

Obstetric pain management for pregnant women with opioid use disorder: A qualitative and quantitative comparison of patient and provider perspectives (QUEST study)

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Abstract

Background and aim: Patients with opioid use disorder (OUD) may experience inadequate pain management especially during childbirth. This study assessed and compared patient and provider perspectives on analgesia during and after delivery in women with OUD.

Design: Prospective cohort, mixed method design including semi-structured interviews and structured surveys with pregnant or recently pregnant patients ($n = 17$) and provider ($n = 15$) groups.

Setting: Prenatal clinics and hospital postpartum units.

Participants: Patients were pregnant women with OUD currently treated with methadone ($n = 1$) or buprenorphine ($n = 16$). Providers were obstetricians ($n = 5$), obstetric nurses ($n = 5$) and anesthesiologists ($n = 5$).

Measurements: Validated questionnaires were completed by both groups; patient interviews were conducted during the third trimester and at 5 days post-delivery. Patient topics included pain management preferences, analgesia satisfaction and attitudes toward pain. Provider topics included labor and postpartum pain management perspectives. Interviews were independently coded and qualitatively analyzed for major themes.

Findings: Five major themes emerged from patient interviews: (1) neuraxial blockade was endorsed for labor pain; (2) otherwise, limited pain control options were perceived; (3) no consensus around use of opioids for pain; (4) non-opioid options should be available; and (5) provider communication and health-care system issues act as barriers to adequate pain management. Provider perspective themes included the following: (1) unique challenges in pain management for patients with OUD; (2) confusion on how to plan for and make perinatal adjustments to medication for OUD; (3) discrepant views on use of opioids for pain management; (4) endorsement of non-pharmacological and non-opioid options; and (5) need for improved provider collaboration in developing pain management plans.

Conclusions: Patients with opioid use disorder and health-care providers prioritize pain management during and after childbirth, but have discrepant views on use of opioids

and other pain management options. Inadequate care coordination and discrepancies in opinions need to be addressed both within care teams and between patients and providers. Clinicians would benefit from better evidence to guide clinical care of patients with OUD for patient-centered pain management.

KEYWORDS

Labor analgesia, opioid use disorder, pain, pain management, patient centered care, patient perspectives

INTRODUCTION

Opioid use disorder (OUD) is defined by Diagnostic and Statistical Manual of Mental Disorders Fifth Edition as, 'a problematic pattern of opioid use leading to clinically significant impairment or distress' [1]. There are 10.1 million people over the age of 12 in the United States who report misusing opioids [2]. Of people struggling with OUD, those who are pregnant face risks to both maternal and infant health; substance use disorder is a rising factor in maternal mortality [3–6] and neonatal opioid withdrawal syndrome is a serious and prevalent complication [2]. Neonates exposed to opioids in pregnancy are at risk for poor growth, preterm delivery and birth defects [4].

In addition to risks to postpartum health, OUD increases risk for inadequate pain relief medication because of hyperalgesia [7] (increased sensitivity to feeling pain and an extreme response to pain) or the patient's fear of return to opioid or substance use [8] associated with opioid analgesia exposure [9]. Yet, inadequately treated pain can also trigger treatment non-adherence and return to use [8]. Women are particularly susceptible to suboptimal therapies during pregnancy and lactation [10]. The American College of Obstetricians and Gynecologists (ACOG) and American Society of Addiction Medicine (ASAM) have provided guidelines and opinions on opioid use and use disorder in pregnancy [11, 12]. These guidelines focus on specific OUD treatments and how to manage medication for opioid use disorder (MOUD) in pregnancy. However, evidence on patient-centered priorities specifically for pain management in pregnant people with OUD is lacking.

Patient and provider perspectives regarding pain management for patients with OUD before, during and after pregnancy can guide next steps in priorities for clinical care improvements and research. Patients with OUD who enter the hospital with pain exacerbated by or because of other medical conditions are at risk for inadequate pain management because of their history of substance use disorder [13]. This may stem from a lack of suitable alternatives to opioids for treatment of pain, from conscious or unconscious clinician bias, or from a combination of factors. Both patient and provider perspectives can reveal systemic factors leading to inadequate pain management among people with OUD. The current knowledge gap on patient-centered priorities for pain management among pregnant people with OUD and their providers limits effective treatments in these settings.

The purpose of this study was to assess and compare patient and provider perspectives on pain and pain management among pregnant

women with OUD. Our primary questions were as follows: (1) what are patient attitudes and beliefs about pain and pain management during and after childbirth? (2) What are clinical care provider attitudes and beliefs about pain and pain treatments for people with OUD? (3) How are patient and provider attitudes and beliefs similar versus different?

METHODS

Study design

The study was reviewed and approved by the University of Pittsburgh Institutional Review Board (STUDY20010041). This prospective qualitative study included semi-structured interviews and surveys conducted with two study populations: third trimester, primiparous pregnant patients treated with MOUD ($n = 17$) and clinical providers who care for patients with OUD ($n = 15$; 5 anesthesiologists, 5 obstetricians, 5 nurses). The study site consists of ~143 physicians ($n = 21$ anesthesiologists, $n = 122$ obstetricians) and 133 nurses who routinely provide care for pregnant patients. Purposeful sampling was used to identify the provider participants who self-identified as having cared for pregnant patients with OUD within the last year. Purposeful sampling [14] is a selective sampling strategy commonly used in qualitative research that uses non-random selection of participants from the entire population based on expert judgment of the investigators. This sampling method is used to gain in-depth insights from participants who have more experience than others with a particular phenomenon.

