

# **Influence of Pain, Psychological and Sleep Variables on Acute to Chronic Postsurgical Pain After Cesarean Delivery: a Prospective Observational Study**

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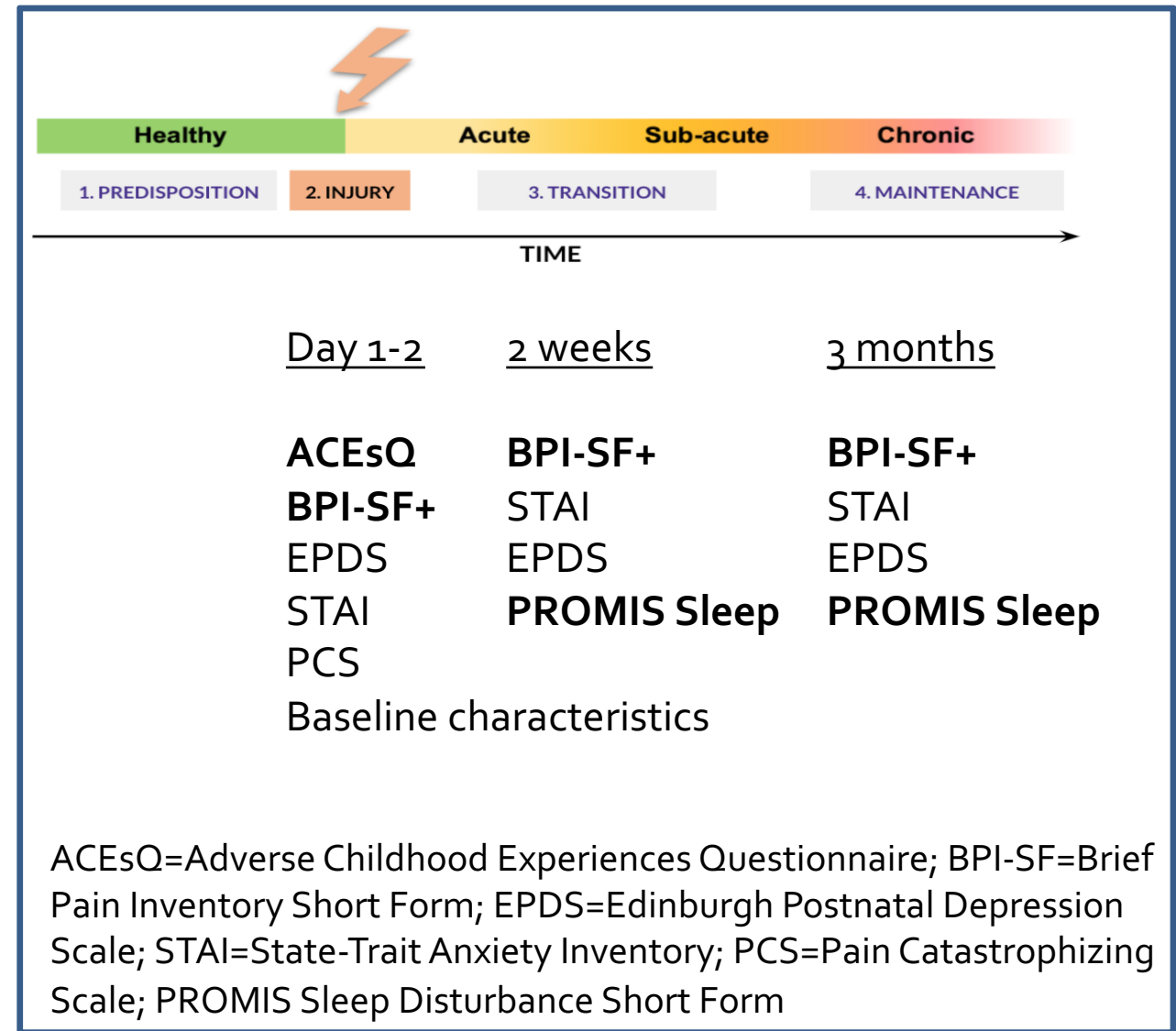
# Background and Aims

- Chronic postsurgical pain (CPSP) affects 15% of patients following cesarean delivery (CD).<sup>1</sup>
- Despite this, its impact on maternal quality of life remains underexplored.
- This study investigates key psychosocial contributors to CPSP:
  - mental health symptoms
  - pain-related cognitions
  - postpartum sleep disturbance
- Addresses a critical gap in understanding the biopsychosocial mechanisms underlying the development of chronic pain after childbirth.<sup>2</sup>

1. Wang LZ, et al.. Anaesthesia. 2025 Mar 11. doi: 10.1111/anae.16596.
2. Sluka KA et al. Pain. 2023 Sep 1;164(9):1912-1926

# Study Design and Methods

- Single-center prospective study.
- We recruited adult patients after CD:
  - Intra-partum or planned
  - $\geq 37/40$  gestation
  - English or Spanish speaking.
- Follow up via REDCap, text and telephone.
- CPSP: Pain at >3 months (Yes or No).



