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ORIGINAL RESEARCH

Non-Cognitive Behavioral Therapy Psychological Interventions May Not Make the Difference in Children and Adolescents With Chronic Pain

Lauren Perlman[1,*], Naomi Malka[1,*], Oliver Terry[1,*], Alex Nguyen[1], Lucas Guimarães Ferreira Fonseca[2], Juan I Ingelmo[3], Pablo Ingelmo[2,4–7]

[1]Faculty of Medicine and Health Sciences, McGill University, Montreal, QC, Canada; [2]Edwards Family Interdisciplinary Center for Complex Pain, Montreal Children's Hospital, McGill University Health Center, Montreal, QC, Canada; [3]Department of Mental Health, Jose de San Martin Clinical Hospital, University of Buenos Aires, Buenos Aires, Argentina; [4]Department of Anesthesia, McGill University, Montreal, QC, Canada; [5]Division of Pediatric Anesthesia Montreal Children's Hospital, McGill University Health Center, Montreal, QC, Canada; [6]Research Institute, McGill University Health Center, Montreal, QC, Canada; [7]The Alan Edwards Centre for Research on Pain, McGill University, Montreal, QC, Canada

*These authors contributed equally to this work

Correspondence: Pablo Ingelmo, Edwards Family Interdisciplinary Center for Complex Pain, Montreal Children's Hospital A02-3525.1, 1001 Boul, Decarie, Montreal, QC, H41 3J1, Canada, Tel +1 514 412 4448, Fax +1 514 412 4341, Email pablo.ingelmo@mcgill.ca

Background and Aim: Chronic pain in pediatric populations presents a multifaceted challenge with biopsychosocial impact, requiring a multidisciplinary approach including psychological treatment. At our interdisciplinary pain center, the SARS-CoV-2 pandemic-related disruptions led to the cessation of cognitive-behavioral therapy (CBT) and other psychological interventions during the pandemic. The aim of this retrospective cohort study with secondary retrospective matched case–control analysis was to evaluate the impact of interruption of non-CBT psychological interventions, namely psychoanalysis and psychodynamic psychotherapy, on children and adolescents with chronic pain conditions during the SARS-CoV-2 pandemic.

Materials and Methods: We included pediatric patients with primary and secondary chronic pain conditions evaluated by our team during the SARS-CoV-2 pandemic. We excluded patients who did not receive psychological intervention when available, those with incomplete data on initial evaluation or follow-up, and those who received outside psychiatric care or individual or group CBT. The primary outcome was a Patients' Global Impression of Change (PGIC) score of 6–7. Secondary outcome measures were pain intensity, use of pain medication, sleep, physical function, school attendance, the incidence of suicidality, and the reason for end of treatment.

Results: The study included 146 patients, 77 who received non-CBT psychological interventions and 69 who did not receive any psychological interventions. We found no meaningful difference between the use of non-CBT psychological intervention and no treatment in the incidence of PGIC 6–7 points, pain intensity, school attendance, physical function, suicidality, and cause of end of treatment. Patients not receiving any psychological interventions were more likely to have normalized sleep at the end of treatment.

Conclusion: Non-CBT psychological interventions, namely psychoanalysis and psychodynamic psychotherapy, were not associated with meaningful benefits for children and adolescents with chronic pain during the COVID-19 pandemic. Patients who did not receive psychological interventions reported normalization of their sleep at the end of treatment compared to those who participated in non-CBT interventions.

Keywords: psychotherapy, adolescents, children, chronic pain, cognitive behavioral therapy

Introduction

Chronic pain in pediatric populations presents a multifaceted challenge, influenced by a spectrum of biological, psychological, and social factors.[1] The repercussions of chronic pain extend far beyond the physical realm, encompassing psychological, social, and educational domains.[2] Children with chronic pain often face diminished quality of life,

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heightened anxiety and depression, school avoidance, social isolation, disrupted sleep patterns, and a decreased propensity for physical activity.[3–6]

To address the multifaceted nature of pediatric chronic pain, the standard of care emphasizes a multidisciplinary approach.[7] Various psychological interventions have been investigated and are used in comprehensive multimodal treatment protocols. More distinctly psychological interventions include cognitive-behavioral therapy (CBT) and psychoeducation, with CBT being the most widely studied and one of the most effective psychological tools for managing pediatric chronic pain. Pain management strategies include relaxation techniques, self-hypnosis, and biofeedback. Finally, insomnia management addresses sleep as an important component of pain management and health optimization.[8–12] However, limited evidence supports using non-CBT psychological interventions in children and adolescents with chronic pain conditions, and the research landscape of such psychological interventions for pediatric chronic pain is fragmented and difficult to draw comparisons from due to often differing research parameters.

