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Patient Preferences and Expectations in Analgesia for First Trimester Surgical Abortion

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ABSTRACT

A central component of a patient's abortion experience is pain perception and optimization of pain management choices. Yet, data on patients' experience of pain and their preferences regarding pain strategies are limited and tend to utilize solely quantitative data. This study utilized a qualitative thematic analysis to identify patient priorities, preferences, and expectations for pain management during first-trimester surgical abortion with nitrous oxide or oral sedation. Thirty-one patients seeking a first-trimester surgical abortion, self-selecting inhaled nitrous oxide (NO) (16 patients), or oral sedation (PO) with oxycodone and Ativan (15 patients) enrolled in this prospective cohort study. Participants provided demographic data, rated procedure pain on a 10 cm visual analog scale (VAS), and participated in semi-structured interviews. We analyzed qualitative data using a content analysis approach. Pre-procedure participants wanted a positive experience. Participants endorsed an ideal analgesic as having a quick onset of action, minimal side effects, no addiction potential, and being effective at reducing pain. After the procedure, there we start differences between priorities in NO and PO participants. NO participants valued the resumption of everyday activities, while PO participants desired ongoing anxiolysis. Anticipatory counseling often mitigated higher procedure pain and more medication side effects than anticipated. Participants emphasized that positive interactions with providers/staff significantly improved their abortion experience. Preemptive comprehensive counseling about procedure and analgesic effectiveness, along with providing options for analgesia, will facilitate an affirmative and patient-centered abortion experience.

KEYWORDS: Nitrous oxide, pain management, patient expectations, patient preferences, surgical abortion

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Up to 97% of patients experience moderate to severe pain during procedural abortions without general anesthesia (Duros et al., 2018; Georgsson & Carlsson, 2019; Renner et al., 2010). Perceived procedural pain affects the overall subjective experience of having an abortion, and is the primary factor for reporting a negative abortion experience (Taylor et al., 2013), leads many to feel they were unprepared for the physical pain (Georgsson & Carlsson, 2019) , and increases procedure-related fear and anxiety (McLemore et al., 2014; Nguyen et al., 2023).

Despite the importance of pain mitigation, literature on analgesia options for abortion care is disproportionately focused on its quantitative assessment using the Visual Analog (VAS) scale (Bayer et al., 2015; Conti et al., 2016; Jensen et al., 1998; Liu & Shaw, 2021; Micks et al., 2012; Renner et al., 2010, 2012; Singh et al., 2017; Zhuang et al., 2010). However, the VAS score only captures a single dimension of pain; therefore, relying on studies limited to assessing changes in VAS scores may lead to an incomplete understanding of what shapes a patient's overall satisfaction with their utilized analgesic regimen (Becker et al., 2020).

Multiple analgesia options are commonly offered in practice, including local anesthetic, nonsteroidal anti-inflammatories, and oral and intravenous (IV) sedation using narcotic and anxiolytic medications (White et al., 2019). While IV sedation with fentanyl and midazolam is one of the few regimens that has been shown to statistically significantly reduce procedural pain (Allen et al., 2009; Moayedi & Tschann, 2018; Renner et al., 2010), regulatory restrictions prevent many clinics from offering this option (Berglas et al., 2018). Additionally, IV sedation protocols often require patients to be fasting for the preceding 8 hours and require specific post-procedure transportation arrangements, both of which may impact patient eligibility for, and/or their choice of, specific analgesic regimens. The increasing burden on patients to travel for abortion care since the United States' Dobbs vs Jackson's Women's Health ruling, which limits abortion access, may exacerbate this challenge (Rader et al., 2022). Therefore, it is more important than ever to understand how patients value and prioritize different aspects of available analgesia options beyond what the VAS score tells us.

In order to improve analgesia options during abortion care and minimize anesthesia-related barriers to abortion access, alternative analgesic options are being increasingly considered (Georgsson & Carlsson, 2019; Liu & Shaw, 2021; Oviedo & Denny, 2023; Peterson & Lerma, 2020; Renner et al., 2010), inhaled nitrous oxide (NO) with oxygen has been used as an option for outpatient analgesia in several specialties and is a common pain relief method in labor globally. For instance, it is now used in more than 50% of births in Australia, the United Kingdom, and Finland and is now regaining in popularity in the United States (Bradfield et al., 2023; Hellams et al., 2018; Likis et al., 2014; Rosen, 2002; Vallejo & Zakowski, 2019). NO has the added benefit of not requiring patients to be fasting and allowing patients to drive themselves after the procedure, which may be of particular benefit to patients traveling for care. While investigational studies to date have found no difference in maximum pain VAS scores comparing nitrous oxide to oral sedation for first-trimester surgical abortion (Singh et al., 2015, 2017), there are no qualitative studies on patients' experiences with nitrous oxide or oral sedation in the abortion setting.