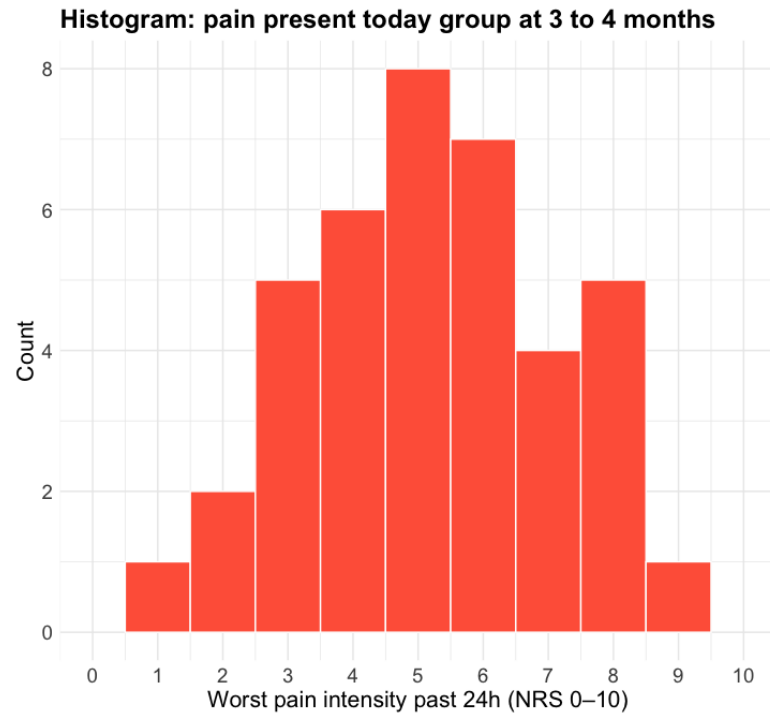
# Results

- 143 participants enrolled (Feb–Sep 2024);
  - ✓ 105 (73%) completed 2-week follow-up
  - ✓ 100 (70%) completed 3-month follow-up
- CPSP at 3 months: 40% (40/100)
- Adverse Childhood Experiences (ACEs):
  - Not associated with pain outcomes
  - 24 h state anxiety ( $p = 0.20$ ,  $p = 0.020$ )  
depressive symptoms ( $p = 0.18$ ,  $p = 0.035$ )
- Pain Catastrophizing:
  - 24 h state anxiety ( $p = 0.62$ ,  $p < 0.001$ )  
depressive symptoms ( $p = 0.54$ ,  $p < 0.001$ )
  - Sleep disruption 2 weeks ( $p = 0.27$ ,  $p = 0.007$ )

Variable	Median [IQR] – No Chronic Pain	Median [IQR] – Yes Chronic Pain	P-value	Sig.
<b>Demographics</b>				
Age	33.5 [28, 37]	34 [30, 37]	0.624	
Parity	0 [0, 1]	0.5 [0, 1]	0.778	
Education level	2 [1, 3]	2 [1, 2]	0.423	
BMI	30.9 [27, 34.8]	28.3 [25.6, 33.2]	0.176	
<b>Pain Catastrophizing</b>				
Pain Catastrophizing Score	5 [0.8, 16.5]	5 [1, 12]	0.862	
<b>Acute Pain (24 to 48 hours)</b>				
Worst Acute Pain (NRS 0-10)	6 [4, 8]	7 [6, 8]	0.025	*
Duration of Time Severe Pain (%)	20 [0, 40]	30 [20, 50]	0.011	*
<b>Chronic Pain (3 to 4 months)</b>				
Worst Pain (NRS 0-10)	0 [0, 1]	5 [4, 7]	<0.001	***
<b>Pain Interference (BPI-SF)</b>				
Sleep (24 to 48 hours)	4 [1, 7]	5 [3, 8]	0.041	*
Feeling in Control (24 to 48 hours)	3.5 [0.8, 5.2]	5 [1.5, 8.5]	0.065	.
<b>Sleep Disturbance (PROMIS)</b>				
2 weeks	13.5 [0, 22]	19 [11, 24.5]	0.042	*
3 to 4 months	16 [9.8, 22]	19 [12, 25.5]	0.110	
<b>Anxiety (STAI)</b>				
24 to 48 hours	44 [41, 46]	44 [43, 46]	0.235	
2 weeks	46.5 [0, 49]	47 [42.2, 49]	0.378	
3 to 4 months	47 [46, 49]	46.5 [44, 49]	0.053	.
<b>Depression (EPDS)</b>				
EPDS (24 to 48 hours)	4 [1, 8]	3 [0, 9]	0.534	
EPDS (2 weeks)	2 [0, 7]	0 [0, 8.2]	0.738	
EPDS (3 to 4 months)	1 [0, 5.2]	3.5 [0, 8]	0.045	*