The emergence of the SARS-CoV-2 pandemic introduced unprecedented challenges, particularly in children and adolescents with chronic pain. During the pandemic, individuals grappling with chronic pain experienced exacerbated symptoms and heightened mental health burdens.[13] The Edwards Family Interdisciplinary Center for Complex Pain of the Montreal Children's Hospital in Canada (CCP) is a comprehensive tertiary pain center which treats approximately 500 children and adolescents per year with a variety of chronic pain conditions. The clinicians at the CCP accept patients with chronic pain, defined as persistent or recurrent pain for at least three months. Our program offers personalized multimodal outpatient treatments, including physiotherapy, psychology (CBT and non-CBT), family and social interventions, medications based on a quantitative sensory testing (QST)-guided personalized protocol, and interventional procedures.[14]

Our CBT and psychoeducation group program was mainly led by clinical psychology residents before the pandemic; at the beginning of the pandemic, the program was discontinued. In April 2022, the psychology staff who provided non-CBT interventions left the program. Between the beginning of the pandemic and April 2022, only non-CBT psychological interventions were provided: psychoanalysis and psychodynamic psychotherapy. We were unable to reestablish the CBT, psychoeducation, and non-CBT program until the end of the pandemic but suggested the use of online CBT tools WebMAP[15] and Petit BamBou[16] to patients. Clinical social workers were available during this time but provided psychoeducation to parents only.

The complete absence of psychologists during this time period presented a unique opportunity to evaluate the consequence of eliminating the remaining non-CBT psychological interventions as a standalone treatment modality within our interdisciplinary program. We hypothesize that the lack of non-CBT psychological interventions may negatively impact the clinical outcomes of children participating in our interdisciplinary chronic pain treatment program.

The primary objective of this study is to evaluate the impact of non-CBT psychological interventions, namely psychoanalysis and psychodynamic psychotherapy, on children and adolescents with chronic pain conditions during the SARS-CoV-2 pandemic. We designed a retrospective cohort study with secondary retrospective matched case–control analysis of pediatric chronic pain patients treated at the CCP.

Materials and Methods

Before starting recruitment, we obtained ethics approval from the Research Ethics Board of the McGill University Health Centre (2019–4887, 2019–4670). Patients at the CCP and their parents received an informed consent form before the multidisciplinary team's first evaluation. The patients and parents authorized the CCP team to access and review data prospectively collected from the CCP database or documented in the patient's electronic chart. All the data gathered from auto-evaluations, initial evaluations, and follow-ups were prospectively documented in the CCP's database and transferred to the patient's electronic chart. These procedures comply with the World Medical Association Declaration of Helsinki.[17]

Population

We included patients with chronic pain conditions evaluated by the CCP team from March 1, 2020, to April 1, 2023, who received non-CBT psychological interventions, namely psychoanalysis and psychodynamic psychotherapy, or those who did not receive any psychological interventions.

We excluded patients who did not receive psychological interventions when available; patients who received, at least once, individual or group CBT interventions (psychoeducation, acceptance and commitment therapy, relaxation, hypnosis, coping skills training, biofeedback, and narrative therapies); patients for whom psychological interventions were not indicated per initial multidisciplinary evaluation; patients who received any psychological care from a provider external to the CCP; patients who had incomplete data either at intake or at the end of treatment; and patients who received only an initial evaluation but for whom no treatment was indicated at the CCP.

Standard of Care at the CCP

The CCP treat patients with chronic primary pain and chronic secondary pain conditions. Chronic primary pain refers to

> pain in one or more anatomical regions that persists or recurs for longer than three months, is associated with significant emotional distress or functional disability, and cannot be better explained by another chronic pain condition.

On the other hand, chronic secondary pain syndromes are associated with other underlying diseases, where pain is initially considered a symptom. Both primary and secondary pain have many subtypes and can occur in many bodily regions.[1] The CCP receives consultations on chronic secondary pain more frequently than those of chronic primary pain.[14]

Standard of care at the CCP has been previously described[14] but includes a multidimensional in-depth initial interview by a multidisciplinary team, and creation by an interdisciplinary team of a multimodal treatment which includes offering WebMAP mobile and Petit BamBou, free downloadable CBT applications. This plan is discussed with patients and their caregivers using a shared decision-making framework.[7,18–20]

Various standardized measurements are used at this initial evaluation and on follow-up, including the Functional Disability Inventory (FDI) questionnaire,[21] Revised Child Anxiety and Depression Scale (RCADS) questionnaire,[22] Pittsburgh Sleep Quality Index (PSQI) questionnaire,[23] the Pain Catastrophizing Scale for Children (PCS-C),[24] the Douleur Neuropathique 4 Questions (DN4),[25] Quantitative Sensory Testing[26–29] for those of age nine and above, and Patient Global Impression of Change (PGIC) scale.[30]

Patients are followed up regularly with both quantitative and qualitative means until discharge, which occurs when they report a PGIC of 6 or 7 points. Patients are also discharged if (1) they turn 18 and are transferred to adult care, (2) they are transferred to another specialist, (3) they are lost to follow up, or (4) they fail to comply with treatment. Other factors leading to discharge include when the patient reports the combination of all of the following: (1) minimal or no pain, (2) ceasing to require medication, (3) regaining normal physical and psychological function, (4) reporting normal sleep patterns, and (5) normalizing their school attendance.