As suggested by bioecological systems theory, experiences, and choices may be impacted by a host of factors and contexts, such as biological factors (e.g., medication efficacy and side effects), proximal factors (e.g., how medication characteristics such as sedation duration may impact work or childcare responsibilities), distal factors (e.g., how abortion stigma may modify patients' perceptions of their procedural experience), and how these various domains interact with and influence one another (i.e., the mesosystem) (Bronfenbrenner, 1994). The current study is informed by bioecological systems theory and seeks to better understand patient analgesic choice as it relates to the overall abortion experience.

The aim of this study was to provide more comprehensive insight into pain and pain

management, given the emerging use of nitrous oxide compared to the more broadly used oral sedation. We evaluated participants' pain experience through a mixed methods approach, utilizing the VAS with semi-structured interviewers. Aligning with a bioecological systems framework, we sought to understand the motivations behind analgesic choice, how different contexts inform choices, and the ways these contexts interact with each other to impact pain experiences (e.g., personal pain tolerance and patient-abortion provider interactions). We hypothesized that assessing pain using semi-structured interviews and the VAS would elicit a multidimensional understanding of pain experience, highlighting the inadequacies of current methods and identifying priorities to improve patient satisfaction and overall experience.

Methods

Context of Study

This prospective cohort study was conducted at a reproductive health clinic in a state that is legislatively supportive of abortion rights and was conducted from April to October 2017 at University of New Mexico (UNM) Center for Reproductive Health. It was approved by the University's Human Research Review Committee and Institutional Review Board. The authors and coding team represent a group of cis-gendered and genderqueer women, half of whom identify as Caucasian and half of whom identify as non-black, non-indigenous women of color. We are comprised of physicians and non-clinical research staff. Our clinicians were either in training or physicians supervising trainees. We all support access to abortion care and approach this topic through a reproductive justice framework (Ross, 2017), with the goal of supporting patients' bodily autonomy, broadening understanding of pain experiences, and centering the patient's perspective.

Participants

The study featured pre-and post-procedure semi-structured interviews with patients undergoing first-trimester surgical abortion using a paracervical block plus inhaled nitrous oxide (NO) or oral sedation (PO) with 5-10 mg oxycodone and 1-2 mg Ativan. Convenience sampling was used to recruit participants. Patients were eligible to participate if they were 18 years or older, English speaking, with a gestational age of less than 14 weeks by ultrasound, and if they self-selected either NO or PO sedation for their procedure. Exclusion criteria included minors, patients with cognitive impairment, and those currently incarcerated. Patients who were not proficient in English were also excluded from the study, as the semi-structured interviews required English fluency, and the interviewers were only fluent in English. All eligible patients between the ages of 18 and 45 seeking a first-trimester surgical abortion were approached by either medical assistants, nurses, or physicians to assess interest in study participation. If interested, a research assistant reviewed the research protocol with them and obtained informed consent. To mitigate selection bias, we made efforts to approach all eligible patients. We then compared our sample against state population data to evaluate its representativeness, and these comparisons are discussed in our findings.

Additionally, the study's progress was reviewed during bi-monthly research meetings to update staff on enrollment progress and ensure that representative requirements were continually met. A total of 31 participants were enrolled, 16 patients received NO and 15 received PO sedation. 13 participants in the NO cohort were reached for follow-up interviews, a retention rate of 81%. Twelve participants were enrolled in the PO cohort, with a retention rate of 80%. All participants received a standard paracervical block using 20 ccs of 1% lidocaine.

Procedure

Before the abortion procedure, participants completed a demographic questionnaire entered into *Redcap,* an online database manager (Harris et al., 2009). Patients then rated present pain and anticipated procedural pain using a 10-point VAS and underwent a 10 to 15-minute semi-structured interview with a study team member. Immediately after the procedure, participants rated their maximal procedural pain using the VAS. A team member then called participants to undergo a 25-minute follow-up semi-structured interview within 1 to 3 days of their procedure. Participants received a $20 gift card after completing the first and second set of interviews.

