



Unique Pain Management Needs for Pregnant Women with Pre-existing PTSD and Other Mental Health Disorders

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Accepted: 21 December 2020 / Published online: 7 January 2021

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Abstract

Purpose of Review This review describes how the presence of maternal mental health disorders influences peripartum pain. It provides practical guidance for tailored anesthetic plans that address the unique needs of pregnant women with such disorders.

Recent Findings The role of maternal mental health conditions in the peripartum experience and postpartum course for the mother-baby dyad is an evolving area of interest in the current psychiatric and obstetric literature. It is only recently, however, that providers are beginning to understand how pre-existing maternal posttraumatic stress disorder (PTSD), anxiety, or depression influences how these patients perceive pain during labor or cesarean section. There is, unfortunately, a lack of understanding and consistency in the approach to pain management for these patients. Emphasis on recognition of these unique patient needs and tailoring of peripartum pain management strategies is crucial in helping to achieve a positive birth experience and minimize increased postpartum mental health symptom severity and/or chronic pain for these patients.

Summary Peripartum pain during labor and/or surgical delivery can be influenced by a pre-existing history of mental health conditions. Specialized pain assessment and management strategies should accommodate the unique needs of these patients.

Keywords Pregnancy · Labor pain perception · Maternal mental health · Obstetric anesthesia · Peripartum PTSD · Peripartum pain

This article is part of the Topical Collection on *Obstetric Anesthesia*

Search Strategy

An extensive review of the literature was conducted using PubMed, Medline, CINAHL, and Google Scholar focusing on recent contributions (2012–2020). This review included, but was not limited to, systematic and major narrative reviews, large observational studies, and prospective and retrospective analyses. Papers published outside this range were included if they were found to be of significant benefit and support to the discussion. Headings/keywords used for the search included labor pain and mental health/mental health issues; inadequate anesthesia, cesarean section, consequences; anesthesia, cesarean section, emergency procedures; maternal PTSD and labor pain; maternal PTSD and surgical pain; PTSD and surgical pain and pain perception; and maternal mental health and altered pain thresholds, dexmedetomidine and pregnancy, anti-anxiety agents-pregnancy, chronic pain and pregnancy, opiate use disorder, and pregnancy.

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Introduction

Perinatal mood and anxiety disorders are the most common mental health conditions affecting pregnant women today [1]. The presence of mental health conditions during the peripartum period predisposes patients to physical and psychological risks and creates logistical challenges for providers during labor and delivery. The unique pain management needs of these patients have only recently been recognized in obstetric, psychiatric, and anesthesia research, and widespread understanding and acceptance has yet to occur. Complicating things further is the absence of universal screening for trauma/posttraumatic stress disorder (PTSD) and anxiety during pregnancy as there is for depression; thus, it is likely that providers do not always realize that they are caring for individuals with underlying mental health conditions [2].

Failure to appreciate the unique needs of these patients can contribute to difficulties in pain management, negative personal interactions, inadequate analgesia and/or anesthesia, a negative perception of their birth experience, and increased

severity of mental health symptoms postpartum [3••]. While anesthesia providers are well equipped to manage complex pain management issues for the general operating room population, the complex issues surrounding pregnancy such as concern for fetal and neonatal drug exposure, emphasis on early bonding and breastfeeding, and the predominance of regional anesthesia for surgery make the same management strategies on a labor and delivery unit problematic. Additionally, providers must consider the maternal desire to be awake for the childbirth experience. For some women, especially those with psychological impairment, this desire is often complicated by the possible risk of panic and dissociation which can have devastating consequences for mother and child, including a negative perception of birth and postpartum PTSD [3••].

Mental Health Conditions and Effect on Labor Pain Perception

There is a considerable amount of research that examines the role of severe labor pain in the development of postpartum depression, anxiety, and/or PTSD. What is lacking in the literature, however, is an understanding of how pre-existing mental health conditions impact the perception of labor pain. Researchers have recognized that a relationship exists between prenatal anxiety levels and labor pain and that this relationship is bidirectional in that increases in anxiety may increase pain sensitivity and pain may increase anxiety [4]. This concept has been explored over the years to include other mental health conditions, fear of childbirth, and pre-existing chronic pain in an attempt to elucidate any influence they might have on labor pain.

