



Racial and ethnic disparities in obstetric anesthesia: a scoping review

Disparités raciales et ethniques en anesthésie obstétricale : une étude de portée

Won Lee, MD, ScM · Marina Souto Martins, MD · Ronald B. George, MD, FRCPC · Alicia Fernandez, MD

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Abstract

Purpose Health disparities continue to affect racial and ethnic marginalized obstetric patients disproportionately with increased risk of Cesarean delivery and pregnancy-related death. Yet, the literature on what influences such disparities in obstetric anesthesia service and its clinical outcomes is less well known. We set out to describe racial and ethnic disparities in obstetric anesthesia during the peripartum period in the USA via a scoping review of the recent literature.

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W. Lee, MD, ScM (✉)

Department of Anesthesia and Perioperative Care, University of California San Francisco, 513 Parnassus Avenue, S455E, San Francisco, CA 94143, USA

M. S. Martins, MD

School of Medicine, Universidade de Fortaleza, Fortaleza, Brazil

R. B. George, MD, FRCPC

Department of Anesthesia and Pain Management, Mount Sinai Hospital, Toronto, ON, Canada

Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, ON, Canada

A. Fernandez, MD

Department of Medicine, University of California San Francisco, San Francisco, CA, USA

Zuckerberg San Francisco General Hospital and Trauma Center, San Francisco, CA, USA

Source Using the Institute of Medicine's definition of disparities, we searched the National Library of Medicine's PubMed/Medline, Embase, Web of Science, APA PsycINFO, and Google Scholar for articles published between 1 January 2000 and 30 June 2022 to identify literature on racial and ethnic disparities in obstetric anesthesia.

Principal Findings Out of 8,432 articles reviewed, 15 met our inclusion criteria. All but one study was observational. Seven studies were single-institutional while the remaining used multicentre data/databases. All studies compared two or more race and ethnicity classifications. Studies in this review described disparities in the use of labour epidural analgesia, labour epidural request timing, anesthesia for Cesarean deliveries, postpartum pain management, and epidural blood patch for postdural puncture headaches. Several studies reported disparities observed in the unadjusted models becoming no longer significant when adjusted for other covariates.

Conclusion Based on the findings of the present scoping review on racial and ethnic disparities in obstetric anesthesia, we present an evidence map identifying knowledge gaps and propose a future research agenda.

Résumé

Objectif Les disparités en matière de santé continuent d'affecter de manière disproportionnée les patient-es en obstétrique marginalisé-es sur le plan racial et ethnique, avec un risque accru d'accouchement par césarienne et de décès lié à la grossesse. Pourtant, la littérature sur ce qui influence de telles disparités dans les services d'anesthésie obstétricale et leurs issues cliniques est moins bien connue. Notre objectif était de décrire les disparités raciales et ethniques en matière d'anesthésie obstétricale au cours de

la période péripartum aux États-Unis via une étude de portée de la littérature récente.

Sources En utilisant la définition des disparités de l'Institute of Medicine, nous avons effectué des recherches dans les bases de données PubMed/Medline de la National Library of Medicine, Embase, Web of Science, APA PsycINFO et Google Scholar pour trouver des articles publiés entre le 1^{er} janvier 2000 et le 30 juin 2022, afin d'identifier la littérature sur les disparités raciales et ethniques en anesthésie obstétricale.

Constatations principales Sur 8432 articles examinés, 15 répondaient à nos critères d'inclusion. Toutes les études sauf une étaient observationnelles. Sept études étaient monocentriques tandis que les autres utilisaient des données/bases de données multicentriques. Toutes les études comparaient deux classifications de race et d'origine ethnique ou plus. Les études de cette revue décrivaient des disparités dans l'utilisation de l'analgésie péridurale obstétricale, le moment de la demande pour une péridurale obstétricale, l'anesthésie pour les accouchements par césarienne, la prise en charge de la douleur post-partum et les injections de sang autologue en péridural pour les céphalées post-ponction durale. Plusieurs études ont fait état de disparités observées dans les modèles non ajustés qui n'étaient plus significatives lors de l'ajustement pour tenir compte d'autres covariables.