Our study used pre- and post-procedure semi-structured interviews to assess patients' pain experiences and preferences during first-trimester surgical abortion with either inhaled nitrous oxide or oral sedation. Physicians specializing in outpatient abortion services developed the interview guides, piloted them with two patients and two family planning specialists, and made iterative modifications throughout the study. Prior to the surgical abortion, we aimed to understand patients' pain control preferences and priorities, ideal pain medication, and tolerable physical sensations. Specifically, pre-procedure interviews explored patients' past experiences with pain control, their pain and pain control expectations, and what would constitute an ideal pain medication regimen. Following the procedure, we aimed to explore participants' actual experience, satisfaction with pain medication, and reflections on an ideal abortion experience. Specifically, post-procedure interviews addressed patients' experiences with pain and sedation regimens during their procedures, assessing how accurately they were counseled on these issues by providers before their procedure and what issues were the most important to them during their overall abortion experience. Interviews were audio-recorded, transcribed verbatim, and stored on *Dedoose,* a qualitative data analysis software used to organize data and support interpretation. Interviews were conducted until the conceptual depth was reached.

Data Analysis

Data analysis proceeded in an iterative fashion using a thematic analysis approach. All coders received training on qualitative thematic analysis and code generation. Codes were generated by three researchers, two medical students, and one research coordinator, utilizing inductive coding. Thus, no codes were generated a priori. All coders read through four transcripts independently, two from each group, and took notes regarding common themes to generate initial codes. Subsequently, coders met to discuss their observations and collaboratively develop a preliminary codebook of these common themes, which provided a foundational framework for coding the transcripts. As coders reviewed additional transcripts, they refined the codebook through revisions to more precisely capture the data, applying the evolving codebook to all transcripts. Coders also thoroughly familiarized themselves with the data through repeated transcript reviews, detailed note-taking, and frequent check-ins with the rest of the research team. The three coders coded all transcripts independently and then met to discuss any incongruencies or disagreements. When incongruencies arose, another author was consulted as a mediator, and disagreement was examined, resulting in a final coding scheme. The codebook was modified iteratively until data and thematic saturation were reached. Data saturation entailed coders and authors agreeing that there was sufficient data to address the main research questions; thematic saturation was reached when the researchers determined no new themes or codes were emerging from interviews (Rahimi & Khatooni, 2024). The coders also sought to achieve meaning saturation, such that not only were no new codes emerging, but the significance of individual codes, their interconnections, and their relevance to the research questions was understood (Hennink et al., 2017). Analysis was considered

finalized once the coders agreed that the codebook and related analysis fully represented the range and depth of the data.

Results

The study included 31 participants whose demographic characteristics are reported as means (+/- SD) and percentages in Table 1. See Table 2 for mean maximum procedural pain.

Table 1
Demographics of Study Participants

	Nitrous Oxide N=16	Oral Anesthesia N=15	All Participants N=31
	N (%)	N (%)	N (%)
Age			
Mean	27.88 (5.80)	28.80 (5.92)	28.32 (5.78)
Distance Traveled to Appointment			
1-40 miles	10 (62.5)	8 (53.3)	18 (58.1)
40-80 miles	2 (12.5)	0 (0)	2 (6.5)
Greater than 80 miles	2 (12.5)	5 (33.3)	7 (22.6)
Out of state	2 (12.5)	2 (13.3)	4 (12.9)
Race			
American Indian/Alaska Native	1 (6.3)	0 (0)	1 (3.2)
Asian	1 (6.3)	0 (0)	1 (3.2)
African-American	0 (0)	0 (0)	0 (0)
Native Hawaiian or Other Pacific Islander	0 (0)	1 (6.7)	1 (3.2)
White	13 (81.3)	14 (93.3)	27 (87.1)
Other	2 (12.5)	1 (6.7)	3 (9.7)
Ethnicity			
Hispanic	9 (60.0)	9 (60.0)	18 (60.0)
Non-Hispanic	6 (40.0)	6 (40.0)	12 (40.0)
Relationship Status			
Single/living with partner	4 (25)	9 (60.0)	13 (41.9)
Single/not living with partner	4 (25)	3 (20.0)	7 (22.6)
Married	6 (37.5)	0 (0)	6 (19.4)
Divorced	0 (0)	3 (20.0)	3 (9.7)
Widowed	0 (0)	0 (0)	0 (0)
Other	2 (12.5)	1 (6.7)	3 (9.7)
Support Person			
Friend	2 (12.5)	2 (13.3)	4 (12.9)
Partner/boyfriend/girlfriend/husband	7(43.8)	9 (60.0)	16 (51.6)
Other Family	2 (12.5)	2 (13.3)	4 (12.9)
None	5 (31.3)	3 (20.0)	8 (25.8)
Employment Status			
Working at a job	11 (78.6)	9 (60.0)	20 (69.0)
Working inside the home	1 (7.1)	0 (0)	1 (3.4)
A student	4 (28.6)	5 (33.3)	9 (31.0)
Unemployed	2 (14.3)	1 (6.7)	3 (10.3)
Other	1 (7.1)	1 (6.7)	2 (6.9)