Enrolment procedures

Pregnant patients were approached in their third trimester at their prenatal clinic visit, at antepartum inpatient units, or postpartum units at University of Pittsburgh School of Medicine (UPMC) Magee Hospital (Pittsburgh, Pennsylvania, USA). Patients were included if they were pregnant with a viable gestation and currently treated with methadone or buprenorphine, the most common MOUD. Patients were excluded if they were unable to participate in the informed consent discussions, not fluent in English given that the surveys were validated in the English language or unable to participate fully in all study procedures for any reason. Providers were

included if they were a labor and delivery nurse, an obstetrician, or an anesthesia provider who had cared for pregnant women with OUD within the last year. Provider exclusions were the same as patient exclusion criteria.

Interview methodology: Patient and provider groups

Purposeful sampling was used to identify pregnant patients and providers eligible for the study, as outlined above. Interviews were in-person meetings or phone conversations, depending on patient preference. Interviews addressed pain attitudes and beliefs, expectations about childbirth pain and management and pain management both during and after childbirth. Initial interviews were conducted during the third trimester of pregnancy before the onset of labor with follow-up interviews within 5 days of delivery postpartum, to capture perspectives between their pain management expectations and actual experience both during labor and in the days following delivery. Provider interviews addressed their perspectives on childbirth pain and postpartum pain in pregnant women with OUD. Interviews were de-identified, recorded and transcribed for coding.

Interview process and data collection

Verbal informed consent was taken at the start of each interview. An audio recorder was used to assist transcriptions. Interviews were conducted by two investigators (E.N. and M.M.) trained in qualitative research methods. Semi-structured interviews with pregnant women were conducted using an interview guide (patient group) and an interview guide adjusted based on type of patient contact and provider discipline (provider group). Questions for patient and provider groups are summarized in Table 1. The interview guides were developed by two investigators (G.L. and E.K.) and question types based on conceptual framework by Patton [15], focused on experiences and behaviors, opinions and values, feelings, knowledge and sensory observations. Each interview took ~30 min. Data abstracted from the medical record included mode of delivery, duration of labor, neonatal Apgar scores and anesthesia type during delivery.

Survey instruments

Surveys were completed by participants before the interviews that used valid and reliable instruments for the constructs they measured. The Multidimensional Scale of Perceived Social Support (MSPSS) [16, 17] is a 12-item measure of an individual perceived social support adequacy from family, friends and significant other. The Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety and Depression inventories [18–20] are validated,

patient-centered measures developed by the National Institute of Health that evaluates and monitors physical, mental and social health in adults. The Fear of Pain [21] questionnaire is a 30-item self-report measure that assesses fear of pain associated with potentially harmful stimuli ranging from mild ‘paper cut’ or severe ‘breaking your arm.’ Each item is rated on a 5-point Likert scale ranging from 1 (not at all) to 5 (extreme), and the total score ranges from 30 to 150. The Pain Catastrophizing Scale (PCS) [22, 23] assesses the extent of catastrophic thinking as it relates to pain. It is a 13-item scale, with a total range of 0 to 52, and higher scores are associated with higher pain catastrophizing.

Before participating in the interviews, patients also completed surveys on demographic information, questions about pain management preferences and attitudes/beliefs about pain. Before the interviews, provider participants completed surveys about personal attitudes and beliefs regarding pain management in patients with OUD.

Qualitative data coding and analysis and survey data analysis

Interviews were transcribed by two investigators (E.N. and M.M.) from digital recordings and reviewed for accuracy. During the initial analysis phase, a coding team of three independent coders (O.J., S.D. and V.A.) created preliminary codes emerging in the first three interview transcripts. The team then independently analyzed each transcript and assigned codes to individual words, phrases and sentences. Using an iterative process of content analysis, the coding team met periodically to arbitrate differences and create a universal code book. The final coding scheme was then used to recode all transcripts for consistency. A coding diary was kept recording the number of new codes introduced at each meeting and to determine when thematic saturation had been met, as defined as the number of interviews needed until no new ideas, codes, or themes are apparent, otherwise known as ‘informational redundancy’ [24–27]. Thematic saturation was the main principle guiding sample size and was expected to be reached by 12 to 30 interviews. Therefore, between 12 and 30 participants were targeted for enrolment. Thematic saturation was found to be achieved for the major themes by the twelfth patient interview and the sixth provider interview. Comparisons between patient and provider responses were made by the constant comparison method. All qualitative data analysis was completed using ATLAS.ti (Version 9.1.3, Scientific Software).

