



Adverse childhood experiences in parents of youth with chronic pain: prevalence and comparison with a community-based sample

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Abstract

Introduction: Adverse childhood experiences (ACEs) are common occurrences that are related to poor health outcomes, including chronic pain, in youth and adults. Research suggests that children of parents exposed to ACEs are also at risk of poor outcomes. However, little is known about the risk that ACEs confer for chronic pain across generations. Parent ACEs may play an important role in pediatric chronic pain, given their association with key parent factors (eg, mental and physical health).

Objectives: This study evaluated the prevalence of ACEs in parents of youth with chronic pain and compared these rates to a community-based sample.

Methods: One hundred seventy parents of youth (aged 10–18 years) with chronic pain, recruited from a tertiary-level chronic pain program at a pediatric hospital in Canada, completed a self-report measure of ACEs. A comparison sample (n = 3914) was drawn from a local, community-based study that examined ACEs among adults in primary care.

Results: Among parents of youth with chronic pain, 67.6% reported ≥ 1 ACE and 23.5% reported ≥ 4 ACEs. Controlling for sociodemographic factors, ACEs were similar across samples, except parents of youth with chronic pain reported significantly higher rates of physical neglect (odds ratio = 2.14; 95% confidence interval = 1.35–3.40) than the community-based sample.

Conclusion: Adverse childhood experiences are prevalent among parents of youth with chronic pain, with physical neglect reported more frequently than the community-based sample. Further research that examines the association between parent ACEs and child chronic pain, as well as neurobiological and psychosocial factors that may mediate this potential relation, is needed.

Keywords: ACEs, Childhood maltreatment, Household dysfunction, Chronic pain, Pediatric pain, Intergenerational

1. Introduction

Parents play an important role in children's chronic pain experience. The impact of parenting behaviors on the functioning of youth with chronic pain is well-established,¹⁶ and research suggests parents' mental health and physical health are also related to children's chronic pain outcomes.^{10,12,19,26,32,42,47} However, adverse childhood experiences (ACEs) among parents of youth with chronic pain have not been examined.

Adverse childhood experiences (abuse, neglect, and household dysfunction during childhood) can be associated with mental and

physical health conditions in a dose–response fashion, with higher numbers (eg, ≥ 4) conferring greater risk of poor outcomes.^{1,20,28,30} Individual ACEs and total ACE scores are related to the occurrence and severity of chronic pain in individuals.^{3,13,29,35,39,43,44,52} However, little is known about the risk that ACEs confer for chronic pain across generations. Research on the intergenerational impact of ACEs, which focuses on associations between parent ACEs and children's health, development, and functioning, has found continuity in risk of poor outcomes.^{33,34,36,46,50,55,58} Thus, parent ACEs may contribute to chronic pain in youth, especially given their

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association with parent factors (eg, mental and physical health) that are implicated in pediatric chronic pain.^{4,14,16,26,42,46}

Adverse childhood experiences are common in community-based samples, with 64% of adults in the Centers for Disease Control and Prevention-Kaiser ACE Study reporting ≥ 1 ACE and 12.5% reporting ≥ 4 ACEs.¹¹ ACEs are more prevalent among individuals with chronic pain. In 1 study, 84% of women with chronic pain reported ≥ 1 ACE and 44.5% reported ≥ 4 ACEs.¹⁴ Another study found 81.6% of youth with chronic pain reported ≥ 1 ACE and 23.4% reported ≥ 3 ACEs.³⁹ This brief report was the first to evaluate the prevalence of ACEs among parents of youth with chronic pain and compare these rates with a community-based sample. We hypothesized that ACEs would be more prevalent among parents of youth with chronic pain than adults from the community.

2. Methods

2.1. Participants and procedure

Parents of youth with chronic pain were recruited from a tertiary-level chronic pain program at a pediatric hospital in Calgary,

Canada. The current aims are distinct from previous studies that used data from the larger study.^{40,41,45} Study procedures were approved by the institution's health research ethics board and are described in detail elsewhere.^{40,41,45}

Parents were eligible to participate if they were the legal guardian of a child (aged 10–18 years) with ongoing chronic pain (pain lasting ≥ 3 months), could speak/read English, and had Internet access. Informed consent was obtained through telephone and online consent forms. Parents completed self-report measures online in REDCap.^{24,25} Data were collected between February 2017 and May 2020. Parents who did not complete the ACE Questionnaire ($n = 9$) were excluded. To be consistent with the comparison sample, parents who indicated "other" as their gender ($n = 1$) were also excluded. The final parent sample included 170 participants.