Conclusion Sur la base des résultats de cette étude de portée sur les disparités raciales et ethniques en anesthésie obstétricale, nous présentons une carte des données probantes identifiant les lacunes dans les connaissances et proposons un futur programme de recherche.

Keywords disparities · obstetric anesthesia · scoping review · value-concordancy

The field of obstetric anesthesia has evolved over the last decades to encompass comprehensive aspects of maternal care, including antepartum assessment for high-risk patients, safe administration of analgesia and anesthesia during labour and delivery, maternal resuscitation, and improving patient satisfaction.¹ These efforts have led to a substantial reduction in anesthesia-related maternal mortality and morbidity while improving peripartum pain management.^{2–4} Despite multidisciplinary efforts to improve maternal safety, significant health care disparities continue to disproportionately impact pregnant patients within racial and ethnic marginalized groups in the USA.^{5,6}

Based on the analysis of national data, Black patients have a 2.4–3.3-times higher risk for pregnancy-related

deaths than White patients do. This is despite having a similar prevalence of preeclampsia/eclampsia, placenta previa, or postpartum hemorrhage, which are known to be peripartum mortality risk factors, with increased disparity in older and college-educated patients.^{7,8} Among low-risk primiparous patients, Black and Asian patients had higher rates of Cesarean delivery than White patients did.⁹ Hospital policies may also disproportionately impact the birth experience of Latino/Hispanic parturients by limiting access to a diverse support network, which further complicated care during the pandemic.¹⁰

The literature on racial and ethnic health disparities related to obstetric anesthesia service provision or clinical outcomes appears to be less well known. Therefore, we set out to 1) describe the characteristics of quantitative studies on racial and ethnic health care disparities in obstetric anesthesia in the USA, 2) summarize the nature of the observed associations, and 3) propose a future research agenda to address key knowledge gaps via a scoping review of the literature. Given the presumed limited and heterogeneous nature of research in this field to date, we considered it impractical to perform a systemic review or to quantify the influence of race and ethnicity on disparities in obstetric anesthesia. Instead, we employed a scoping review, a process of mapping the extent and nature of research activities in a specific subject area.¹¹

Methods

We adhered to the Preferred Reporting Items for Systemic Reviews and Meta-Analysis extension for Scoping Review standards (PRISMA-ScR).¹²

Information source

We systemically searched the National Library of Medicine's PubMed/Medline, Embase, Web of Science, APA Psycinfo, and Google Scholar for relevant articles published in peer-reviewed journals in the English language between 1 January 2000 and 30 June 2022. We chose these dates to focus on recent literature in obstetric anesthesia. We manually searched the reviewed articles' reference lists for additional relevant studies.

Eligibility criteria

We included all relevant clinical trials (randomized and nonrandomized) and observational studies (prospective and retrospective) that examined health care disparities by race and ethnicity in obstetric anesthesia. We defined racial and ethnic disparities per the Institute of Medicine as differences in the quality of health care that are not due

to access-related factors or clinical needs, preferences, and appropriateness of intervention.¹³ These include both personal and systematic factors that may contribute to said disparities including language barriers, availability of care, and complex clinical situations. Due to the heterogeneous nature of racial and ethnic health disparities in different nations, we specifically selected health care disparity studies focused on the USA.

The studies had to include race or ethnicity as a predictor variable, with two or more race/ethnic categories for comparison. Outcomes had to be related to one or both of the following aspects of obstetric anesthesia: 1) service provision of anesthesia during routine peripartum care, including, but not limited to, care provided during labour and delivery (labour epidurals and anesthetic care for Cesarean deliveries) and 2) clinical outcomes, that is, the management of peripartum anesthesia complications, conversion to general anesthesia, postdural puncture headache, and postpartum pain. We did not impose a minimum sample size for study inclusion.

Search

We consulted with a medical librarian in designing our search. We used keywords to search each database, with search combined terms related to 1) anesthesia, 2) health disparities and/or race and/or ethnicity, and 3) obstetric and/or peripartum. The keywords used to search the databases are available in Electronic Supplementary Material (ESM) eAppendix 1.