Survey data were analyzed separately to ensure there was no bias during the coding and thematic analysis process. Quantitative survey data, demographic data and medical record data were summarized by group using descriptive statistics. Comparisons between patient and provider group responses for survey question responses were made using Fisher exact test, and a P -value <0.05 was considered significant. All analyses were conducted using Stata SE 17 (StataCorp LP, 1985) and XLSTAT (Microsoft).

TABLE 1 Semi-structured interview guide.

Patient group

1. Pain attitudes, beliefs and narrative

- To start, could you tell me about your experience with opioid addiction, from when you first started using opioids until now?
- Tell me about how you typically cope pain. How well do you cope? What works? What does not work?
- Does opioid dependence impact your experiences with pain? If so, how?

2. Expectations about childbirth pain and its management

- Can you tell me about what you are expecting about pain during and after childbirth?
 - Did your provider talk to you about pain management options? If so, what options?
 - Have you done anything to prepare yourself for pain related to childbirth? If so, what things have you done? Do you think preparations would help you deal with pain?
- What is your understanding of the available options for pain management during and after birth?
 - What kinds of pain treatments do you think would work for you?
- Some people use things other than medication to treat pain, such as heat, massage, or electronic devices. What do you think about these options for you and your pain?
- Some people experience itchiness as a side effect of epidural pain control in childbirth or after cesarean birth. For some people in recovery, feeling itchiness from medication might be a trigger for relapse. What do you think about that?

3. Pain management – during childbirth

- Ideally, what kinds of services would you want to help you manage pain during childbirth?
 - How would these services be delivered to best help you?
- How would you feel about things like music therapy, distraction, aromatherapy, buzzing units, or other devices to treat your pain during childbirth?
- Some people are afraid about using opioids for pain after childbirth. How do you feel about opioids for your own pain management during childbirth?

4. Pain management – after childbirth

- Ideally, what kinds of services would you want to help you manage pain after childbirth?
 - How would these services be delivered to best help you?
- How would you feel about things like music therapy, distraction, aromatherapy, buzzing units, or other devices to treat your pain after childbirth?
- Some people are afraid about using opioids for pain after childbirth. How do you feel about opioids for your own pain management after childbirth?
- Some pain is treated with non-opioid medications like gabapentin ('Neurontin') or pregabalin ('Lyrica'). Some folks think this is great because it reduces the need to use opioids. Other folks think these other medications carry too much addiction risk and should not be used at all. What do you think?

5. Closing

- Is there anything else you would like to add that we did not discuss?

Provider Group

1. Perspectives related to childbirth pain

- From your point of view, are women with opioid use disorder different than other women with respect to childbirth pain management? If so, how?
- Some patients use non-medication strategies to deal with childbirth pain – things like aromatherapy, massage, heat, or electronic buzzing units. How do you expect women with opioid use disorder would do with these treatments?
- Have you had any discussions with patients or other health care providers about pain management options for women with opioid use disorder?
- What role do opioids have in pain management during childbirth, for women with OUD? How about for women without OUD?

2. Perspectives related to postpartum pain

- From your point of view, are women with opioid use disorder different than other women with respect to childbirth pain management? If so, how?
- For postpartum pain, how do you expect women with opioid use disorder would do with nonmedication treatments, such as aromatherapy, massage, heat, or electronic units?
- What role do opioids have in POSTPARTUM pain management, for women with OUD? How about for women without OUD?

(Continues)

TABLE 1 (Continued)

- Some pain is treated with non-opioid medications like gabapentin ('Neurontin') or pregabalin ('Lyrica'). Some folks think this is great because it reduces the need to use opioids. Other folks think these other medications carry too much addiction risk and should not be used at all. What do you think?
3. Closing
- Is there anything else you would like to add that we did not discuss?

Abbreviation: OUD, opioid use disorder.

TABLE 2 Study population characteristics. The population consisted of pregnant women enrolled in the third trimester with a history of opioid use disorder currently treated with MOUD.

Characteristics	Patients (n = 17)
Mean age (95% CI)	28.9 (21–34)
Race/ethnicity—no./total no. (%)	
White non-Hispanic	17/17 (100)
Mean body mass index (IQR)	28.8 [20.4–47]
History of anxiety/depression (%)	15/17 (88)
History of mental illness aside from anxiety or depression (%)	9/17 (52)
Education level—no./total no. (%)	
High school graduate or equivalent	11/17 (64)
Trade/technical/vocational training	1/17 (5)
Some college credit, no degree	4/17 (23)
Associate degree	1/17 (5)
Income level—no./total no. (%)	
Less than \$10 000	5/16 (31)
\$10 000 to \$19 999	4/16 (25)
\$20 000 to \$29 999	3/16 (18)
\$30 000 to \$39 999	3/16 (18)
\$100 000 to \$149 999	1/16 (6)
Median previous pregnancies (IQR)	4 [1–12]
Median previous deliveries (IQR)	2 [0–10]
Median prior cesareans (IQR)	0 [0–2]
MOUD type—no./total no. (%)	
Methadone	1/17 (6)
Buprenorphine-naloxone	6/17 (35)
Buprenorphine	10/17 (59)

Abbreviations: IQR, interquartile range; MOUD, medication for opioid use disorder; no., number.