Researchers have investigated a multitude of variables and outcome measures attempting to explain how mental health conditions influence labor pain. Authors have shown that a history of depression and anxiety is associated with increased use of epidural analgesia during labor, and that women with higher antenatal anxiety scores report more pronounced pain before administration of epidural analgesia. Additionally, the presence of mental health histories results in maximum pain ratings during labor with sensory aspects above and beyond demographic and social factors, and a direct correlation between anxiety sensitivity and maximum pain during labor. Furthermore, they have shown that substance use disorder and anxiety cause high pain ratings [4–7].

Fear of childbirth (tokophobia) although not technically defined as a mental health condition is shown to have moderate association with antenatal anxiety and depression [8]. In one study, authors found that although the majority of women with a fear of childbirth did not report a history of anxiety or depression, the presence of anxiety or depression increased the prevalence of fear of childbirth. Severe tokophobia was

reported by 12% of women with anxiety only, 32% with depression only, and 38% with anxiety and depression. It is possible that severe tokophobia, via its relationship to anxiety and depression, also influences pain perception. Another study assessing labor pain in women with and without severe fear of childbirth found that women with severe fear of childbirth use more anesthetics, and that symptoms of depression and anxiety explained the relationship between the fear of childbirth and labor pain [9]. Other research that looked at self-rated antenatal depressed mood and anxiety showed that depressed mood during pregnancy is associated with early arrival to the delivery unit [6]. An inconspicuous relationship between fear of childbirth and anxiety and pain is that higher levels of fear or anxiety may lead to pain avoidance behaviors, resulting in other care pathways or procedures such as instrumental or surgical delivery that carry higher risk to the woman or her child [7]. In fact, there are multiple articles that address patient request for elective surgical delivery due to fear of labor pain [5, 10–13].

There are few studies to date that specifically examine pre-existing PTSD and its effect on labor pain perception. Until the past decade, there were few articles exploring peripartum PTSD in general and even fewer exploring its influence on labor pain perception. Only one investigating a prediction model for outliers in pain, analgesia requirements, and recovery after childbirth included the Posttraumatic Stress Disorder Checklist for the DSM 5 (PCL-5) to determine baseline psychological status [14]. The authors did not find any association with PCL-5 total score and a predictive value for the study outcome variables: time to pain and opioid-free functional recovery, time to pain resolution, time to opioid cessation, time to functional recovery, time to all analgesic cessation, and pain burden (area under the curve). This must be interpreted with caution however, as the majority of patients in the study never reached the cutoff score of 30–33 for having PTSD. Future studies are needed that examine the relationship between a known antenatal diagnosis of PTSD and perception of labor pain.

It is widely understood that labor pain can be one of the most painful experiences in a woman's lifetime and that perceived pain during childbirth is complex and a result of multiple underlying mechanisms [15]. The impact of mental health illness on labor pain has to be viewed alongside other factors such as antenatal chronic pain and previous pain experience, sleep satiated state, amount of support, cultural beliefs, and other physiological factors such as parity, onset and duration of labor, or size of fetus [16, 17, 18••, 19]. Researchers have recently explored genetic and biological mechanisms that could also help explain the relationship between mental health disorders and pain perception. One study prospectively examined depressed mood and anxiety and showed that carriers for the guanosine triphosphate cyclohydrolase 1 gene (GCH1) were more inclined to use 2nd-line labor analgesia

(defined as any use of more than one type of analgesia during labor) [6]. Ren et al. examined the association of COMT (catechol-O-methyl-transferase) gene polymorphism with mental health conditions and sensitivity to pain [20]. They were able to show that certain mutations in the COMT gene (specifically the Val58Met mutation) could result in increased labor anxiety, less effective labor analgesia, and an increase in epinephrine and norepinephrine levels as compared to the non-mutant homozygotes. These studies begin to highlight a possible genetic or biological connection between pre-existing anxiety and pain perception. In the not-too-distant future, it is possible that the antenatal utilization of genetic markers alongside the identification of known psychological and physical risk factors will aid in the prediction of altered pain perceptions and guide pain management.