Selection of sources of evidence and data charting process

The articles identified during the search were initially merged into Mendeley Reference Manager (London, UK). Two reviewers screened the articles for eligibility by title and abstract. Reviewers were instructed to categorize articles as include, exclude, and possible. For inclusion in the study, an article must have been published after 1 January 2000; been written in English; been limited to the USA; and compared more than one racial/ethnic group. After initial screening, articles categorized for inclusion or possible inclusion were uploaded onto Rayyan (Qatar Computing Research Institute, Ar-Rayyan, Qatar), a web- and mobile-based systemic review software that allows for blinded screening between reviewers.¹⁴ Two authors (W. L. and M. S.) independently evaluated publications uploaded to Rayyan by evaluating their full manuscripts. Disagreements on the articles' eligibility were resolved by discussion among the evaluators, with a third blinded author (A. F.) available for adjudication. Data on primary author's name, publication year, study design, racial and

ethnic groups evaluated in the study, outcome measures, and study findings were extracted.

Conceptual framework for evidence mapping

We conceptualized the evidence map of this review by adapting the framework Kilbourne *et al.* proposed.¹⁵ This framework guides health disparities research by understanding multilevel determinants of disparities, including patient and provider factors, health care system culture and issues, and individual beliefs and preferences. We organized the literature by phases of peripartum care (ante-partum, labour and delivery, and postpartum) and proposed future research to address gaps of knowledge based on the framework.

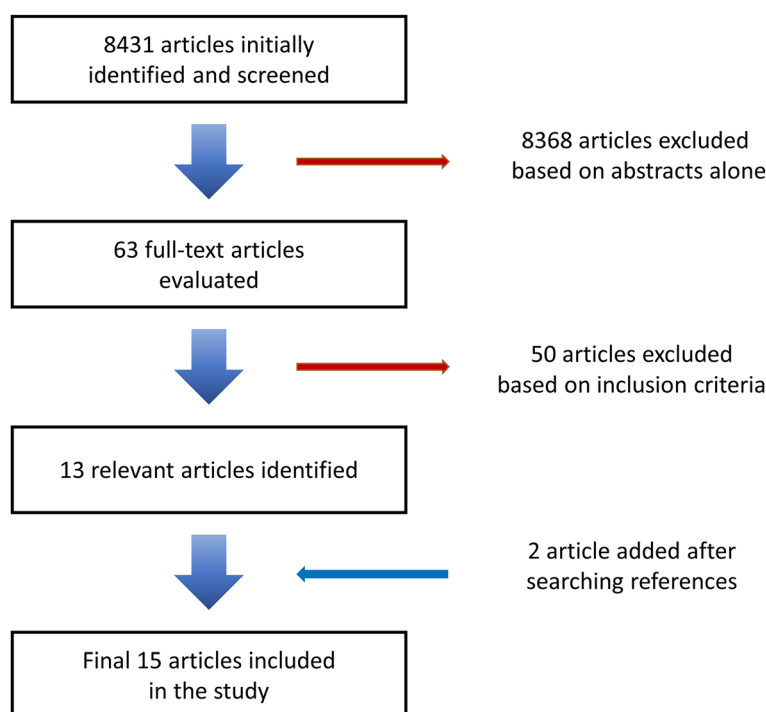
Results

Study characteristics

From title and abstract screening of the database search, we identified 8,432 articles. Of these, 63 articles were uploaded to Rayyan for full-text reviews, and 15 articles that met the criteria were included in the final analysis (Fig. 1). Most sample sizes ranged from 200 to 81,883 with one retrospective study including 1,159,035 participants, for a total of 1,372,083 included in this review. Studies focused on various aspects of obstetric anesthesia with anesthetic and analgesic management during labour and delivery being the most common focus. A few studies evaluated disparities in postpartum pain management and one study evaluated disparities in managing postdural puncture headaches (Table).