All aspects of treatment at the CCP are provided at no charge to the patient by Quebec's public health system (25%), and by the support of the Montreal Children's Hospital and of the Louis and Alan Edwards Foundation (75%).

Data Collection

We initially searched the CCP database for new patients admitted to the CCP program between March 1, 2020, and April 1, 2023. Four authors (LP, NM, AN, and OT) independently evaluated eligible patients' charts. The authors subsequently created a database, which contained baseline information, primary outcomes, and secondary outcomes. The authors manually examined the psychology team's reports to ascertain what type of psychological intervention each patient received during each session. Two authors (LGFF and PI) reviewed the study dataset to confirm data consistency and discussed potential inconsistencies with the data management team.

Outcome Variables

The primary outcome variable was the proportion of patients achieving a PGIC score of 6 or 7 points.

The secondary outcome variables included the proportion of patients not receiving medications; the proportion of patients reporting normal sleep, normal physical function, or normal school attendance; and the proportion of patients exhibiting suicidality — ie suicidal ideation with a plan, suicidal attempt, or admission due to suicidality. Secondary outcomes variables also included the number of visits to the emergency department due to pain, the pain intensity at the end of treatment, and the reasons for which patients were discharged from the program — including transfer to adult

care, transfer to another specialist, loss to follow-up, and noncompliance with treatment. Finally, we noted whether patients were still receiving services from the CCP at the end of data collection on April 1, 2023.

Statistical Analysis

We used descriptive statistics to summarize the data, and we used the function *prop.test()* of version 4.3.1 of the statistical programming software *R*[31] to generate a two-sided test of proportion, which can identify significant differences between intervention and non-intervention groups.[31] We then performed a secondary analysis. Using the package *survival*[32] for *R*, we analyzed the same outcomes with a conditional logistical regression, matching subjects on age at initial presentation (below 12 vs 12 and over) and primary vs secondary pain disorder. Subjects who had received non-CBT psychological intervention were matched 1:1 to those who did not, by separating them by age at initial presentation and primary vs secondary pain disorder, randomizing each group, and then matching them one by one and discarding any supernumerary subjects. A p-value of <0.05 was considered statistically significant in all analyses.

Results

Among the 334 eligible patients, we analyzed 146 patients, 77 received non-CBT psychological interventions, and 69 received no psychological intervention.

We excluded 77 patients without indication for psychological interventions, 28 patients receiving psychological care from a provider external to the CCP, 38 patients receiving individual or group CBT or psychoeducation, 35 patients who had incomplete data at the end of treatment, and 10 patients who received only an initial evaluation but no treatment at the CCP. A flowchart chart displaying these exclusions is shown in Figure 1.

There were no significant differences in the age (mean age 14 ± 4 vs 14 ± 3 years), gender (87% vs 84% female), and diagnosis type (25% vs 26% chronic primary pain, 75% vs 74% chronic secondary pain) between patients receiving non-CBT psychological intervention and those who did not received psychological interventions.

At baseline, the two groups were comparable in pain intensity, as well as in their FDI, RCADS, PSQI, and DN4 scores. However, patients who received non-CBT psychological interventions had significantly higherscores on the pain catastrophizing scale (PCS-C) (Table 1).

Primary Outcome Measures

There was no significant difference in the proportion of patients reporting a PGIC of 6 or 7 points between children receiving non-CBT psychological intervention and those not receiving psychological interventions. Twenty patients (29%) not receiving psychological intervention reported a PGIC of 6–7 points compared with 27 patients (35%) of those receiving non-CBT psychological intervention (Table 2).

Six patients (32%) with primary pain conditions who did not receive psychological intervention reported a PGIC score of 6–7 compared with two patients (11%) who received non-CBT psychological interventions. Twenty-one patients (36%) with secondary pain conditions, who did not receive psychological intervention reported a PGIC score of 6–7 compared with 18 (35%) patients who received non-CBT intervention obtained a PGIC score of 6–7.

Secondary Outcomes

There were no significant differences between the two groups in the proportions of patients without pain, with normal school attendance, normal physical function, or not taking medications. However, patients who did not receive psychological interventions had a statistically significant higher likelihood of normalizing their sleep compared to those receiving non-CBT interventions (Table 3).

There were no differences between the groups regarding the pain intensity at the end of the treatment or regarding the reason for leaving the program. Compared to baseline data, both groups exhibited a meaningful reduction in the proportion of patients consulting and in the number of consults to the emergency department (Table 3).

Eight patients (6%), four in each group (95% CI, −7 to 8) reported suicidal attempts or were admitted due to suicidality.