Education Completed			
Middle School	0 (0)	0 (0)	0 (0)
Some high school (grades 9 through 12)	1 (6.7)	1 (6.7)	2 (6.7)
High school graduate (Grade 12 or GED)	2 (13.3)	2 (13.3)	4 (13.3)
Some college/technical school	7 (46.7)	9 (60.0)	16 (53.3)
University	5 (33.3)	3 (20.0)	8 (26.7)
Health Insurance			
None	3 (20.0)	2 (13.3)	5 (16.7)
Medicaid	5 (33.3)	8 (53.3)	13 (43.3)
Insurance	7 (46.7)	5 (33.3)	12 (40.0)
Payment Method			
Insurance	9 (52.3)	9 (60.0)	17 (56.7)
Cash	5 (33.3)	1 (6.7)	6 (20.0)
Credit Card	3 (20.0)	7 (46.7)	10 (33.3)
Funding from organization	0 (0)	1 (6.7)	1 (3.3)

Table 2
Pain Scores on 100-mm Visual Analog Scale

	Nitrous Oxide N=16	Oral Anesthesia N=15	All Participants N=31	*t*(29)	*p*
Baseline pain, mm	0.28 ± 0.69	0.42 ± 0.53	0.34 ± 0.61	-.652	.519
Expected pain, mm	4.83 ± 2.16	5.33 ± 2.53	5.03 ± 2.30	-.603	.551
Greatest pain during procedure*	5.69 ± 3.15	7.10 ± 2.06	6.36 ± 2.71	-1.46	.155

Note. Values as mean ± SD.
*Measured 2 minutes after the procedure

The following themes emerged from interviews in both the NO and PO groups. See Table 3 for additional sample quotations from NO and PO group participants.

Pre-procedure Themes

Theme 1: Patients Want to Frame Their Abortion Experience Positively

Across both analgesia groups, participants preferred to experience positive emotions during their abortion encounters, including feelings of calmness, relief, comfort, and relaxation. Many people also discussed wanting to have little to no pain both during and after the procedure. This is particularly interesting given the VAS responses, which indicated that most participants expected to feel moderate pain, see Table 2. However, during the interviews, this expectation was more nuanced, and many participants seemed hopeful that little pain would be present.

Participants also discussed the desire not to experience negative emotions and highlighted the importance of not feeling fearful, guilty, or judged. In many descriptions, an ideal experience was one where the providers and staff were supportive and the procedure was successful.

Theme 2: Patients Feel Concerned Before Their Abortions

Participants often feel anxiety and fear from unclear expectations, anticipating significant procedural pain, worrying about judgmental staff and providers, procedural complications, and adverse effects from anesthesia. Patients are also concerned that the emotional complexity of having an abortion may exacerbate any physical discomfort, leading to a traumatic experience. Some participants also described concerns about pain after the procedure as well as emotional responses. As one participant described a worst-case scenario, "Maybe just feeling super guilty, becoming depressed over it, thinking I made a mistake. That's probably the only thing I'm worried about afterward."

Participants noted that staff could help alleviate these concerns through judgment-free, thorough counseling, and a calm clinic environment. As one participant described stated:

> I've really appreciated the way that they handled everything and the understanding. And I was really worried that they were going to try to talk me out of doing what I have to do medically. So, I appreciate the non-pressure and their help so far.

While another participant noted, "I mean, I'm glad this clinic is set up to where—we were talking about it—where it's not judging and all that, you know, like you do have a choice."

Theme 3: Patients Have Varying Preferences for Analgesia Options

Throughout the interviews, priorities regarding analgesia varied greatly. Some participants prefer maximal analgesia during their procedures, even if that means additional sedation and decreased awareness. In contrast, others prefer less sedation and may be willing to tolerate more procedural discomfort. As one participant noted:

> I don't like the idea, or I don't like the feeling of my body being overtaken by something, whether or not that is pain medication for my teeth or alcohol or anything like that. I don't like the sensation of not having control of my body.

Most participants described ideal analgesics as easy to administer, working quickly, fully relieving pain, having no addictive potential, wearing off soon after the procedure, and without adverse effects. Many participants reported that medications that could make them perceive this experience more positively, i.e., alleviate anxiety/reduce fear, would improve their abortion experience. Participants discussed that there were sometimes barriers and struggles, even coming into the clinic, and thus wanted the abortion procedure and experience in the clinic to be smooth. One participant commented, "I mean, I would rather not feel pain while going through this. I think I've been through enough punishment for what's going on."