Mental Health Conditions and Effect on Pain Perception for Cesarean Section

Pre-existing anxiety and depression play a role in the perceived intensity of postoperative pain after cesarean section. Borges et al. performed a prospective longitudinal study that included 1062 patients who underwent cesarean section under spinal anesthesia with bupivacaine and morphine [21]. They found that preoperative anxiety, defined by the Hospital Anxiety and Depression Scale (HADS), was the single most predictor factor for severe acute postoperative pain. Another retrospective analysis found that pre-existing anxiety, depression, chronic pain, opioid tolerance, and tobacco use were associated with increased post-cesarean section pain [22]. Importantly, this study also showed that overall pain scores were significantly higher in the 24–48-h period than in the first 24 h, suggesting the need to re-evaluate pain management strategies to encompass this time frame for patients at risk. Some prediction modeling studies have shown that the impact of preoperative anxiety alone was not as strong a predictor of post-cesarean delivery pain; however, when combined with simple pain prediction ratings or thermal pain threshold, multivariate analysis showed that anxiety was associated with increased opioid usage [23, 24]. Importantly, severe pain in the immediate postoperative period has been shown to significantly increase the risk for chronic pain and other mental health issues such as postpartum PTSD and depression [25]. Persistent surgical pain is associated with difficulty performing activities of daily living, sleep disturbances, and altered mood [25, 26]. This evidence highlights the importance of vigilance in treating acute postoperative pain to prevent or minimize additional maternal morbidity.

The effects of psychological disease on perception of intraoperative pain, although documented in other disciplines, have not been studied extensively with cesarean section patients [27, 28]. A recent article by Lee et al. looked at this issue

in patients undergoing cesarean delivery for failure to progress under epidural anesthesia [29]. They excluded patients with known anxiety disorders and measured trait anxiety (assessed as how much anxiety a person has during times away from the hospital setting), anxiety about surgery, and anticipated intraoperative pain right before patients entered the operating room. Although there were several limitations to the study including possible response bias, high rate of loss to follow-up, and use of VAS and not a standard anxiety screening tool, they concluded that anxiety about surgery and anticipated intraoperative pain are independent predictors of the occurrence of intraoperative pain during epidural anesthesia. An awareness of those patients with increased anxiety and higher anticipated pain just prior to their surgery would alert providers to the possible need for a different plan. This may include neuraxial adjuncts to increase block density (opioids, alpha-2 agonists), pharmacologic and non-pharmacologic anxiolysis, or intravenous analgesic supplementation.

Patients with a specific diagnosis of PTSD or who have a history of previous trauma may also have significant fear of the operating room environment [30]. Patients may present with anxiety and acute stress symptoms that are the manifestations of the re-experiencing (flashbacks, triggers) and hyperarousal that categorize PTSD; however, there is scant literature on the specific pain management needs for these patients requiring cesarean section. Although PTSD is likely under-recognized, its comorbidity and shared symptomatology with other mental health conditions allow us to extrapolate some of what we know about how anxiety and depression influence pain perception to include women with PTSD histories [2, 30]. More research, though, is needed to clearly delineate if the altered perioperative pain perceptions of women with anxiety and depression are indeed the same for those with PTSD.

Treatment of Anxiety

The evidence to date, although not conclusive, would suggest that pre-existing anxiety contributes to negative alterations in pain perception with resultant increased intra- and postoperative pain and opioid usage. The fact that severe acute postoperative pain can lead to unwanted consequences such as a traumatic birth experience, postpartum PTSD, chronic pain states, and negative impact on neonatal health, makes it seem prudent to consider the management of peripartum anxiety as part of an overall strategy [30].

Traditionally, there has been a reluctance to treat pregnant patients with psychotropic medications (anxiolytics, sedatives) due to fear of adverse neonatal effects. Concern for neonatal well-being, although well intentioned, has overshadowed the need for maternal psychological safety despite evidence showing that severe peripartum fear and anxiety can have devastating physical and psychological

consequences on the mother and ultimately the maternal-neonatal bond [3••]. When considering whether or not to administer an anxiolytic, there are things to consider. Untreated anxiety can lead to maternal acute stress response with physical and psychological consequences: (1) physical manifestations including increased blood pressure and heart rate, hyperventilation and vasoconstriction, and unexpected/uncontrolled shaking and movement due to panic (California Maternal Quality Care Collaborative Task Force, Stanford California, Toolkit Version 2.0) and (2) psychological manifestations including increased risk for dissociation and increased risk for postpartum PTSD/anxiety/depression and suicidal ideation [3••]. On the other hand, overtreating maternal anxiety could potentially cause amnesia for the birth experience, maternal sedation, and neonatal complications. Therefore, a solid understanding of the safety profiles of available anxiolytics is essential in order to balance unwanted maternal effects of acute stress—both physical and psychological—with negative neonatal consequences.