All 15 studies used non-Hispanic White as a reference race/ethnicity category. Two studies evaluated race and ethnicity (Hispanic vs non-Hispanic) separately,^{16,17} but otherwise, all other studies combined race and ethnicity into one category. All 15 studies included in this review compared Hispanic patients with the reference category, 13 studies included non-Hispanic Black, and six studies included an Asian patient category. Some studies combined several racial/ethnic groups because of small sample sizes. The terminology of race/ethnicity classification differed. Some studies specifically used the term non-Hispanic White, while other studies used the terms Caucasian or White. Similarly, studies used either African Americans, Black or non-Hispanic Black. In this review, we retained the terminology as presented in each study. The detailed summary of study outcomes, adjustments, and findings are available in ESM eAppendix 2.

Fig. 1 A flowchart of the screening and eligibility evaluation process



Use of labour epidural analgesia

Seven studies examined the association of race and ethnicity in labour epidural analgesia use.^{16,18–23} Six were observational studies and one was a parallel cohort study. Among six observational studies, two used single tertiary academic centre data^{18,19} while four used state(s) or national databases.^{16,20–22} Five studies explicitly stated that race and ethnicity were self-reported.^{16,18–21} One study did not specify how race and ethnicity data were obtained. One study used the Healthcare Cost and Utilization Project database where reporting of information on race and ethnicity can vary by hospital.

Each study adjusted for different covariates. Of these, maternal age (four studies), insurance status (three studies), and socioeconomic indicators (three studies) were the most adjusted variables. Maternal and pregnancy conditions, including maternal comorbidities, pregnancy-related complications (two studies), parity (two studies), and hospital indicators including metropolitan status, number of anesthesiologists per capita (one study), and language (one study) were also considered as covariates.

All seven studies compared Hispanic patients to non-Hispanic White patients. One study considered Hispanic as an ethnicity rather than combining race and ethnicity together.¹⁶ Among six observational studies, three found Hispanic patients were less likely than non-Hispanic White patients to receive labour epidural analgesia (adjusted odd

ratio [aOR] range, 0.44–0.80) after adjusting for covariates. Caballero *et al.* found no difference in labour epidural use after adjusting for language.¹⁹ Glance *et al.* noted that, although Hispanic patients were less likely to receive labour epidural analgesia (aOR, 0.85; 95% CI, 0.78 to 0.93; $P < 0.001$), after adjusting for insurance type, only Hispanic patients with Medicaid were less likely than non-Hispanic White patients to receive labour epidural analgesia.²¹

In a parallel cohort study, Togioka *et al.* examined if a language-concordant education program would improve the epidural use rate and decrease misconceptions regarding labour epidural analgesia.²³ In two separate cohorts of 100 Hispanic and 100 non-Hispanic patients, the authors found that Hispanic education groups were more likely to choose epidural compared with the control group (relative risk [RR], 1.33; 95% CI, 1.02 to 1.74; $P = 0.03$), but no difference was detected in the non-Hispanic cohort (RR, 0.96; 95% CI, 0.80 to 1.14; $P = 0.62$).²³ Patients assigned to the education group had a greater improvement in epidural understanding for both the Hispanic and the non-Hispanic cohort.

Five studies evaluated labour epidural use among non-Hispanic Black patients with mixed findings.^{18–22} Three database studies all noted non-Hispanic Black patients were less likely to use labour epidural analgesia (aOR range, 0.49–0.79).^{20–22} Two studies using tertiary academic centre data noted no difference compared with non-Hispanic White patients (aOR range, 0.93–1.28).^{18,19}