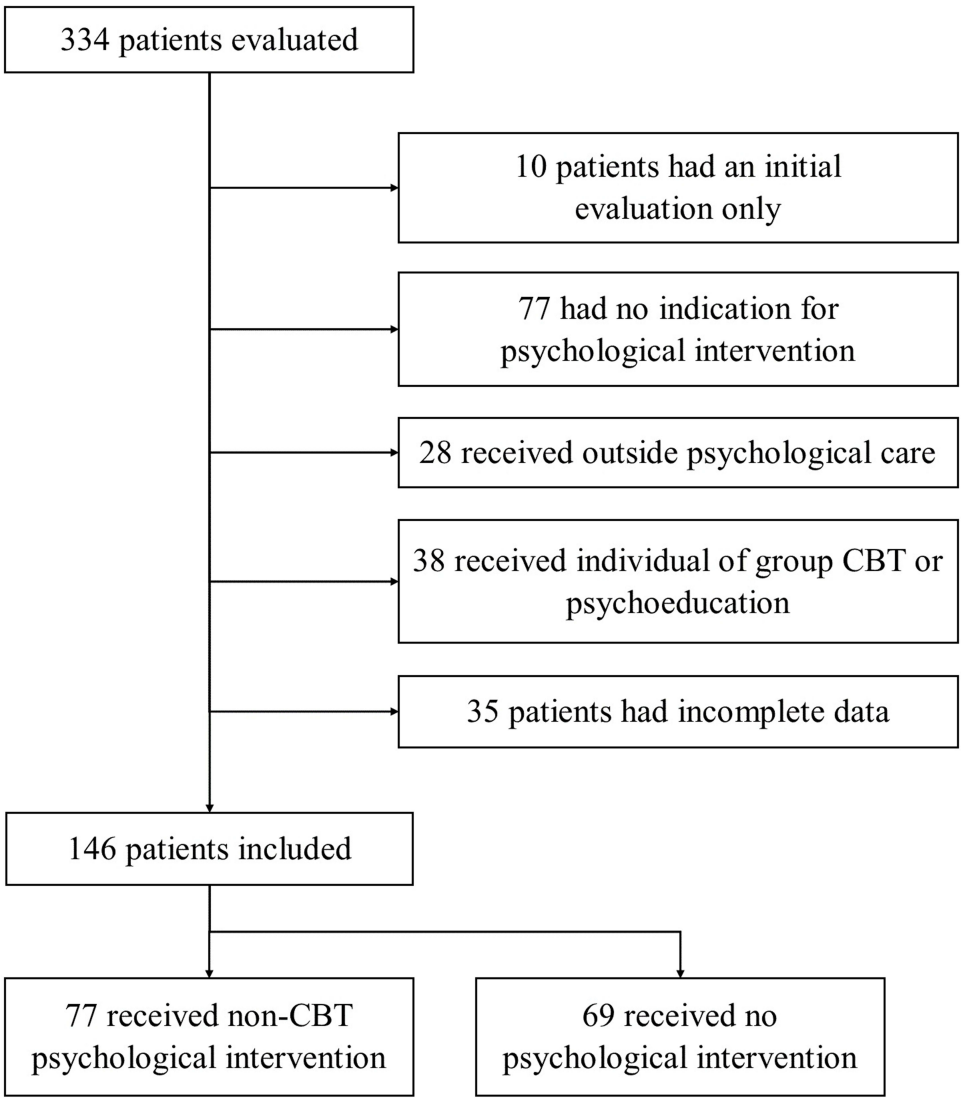

Figure 1 Flow chart of patients included and excluded.

We conducted an analysis using conditional logistic regression, which matched patients on diagnosis and on age at entry to the CCP program (<12 vs 12 and over) (Table 4). This analysis showed no association between non-CBT psychological intervention and discharge from the program (OR 0.67, 95% CI 0.11–4.00, p=0.66), and it showed no

Table 1 Clinical Characteristics at First Evaluation by the CCP

	No Psychological Intervention (n=69)	Non-CBT Psychological Intervention (n=77)
Functional Disability Index (FDI)		
0–12	24 (35%)	22 (29%)
13–20	21 (30%)	17 (22%)
21–29	17 (25%)	25 (33%)
>30	7 (10%)	11 (14%)
Unknown	0 (0%)	1 (1%)

(*Continued*)

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Table 1 (Continued).