94% were currently being treated with buprenorphine monotherapy or a combination of buprenorphine and naloxone, and 6% were treated with methadone (Table 2). As shown in Table 3, the patient cohort responses indicated adequate perceived social support, low pain catastrophizing, low anxiety or depression and low fear of pain. As shown in Table 4, 16 of 17 patients were admitted for labor and delivery, whereas 1 had a cesarean birth without labor. Nine had a vaginal birth, whereas seven had cesarean birth under neuraxial anesthesia (epidural) with surgical times averaging 64 min and estimated blood loss averaging 500 mL (Table 4). The median duration of labor was 435 min; average neonatal Apgar scores at 5 min were within normal limits (8.8 of 10, indicating infants had pink color, strong tone, independent breathing and reassuring grimace and pulse measurements).

Patient and provider survey results

Table 5 presents results of patient and provider survey responses with significant differences found on three of the five questions. Providers endorsed the importance of childbirth pain management more than patients (100% of providers vs 59% of patients; $P = 0.003$). Providers more so than patients were more likely to report that 'Obstetric patients with OUD who are taking buprenorphine or methadone experience worse pain than patients without OUD' (67% vs 12% agreed; $P = 0.003$) and tended more so than patients to endorse the need for more pain medication in those with versus without OUD (60% vs 24%; $P = 0.06$). Epidural analgesia was rated highly as a desirable option for labor pain control by both patient and provider groups (100% providers, 94% patients; $P = 0.11$), but providers were more likely than patients to endorse use of non-opioid analgesics (67% vs 18%; $P = 0.003$), nitrous oxide (47% vs 12%; $P = 0.02$) and complementary or alternative medicines (73% vs 41%; $P = 0.05$).

RESULTS

Patient characteristics

A total of 32 participants (17 patients and 15 providers) completed both interviews and surveys and were included in the thematic analysis (demographic data are shown in Table 2). Among the 17 patients,

Patient interviews

Qualitative findings are a compilation of both prenatal and postpartum interviews for each patient participant. Four major themes emerged regarding patient attitudes and beliefs toward obstetric pain and their OUD (Supporting information Data S1): (1) history of OUD limits labor analgesia options and ability to achieve adequate

TABLE 3 Patient self-reported quantitative instrument results for the study cohort.

Characteristic		Result (n = 17)	Scale ranges for normal scores
MSPSS	PSS—total, mean (SD)	63.8 (15.5)	12–84
	PSS—family, mean (SD)	21.5(6.0)	7–28
	PSS—significant other, mean (SD)	24.1 (5.1)	7–28
	PSS—friends, mean (SD)	18.2(7.2)	7–28
PCS	PCS—total, mean (SD)	11.5 (10.9)	0–52
	PCS—rumination, mean (SD)	4.1 (4.2)	0–16
	PCS—magnification, mean (SD)	2.5 (2.6)	0–12
	PCS—helplessness, mean (SD)	4.9 (4.6)	0–24
PROMIS anxiety or depression	Anxiety, mean (SD)	15.1 (6.1)	7–35
	Depression, mean (SD)	15.41 (6.4)	8–40
FOP	FOP—total, mean (SD)	17.8 (6.2)	9–45
	FOP—severe, mean (SD)	8 (3.6)	3–15
	FOP—minor, mean (SD)	4.4 (1.7)	3–15
	FOP—medical, mean (SD)	5.5 (2.1)	3–15

Abbreviations: FOP, fear of pain; MSPSS, multidimensional scale of perceived social support; PCS, Pain Catastrophizing Scale; PROMIS, Patient Reported Outcomes Measurement Information System; PSS, perceived social support.

TABLE 4 Obstetric, labor and delivery outcomes.

Characteristic	Result (n = 17)
Median duration of labor (min) median [IQR]	435 [174.5–1347.0]
Mean neonatal Apgar ^a 1 min mean (SD)	8.0 (1.0)
Mean neonatal Apgar ^a 5 min mean (SD)	8.8 (0.6)
Mode of delivery ^b —no./total no. (%)	
Vaginal	9/17 (53)
Cesarean	7/17 (41)
Assisted vaginal birth	1/17 (5)
Reasons for cesarean—no./total no. (%)	
Non reassuring fetal heart tracing	1/7 (14)
Elective repeat	3/7 (43)
Breech/malpresentation	2/7 (26)
Abnormal placenta	1/7 (14)
Anesthesia type for cesarean—no./total no. (%)	
Spinal	6/7 (86)
Epidural	1/7 (14)
Median surgery time (min) median [IQR]	64 [48–72]
Labor analgesia type—no./total no. (%)	
Epidural analgesia	10/16 (62)
Other (nitrous oxide, systemic analgesia)	6/16 (36)

Abbreviations: IQR, interquartile range; SD, standard deviation.

^aApgar score is a scoring system routinely performed on newborns immediately after delivery (at 1 and 5 min of life) as a fast way for clinical teams to determine need and response for neonatal resuscitation. Areas assessed in scoring include color, tone, grimace, pulse and respiratory effort. A score of 7 and above is considered normal; 4–6 is considered low; and 3 and below are considered critically low requiring immediate resuscitation.