Theme 4: Procedures Were Often Painful

Most participants reported experiencing physical pain during their procedures, ranging from mild discomfort to severe pain. It was often described as sharp and cramping. At times, this pain was more than anticipated, while at other times, it was concordant with expectations. Even

when experienced pain was moderate to severe, participants appreciated when their provider helped them gain a realistic sense of how much pain to expect.

Participants also reported that they would have valued more effective and reliable analgesia overall. As one participant described, "There was cramping, hurting, sharp pain with a dull pain in the back. Everything I didn't want."

Theme 5: Patients Experienced Both Positive and Negative Effects from Their Analgesic Regimens

In the NO group, patients valued the associated relaxation, the quick onset of action, and the ability to resume activities of daily living upon procedure completion promptly, potentially reducing the need for extended time off work or childcare and related expenses. They also noted adverse effects, including nausea, dizziness, and paresthesia. Patients often reported that the oral medications produced more anxiolysis than analgesia in the PO group. Still, they strongly valued the anxiolysis and the ongoing ability to feel relaxed even after the procedure's completion. However, some patients reported that in addition to experiencing adverse effects such as nausea, vomiting, disorientation, and dizziness, the slow and often unpredictable onset of action of oral medications was frustrating.

Theme 6: Patients Value Choice in Analgesia Regimens

Participants recognized that priorities regarding analgesic regimens differ. Therefore, the ability to choose the analgesia that best fits their priorities was important. Participants also discussed that counseling patients thoroughly on different options, advantages, and disadvantages can empower them to choose the analgesia regimen best suited to their individualized needs. As one participant said, "I think the most important thing, I would say, is everyone's different; they're—like we've mentioned several times—their pain threshold's different, what they want to feel versus don't want to feel during the process."

Theme 7: Patients Often Prioritize Other Aspects of The Overall Abortion Experience Over Pain Control

As crucial as adequate analgesia is for optimizing a patient's abortion experience, the thematic analysis revealed that participants strongly valued other factors that contributed to making their abortion experience an affirmative one, including compassionate, kind, and non-judgmental interactions with staff, emotional support throughout their procedure, and the opportunity to discuss their abortion experience afterward if so desired. As one participant described the most positive aspect of her experience, "Probably discussing the procedure because I haven't actually discussed that with anyone, but to […] be able to share that is kind of a relief that I didn't know I'd have." While another participant said:

> The most important thing to me was the care of the providers and how they made me feel comfortable, and that, I guess, was part of the pain management because I felt really comfortable and supported, so everything else that happened I felt like I could trust them, so that was the most important to me.

Table 3

Example Quotations from Participants

Themes	Interview Exerts	Analgesia
Pre-Procedure		
Positive Framing and Concern	"I think a successful procedure would probably be me leaving the clinic feeling okay, you know, feeling able to at least get, you know, the norm today, tomorrow and just move forward. I think that there'd be – I'd hope there'd be little pain, little to no pain. I'd really like to just go back about my normal day. I think it would be a nice procedure just leaving the clinic knowing that I'm going to be fine with the rest of my day."	NO
	"That I'm like cringing in pain, that I don't want them to continue because it hurts so bad. That's kind of a little nightmare. Something that's in the back of my mind. But regardless I'm not afraid of pain, I guess. It's nice to have something that makes you know that you're gonna feel better though."	PO
	"My resolve is there. This is happening. Now I just need to let it happen because this is what I need to get my life together before I can bring somebody else in."	PO
Ideal Analgesic	"Ideal feelings would be that I will get the gas and that I will have no pain, and that it'll maybe sort of also block the pain that I get from discomfort. I guess the main thing, too, is like feeling relaxed. I hope that the pain medication will somewhat relax me, which I think it should do."	NO
	"I would like to feel – I mean I would like to feel reliefed – relieved, not reliefed. That's not a word. I would like to feel good about the way things went. For it to go smoothly and quickly, no complications, minimal pain and just have it be over."	PO
Post Procedure		
Desire for Stronger Pain Control	"There was cramping, hurting, sharp pain with a dull pain in the back. Everything I didn't want."	NO
	"Well, I don't think it really worked a lot, but unless it was – because the pain was a little bit pretty hard… It was just, just excruciating pelvic pain."	NO
	"Probably that it helped somewhat in the actual procedure. I mean because again, I honestly thought I wasn't going to feel as much as I felt. But I mean I guess it's still better than nothing because if I wouldn't have taken those medications, then I probably would have felt it a lot more than what I did."	PO
	"They weren't quite strong enough. I ended up feeling more pain than I expected than it should have been. That was painful. And the nurses and doctor and assistant who were being quite understanding of that and understood my pain, which was sweet of them but it was a bit more painful than I had experienced before."	PO
Valuing of Choice in Analgesia	"Since we're discussing pain management, I think the most important thing, I would say, is everyone's different; they're – like we've mentioned several times – their pain threshold's different, what they want to feel versus don't want to feel during the process. So, I feel like they do have	NO