Dexmedetomidine is a highly selective alpha-2 agonist that has both anxiolytic and analgesic properties. Many studies in obstetrics have examined its analgesic and maternal hemodynamic-stabilization effects with or without preeclampsia, and under various anesthetic conditions with negligible effects on the fetus or neonate (Table 1). In most of these studies, the authors examined APGAR scores, but some included fetal blood gases and Neonatal Neurological and Adaptive Capacity Scoring (NACS) as endpoints and showed no significant differences between study and control groups. Nair et al. demonstrated high placental retention related to the fat-soluble properties of dexmedetomidine [38]. Another study looked at the concentration of dexmedetomidine in breast milk and demonstrated minimal passage into the colostrum with a milk to plasma (M/P) ratio (at the highest doses studied) of 0.76 [36]. These authors concluded that because of dexmedetomidine's high degree of protein binding and higher molecular weight, it does not pass through the mammary epithelium easily. The median Relative Infant Dose was < 1% with a value less than 10% considered safe [39]. Of note, the authors have recently identified other possible obstetric benefits of this drug. Dexmedetomidine may have the potential to increase uterine muscle contractility as demonstrated in multiple animal models, and to attenuate postpartum depressive symptoms when administered as an infusion in the immediate postpartum period [36, 40].

Midazolam is another anxiolytic commonly used in the general surgery population. Its use in obstetrics has been limited historically by the concern for fetal teratogenicity if given in the first trimester, and neonatal sedation and long-term neurobehavioral effects if given at the time of delivery. There are multiple articles that address neonatal outcomes when midazolam is given before delivery during cesarean section (Table 2). At doses ranging from 0.020 to 0.035 mg/kg IV,

they have shown no negative impact on neonatal well-being as evidenced by Apgar scores, Neonatal Neurologic and Adaptive Capacity Scoring (NACS), or umbilical gas measurements. Additionally, midazolam has been shown to decrease anxiety with no negative impact on memory of the childbirth event and increased patient satisfaction [41, 43]. Further support for midazolam's safety profile comes from pharmacokinetic and pharmacodynamic studies of the drug that state that midazolam has a F/M ratio of 0.15–0.66 which is lower than most other benzodiazepines with F/M ratios closer to 1. The M/P ratio for this drug is only 0.15 indicating that only low levels of the drug are transferred into the milk. These drug qualities make it the optimal benzodiazepine for short-term use in the intrapartum period [44].

Nitrous oxide has been widely used for decades as an anxiolytic and analgesic during labor. It has also been shown to decrease anxiety just before spinal placement and, at the time of spinal needle insertion, at skin and uterine incision [45–47]. Although nitrous oxide has no apparent effect on uterine tone, fetal heart rate, or Apgar scores, ongoing controversy remains as to whether intrauterine exposure increases infant risks of persistent neurocognitive function and psychosocial development [47].

Chronic Pain Issues

Chronic pain is not listed specifically in the 5th edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-V) as a mental health disorder but often coexists with anxiety and depression [48–50]. Chronic pain is also common among PTSD patients [51]. Specific chronic pain states that disproportionately impact women such as fibromyalgia syndrome, chronic migraines, and interstitial cystitis/bladder pain syndrome have recently been associated with a history of trauma and/or PTSD [52–55]. The underlying mechanism explaining the relationship between mental health disease and chronic pain is complex and how that pain is exhibited may not be the same for all conditions [51]. Defrin et al. showed that chronic pain exhibited by those with PTSD was significantly more intense and widespread than in those patients with anxiety alone and chronic pain in PTSD may be specific to PTSD itself rather than to anxiety [51].

Much of the current research into peripartum chronic pain explores its development after peripartum events. Pre-existing chronic pain and its influence on pain perception during the peripartum period has not been studied as extensively but some studies offer valuable insight. Rosseland et al. looked at the role of labor pain and overall birth experience in the development of persistent pain and depression at 8 weeks postpartum [17]. Their results were somewhat surprising and showed that labor pain intensity was not associated with persistent pain, but a history of depression and pre-pregnancy