^bOf 17 patients, 16 were admitted for labor and delivery, whereas 1 had a cesarean birth without labor.

pain control; (2) patients are determined to limit opioid-use during pregnancy, labor and the postpartum period; (3) despite its endorsement and general satisfaction as the best option for labor pain management, there were opportunities to improve neuraxial labor analgesia; (4) multimodal pain management, including non-pharmacological methods, can be effective; and (5) systematic and health-care-based barriers prohibited patients from receiving adequate pain relief.

Limited pain management options perceived

Overwhelmingly, patients expressed concern and frustration for what they perceived as limited pain management options. Most patients listed epidural and acetaminophen as the only pain control options offered to them during obstetric provider consultations. In some cases, this was expressed as a concern that providers would not supply pain medications because of a history of OUD. *Provider comparison:* Providers, in contrast, perceived and endorsed multiple options available for pain control in pregnant OUD patients (see survey data Table 5).

Many patients also described increased sensitivity to pain because of their past opioid use. There were also statements that tolerance had developed to both opioid and non-opioid medication with frequent expressions that acetaminophen, and NSAIDs did not control their pain at baseline and therefore would likely be ineffective during labor or the postpartum period. Their increased sensitivity to pain and tolerance to medications heightened the fears of inadequately controlled pain during birth. *Provider comparison:* Providers generally agreed that patients with OUD and MOUD experienced worse pain than those without OUD (Table 5).

TABLE 5 Quantitative survey results of pain attitudes and beliefs among pregnant patients with OUD and their providers (anesthesiologists, obstetricians and nurses).

	Patient n = 17	Providers n = 15	Total n = 32	P-value
How important is childbirth pain management to you? No./total no. (%)				
Important	10/17 (58.8)	15/15 (100)	25/32 (78.1)	0.003*
Moderately important	6/17 (35.3)	0/5 (0)	6/32 (18.8)	
Of little importance	2/17 (11.8)	0/5 (0)	2/32 (6.3)	
Obstetric patients with OUD who are taking buprenorphine or methadone experience worse pain than patients without OUD. No./total no. (%)				
Agree	2/17 (11.8)	10/15 (66.7)	12/32 (37.5)	0.003*
Neither agree nor disagree	9/17 (52.9)	3/15 (20.0)	12/32 (37.5)	
Disagree	7/17 (41.2)	2/15 (13.3)	9/32 (28.1)	
Obstetric patients with OUD who are taking buprenorphine or methadone need more pain medication for labor pain management than patients without OUD. No./total no. (%)				
Agree	4/17 (23.5)	9/15 (60.0)	13/32 (40.6)	0.06
Neither agree nor disagree	7/17 (41.2)	4/15 (26.7)	11/32 (34.4)	
Disagree	7/17 (41.2)	2/15 (13.3)	9/32 (28.1)	
For obstetric patients with OUD, good options for labor pain management strategies include: no./total no. (%)				
Epidural	16/17 (94.1)	15/15 (100)	31/32 (96.9)	0.11
IV or IM opioids	4/17 (23.5)	7/15 (46.7)	11/32 (34.4)	0.14
IV or IM non-opioid analgesia	3/17 (17.6)	10/15 (66.7)	13/32 (40.6)	0.003*
Nitrous oxide	2/17 (11.8)	7/15 (46.7)	9/32 (28.1)	0.02*
Complementary and alternative medicine approaches	7/17 (41.2)	11/15 (73.3)	18/32 (56.3)	0.05*
The obstetric patients with OUD the best option for labor pain management strategies is: no./total no. (%)				
Epidural	14/17 (82.4)	15/15 (100)	29/32 (90.6)	0.15
IV or IM opioids	1/17 (5.9)	0/15 (0)	1/32 (3.1)	
IV or IM non-opioid pain medication	1/17 (5.9)	0/15 (0)	1/32 (3.1)	
Nitrous oxide	0/17 (0)	0/15 (0)	0/32 (0)	
Complementary and alternative medicine approaches	2/17 (11.8)	0/15 (0)	2/32 (6.3)	

*P < 0.05.

Abbreviations: IM, intramuscular; IV, intravenous; OUD, opioid use disorder.

Patients are determined to limit opioid-use for pain management, but some are open to it in extreme situations

When asked whether they would be willing to use opioids for pain control during childbirth and postpartum period, most participants were committed to avoiding them at all costs. Nine (9/17, 53%) participants cited fear of return to use or a fear of the opiates affecting their baby as their primary reasons for avoiding these medications. Several felt that the pain of childbirth and postpartum pain was not severe enough to warrant opioid-use. However, others (3/17, 18%) felt that exceptions could be made in the case of cesarean deliveries or extreme pain that could not be relieved with other non-opioid medications, particularly during the postpartum period. One patient was afraid using opiates would disrupt her maintenance suboxone therapy and precipitate withdrawal symptoms. Three patients considered the use of prescription opioids for postpartum pain relief to be similar to

returning to use ('relapsing'). *Provider comparison:* Providers were more willing than patients to consider use of opioids for pain management (Table 5).