The comparison sample ($n = 3914$) was drawn from a community-based study examining ACEs and health conditions among adults attending primary care clinics in Calgary.¹⁵

Table 1

Sociodemographic characteristics of the parent sample (N = 170) and comparison sample (N = 3914).

Sociodemographic variable	Parent sample		Comparison sample		P
	n	M or %	n	M or %	
Age, y (M, SD)	—	45.10 (5.34)	—	44.18 (17.01)	0.070
Gender					<0.001
Female	155	91.2	2673	68.3	
Male	15	8.8	1241	31.7	
Race/ethnicity					0.436
White/Anglo-American	144	84.7	3235	82.7	
Biracial/multiracial	10	5.9	—	—	
Latin American	4	2.4	—	—	
Asian	—	—	284	7.3	
Arab/West Asian	3	1.8	—	—	
South Asian	2	1.2	103	2.6	
Chinese	1	0.6	—	—	
Filipino	1	0.6	—	—	
Aboriginal/First Nations	1	0.6	34	0.9	
Black/African American	1	0.6	38	1.0	
Other	2	1.2	208	5.3	
Did not answer	1	0.6	12	0.3	
Marital status					<0.001
Married or cohabitating	136	80.0	2506	64.0	
Divorced, separated, or widowed	28	16.5	507	13.0	
Single or never married	6	3.5	891	22.8	
Did not answer	—	—	10	0.2	
Relationship to child					—
Biological	166	97.6	—	—	
Adoptive	3	1.8	—	—	
Did not answer	1	0.6	—	—	
Education					0.024
High school or less	19	11.2	800	20.4	
Some training, college, or university (no degree)	38	22.4	871	22.3	
College diploma or undergraduate degree	93	54.7	1840	47.0	
Graduate or professional degree	20	11.8	397	10.1	
Did not answer	—	—	6	0.2	
Employment status					0.001
Full-time	88	51.8	1821	46.5	
Part-time	49	28.8	831	21.2	
Not working or retired	32	18.8	1250	31.9	
Did not answer	1	0.6	12	0.3	
Annual household income, CAD					<0.001
\leq \$59,999	27	15.9	1418	36.2	
\geq \$60,000	120	70.6	2419	61.8	
Did not answer	23	13.5	77	2.0	

Because of low cell counts, the χ^2 test for race/ethnicity compared White/Anglo-American with the combination of all other race/ethnicity categories. The other comparison analyses included the listed categories except "did not answer."

2.2. Measures

2.2.1. Sociodemographic information

Participants reported their age, gender, race/ethnicity, marital status, relationship to child, education, employment status, and annual household income.

2.2.2. Adverse childhood experiences

The 28-item ACE Questionnaire, adapted from existing measures^{8,54,59} for the ACE Study,²⁰ was administered to assess exposure to ACEs (emotional, physical and sexual abuse, emotional and physical neglect, and 5 types of household dysfunction) during the first 18 years of life (see Supplemental Digital Content 1, available at <http://links.lww.com/PR9/A85>). Adverse childhood experience categories are assessed with 1 or more items, which are rated on dichotomous or 5-point Likert-type scales. If at least 1 item of the category was reported, the ACE was coded as present. Total scores were obtained by summing responses to the relevant categories. Higher scores indicate exposure to more ACEs. This measure has demonstrated good psychometric properties,^{17,22,23,38} and factor analytic studies support the subdomains of maltreatment and household dysfunction.^{22,38}

2.3. Data analysis

Statistical analyses were performed in SPSS (version 24). Descriptive statistics characterized the samples. Differences between samples on sociodemographic variables were examined using *t* (continuous variables) or χ^2 (categorical variables) tests. Variables that were significantly different between samples were included as covariates in analyses. To compare samples on ACEs, analyses of (co)variance (continuous variables) and logistic regressions (categorical variables) were conducted.

3. Results

The parent and comparison samples were similar on age and race/ethnicity but differed on gender, marital status, education, employment status, and household income (Table 1). Parents were more likely to be female, married/cohabitating, college or university educated, employed, and less likely to report a household income \leq \$59,999. Health characteristics of the parent sample are reported in Supplemental Digital Content 2 (available at <http://links.lww.com/PR9/A85>).