	choices in every aspect, and they do have control over what and how much – you know, how much they'll allow the pain medication to affect them."	
	"I wanted to at least feel a little bit of pain. I wanted to know where they were like in the process and kind of like what was happening to my body. I didn't really want it to be just zero pain at all."	PO
	"Since we're discussing pain management, I think the most important thing, I would say, is everyone's different; they're – like we've mentioned several times – their pain threshold's different, what they want to feel versus don't want to feel during the process. So, I feel like they do have choices in every aspect, and they do have control over what and how much – you know, how much they'll allow the pain medication to affect them."	NO
Importance of Patient Counselling	"I'm a very spiritual person, and in these situations, it was very comforting to have Dr.____, a woman of color herself, be as either supporting me as another woman of color going through something like this. So, spiritually, that was very comforting because I wish we could have the cleansing herbs and prayer and stuff like that that maybe our ancestors would have done. So, having the option to be able to drive home after, having Dr. ___ there, being able to be part of a study is pretty cool. And I appreciate you taking the time to listen to me."	NO
	"The most important thing to me was the care of the providers and how they made me feel comfortable and that, I guess, was part of the pain management, because I felt really comfortable and supported, so everything else that happened I felt like I could trust them, so that was the most important to me."	PO

Note. NO indicates that the patient chose Nitrous Oxide. PO indicates that the patient chose oral sedation—Oxycodone and Ativan.

Discussion

Pain is a complex experience influenced by many factors. However, pain during procedural abortions has traditionally been evaluated using the visual analog scale (VAS), confining the description of pain to one dimension. This limited approach contrasts with a recent study showing that patients who reported knowing what to expect before an abortion were more satisfied with their experience (LaRoche & Foster, 2020). The current study aligns with this work and suggests that a host of considerations are important for assessing patients' pain preferences and abortion experience.

Our findings demonstrate that patients often arrive with anticipatory anxiety and concern but prefer to experience their abortion within an affirmative context. Factors contributing to pre-procedural concern included unclear expectations, anticipated pain, and the possibility of emotions heightening the physical response. Participants preferred a pain-free procedure accompanied by feelings of calmness and relief. Many participants emphasized the importance of not feeling judged, illustrating the role of proximal factors such as abortion stigma.

For our participants, what constituted a positive experience involved, but was not limited to, adequate procedural analgesia. While the desire to not feel any pain was consistent, there was significant variability in patients' preferred route of administration, degree of desired sedation, and willingness to tolerate associated side effects. Some participants prioritized maximal analgesia, while others were unwilling to endure excessive sedation to achieve it. These differences may be

impacted by biological factors, such as sensitivity to side effects, as well as proximal factors, such as whether or not a patient has someone to drive them home afterward. However, patients discussed the role of multiple other factors in their experiences and analgesic choice, such as existing responsibilities (e.g., childcare), distal factors (e.g., lack of abortion providers in their home town, necessitating traveling for abortion care), as well as the ways these contexts interact with each other (i.e., mesosystem) (Bronfenbrenner, 1994).

Most participants experienced some level of procedural pain, often worse than anticipated. Nitrous oxide users valued the quick relaxation and ability to resume activities promptly but experienced nausea, dizziness, and paresthesia. Oral sedation users valued ongoing sedation but also commented on slow onset and adverse effects like nausea and disorientation. Patients valued choosing a pain medication suited to their individualized needs. Notably, this ability to customize one's experience and consider the economic advantages of some analgesia methods (i.e., the ability to drive oneself home after NO sedation, the ability to go back to work) was sometimes more important than the degree of analgesia. Even when patients described significant pain, many described the overall experience as positive, highlighting the importance of non-procedural factors, such as how comfortable and supported the patient feels in the clinic.

Few studies have similarly qualitatively examined patients' preferences for analgesia during first-trimester surgical abortion. Clark et al. (2002) assessed 100 individuals using local anesthesia or IV sedation for preferences and perceptions of pain through VAS and a post-procedure interview, finding strong preferences for pain management methods and varied preferences for the level of consciousness. Analgesia choice was influenced by factors like cost, convenience, and privacy (Clark et al., 2002). Allen et al. conducted pre- and post-operative semi-structured interviews with patients undergoing first-trimester abortion with either local anesthesia alone or local anesthesia plus IV sedation to examine their preferences and characterize dominant descriptors of pain (Allen et al., 2012). The authors concluded that although most participants preferred a complete reduction in pain, responses varied regarding desired awareness and tolerated side effects. Patients favored making pain control decisions based on personal preferences, including pain tolerance and acceptability of side effects (Allen et al., 2012). Altshuler et al. also noted patients' desire for control over their analgesic choice and level of presence during the procedure (Altshuler et al., 2017). We found similar results in the current study, such that patients choosing NO and those choosing PO often had different priorities.