Patients were generally satisfied with neuraxial labor analgesia, with improvement opportunities noted

Neuraxial analgesia (epidural) for labor analgesia was almost universally endorsed. Only two of 17 (12%) participants did not want epidural analgesia, stating they wanted to attempt a natural, non-medicated birth. Most patients did not report side effects such as itchiness from their epidural placement and did not believe itchiness would be a trigger for relapse. However, two patients felt the timing of their epidural was delayed, and therefore, it did not control their pain adequately. These patients said they received their epidural too late into the course of their labor. Two patients (12%) described difficulties with

epidural analgesia including a unilateral anesthetic experience and unintended spinal analgesia creating a lack of sensation in the lower extremities. However, the majority of patients were satisfied with their neuraxial blockade and believed it provided adequate pain management during childbirth.

Patients endorse a desire to use multimodal pain management including non-pharmacological methods

Participants listed NSAIDs, acetaminophen, ketorolac, gabapentin and marijuana as non-opioid medications that were helpful for pain in general, positing it could also be helpful for pain during and after birth. When asked about using gabapentin for pain management, most patients were willing to try this medication. One patient acknowledged the addiction risk associated with gabapentin, but said that this risk could be preferable to inadequately controlled pain that could lead to return to substance use. Many patients found multimodal non-opioid therapies (i.e. NSAIDs, acetaminophen and ketorolac) to be extremely helpful in the postpartum period.

When asked by the interviewers specifically, patients were also open to a variety of non-pharmacological pain management options including transcutaneous electrical nerve stimulation units, music therapy, breathing exercises, physical activity, relaxation techniques, social supports, numbing sprays, massage therapy and aromatherapy. Women most listed temperature control through heating and cooling pads, baths and showers, to be non-pharmacological methods they imagined would be effective during birth and in the postpartum period. During third trimester interviews, patients expressed a willingness to try these pain control methods, but when asked again during postpartum interviews, many expressed that these methods were or would have been ineffective without additional pharmacological pain medications. *Provider comparison:* Providers also endorsed the use of complementary and alternative pain management strategies but ranked them lower among the 'best' strategies to use compared to patient rankings (Table 5).

Patients perceived systems barriers that impact adequate pain relief

Three discrete themes were identified within this topic area. First, a lack of provider counseling on pain management options for childbirth was cited. Eight of 17 (47%) patients said they had not received counseling on their pain management plans during their third trimester. Among patients that did receive counseling, it was usually provided by the obstetrician during the third trimester, and they could only recall discussing their maintenance therapy plan and optional oxycodone for postpartum pain management. When the interviewers mentioned non-pharmacological pain control methods such as massage therapy, aromatherapy or distraction methods, patients said they had often never heard of these as viable options from their providers.

Second, there was a perception of stigmatization from health-care providers. Three patients described negative encounters with the health-care staff during their birth and postpartum process that reflected stigmatization. During these instances, participants described being disregarded and felt as if their pain was not acknowledged. Another patient felt that she and her partner were disrespected by the nursing staff in the postpartum unit. She describes being ignored when asking for help and being treated differently because of her suboxone usage. The third participant felt that the health-care staff were judging and blaming her for her baby's neonatal abstinence syndrome. These participants expressed extreme discontent and distrust with the health-care system and were apprehensive of any future interactions with the labor and delivery staff.

Third, patients perceived a lack of communication and planning among care team members. Patients complained that there seemed to be little communication between different providers. For example, one described that the chronic pain provider might have a suboxone plan that is different from the obstetrician's plan or the anesthesiologist's plan. This discrepancy created confusion for the patient particularly about therapy adjustments and furthered a distrust of the providers and care system.

Provider interviews

There were 15 providers included in this study: five nurses, five obstetric providers and five anesthesiologists. During interviews, four major themes emerged on provider perspectives: (1) there are unique challenges in pain management for patients with OUD; (2) there is confusion about MOUD modification and use of supplemental opioids; (3) there is interest in use of non-pharmacological pain control methods; and (4) there is a need for pain management planning and improved interdisciplinary provider collaboration.

There are unique challenges in pain management for patients with OUD

All providers acknowledged the unique challenges in pain management in patients with OUD. Providers believed that substance use history increases sensitivity to pain and tolerance to typical pain control methods and that mental health issues may also exacerbate response to pain. One nurse noted that patients with OUD rarely wanted an unmedicated birth, requested and needed epidural analgesia more frequently and earlier than patients without OUD and typically did better with multimodal pain management strategies. Providers recognized that patients with OUD are at higher risk for poorly controlled postpartum pain than patients without OUD and that higher doses of opioids may be required to adequately control pain in patients with OUD. There were differing opinions on the use of gabapentin and other medications that treat neuropathic pain in the postpartum period to control acute pain, including the risk of addiction and misuse associated with gabapentin. Overall, providers described limited-use

gabapentin in the postpartum period for patients with OUD after acetaminophen and ibuprofen had failed to adequately control their pain. Another obstetrician described the unique psychiatric comorbidities associated with OUD patients such as psychological trauma and depression or anxiety and how these might exacerbate pain. *Patient comparison:* When queried by the survey, patients did not necessarily believe that their history of OUD would affect their pain experience (Table 5); however, when queried via interview, patients voiced concerns regarding their increased sensitivity to pain given their past experiences (see section above).