	No Psychological Intervention (n=69)	Non-CBT Psychological Intervention (n=77)
Revised Children's Anxiety and Depression Scale (RCADS) – Separation Anxiety		
0–64	43 (61%)	40 (52%)
65–70	18 (25%)	17 (22%)
>70	9 (13%)	20 (26%)
Revised Children's Anxiety and Depression Scale (RCADS) – General Anxiety		
0–64	68 (99%)	75 (97%)
65–70	0	1 (1%)
>70	1 (1%)	1 (1%)
Revised Children's Anxiety and Depression Scale (RCADS) – Panic		
0–64	55 (80%)	58 (75%)
65–70	8 (12%)	9 (12%)
>70	6 (9%)	10 (13%)
Revised Children's Anxiety and Depression Scale (RCADS) – Social Phobia		
0–64	68 (99%)	77 (100%)
65–70	1 (1%)	0
>70	0	0
Revised Children's Anxiety and Depression Scale (RCADS) – Obsession		
0–64	66 (96%)	71 (92%)
65–70	1 (1%)	3 (4%)
>70	2 (3%)	3 (4%)
Revised Children's Anxiety and Depression Scale (RCADS) - Depression		
0–64	56 (81%)	50 (65%)
65–70	10 (14%)	13 (17%)
>70	3 (4%)	13 (17%)
Unknown	0	1 (1%)
Philadelphia Sleep Quality Index (PSQI)		
0–5	15 (22%)	9 (12%)
>5	54 (78%)	68 (88%)
Pain Catastrophizing Scale for Children (PCS-C)		
0–30	43 (62%)	34 (44%)
>30	26 (38%)	43 (56%)*

(*Continued*)

Table 1 (Continued).

	No Psychological Intervention (n=69)	Non-CBT Psychological Intervention (n=77)
Douleur Neuropathique 4 Questions (DN4)		
0–3	40 (58%)	41 (53%)
≥4	23 (33%)	34 (44%)
Unknown	6 (9%)	2 (3%)
Pain Intensity		
Pain at Rest (mean, SD)	5.0 (2.5)	4.4 (3.2)
Pain with Activity (mean, SD)	7.1 (2.6)	6.2 (3.6)
Worst Pain (mean, SD)	8.1 (1.4)	8.6 (1.3)
Emergency Department (ED) Visits		
Patients with ED Visits pre-CCP	48 (70%)	54 (70%)
Mean Number of ED visits pre-CCP (SD)	4 (4)	3 (4)

Notes: Data are expressed number of patients and percentage (%). Age, pain intensity and number of visits to the emergency department are mean and standard deviation (SD). (*) <0.05.

Table 2 Patient Global Impression of Change (PGIC) at the End of Treatment

PGIC scores	No Psychological Intervention (%)	Non-CBT Psychological Intervention (%)	Difference (95% CI)
No Change or Condition Has Gotten Worse	12 (17)	17 (22)	−5 (−19 to 10)
Almost the Same, Hardly Any Change at All	17 (25)	12 (16)	9 (−5 to 23)
A Little Better, but No Noticeable Change	9 (13)	8 (10)	3 (−10 to 14)
Somewhat Better, but the Change Has Not Made any Real Difference	0 (0)	1 (1)	0 (0)
Moderately Better, and a Slight but Noticeable Change	8 (12)	9 (12)	0 (−11 to 10)
Better, and a Definite Improvement that has made a Real and Worthwhile Difference	10 (14)	20 (26)	−11 (−26 to 27)
A Great Deal Better, and a Considerable Improvement that has Made all the Difference	10 (14)	7 (9)	5 (−6 to 17)
Unknown	3 (4)	3 (4)	0 (−6 to 7)

Notes: Data are the number of patients, percentage (%), difference and 95% confidence interval of the difference (95% CI).

association with any level of PGIC improvement or deterioration. We found no association with the transfer to adult care (OR 0.8, 95% CI 0.22–2.98, p=0.74) or suicidality (OR 2.0, 95% CI 0.37–10.92, p=0.42).

We found an association between not receiving psychological interventions and improvements on sleep (OR 0.425, 95% CI 0.196–0.920, p-value=0.03).

Table 3 Secondary Outcomes at Discharge or at the End of the Planned Analysis

Secondary outcomes	No Psychological Intervention (%)	Non-CBT Psychological Intervention (%)	Difference (95% CI)
No Medications	21 (30)	25 (33)	−2 (−18 to 14)
No Pain	11 (16)	23 (30)	−14 (−29 to 1)
Normal Sleep	45 (65)	35 (45)	20 (3 to 37)*
Normal School	49 (71)	52 (68)	3 (−13 to 20)
Normal Physical Function	41 (59)	36 (47)	13 (−5 to 30)
Pain Intensity			
Pain at Rest (mean, SD)	4.2 (2.7)	4.5 (3.0)	NA
Pain with Activity (mean, SD)	5.0 (2.6)	5.2 (3.2)	NA
Worst Pain (mean, SD)	6.3 (2.7)	6.5 (3.2)	NA
End of treatment			
Still Undergoing Treatment	32 (46)	25 (32)	14 (−3 to 31)
Discharge with meaningful clinical improvements	23 (33)	30 (39)	−6 (−23 to 11)
Transferred to Adults	5 (7)	8 (10)	−3 (−14 to 7)
Transferred to Another Clinic, Institution, or Specialist	0 (0)	3 (4)	−4 (−10 to 2)
Noncompliant or Lost to Follow-up	9 (13)	11 (14)	−1 (−10 to 15)
Emergency Department (ED) Visits while under treatment at the CCP			
Patients with ED visits	16 (26)	29 (36)	−14 (−30 to 2)
Mean number of ED visits (SD)	1 (1)	1 (1)	NA

Notes: Data are the number of patients, percentage (%), difference and 95% confidence interval of the difference (CI95%). Continuous data is presented as mean and standard deviation (SD). (*) $p < 0.05$.