Consistent with other research (Allen et al., 2012; Altshuler et al., 2017; Clark et al., 2002), our findings demonstrate that no ideal medication regimen for procedural sedation exists. A patient-centered abortion experience requires that patients are fully aware of their analgesia and sedation options, including a discussion of advantages, disadvantages, and financial considerations. Nitrous oxide may offer an advantage over other methods, given the ability to drive immediately afterward, which should be considered when selecting pain management options. This concern may be particularly significant for individuals needing to travel long distances for abortion care, which is a concern across a host of countries. For example, patients traveling from rural areas to Mexico City, where abortion was decriminalized in 2007, or individuals in Poland traveling abroad due to increasing regulations on access often face significant challenges (Barr-Walker et al., 2019; Jacobson et al., 2022; Zaręba et al., 2021). These restrictions and the need for travel underscore the importance of analgesic options that facilitate a faster return to baseline post-procedure.

Given the negative opinions many patients have about their abortion care pain management (Georgsson & Carlsson, 2019; McLemore et al., 2014; Taylor et al., 2013), providers and the scientific community need to better understand the experience and preferences of those receiving alternative pain management methods. Adequate pre-procedure counseling in our study often helped mitigate inadequate analgesia or adverse medication effects. Therefore, our study not only

aligns with existing literature but also provides the first qualitative characterization of both nitrous oxide and oral sedation in procedural abortion through our longitudinal mixed methods approach. These findings can improve clinician counseling, help alleviate possible misconceptions, and better enable patients to make an informed choice about their analgesic options.

Finally, our study builds on previous literature regarding preprocedural patient expectations. Makleff and colleagues conducted 34 semi-structured interviews and two focus groups in Kenya and India to explore expectations of abortion care. They found that participants were not fully informed about the services, anticipated judgment from providers, and were concerned about health consequences (Makleff et al., 2019). A study in Mexico City and Colombia also highlighted individuals' intense fears of judgment when seeking abortion procedures but appreciated providers who helped them understand the expected pain level. They also feared being judged, highlighting the importance of compassionate, non-judgmental care. A more comprehensive understanding of how clinicians can foster a judgment-free environment could contribute to a more positive abortion experience.

Strengths and Limitations

This study has several strengths. First, our results highlight the limitations of the Visual Analog Scale (VAS) and Numerical Rating Scale (NRS) for assessing pain during surgical abortions by oversimplifying a complex, multifaceted experience shaped by factors such as emotional context, anticipatory anxiety, and the stigma surrounding abortion. Our results suggest that future research should incorporate more comprehensive tools to better capture and address multidimensional pain and understand patients' pain management needs.

The current study also included a sample of demographically diverse participants representative of the state's population, including insured and uninsured individuals, as well as local and out-of-state patients. The procedural costs at our clinic were the same regardless of the selected analgesia method, reducing the chance that financial considerations would interfere with analgesia selection. Lastly, because all procedures were done at the same clinic with the same staff and providers, many external variables that could have contributed to a patient's overall experience remained constant.

This study also had various limitations. Some patients were ineligible to receive IV moderate sedation, which is also offered at the clinic, and therefore may have selected PO or NO sedation due to ineligibility. However, we do not feel that that significantly impacted their ability to discuss their experiences with the NO or PO sedation regimens that they ultimately received. Additionally, some patients may have received misoprostol for cervical preparation, which may have impacted their perceived discomfort. Also, all patients received antibiotic prophylaxis before their procedure, so it is difficult to ascertain whether some of the referenced side effects, including nausea or vomiting, were due to the antibiotic or the analgesia regimens, even though patients generally attributed them to the latter. Finally, although most of our study population identifies as Hispanic, few Black patients participated in our study. Given the extent of racial and ethnic disparities in providing adequate analgesia (Anderson et al., 2009), further research is needed on the pain experience of Black patients undergoing abortion care.