There is confusion about MOUD management during pregnancy

Providers emphasized the perceived lack of consensus on management of both MOUD dose modification and for guidance on when and how additional opioids can be given to these patients for pain control. Providers stressed the importance of continuing MOUD through pregnancy, labor and in the postpartum period. They felt that maintaining MOUD therapy was an important factor to prevent return to use and should be considered a priority, despite any confusion about when and how to make dosing changes and about additional opiate requirements. One anesthesiologist felt that patients should not need to choose between continuing their opioid maintenance therapy versus getting opioids for acute pain and that it was possible to do both. At the same time, interviews revealed that there is confusion about how to plan for and make perinatal adjustments to MOUD. Nurses and obstetric providers were particularly unaware of how to modify MOUD during labor and in the postoperative period. *Patient comparison:* Patients also noted discrepancies in provider communication for how to manage MOUD during pregnancy and in the context of pain (see section above).

There are divergent opinions on using or avoiding opioids for pain management

Among providers, there were different opinions on how to combine MOUD therapy and additional opioids for pain control. In fact, one nurse provider believed that MOUD was a contraindication to additional opioids. Other providers, including obstetricians and anesthesiologists, understood that MOUD may blunt the effect of additional opioids, but felt that if necessary for severe pain, opioids can and should still be used in conjunction even if higher doses are required as opioids are an important tool in pain management. Finally, four anesthesiologists reported a preference for emphasizing non-opioid methods of pain control among motivated patients and to use opioids as a last resort to avoid the issue of partial agonist or antagonist effects associated with MOUD. *Patient comparison:* Patients voiced a strong desire to avoid opioids or only use it in extreme situations and a desire to use pain management alternatives (see section above).

There is a potential role for non-pharmacological pain control methods

Providers thought that in motivated patients, non-pharmacological pain control methods such as aromatherapy, massage therapy, heat and electronic buzzing units would be helpful for treating both physical pain and 'psychological pain' including the stress associated with labor and delivery especially for patients who are interested in them. However, four anesthesiologists insisted that these must not be used as sole therapies, but should be used in conjunction with pharmacological pain management options. Providers noted that many patients are willing to try non-pharmacological pain control methods, but that education about these options should be given before labor to increase acceptance. Providers noted that non-pharmacological pain control methods are ineffective if patients are distrusting or skeptical of them and therefore, patient buy-in and motivation is crucial. *Patient comparison:* Patients voiced a desire to use alternatives for pain management (see section above).

Creating and sharing pain management plans is important

Almost all providers emphasized the importance of creating an individualized pain management plan with the patients before birth. Ideally, these plans would be created with input from obstetricians, anesthesiologists and patient themselves. One anesthesiologist mentioned that an anesthesia consultation service for this patient population 4 to 6 weeks before their delivery date would be desirable and that involving a chronic pain specialist when making such plans is highly desirable. Sharing these plans across the health-care staff and physicians was recognized as essential to high quality care for these patients. Nursing staff in the labor suites and the postpartum units often have the most contact with the patient. Providers pointed out that sharing individualized pain management plans with the nursing staff was important to achieving adequate pain relief. During interviews with nursing staff, however, it was apparent that nurses had a limited understanding of MOUD and how pain management differs in patients with OUD.

DISCUSSION

The key findings of this study in pregnant patients with OUD are that patients and providers alike report that pain management during and after labor and delivery to be a high priority, but there is a dearth of perceived options, and discrepancies between patient and provider perspectives on this topic exist. Patients believe that their history of OUD limits analgesia options and ability to achieve adequate pain control and experience systematic and health-care-based barriers to achieving pain relief. Patients with OUD are interested in non-pharmacological methods and are usually determined to limit opioid use, with some exceptions. Providers recognize unique challenges in

pain management for patients with OUD and believe better care coordination could improve individualized care plans and increase access to options for effective treatment of pain during and after birth. These findings are important because they highlight dissonance between patient and provider perspectives, urging additional work to improve clinical care.

To our knowledge, this is the first qualitative study specifically aimed at identifying both patient- and provider-centered priorities for pain management during labor and delivery in the context of OUD. These findings can help to shape appropriate patient-centered research agenda for obstetric pain management in patients with OUD. For example, patients' stated interests in non-opioid and non-pharmacologic options, coupled with provider acceptance of these modalities alongside other pain management methods, open opportunities care improvements and research that integrate these modalities in individualized pain management plans. Providers stated that prenatal pain management plans should be completed with an emphasis on optimizing psychiatric co-morbidities such as anxiety and depression, but patient responses indicated that these care plans are not being created nor are patients routinely intimately involved in pain management planning. This discrepancy raises questions on how best to go about creating and communicating these plans across the care teams. Provider (nurse) perspectives on limited options for pain management open opportunities for education and research to improve nursing and provider understanding about how OUD and MOUD affects pain control. Finally, different attitudes and beliefs exist regarding use or avoidance of opioids for severe pain; responses indicated that in some cases, opioid exposure could have adverse consequences on the psychological and mental health of these patients, whereas opioid avoidance and subsequent severe pain could trigger return to use. These discrepancies raise questions about how to generate better evidence to guide patients and providers on use or avoidance of opioids for severe pain in patients with OUD.

