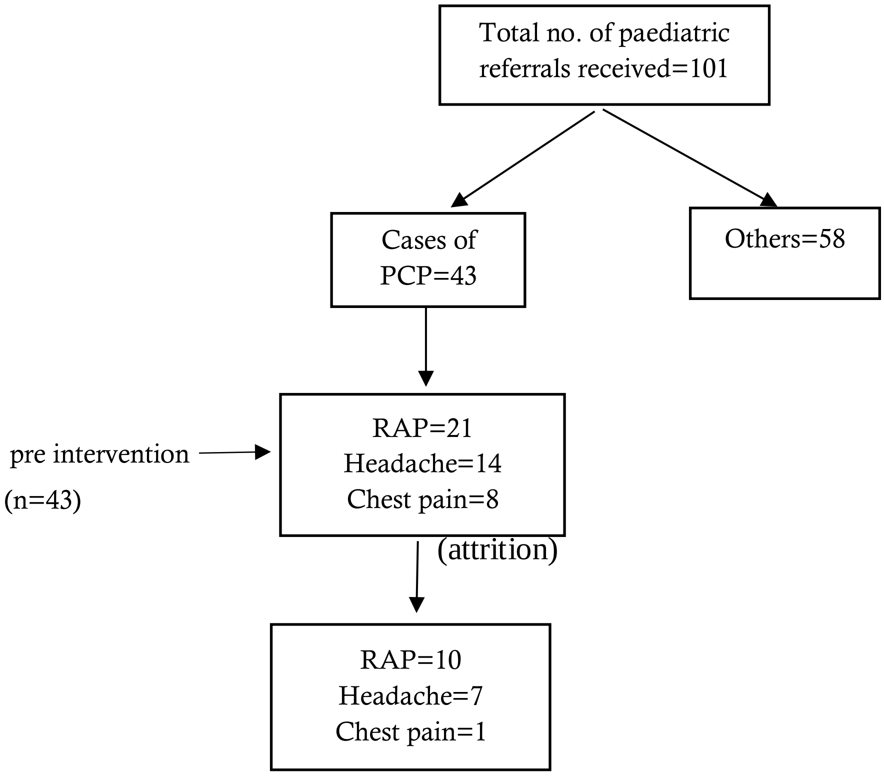

Figure 1: Flow Diagram showing recruitment of study participants

(PCP- Paediatric Chronic Pain, RAP- Recurrent Abdominal Pain)

Treatment Outcome Measures

Pain Intensity: Visual analogue scale (VAS) has been well-researched and validated for children 8 years of age and older [14-16]. It is a 10-cm visual analogue, in the shape of a thermometer, anchored with the terms "no pain" and "worst imaginable pain" at the end points were used to assess highest, lowest, and average pain intensity on a 0-10 scale. On the VAS average pain intensity scores were calculated across each assessment period.

Functionality: Functional Disability Inventory (FDI) [17-18] is a 15-item self-report inventory (with child and parent forms) assessing difficulty with the performance of daily activities in home, school, recreational, and social domains during the past 2 weeks. Items are rated on a 5-point Likert scale, ranging from 0 to 4 ("No Trouble" to "Impossible") and summed to create a total score (range 0-60) with higher scores indicating greater pain-related disability. The FDI may be used to assess health-related activity limitations among youth in both community and clinical populations. It has been reported to have high internal consistency, moderate to high test-retest reliability, moderate cross-informant (parent-child) reliability, and good predictive validity [18].

Procedure

A structured assessment interview was conducted with the child/adolescent and parent [4]. Treatment content was grounded in the Cognitive Behavioral approach and the Self Determination Theory (SDT) [19]. The application of SDT to psychotherapy is particularly relevant because a central task of therapy is to support the client to autonomously explore, identify, initiate, and sustain a process of change. According to this theory, all individuals strive for and need autonomy (the need to feel free and self-directed), competence (the need to feel effective), and relatedness (the need to connect closely with others) in order to flourish and grow.

Based on the review of the most common outpatient intervention frameworks cited over the past 15 years, highlighting how a variety of skills and strategies may be applied in helping children, adolescents, and parents in the management of pediatric pain, the following interventions were included- pain neuroscience education, relaxation strategies, operant strategies for parent training and cognitive skills training.[20] These were mutually inclusive of each other. Each session commenced with the child rating his/her pain on a Visual Analogue Scale (VAS) for the previous week.

Session 1 involved the assessment of the following areas: pain history (onset, frequency, intensity, duration, interference), medication review, emotional functioning (cognitive-affective responses to pain, pain catastrophizing), physical functioning and lifestyle factors (activities of daily living, activities with family, peers and school functioning), sleep, family relationships, school functioning and peer relationships. FDI was also conducted.

Session 2 involved a discussion of the assessment results and pain neuroscience education. The aim was to make the child and family understand that not all pain is due to tissue damage or muscle injury. It could be due to extra sensitive nerves which could be a result of faulty cognitions about pain.