Table 4 Univariate Odds Ratios of the Impact of Non-CBT Psychological Intervention on Pediatric Chronic Pain Treatment Outcomes Calculated Using Conditional Logistic Regression with Patients Matched by Age at Entry to CCP Program <12 Vs 12 and Over and Primary vs Secondary Pain

Outcome	Odds Ratio (95% CI)	p-value
No medications	0.855 (0.488–1.497)	0.583
No pain	2.078 (0.936–4.615)	0.072
Normal sleep	0.425 (0.196–0.920)	0.030
Normal school participation	0.686 (0.368–1.281)	0.237
Normal physical function	0.557 (0296–1.049)	0.070
PGIC 6–7	0.950 (0.506–1.782)	0.873

(*Continued*)

Table 4 (Continued).

Outcome	Odds Ratio (95% CI)	p-value
Noncompliant or lost to follow-up	1.614 (0.755–3.451)	0.217
Transferred to adults	1.250 (0.336–4.665)	0.739
Emergency Department Visits post initial evaluation by CCP	0.915 (0.709–1.181)	0.496
Suicidality	0.667 (0.111–3.990)	0.657

Discussion

We examined the impact of withdrawing non-CBT psychological interventions, namely psychoanalysis and psychodynamic psychotherapy, from an interdisciplinary program for children and adolescents with chronic pain during the COVID-19 pandemic using a retrospective matched case–control analysis. Contrary to our initial hypothesis, patients not receiving psychological interventions reported similar clinical outcomes of those receiving non-CBT psychological interventions. Moreover, patients who did not receive psychological interventions reported normalization of sleep at the end of their treatments independently of the pain diagnosis or of the age.

Notably, only 32% of patients included in this study reported PGIC scores of 6–7, which represents a 50% reduction in the proportion of patients achieving meaningful outcomes compared with a previous series of our group. Ocay DD et al analyzed a similar population, assisted by the same team and receiving CBT before the pandemic.[14] In that study, up to 75% of patients receiving CBT and non-CBT interventions as part of an interdisciplinary pain treatment program reported PGIC scores of 6–7. The proportion of patients achieving meaningful clinical outcomes following the completion of their treatment (medications, physiotherapy, psychology, nursing, social work, and/or interventional procedures) was lower in patients with nociplastic pain (62%) compared to those without nociplastic pain (86%). The proportion of patients with primary and secondary pain conditions was similar in both reports.[14] Our study found a similar reduction in the number of consults to the emergency department in patients receiving and not receiving psychological interventions, suggesting that interdisciplinary care can reduce the incidence of emergency service visits and replicating previous results,[33] even in the absence of psychological intervention.

The poorer clinical outcomes compared with our previous report of our group can be attributed to several factors, including the effects of the pandemic and the lack of CBT psychological interventions or the combination of CBT and non-CBT interventions. The SARS-CoV-2 pandemic resulted in increased pain severity and mental health challenges among youth with chronic pain. The disruptions to regular healthcare services, social isolation, and heightened anxiety associated with the pandemic have significantly contributed to these adverse outcomes.[13] Consequently, the stressors and healthcare barriers induced by the pandemic may have diminished any potential effect of non-CBT interventions.

Data on the effects of non-CBT psychological interventions such as psychoanalysis and psychodynamic psychotherapy in children and adolescents with chronic pain conditions are lacking. Psychoanalytic treatments are usually long term, and data on their effects on pain reduction, medication usage, and social performance in pediatric populations with chronic pain are almost non-existent. Shorter courses of psychodynamic therapy have been used as part of multidisciplinary approaches. Some case reports suggest improvements in coping mechanisms, reduction in pain-related distress, and enhanced social functioning in adult populations.[34–36] Their role in the treatment of children with chronic pain conditions, as well as any risks and complications, remains unclear.

Contrary to our findings for non-CBT psychological interventions, CBT itself is a well-validated treatment for chronic pain, shown to have significant efficacy across various pain conditions.[8–12,37,38] Additional advantages of CBT include its flexibility in terms of accessibility, methods, and the range of professionals who can administer or oversee the treatment. This is particularly crucial when there is a shortage of trained pain psychologists to deliver psychological care for pediatric chronic pain.[7,39]