The results indicated that often, obstetricians and anesthesiologists may have different understandings of how to treat postpartum pain in patients with OUD. Providers perceive confusion about management of MOUD in the perinatal period and recognize a need for improved interdisciplinary provider collaboration. Therefore, interdisciplinary discussions and educational sessions about the intricacies of managing pain in patients with OUD are necessary to achieved shared understanding and care planning.

Although most patients initially (in prenatal period) understood labor pain to be unavoidable, many reflected that their actual pain experience was more severe than they initially imagined it would be. Many felt that they simply had to live with their postpartum pain. All recognized that their history of OUD was intimately tied to their pain expectations and experiences during birth. These findings are important because they highlight patients' perspectives related to labor pain, including its sense of inevitability and perceived lack of options. Future research can focus on identifying appropriate and alternative pain control modalities for labor and postpartum pain and methods to better prepare patients with OUD for labor pain and analgesia options. Antenatal consultations focused on preparation for pain

management could be one such solution to better prepare patients with individualized treatment plans and education on pharmacological and non-pharmacological pain treatment strategies.

Our results showed dissonance between PCS, which were relatively low for the patient cohort, which contrasted with the qualitative results that indicated high stress in anticipation of birth pain experience. One potential reason for this discrepancy is that PCS is intended to measure catastrophizing in the context of chronic pain [28], whereas patients with OUD may not necessarily have chronic pain. Therefore, the questions in the PCS (e.g. 'I can't seem to keep it out of my head') may not apply directly to pain in the context of birth for patients with OUD. These findings highlight the need for better quantitative instruments to assess dysfunctional pain processing in pregnant patients and patients with OUD.

The ACOG and ASAM guidelines [11, 12] provide guidance on opioid use and OUD, but are not intended to address pain and its management. Although the guidelines are listed in detail on the ACOG and ASAM websites, the results of our interviews indicate that patients are not routinely hearing from providers about MOUD management during pregnancy and birth, and providers, mainly nurses, are not aware of these guidelines at all. Further, because the guidelines are not intended to be focused on pain management, they lack information on how to dose additional opioids for analgesia above and beyond MOUD, or which strategies are most effective for pain control for patients with OUD. Research can focus on closing the gap between guidelines and clinician awareness and understanding and on closing the gaps in effective pain control strategies for patients with OUD.

Limitations of this study include the following points. Provider perspectives were clustered into all providers, although nursing, obstetrician and anesthesiologists may have unique and separate perspectives that would be worth investigating separately. All modes of delivery were included in the patient sampling because the ultimate mode of delivery was not known at the time of enrolment. However, a future study specifically investigating the potential differential pain management priorities among patients with OUD experiencing vaginal versus cesarean birth may be worthwhile. All patients included in this study were all Caucasian females at a single institution, which may limit generalizability. This reflects the demographics of the OUD epidemic in Western Pennsylvania, because our institution is the largest labor and delivery center in this region referring care for this special population. Pennsylvania also has long and complex history in terms of the opioid epidemic and continues to have a larger population of OUD patients than many other regions in the United States. Finally, there was no reliable data available on the duration of MOUD therapy for each patient before labor and delivery.

In summary, we identified themes for patient-centered priorities and provider perspectives regarding pain management among pregnant people with OUD. These perspectives reveal opportunities for clinical care improvement and research. The data suggest that there is a need to expand multidisciplinary prenatal coordination for pregnant people with OUD. Consultation can provide information, eliminate

fears and misunderstandings and create individualized pain management plans before labor and delivery. Clinical providers require better education regarding OUD and its management as well as effective communication strategies when treating OUD patients that reduce the patient perception of stigma. Early interventions and information dissemination strategies can be evaluated in future studies for outcomes of improved pain management and patient satisfaction and potentially postpartum treatment adherence and risk for return to opioid use.

PRIOR PRESENTATIONS

This project was presented at the International Anesthesiology Research Society (IARS) Annual Meeting March 19, 2022 in Hawaii, USA, and Society for Obstetric Anesthesia and Perinatology (SOAP) Annual Meeting May 11–15, 2022 in Chicago, Illinois.

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DECLARATION OF INTERESTS

None.

AUTHOR CONTRIBUTIONS

Emma Nowakowski: Data curation; formal analysis; writing - original draft; writing - review and editing. **Sanjana Dayananda:** Data curation; formal analysis; writing - original draft; writing - review and editing. **Madison Morgan:** Data curation; formal analysis; writing - review and editing. **Olivia Jarvis:** Formal analysis; writing - review and editing. **Valeria Altamirano:** Formal analysis; resources; writing - original draft; writing - review and editing. **Kelsea LaSorda:** Data curation; writing - review and editing. **Grace Lim:** Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; supervision; visualization; writing - original draft; writing - review and editing. **Elizabeth Krans:** Data curation-equal; writing - review & editing-equal.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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