Session 3 and 4 consisted of relaxation training for the child/adolescent (diaphragmatic breathing, progressive muscle relaxation) and their parent along with parent training in operant strategies to encourage normal activity during pain episodes of the child and reinforcing it, eliminate status checks (asking time and again if the child was fine), reduce response to pain behaviors (giving pain killers) reinforce use of pain management skills (e.g. relaxation), point system, increase positive and encouraging words; decrease complaints, warnings and commands.

Session 5-7 reinforced coping skills including progressive muscular relaxation and deep-breathing exercises, and cognitive strategies like detective thinking, thought stopping, positive self-statements, continuum techniques and exposure-based exercises.

Session 8 was devoted to relapse prevention training, in which children were taught problem solving strategies for dealing with pain that might arise in future high-risk situations (e.g., when studying for examinations or when participating in social activities).

The training process was accomplished through a combination of verbal and written instructions for both parent and child, within-session demonstrations and practice of techniques, and specific weekly homework tasks.

RESULTS

Table 1: Sociodemographic and clinical characteristics of the participants

Age	Mean = 10.8 years
	SD=1.84
Sex	Male= 12
	Female =6
Accompanied by	Mother= 12
	Father= 3
	Both parents=3
Type of PCP	Recurrent Abdominal Pain (RAP)= 10
	Headache =7
	Chest pain =1
Chronicity	Mean= 9.6 months
	SD= 5.75

Sociodemographic characteristics are shown in Table 1. Mean age of the participants was 10.8 years. They were primarily male and mostly accompanied by their mothers for treatment. The mean duration of chronicity of pain was 9.6 months and RAP was the most commonly reported complaint amongst the participants.

Table 2: Descriptive statistics for treatment outcomes

Outcome		Pre-intervention	Post-intervention
VAS	Child rating	7.05 (0.72)	2.66 (0.84) *
	Parent rating	6.50 (0.98)	2.33 (0.84) *
FDI	Child form	2.50 (0.53)	1.32 (0.34) *
	Parent form	2.36 (0.61)	1.30 (0.32) *

Means and SDs for pain intensity (VAS) and functionality (FDI) at pre-intervention and post-intervention are shown in Table 2. As shown, most of the participants endorsed moderate pre-treatment pain intensity and moderate to high activity limitations. The benchmark for treatment success in paediatric trials for several decades has been typically defined by a reduction in pain of 50% or greater at treatment completion or short-term follow up as compared to baseline [2]. In the present study there was a reduction of more than 50% in the post-intervention ratings on the VAS and scores on the FDI (significant at $p<.001$compared with pre-intervention data)

DISCUSSION

As opposed to existing research, there was a male predominance in all 3 categories of pain [22]. This could be due to greater stigma attached to bringing a girl child for psychological treatment, especially in the state of Haryana which is notorious for its lop-sided sex ratio and access to health care for females. It was also found that RAP was the most reported symptom among the participants. It is defined as recurring episodes of abdominal pain severe enough to interfere with a child's usual activities, but not having an identifiable organic pathology. Previous studies have found RAP to be a common paediatric complaint affecting an estimated 10%–15% of school-age children [23-24].

The VAS has been widely used as a valid and reliable measure of pain intensity with children. The measure has been shown to correlate highly with parental and clinician estimates of pain and is sensitive to the effects of psychological interventions designed to reduce pain [25]. In the present study it was found that at pre-intervention assessment, the participants reported moderate pain on the VAS (M= 7.05) and so did the parents (M= 6.5). Post the intervention phase, there was a significant reduction in pain intensity. Logan and Simons in their study with 40 adolescents and parents found that 4 weeks CBT resulted in reduced pain intensity, negative mood/self-esteem, and improved school functioning at post-treatment [26].

The Functional Disability Inventory (FDI) is one of the most widely used measures of functional impairment among children and adolescents with chronic pain. In a consensus statement on measures recommended for use in clinical trials in paediatric chronic pain, the FDI was recommended for assessment of physical functioning outcomes [16]. It has been used with a wide range of paediatric pain conditions in children and adolescents 8-18 years of age [27].

Despite the financial burden, most of these children had visited multiple medical specialists and undergone invasive medical investigations prior to being referred for psychological intervention. As a result, they and their families frequently presented with considerable frustration regarding lack of clear explanation for the persisting pain and dissatisfaction with prior health care evaluations and interventions and the amount of time given in listening to their concerns. Certain strategies have been found to be useful in engaging the reluctant child/family [28]. The present study found empathizing with their distress, stating the belief that pain was real, enquiring about physical symptoms, acknowledging the patient's views, and encouraging experiment with an alternative explanation of pain to be useful in encouraging the child and his parents towards accepting a biopsychosocial view of pain. It was important to reflect with them that till now they had been told what their symptoms were not, but psychological interventions would involve a collaborative effort to find what the symptoms mean.