Table 1 Neonatal effects of intrapartum administration of anxiolytics

Drug	Study context	Dose used	Author	Neonatal parameters examined	Comment
Dexmedetomidine	Randomized controlled Use in C/S for preeclamptic patients undergoing general anesthesia	1 µg/kg before induction, 0.4 µg/kg/h during surgery	El-Arab et al. [30]	Apgar scores at 1 and 5 min	Stabilized maternal hemodynamics during and after intubation/negligible impact on neonatal Apgar scores
	Randomized controlled Use in C/S for preeclamptic patients undergoing general anesthesia	0.4 µg/kg/h infusion before induction to peritoneal closure	Mahrous et al. [31]	Apgar scores at 1 and 5 min, NACS**, umbilical blood gas	Lower maternal hemodynamic changes* with intubation/no significant difference in Apgar, NCAS**, or blood gas compared to controls
	Randomized controlled Use in C/S for preeclamptic patients undergoing general anesthesia	Loading dose of 1 µg/kg followed by one of two infusion doses: 0.4 µg/kg/min vs. 0.6 µg/kg/min	Eskandr et al. [32]	Apgar scores at 1 and 5 min	Blunted maternal hemodynamic response* to intubation/no difference in Apgar scores between control and both infusion groups
	Meta-analysis of effectiveness and safety in C/S patients undergoing general anesthesia	Bolus dose range 0.6–1 µg/kg Infusion range 0.4–0.8 µg/kg/h	Ao et al. [33]	Apgar scores at 1 and 5 min, umbilical blood gases	Effective attenuation of maternal cardiovascular response and no statistical difference in Apgar scores compared to controls
	Randomized controlled Use during elective C/S under general anesthesia	Bolus dose 1 µg/kg followed by infusion of 0.4 µg/kg/h for duration of surgery	Ibrahim et al. [34]	Apgar scores at 1 and 5 min	Attenuated maternal response* to surgical stress with no difference in Apgar scores compared to controls
	Randomized controlled Effect of placental transfer during C/S under epidural anesthesia	Bolus dose 0.5 µg/kg after epidural followed by infusion of 0.5 µg/kg/min for duration of surgery	Wang et al. [35]	Apgar scores at 1 and 5 min Umbilical blood gases	No significant difference between umbilical blood gases or Apgar scores compared to controls, determined F/M [¶] ratio = 0.68
	Prospective observational Use during elective C/S under combined spinal/epidural and concentration in colostrum	Infusion of 6 µg/kg/h for 10 min after cord clamping and infusion 0.7 µg/kg/h for duration of surgery	Yoshimura et al. [36]	Apgar scores at 1 and 5 min Milk/plasma [†] ratio at 6 h Relative infant dose [‡] Sucking ability on days 3 and 5	Lowest Apgar scores were 8 at 1 min and 8 at 5 min M/P ratio of 0.76 Relative infant dose < 1% Sucking noted as adequate at both time points
	Systematic review/meta-analysis Fetal responses in C/S including patients receiving regional or general anesthesia	General anesthesia—max bolus dose of 0.6 µg/kg, infusions 0.2–0.6 µg/kg/h Spinal anesthesia 5–10 µg Epidural anesthesia 1 µg/kg	Zhang et al. [37]	Apgar scores at 1 and 5 min Umbilical blood gases	No significant difference between umbilical blood gases or Apgar scores compared to controls

*Increased maternal sedation noted at doses studied

**Neonatal Neurological and Adaptive Capacity Scoring

¶Fetal/maternal blood concentration ratio

†The M/P ratio is the ratio of the concentration of the drug in the mother's milk to the concentration in the mother's plasma. If < 1, there is a good indication that only low levels of the drug are transferred into the milk [36]

‡Relative infant dose (%) = absolute infant dose (mg/kg/day)/maternal dose (mg/kg/day) × 100. Most medications are considered relatively safe to use if the RID < 10% [39]

pain were statistically significant predictors of persistent pain at 8 weeks suggesting that pre-existing antenatal mental health conditions and chronic pain increase the risk for persistent

pain after delivery. Mehdிரatta et al. also showed that pre-existing chronic pain (non-specific) was associated with increased post-cesarean pain [22].