**Table 1.** Median [IQR] variable comparisons by pain group (pain present at 3 to 4 months Yes or No). Values are presented as Median [Interquartile Range]. P-values calculated using Mann–Whitney U test. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , . = trend ( $p < .10$ ). Abbreviations: BPI-SF= Brief Pain Inventory Short Form; EPDS = Edinburgh Postnatal Depression Scale; STAI = State-Trait Anxiety Inventory; PROMIS = Patient-Reported Outcomes Measurement Information System.

# Results: Chronic Pain Group



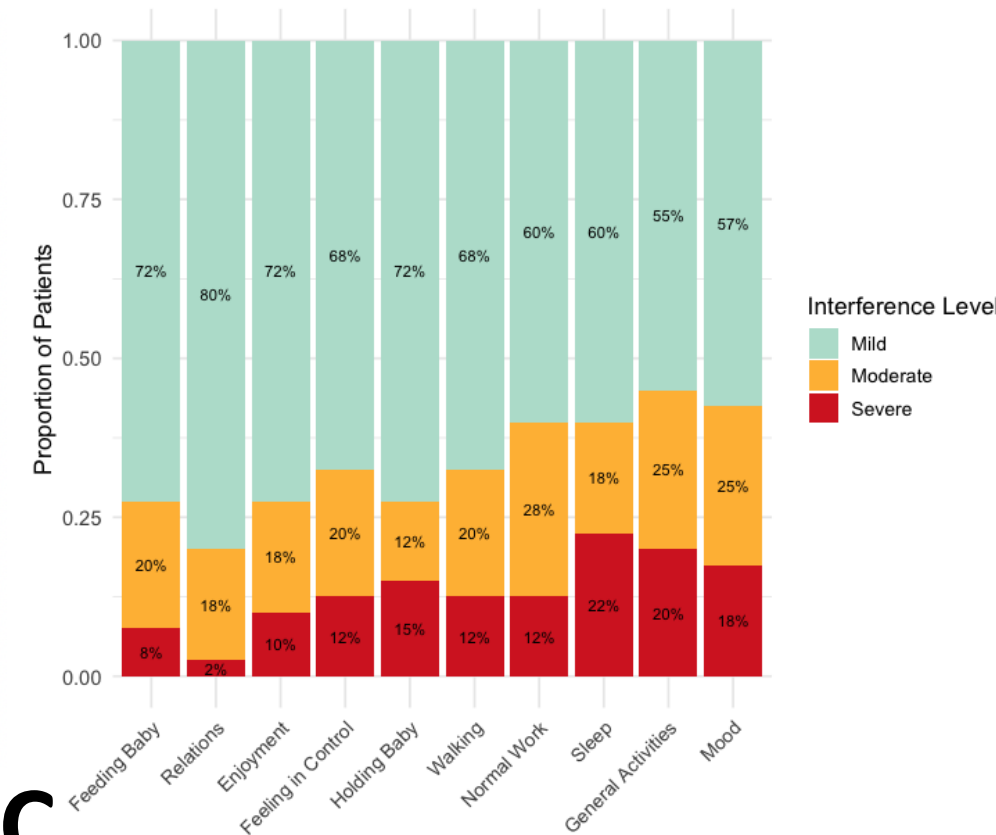
A

Interference Domain	Median [IQR]
General Activities	3 [0.8, 6]
Mood	3 [0, 6]
Normal Work	2 [0, 5]
Sleep	2 [0, 6]
Enjoyment	1 [0, 5]
Feeling in Control	1 [0, 5]
Holding Baby	1 [0, 4.2]
Walking	1 [0, 5]
Feeding Baby	0 [0, 4]
Relations	0 [0, 1.2]