CBT can also be delivered remotely, and idea which has gained traction during the SARS-CoV-2 pandemic and due to technological advancements.[40,41] The internet-based WebMAP CBT tool produced small effect sizes in reducing disability up to 12 months post-treatment compared to Internet-based Pain Education. Enhanced sleep quality and higher pre-treatment pain intensity were associated with greater improvement in disability across various treatment groups.[42] Moreover, the individual characteristics of patients and parents affect both engagement with such digital tools and clinical outcomes. Murray et al suggested that younger adolescents (ages 11–14) and those with less distressed parents benefit more from internet-delivered CBT, whereas older adolescents (ages 15–17) and those with more distressed parents may require different treatments.[42] Patient and parent engagement poses a challenge in digital interventions where over 50% of patients are non-adherent.[43]

Our findings suggest that non-CBT psychological interventions, namely psychoanalysis and psychodynamic psychotherapy, performed similarly to no treatment in children with chronic pain conditions during the SARS-CoV-2 pandemic. These therapeutic modalities encompass a plethora of approaches, each with its unique methodologies and theoretical underpinnings. The heterogeneity of techniques within psychoanalytic therapy complicates the task of conducting a transparent and rigorous assessment of the risks and benefits associated with their use in clinical settings.

A pivotal factor in the success of such treatments lies in the interaction between the therapist's and patient's conditions, with the psychoanalytic therapy being intimately dependent on these variables. The unprecedented emergence of the SARS-CoV-2 pandemic thrust many treatments into isolation conditions, raising the question of whether these circumstances have prompted alterations in the characteristics of treatments previously offered. Furthermore, the manner in which non-CBT treatments draw to a close significantly influences their effectiveness and the psychological wellbeing of patients. As suggested by Strean's reference to Blos's seminal work on adolescence, an abrupt termination of treatment can amplify separation anxieties and trigger feelings of abandonment.[44] Such an abrupt conclusion could be consequential if precipitated by the therapist's unanticipated absence or their transfer to adult care, underlining the necessity of a considered and gradual process of termination.

More research is urgently needed to assess the short- and long-term impacts and the cost–benefit analysis of non-CBT interventions on pain and health outcomes of children with chronic pain diagnoses. Without a thorough understanding and empirical support for these treatments' methodologies and outcomes, the deployment of psychoanalytic therapy in such a vulnerable cohort remains an exercise fraught with uncertainties, especially where resources could be redirected to more evidence-based interventions.

While non-CBT psychological interventions were not efficacious in our cohort, they have shown benefit in some specific populations, such as those with comorbid primary psychological disorders or recovering from chronic pain. Evidence shows an overlap between chronic pain and psychological disorders, such as depression, in children and adolescents.[45–47] Moreover, it is estimated that up to 20% of adolescents with chronic pain also have a history or current diagnosis of a primary psychological disorder.[45] A national study of adolescents with chronic pain and diagnosed anxiety revealed that these adolescents were more likely to develop psychological disorders prior to the onset of chronic pain rather than afterwards.[48] Children recovered from chronic pain conditions after intensive pain rehabilitation frequently exhibit poorer physical and mental health and need more frequent healthcare services compared to peers in early adulthood. This underscores the importance of early specialized psychological intervention due to the long-term negative impacts of childhood chronic pain.[49]

Other patient demographic factors and pain mechanisms have been shown to impact the efficacy of psychological interventions. Ocay et al identified three psychosocial profiles categorized by level of distress and disability among pediatric chronic musculoskeletal pain patients, which correlated significantly with somatosensory characteristics: patients with nociplastic pain experienced more intense panic disorder, more acute social phobia, and worse sleep quality than those with non-nociplastic pain.[26] Widespread pain, often linked to altered brain function, is associated with negative outcomes such as pain interference, pain catastrophizing, fatigue, anxiety, and depression.[50] Walker et al investigated if different patient subgroups, categorized by level of pain and adaptivity vs dysfunction, affected the responses to cognitive-behavioral therapy (CBT) in adolescents with functional abdominal pain and their parents.[51] Provision of CBT or pain education was seen to have a significant and differential impact by subgroup on GI symptoms

and abdominal pain. These findings suggest that categorizing by psychosocial and nociceptive profiles could provide consistency in the type of treatment needed and enhance treatment effectiveness.[52]

Finally, older adolescents (ages 15–17) constitute the group with the greatest proportion of non-responders to treatment 12 months after discharge from intensive pediatric pain rehabilitation programs. This demographic is often more difficult to treat because they usually experience severe pain for an extended period before seeking specialized care.[53,54] Older adolescents may form entrenched cognitive patterns and behaviors that perpetuate their pain and disability. It is crucial to identify patients who might have poor outcomes with CBT and may require alternative psychological treatments.[43]

Strengths

There are four principal strengths in this study's methodology. First, this study utilized a matched case–control component to enhance its ability to control for confounding variables by matching patients based on age at initial presentation (<12 years vs 12 years and over) and primary vs secondary pain disorders. This approach significantly reinforced the causal inferences that can be drawn. The effectiveness of this method is exemplified by the homogeneity in the baseline characteristics of cases and controls.