Table 2 Neonatal effects of intrapartum administration of anxiolytics

Drug	Study context	Dose used	Author	Neonatal parameters examined	Comment
Midazolam	Randomized controlled Use in C/S for preeclamptic patients undergoing spinal anesthesia	0.035 mg/kg IV given 30 min before spinal	Mokhtar et al. [41]	Apgar scores at 1 and 5 min, NACS* umbilical blood gas	Decreased maternal anxiety, improved maternal satisfaction, no significant differences in Apgar scores, NACS*, or blood gases compared to controls
	Randomized controlled Use in C/S for patients undergoing spinal anesthesia	0.025 mg/kg IV given in the preoperative waiting room	Senel et al. [42]	Apgar scores at 1 and 5 min, NACS*	Decreased maternal anxiety, no significant differences in Apgar scores, NACS* compared to controls
	Randomized controlled Use in C/S for patients undergoing spinal anesthesia	0.02 mg/kg IV at time of spinal	Frolich et al. [43]	Apgar scores at 1 and 5 min, NACS*, neonatal pulse oximetry \times 3 h	No significant differences in Apgar scores or NACS* compared to controls None of the neonates showed clinically significant oxygen desaturation

*Neonatal Neurological and Adaptive Capacity Scoring

Research detailing chronic pain conditions that develop during pregnancy are also lacking. Back and pelvic pain are among the most common pain conditions during pregnancy and occur in 71.7% of pregnancies, yet their relationship with intrapartum or intraoperative pain perception remains unclear [48]. The prevalence, general course, and impact on pain perception of many other chronic pain disorders during pregnancy such as headache, rheumatoid arthritis, sickle cell disease, Ehlers-Danlos syndrome, and vulvodynia are also uncertain [48].

Opioid Use Disorder

The DSM-V now includes the maladaptive and problematic pattern of opioid use as a mental health disorder. This is one of the mental health conditions that is most recognized and universally accepted as a cause of altered pain perception. An important aspect of opioid use disorder (OUD), however, that is rarely addressed in current pain management strategies is its frequent co-existence with other psychiatric conditions [56]. Additionally, a significant number of women with OUD have a history of emotional and/or physical trauma, including childhood abuse (physical and sexual) and neglect, sexual assault, and intimate partner violence [56–59]. The increasing prevalence of OUD and its negative influence on pain present significant challenges for obstetric and anesthesia providers. Two recent papers provide exceptional comprehensive pain management recommendations for pregnant women with chronic opiate use [18, 60]. Both articles offer suggestions for a multimodal approach which include pharmacologic and nonpharmacologic modalities to address the expected changes in pain perceptions. Neither article, though, addresses the

management of comorbid mental health conditions, especially trauma/PTSD, as part of a multimodal plan.

Discussion

It is clear that a complex relationship exists between peripartum mental health and pain perception. Of all peripartum mental health disorders, anxiety has been studied most extensively and PTSD the least. As illustrated in this paper, the presence of anxiety, antenatally or immediately before entering the operating room, and an extreme fear of childbirth have been associated with earlier presentations to the hospital during labor, earlier requests for interventions, increased utilization of epidural resources, more intense labor pain, increased requirement for and overall usage of pain medications including opioids, and more intense acute postoperative pain with subsequent risk for chronic pain states. Severe untreated anxiety in the operating room can influence overall pain perception and may also put the patient at risk for a negative birth experience, significant psychological harm, and disruption of maternal-neonatal bonding. Despite ample evidence showing this association, most pain management regimens fail to include the management of comorbid psychological symptoms. Pharmacologic intervention with low doses of dexmedetomidine or midazolam has proven effective for maternal psychological protection with negligible effects on the neonate. This author uses even lower doses than presented in this article with good results. Providers and patients should understand that the overall goal should be a positive birth experience—this could include a woman's desire to be aware of the birth and experience skin-to-skin, and still feel safe and have a manageable amount of fear. The benefits of any medications administered to a pregnant woman must always be

balanced with the potential for fetal or neonatal adverse effects, *and* the potential for adverse maternal risks if withheld.

Women with a history of trauma or a diagnosis of PTSD often present with acute stress. Symptoms of extreme fear and anxiety are common, and patients would benefit from approaches outlined above to address anxiolysis; however, it is important to note that there is scant literature to guide an optimal pain management strategy for these women. More research is desperately needed to elucidate specific differences in pain perceptions between women with PTSD versus those with other mental health disorders.

Trauma-informed practices may be a valuable adjunct to pharmacotherapy for overall pain strategies for these women [3••]. Because trauma is unique to each person, individualized approaches may be required. The following practices are recommendations based on general trauma-informed care principles and this author's extensive work with trauma survivors in the peripartum period.