**Table:** Pain interference scores (Median [IQR]) of patients with pain present today (3 to 4 months postpartum)

B

**Pain Interference: Patients with Pain Today (3 to 4 Months)**  
Categorized as Mild (0–3), Moderate (4–6), Severe (7–10)

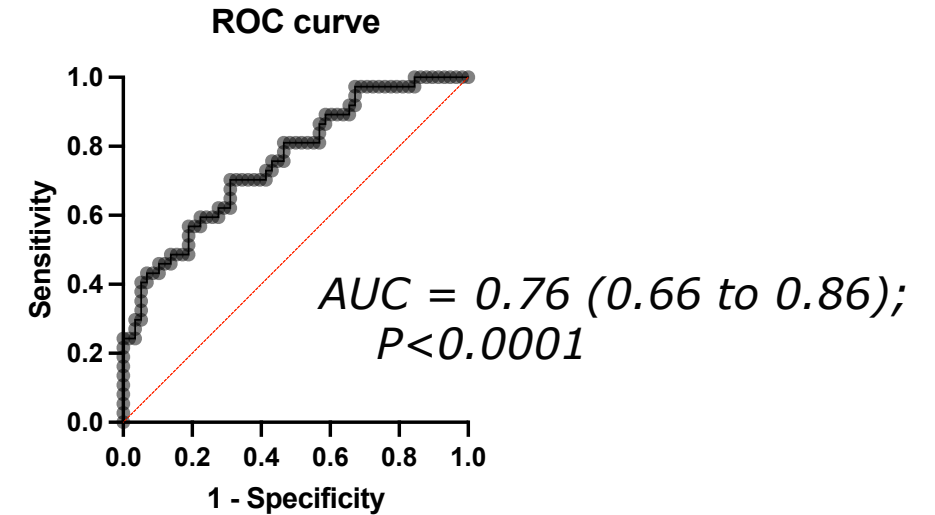


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# Results: Predictors of Chronic Pain

Variable	OR (95% C.I.)	P value
<b>Inpatient variables</b>		
BPI Worst pain over the past 24 h	1.25 (1.03 to 1.52)	<b>0.020</b>
Duration of time in severe pain in past 24 h	1.21 (1.03 to 1.4)	<b>0.020</b>
BPI Pain interference with sleep	1.14 (1.00 to 1.3)	<b>0.044</b>
Pain interference with ability to feel in control	1.13 (1.00 to 1.28)	0.055
BPI Pain interference with general activities	1.12 (0.98 to 1.27)	0.088
BPI Current pain (24 to 48 h)	1.10 (0.93 to 1.3)	0.275
<b>2 week variables</b>		
BPI Pain interference with general activities	1.24 (1.02 to 1.5)	<b>0.028</b>
BPI Pain interference with sleep	1.20 (0.99 to 1.45)	0.057
PROMIS Sleep Disturbance Short Form	1.08 (1.01 to 1.15)	<b>0.030</b>
<b>3 month variables</b>		
PROMIS Sleep Disturbance Short Form	1.05 (1.00 to 1.10)	<b>0.049</b>
STAI score	1.04 (1.00 to 1.08)	<b>0.038</b>

**Table.** Variables and association with the odds of chronic pain presence; OR= Odds ratio; p-values in **bold** are statistically significant. BPI= Brief Pain Inventory; STAI= State Trait Anxiety Inventory



## Antenatal

BMI

## Postoperative day 1-2

Worst pain past 24 h (BPI-SF)

Duration of time in severe pain past 24 h

Pain interference with sleep (BPI-SF)

Pain interference with ability to feel in control

# Discussion and Conclusion

- CPSP was common at 3 months, highlighting the need for early identification.
- Sleep disturbance emerged as a consistent factor and may represent a modifiable risk.
- Pain interference with sleep and activity improved prediction
  - value of functional pain metrics.
- Pain catastrophizing strongly linked to mood, supporting biopsychosocial screening.
- ACEs may influence emotional wellbeing more than pain outcomes in this population.
- Our study supports personalized postpartum pain care
  - targeting sleep and psychosocial risk
  - potential for future digital tools.