Prevalence rates of ACEs are reported in Tables 2 and 3. More than two-thirds (67.6%) of the parent sample reported ≥ 1 ACE and 23.5% reported ≥ 4 ACEs. Their average ACE score was 2.05/10, and their most frequently reported ACEs were types of household dysfunction: household mental illness (35.9%), parent separation/divorce (31.8%), and problematic substance use in the household (31.8%). Maltreatment was also frequently reported, with 26.5% of parents reporting sexual abuse and 24.7% reporting emotional abuse. Overall, 45.3% of parents reported ≥ 1 experience of maltreatment and 57.6% reported ≥ 1 household dysfunction.

In unadjusted analyses, the parent sample reported significantly higher rates of physical neglect (odds ratio [OR] = 1.80; 95% confidence interval [CI] = 1.18–2.75) and parent separation/divorce (OR = 1.40; 95% CI = 1.01–1.95) than the comparison sample, whereas the comparison sample reported significantly higher rates of household mental illness (OR = 0.68; 95% CI = 0.49–0.93) than the parent sample. In adjusted analyses, only

Table 2

Prevalence rates of total ACEs, experiences of maltreatment, and household dysfunction in parents of youth with chronic pain (N = 170) and the comparison sample (N = 3914).

Variable	Parent sample		Comparison sample	
	n	%	n	%
Total ACE score				
0	55	32.4	1115	28.5
1	38	22.4	906	23.1
2	26	15.3	614	15.7
3	11	6.5	439	11.2
4	13	7.6	290	7.4
5	10	5.9	160	4.1
6	8	4.7	129	3.3
7	2	1.2	88	2.2
8	3	1.8	67	1.7
9	2	1.2	29	0.7
10	2	1.2	10	0.3
Total experiences of maltreatment				
0	93	54.7	2187	55.9
1	44	25.9	839	21.4
2	10	5.9	419	10.7
3	7	4.1	223	5.7
4	12	7.1	123	3.1
5	4	2.4	56	1.4
Total household dysfunction				
0	72	42.4	1455	37.2
1	41	24.1	1113	28.4
2	29	17.1	637	16.3
3	19	11.2	377	9.6
4	5	2.9	193	4.9
5	4	2.4	58	1.5

ACE, adverse childhood experience.

rates of physical neglect were significantly different between samples (OR = 2.14; 95% CI = 1.35–3.40). Total ACE scores were similar across samples in unadjusted, $F(1, 4015) = 0.10, P > 0.05$, and adjusted, $F(1, 3887) = 0.98, P > 0.05$, analyses.

4. Discussion

This study found that ACEs were common among parents of youth with chronic pain, with 67.6% reporting ≥ 1 ACE and 23.5% reporting ≥ 4 ACEs. The prevalence of ACEs in these parents was similar to a community-based sample from the same city, except for physical neglect, which was more prevalent among parents. This finding is consistent with previous ACE research showing unique associations between physical neglect and chronic pain^{52,57} and may reflect the high rates of chronic pain observed in parents of youth with chronic pain.^{10,53} The community-based sample comprised adults attending primary care clinics for various issues and was thus treatment-seeking. Given associations between ACEs and poor health, treatment-seeking adults may be more likely to report ACEs than adults not attending medical appointments. Future research should compare the prevalence of ACEs in parents of youth with chronic pain with other community-based samples (eg, parents of youth without chronic pain, non-treatment-seeking adults).

Further research examining the relation between parent ACEs and child chronic pain, as well as factors that may mediate this potential relation, is needed. Although speculative, parent ACEs may impact parents' health which could, in turn, increase children's risk of chronic pain through parent (eg, chronic pain) and child (eg, depressive symptoms) risk factors.^{18,26,27} To the best of our knowledge, only 1 study has examined parent ACEs in

Table 3**Comparison of prevalence rates of ACEs between parents of youth with chronic pain (N = 170) and the comparison sample (N = 3914).**