1. *Antepartum preparation* should involve elucidation of specific concerns and fears of the upcoming experience and discussions about pain expectations and pain management. Familiarization with the environment can be accomplished with actual (or virtual) tours of labor suites and the operating room giving the patient an opportunity to process information and ask questions long before delivery. Early selection of team members and introduction to the patient help to establish trust. Additional discussion topics include nicotine management, opioid maintenance and withdrawal prevention, role of significant other and level of support, need for private preoperative and/or recovery space, use of low dose anxiolytics, any history of panic, and established coping mechanisms for stressful or triggering situations.
2. The *intrapartum/intraoperative period* should focus on compassionate and respectful communication. This includes frequently acknowledging the patient's emotional state and planned use of non-pharmacologic anxiolysis (i.e., breathing techniques, music), minimizing harsh and loud stimuli and communicating with a calm voice, maintaining a focus on her experience, and avoiding sidebar discussions with other staff members. All members of her care team should be aware of her history and plan when she presents. Avoid separation of the patient and significant other in the operating room, the use of arm straps (unless she meets absolute criteria for restraints), unnecessary oxygen masks, nausea and vomiting, and severe shaking as these can all trigger acute stress responses. Be mindful of her modesty and privacy by keeping her body covered as much as possible and asking before entering her room.
3. *During the postpartum period*, observe for any changes in affect or mood and refer early to mental health experts. Understand that any complications, including difficult

block placement, could potentially be perceived as a traumatic experience and acknowledge any such patient reports with understanding, validation, and support.

The concept of personalized analgesic regimens for cesarean delivery has previously been proposed that advocate for the identification of high-risk patients and the tailoring of analgesic plans that offer women the choice of analgesic dose and protocol and individualized post-discharge opioid prescribing [23, 61••]. Intervening early and tailoring these anesthetics to meet the unique needs of this population could potentially lead to improved peripartum pain control, earlier mobility, better compliance with Early Recovery after Cesarean Section (ERAC) protocols, improved patient satisfaction, improved bonding and breastfeeding success, and decreased risk of traumatic birth experiences and chronic pain. Some authors have found that the predictive value of preoperative questionnaires is only of moderate value in identifying at-risk patients and predicting increased pain, plus the time and expertise needed to administer them would preclude widespread usage [23]. Perhaps we need a simpler approach, one that identifies vulnerable populations based on known factors (mental health disorders, OUD, severe fear of childbirth) and allows for a more patient-initiated plan based on preferences, concern for maternal and/or neonatal side effects, and unique needs resulting from previous traumatic experience.

Some recommended pain management strategies for OUD describe the use of higher doses of intrathecal opiates, multimodal medications (acetaminophen, NSAIDs), and adjuncts such as neuraxial clonidine, gabapentin, and ketamine [18••, 60, 62–66]. The use of regional blocks, continuous epidural infusions, and wound infiltration with long-lasting local anesthetics have also been suggested [18••, 60]. New protocols that consider mental health contributions should also encompass pharmacologic and non-pharmacologic treatment for anxiety, trauma-informed practices, and assessment for and consideration of all psychotropic and chronic pain medications [67]. Chronic pain issues may warrant a multidisciplinary approach with behavioral health and chronic pain specialists to help prepare for intrapartum pain management and postpartum care. Chronic pain independently can influence pain perception, but providers must also consider the confounding contributions that opioid therapy, withdrawal, and other recreational substances (nicotine, marijuana) used to manage chronic pain might have on pain perception. (A proposed strategy for pain management for patients with mental health disorders is shown in Fig. 1.)

Conclusion

The consequences of severe pain during the peripartum period can have devastating maternal consequences. Mental health