It is important to appreciate that assessment is an ongoing endeavour in any psychotherapeutic process and has major implications for formulation and management. The children and their family members use their own common-sense formulations to solve the problem of chronic pain. Most of the time, their formulations are based on the obvious facts related to the immediate past. They may accept the first available explanation and if it is accepted by significant others, then there is no looking beyond [29]. In the present study, certain common-sense formulations revolved around supernatural beliefs, visit to faith healers, and previous labelling by medical professionals of the pain being all in the head, which led to the denial of seeking psychological treatment for pain.

With respect to interventions, the evidence for effectiveness is strongest for CBT which has been evaluated in RCTs for over three decades. It is an Evidence Based Practice (EBP). But in the Indian context, the real-world issue is not one of efficacy; rather it is one of access. In the present study, a major area of concern for most parents and children was absenteeism from school. Thus, focus of treatment was to improve children's functioning and reintegration into their daily activities (e.g., school, and social activities) despite their pain. Emphasis was placed on normalization, practice, and the maintenance and promotion of change. Thus, the outcome evaluation was based on a functional restoration approach.

Pain Neuroscience Education (PNE) has been found to be the most important part of any pain management program in multiple researches. It is described as an educational intervention that clearly explains "the neurobiology and neurophysiology of pain and pain processing in the nervous system"[30]. Research suggests that restructuring cognitions about pain through PNE can produce immediate and long-term improvement in pain severity, physical activity, fear, and catastrophic thinking [31-33]. Additionally, it can prepare the child for cognitive-behavioural strategies and how they can effectively reduce pain and restore function. Various studies have shown, through the use of PNE, reductions in pain [34], improved function [35], decreased fear of movement [36] and less catastrophizing [37]. In the present study, the aim of PNE was to make the child and family understand that not all pain is due to tissue damage or muscle injury. It could be due to extra sensitive nerves which could be a result of faulty cognitions about pain. The goal was to change their perception of pain which resulted in greater sense of competence in the children and their families, in the context of SDT.

Relaxation strategies form the backbone of all lot of our work in mental health as it aims at the mind body homeostasis. Benefits include slowed heart rate, increased blood flow to muscles, reduced muscle tension, greater sense of efficacy in coping and hopefulness for trying out other cognitive strategies. The basic techniques used were diaphragmatic breathing, progressive muscle relaxation and imagery. The children maintained a star chart for the same which in turn increased their sense of autonomy (with respect to SDT). The decreased physiological state of arousal that resulted from the practice of different relaxation-based strategies also served to diminish pain and its emotional symptoms associated with it. This is also supported by previous studies [38-39].

It was seen that many parents did not view psychological treatments favourably mainly because they focused on finding a medical "cure" for chronic pain in their children and consequently viewed psychological treatments as undesirable and unnecessary. Parent training into operant principles was the mainstay of treating PCP and sense of relatedness through therapeutic alliance was found to be important for this. Sessions with parents focussed on encouraging normal activity during pain episodes of the child and reinforcing it, eliminate status checks (asking time and again if the child was fine), reduce response to pain behaviours (giving pain killers) reinforce use of pain management skills (e.g. relaxation), point system, increase positive and encouraging words; decrease complaints, warnings and commands. Research on intensive interdisciplinary pain treatment examining the effects of including parents in children's treatment found that parents made reductions in protective parenting responses (e.g., more encouragement of normal activity) [40], in their own emotional status and coping efforts (e.g., reduction in depressive symptoms less pain catastrophizing, and improved psychological flexibility) [41-42], and decreased protective and monitoring, responses during treatment (e.g., fewer instances of checking in about symptoms and more recognition of children's positive behaviours) [43].

Challenging the child's and the family's beliefs, worries and fears about pain and its recurrence were dealt with through core cognitive strategies like detective thinking, thought stopping, positive appraisals, and exposure-based exercises. Positive self-statements were provided in written format which assisted the children to cope positively with pain. These techniques are widely applied, as persistent negative thinking, referred to as 'catastrophizing', is commonly associated with chronic pain and can contribute to increased pain and disability. Modifying catastrophic thinking—for children with pain and their parents—helped to foster adaptive recovery [44-45].

This process of management resulted in children reporting greater self-efficacy in managing pain, improved school attendance, reduced impairment in activities requiring physical exertion and reduced pain catastrophizing. Family members reported reduced behaviours of protection and monitoring towards the child, better involvement in daily chores and improved interpersonal relationships. Our study was limited by a high dropout rate and lack of long term follow up.

CONCLUSION

The study concludes that adhering to a psychotherapeutic management process of PCP results in pain reduction and increased functional capacity in children and adolescents. PCP is a global issue and requires consistent research-based efforts on our part in its management. Accessibility remains a major issue for children and their families from rural and suburban areas. We can contribute by engaging in efforts to integrate psychosocial interventions, not only for chronic pain but across the spectrum of health problems, into routine health care. Psychologists are well poised to play central roles in health care teams and organizations confronting the problem of chronic pain, as clinicians, researchers, administrators, and policymakers.

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