ACE score/category	Parent sample		Comparison sample		Logistic regression results	
	n	M or %	n	M or %	OR (95% CI)	aOR† (95% CI)
Total ACE score, of 10 (M, SD)	—	2.05 (2.34)	—	2.00 (2.11)	—	—
≥ 1 ACE	115	67.6	2732	69.8	0.85 (0.61–1.19)	0.85 (0.59–1.21)
Maltreatment categories						
≥ 1 experience maltreatment	77	45.3	1660	42.4	1.09 (0.80–1.49)	1.15 (0.83–1.62)
Emotional abuse	42	24.7	1115	28.5	0.81 (0.57–1.15)	0.95 (0.65–1.38)
Physical abuse	11	6.5	279	7.1	0.89 (0.47–1.65)	1.05 (0.54–2.03)
Sexual abuse	45	26.5	794	20.3	1.38 (0.97–1.96)	1.30 (0.89–1.90)
Emotional neglect	28	16.5	566	14.5	1.14 (0.75–1.72)	1.45 (0.94–2.25)
Physical neglect	27	15.9	364	9.3	1.80 (1.18–2.75)**	2.14 (1.35–3.40)**
Household dysfunction categories						
≥ 1 household dysfunction	98	57.6	2378	60.8	0.83 (0.61–1.14)	0.86 (0.61–1.21)
Problematic substance use in household	54	31.8	1192	30.5	1.03 (0.74–1.43)	1.10 (0.77–1.57)
Mental illness in household	61	35.9	1733	44.3	0.68 (0.49–0.93)*	0.71 (0.50–1.00)
Physical violence between parents	21	12.4	500	12.8	0.94 (0.59–1.49)	1.14 (0.71–1.84)
Household member in prison	6	3.5	196	5.0	0.68 (0.30–1.55)	0.89 (0.38–2.05)
Parents separated/divorced	54	31.8	959	24.5	1.40 (1.01–1.95)*	1.35 (0.94–1.94)

* $P < 0.05$, ** $P < 0.01$.† Adjusted for sociodemographic variables that were significantly different between samples: gender (female vs male), education (high school or less vs more than high school), marital status (single, separated/divorced, or widowed vs married or cohabitating), employment status (not working or retired vs working full- or part-time), and household income ($\leq \$59,999$ vs $\geq \$60,000$), ns differ depending on the amount of missing data. Target group, parents of youth with chronic pain.

ACE, adverse childhood experience; aOR, adjusted odds ratio; CI, confidence interval; M, mean; OR, odds ratio.

the context of chronic pain. Dennis et al. examined mothers with chronic pain and their children and found that maternal ACEs were not related to child pain but were indirectly related to child depressive symptoms through maternal depressive symptoms.¹⁴ Child pain frequency was low in this sample, which was expected as children were recruited before adolescence, when rates of chronic pain increase.³¹ The authors suggested that maternal ACEs may be more related to adolescent-onset chronic pain, with depressive symptoms acting as a mediator.¹⁴

To inform research and interventions, studies with both clinical samples of youth with chronic pain and at-risk samples (eg, children of parents with chronic pain and youth undergoing surgery) are needed. Neurobiological (eg, epigenetic alterations) and psychosocial (eg, social learning) mechanisms likely underlie any intergenerational continuity. Thus, translational studies incorporating basic and clinical research are critical. Research also suggests maltreatment is a stronger predictor of chronic pain than household dysfunction.⁶ Therefore, research on parent ACEs should consider the differential impacts of these ACE domains, as opposed to the “ACE score” that equally weighs each ACE, on child pain outcomes. It is also important to note that concerns have been raised about the ACE Questionnaire (eg, narrow focus on 10 adversities, no assessment of chronicity, and potential for retraumatization^{2,21,37,48}). Therefore, use of the ACE Questionnaire should be carefully considered. Finally, exposure to ACEs does not ensure poor outcomes; factors such as supportive relationships can moderate the negative effects of ACEs.^{5,7,9,49,51,56} Thus, research on protective factors is also needed to identify factors that buffer against the intergenerational transmission of risk of chronic pain.

In conclusion, ACEs, particularly physical neglect, were prevalent among parents of youth with chronic pain. This study was not preregistered, and data were from parents of youth receiving tertiary-level care in Canada with relatively high socioeconomic status. Research that merges neurobiology and psychology to examine possible mechanisms linking parent ACEs to child chronic pain is needed to advance knowledge in this area.

Disclosures

The authors have no conflicts of interest to declare.

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Appendix A. Supplemental digital content

Supplemental digital content associated with this article can be found online at <http://links.lww.com/PR9/A85>.

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