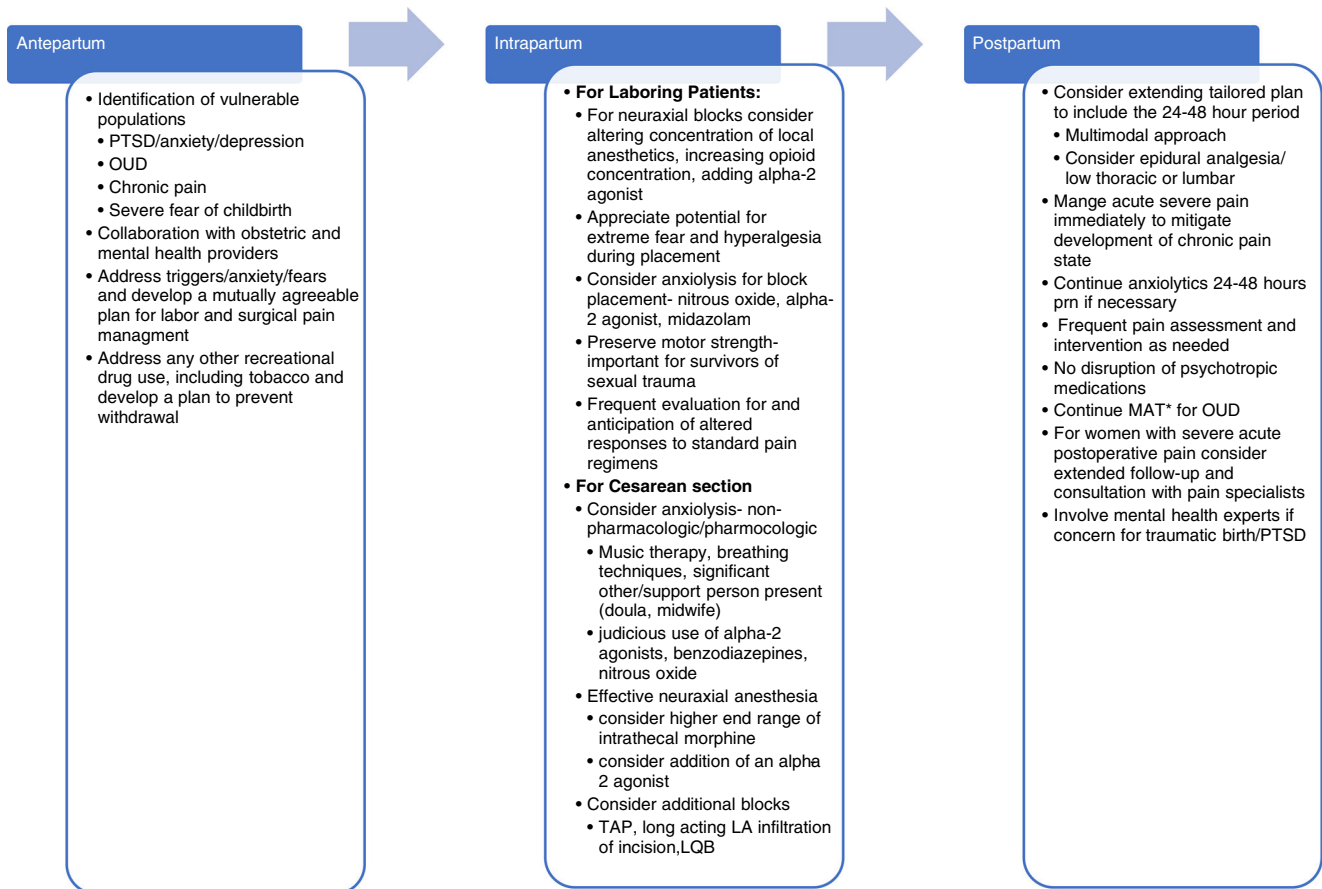


Fig. 1 Proposed guide to optimize early identification and tailoring of pain management strategies for pregnant women with mental health conditions. *Medication-assisted treatment

disorders have been shown to negatively affect pain perception, and now we have a better understanding of how chronic pain and an extreme fear of childbirth might affect pain as well. Obstetric anesthesia providers already recognize the need for specific protocols such as those for OUD, to address individual differences. What is needed now is an expansion of those protocols to include patients with mental health issues and to incorporate multidisciplinary planning that addresses previous fears/concerns, negative pain experiences, and pain perception and expectations. Furthermore, there is now evidence that the complex needs of these patients continue well past the first 24 h and that clear communication and collaboration with obstetric and behavioral health teams will be necessary to continue established regimens. Ultimately, it is important for all providers to realize that effective pain management is not synonymous with maternal satisfaction. It is just one of the many variables that can contribute to a positive birth experience. But, if we learn to ask different questions, allow flexibility and tailoring of plans to suit a woman's needs, and continue to research and understand the safe pharmacologic and non-pharmacologic options available, we will hopefully achieve optimal pain management for each patient and contribute to a positive birth experience.

Compliance with Ethical Standards

Conflict of Interest The author does not have any potential conflicts of interest to disclose.

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- Of importance
- Of major importance

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