Importantly, our study was conducted prior to the June 24th, 2022, Dobbs ruling reversing the prior right to an abortion in the United States. Within one month of the decision, abortion had been banned in numerous states (Nash & Cross, 2022), and legislation is rapidly evolving, with estimates suggesting that a total of 26 states will likely ban abortions (Nash & Cross, 2022). This overturning will have consequential effects on women's health experiences, including an increase in the number of people forced to travel long-distance for abortion care (Rader et al., 2022;

Reingold & Gostin, 2022) as well as a worsening of abortion care inequities and disproportionately poor health outcomes for underserved and marginalized individuals (Dehlendorf et al., 2013; Reingold & Gostin, 2022; Stevenson, 2021). Given our finding of how important the non-procedural components of abortion care are, future work should include how legislative consequences will impact the abortion experience, including preferences and expectations for analgesic care.

Implications for Clinical Practice

Approximately 73 million induced abortions occur worldwide annually (Bearak et al., 2020); findings from this study advance current knowledge and practice in the field of abortion provision in several ways, utilizing patients' own words as a guide. First, this study highlights the value of thorough and comprehensive pre-procedure counseling, focusing on what to expect physically and emotionally during and after the procedure. Participants discussed how adequate pre-procedure counseling helped manage their expectations and alleviate fears. Furthermore, our findings suggest that effective counseling can reduce the impact of inadequate analgesia and adverse medication effects, leading to a more positive overall experience.

The results of this study also emphasize the importance of patient-centered care and consider patients' preferences beyond pain reduction when selecting an analgesic method. Clinicians may want to ascertain patients' individual preferences for pain relief, sedation and the trade-offs they are willing to make, such as tolerating side effects or considering economic factors. Our findings can also help clinicians engage patients in decision-making regarding analgesia by providing descriptors of analgesic onset, effectiveness, physical and emotional changes, adverse effects, and recovery duration.

Results from this study also offer detailed information on patients' experience with procedural pain with less commonly studied analgesic methods. To date, few studies have used a qualitative approach to assess pain in first-trimester surgical abortions, and none have done so with nitrous oxide or oral sedation as analgesics. This is particularly significant given that over a third of first-trimester abortions use oral narcotics, with or without anxiolytics, for the anesthesia method (White et al., 2019). As the first qualitative account of patients' experience with nitrous oxide, our study may help inform clinicians whether to introduce this analgesia method in their practices. These insights may also offer clinical utility beyond abortion care by offering precise terminology for the sensations associated with oral sedation and nitrous oxide, helping clinicians across specialties to better inform their patients.

Furthermore, unlike other gynecological procedures, our research adds to the existing knowledge on how factors like abortion stigma, logistical challenges (e.g., travel for abortion services), and existing responsibilities (e.g., childcare) influence patients' experiences and decisions regarding pain management. This comprehensive view allows for a more empathetic and context-sensitive approach to abortion care. This approach may be more important currently, given the decreasing access and increasing regulations around abortion care, reinforcing the global relevance of providing a calm and supportive environment where patients can feel unjudged throughout their procedure.

Conclusions

Our study concludes that the degree of analgesia during a procedural abortion is not preeminent. Through the use of longitudinal semi-structured interviews and the VAS, we deepened the understanding of the multiple factors that contribute to optimal health patient care. We learned that patients value choices for pain management, comprehensive pre-procedural counseling, and non-judgmental interactions with providers. While there remains much to learn to reduce pain during outpatient surgical abortions effectively, this patient-centered approach underscores that the degree of pain reduction is not the only variable that matters to patients.

Our novel qualitative exploration of nitrous oxide and oral sedation reveals the limitations of single pain measurements, such as the VAS. This multidimensional approach enhances our understanding of patients' pre-procedural concerns, physical sensations, emotional experiences, and varying efficacy and adverse effects of nitrous oxide and oral sedation in procedural abortion. The current study highlights opportunities for improving our analgesic methods, as well as how we counsel patients and structure our clinic environment. Emphasizing preemptive comprehensive counseling about procedure and analgesia effectiveness, along with providing options for analgesia, will facilitate a patient-centered abortion experience. To prioritize specific regimens over others based solely on their analgesic efficacy might neglect other factors of importance to patients. Future efforts should continue sharing patients' experiences to support informed and empathetic care and to improve the abortion experience worldwide.

Summary of Implications:

- Our study informs clinicians of the experiences of those undergoing first-trimester surgical abortion, enabling them to counsel patients comprehensively on what to expect physically and emotionally.
- Our findings provide further detail on analgesic options by detailing onset, effectiveness, and recovery time, assisting both patients and clinicians in informed decision-making.
- This research emphasizes the importance of considering factors like recovery time alongside pain reduction when counseling patients on choosing analgesic options.
- Our study highlights the importance of a supportive environment, non-judgmental provider interactions, and thorough counseling to improve patient satisfaction during abortion care.

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