Second, the study used standardized clinical questionnaires, such as the FDI, PSQI, RCADS, and PCS. These questionnaires ensure consistent and reliable outcome measurement, enabling robust within-cohort comparisons and facilitating external comparability with other research.

Third, we used the PGIC to evaluate patients' general perception of improvement and other aspects of global well-being. The PGIC is an appropriate metric for children with chronic pain conditions due to its clinical utility, common usage in clinical trials for chronic pain outcomes, and ease of use. The PGIC scale assesses changes in a patient's life following single or multiple interventions. Patients assess the difference between their current and previous health status based on a Likert (numerical rating) scale. Likert scales offer various benefits in clinical practice: they are easy to use for patients and clinicians, and they minimally burden patients.[55]

Fourth, this study provided a unique opportunity to empirically evaluate the efficacy of non-CBT psychological interventions during the COVID-19 pandemic. The study also offered valuable insights into the potential benefits of non-CBT psychological interventions within the interdisciplinary services offered at the CCP.

Limitations

Our study employs a retrospective cohort design complemented by a matched case–control analysis within the pediatric chronic pain patient population at the CCP. This design encounters several limitations that merit consideration. Firstly, the study's retrospective nature constrains data completeness and accuracy because it relies on previously collected information without the possibility of influencing data collection methods or addressing potential gaps retrospectively. However, patient-reported outcome measures were prospectively collected from the patients themselves using an internet-based platform. These measures were then automatically sent to the patients' charts prior to each encounter with the CCP team.

Another notable limitation is the study's reliance on a relatively small sample size, which may introduce bias, impact the statistical power of our findings, and limit the generalizability of our results in larger pediatric chronic pain populations. A post-hoc analysis of statistical power using the *powerSurvEpi*[56] package for the statistical programming language *R* confirmed that the sample size used in this analysis leads to an underpowered study, which would be adequate only for OR below 0.3 and above 3.3. However, the study is unique because it reflects a special situation (interruption of psychological services) in a particular moment (during the COVID-19 pandemic) that cannot be easily or ethically duplicated.

The exclusion criteria in our study further complicate the interpretation of results. Specifically, we excluded patients who did not complete follow-up questionnaires or were deemed unsuitable for receiving psychological interventions or services by the CCP. This approach potentially introduces selection bias by omitting a subset of patients who may exhibit poorer outcomes or distinct experiences from those included in the study. Such exclusion might skew the study findings towards patients with better engagement or outcomes, overlooking the full spectrum of patient experiences and responses

to treatment. However, while various options exist to address missing data beyond exclusion of subjects, these may in turn introduce biases of their own.

Another limitation arises from the decision to include only patients accessing the complex pain service after the onset of the COVID-19 pandemic, with an arbitrary cutoff date based on the disruption in the accessibility of psychological care at our clinic. This cutoff may not accurately reflect the nuanced and varied impact of the pandemic on healthcare services and patient access to psychological interventions. Indeed, it is difficult to validate the assumption that patients beyond this date did not receive psychological interventions, even if deemed necessary. This assumption introduces an element of uncertainty regarding the comprehensive care received by study participants. The fact that we encouraged use of the WebMAP and Petit BamBou digital CBT platforms when CBT interventions had been discontinued exemplifies this uncertainty, but actual usage of this platform by patients, as well as its efficacy with respect to in-person CBT, is unclear especially in light of challenges in engagement with such digital tools.[43]

These limitations underscore the need for cautious interpretation of our findings, and acknowledgement of their exploratory nature. Future research should aim to address these constraints through prospective study designs, larger and more diverse sample sizes, and more nuanced approaches to understanding the impacts of healthcare service disruptions on patient care and outcomes.

Conclusion

Our study, conducted in a center for pediatric complex pain during the COVID-19 pandemic, did not observe significant differences in outcomes between pediatric chronic pain patients receiving non-CBT psychological intervention, namely psychoanalysis and psychodynamic psychotherapy, and those not receiving psychological intervention. The disappointing clinical outcomes observed among children with chronic pain receiving non-CBT psychological interventions or no psychological interventions during the pandemic can be attributed to the compounded effects of pandemic-related stressors and the limited efficacy of non-CBT interventions. These findings underscore the need to employ evidence-based treatments like CBT to help children and adolescents with chronic pain conditions.

Abbreviations

CBT, Cognitive-Behavioral Therapy; CCP, Edwards Family Interdisciplinary Center for Complex Pain; DN4, Douleur Neuropathique 4 Questions; FDI, Functional Disability Inventory; IOFS, Impact on Family Scale; PCS-C, Pain Catastrophizing Scale for Children; PCS-P, Pain Catastrophizing Scale for Parents; PGIC, Patient's Global Impression of Change; PSQI, Philadelphia Sleep Quality Index; QST, Quantitative Sensory Testing; RCADS, Revised Children's Anxiety and Depression Scale; SD, standard deviation.

Data Sharing Statement

The data used in this study are available on request to the authors.

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Disclosure

The authors have no conflicts of interest to disclose.

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