Table Publications included in the study

Publication	Study design	Patients (<i>N</i> = 1,372,083)	
Atherton <i>et al.</i> (2004) ¹⁶	Retrospective cohort study	1,003 (W = 799; H = 339; O = 204) [†]	
Toledo <i>et al.</i> (2012) ¹⁸	Prospective cohort study	509 (NHW = 320; H = 116; NHB = 73)*	
Caballero <i>et al.</i> (2014) ¹⁹	Retrospective cohort study	3,129 (NHW = 908; NHB = 72; H = 1,367; A = 725; O = 57)*	
Rust <i>et al.</i> (2004) ²⁰	Retrospective cohort study	29,833 (NHW = 13,849; NHB = 13,930; H = 1,473; A = 440)*	
Glance <i>et al.</i> (2007) ²¹	Retrospective cohort study	81,883 (NHW = 64,358; H = 3,607; NHB = 11,400; A = 429; O = 2,089)*	
Togioka <i>et al.</i> (2019) ²³	Randomized controlled parallel cohort study	200 (NHW = 100; H = 100)*	
Tangel <i>et al.</i> (2020) ²²	Retrospective observational study	1,159,035 (NHW = 569,330; NHB = 175,951; H = 192,761; O = 208,484; M = 12,509)*	
Wilson <i>et al.</i> (2014) ²⁴	Prospective observational study	380 (NHW = 168; NHB = 161; H = 51)*	
Butwick <i>et al.</i> (2015) ²⁴	Prospective observational study	11,539 (NHW = 5,288; NHB = 3,671; H = 2,034; O = 546)*	
Butwick <i>et al.</i> (2016) ²⁵	Retrospective cohort study	50,974 (NHW = 21,113; NHB = 14,338; H = 12,990; O = 2,533)*	
Burton <i>et al.</i> (2021) ¹⁷	Retrospective observational study	12,876 (NHW = 6,279; NHB = 1,306; A = 784; O = 156; M = 4,351)*	
Johnson <i>et al.</i> (2019) ²⁶	Retrospective cohort study	1,701 (NHW = 705; NHB = 431; A = 85; H = 349; O = 131)*	
Badreldin <i>et al.</i> (2019) ²⁷	Retrospective cohort study	9,900 (NHW = 6,771; H = 2,079; NHB = 1,050)*	
Felder <i>et al.</i> (2022) ²⁸	Retrospective cohort study	200 (NHW = 54; NHB = 91; H = 33; A = 16; O = 6)*	
Lee <i>et al.</i> (2022) ²⁹	Retrospective observational study	8,921 (NHW = 4,960; NHB = 1,028; H = 1,301; O = 1,359; M = 273)*	
Publication	Outcome(s)	Adjustments	Findings
Atherton <i>et al.</i> (2004) ¹⁶	Use of labour epidural analgesia	Age, insurance, pregnancy complications	<ul style="list-style-type: none"> • H less likely to receive labour epidural analgesia • No significant difference for NW
Toledo <i>et al.</i> (2012) ¹⁸	Use of labour epidural analgesia	Age, type of labour, marital status, socioeconomic indicators	<ul style="list-style-type: none"> • No significant difference for H and NHB
Caballero <i>et al.</i> (2014) ¹⁹	Use of labour epidural analgesia	Insurance, parity, language	<ul style="list-style-type: none"> • Language adjusted, no significant difference for H; • NHB less likely to receive labour epidural analgesia; • No significant difference for A and O
Rust <i>et al.</i> (2004) ²⁰	Use of labour epidural analgesia	Age, metropolitan status, number of anesthesia providers per capita	<ul style="list-style-type: none"> • H, NHB, and A less likely to receive labour epidural analgesia
Glance <i>et al.</i> (2007) ²¹	Use of labour epidural analgesia	Clinical risk factors, parity, socioeconomic indicators, provider effects	<ul style="list-style-type: none"> • H and NHB less likely to receive labour epidural analgesia
Togioka <i>et al.</i> (2019) ²³	Use of labour epidural analgesia	N/A	<ul style="list-style-type: none"> • Language concordant education improves labour epidural use for H but not for NHW
Tangel <i>et al.</i> (2020) ²²	Use of labour epidural analgesia Anesthetic for Cesarean delivery	Age, insurance, socioeconomic indicators, hospital-related metrics	<ul style="list-style-type: none"> • H, NHB, and O less likely to receive labour epidural analgesia • H, NHB, and O more likely to receive general anesthesia for Cesarean delivery
Wilson <i>et al.</i> (2014) ²⁴	Epidural request timing	Parity, education level, insurance status, labour augmentation, use of <i>iv</i> pain medication, labour plan, history of prior labour epidural, mode of delivery, and obstetric services	<ul style="list-style-type: none"> • H and NHB no difference in timing of labour epidural request related to cervical dilation at the time of epidural request.

Table continued

Publication	Outcome(s)	Adjustments	Findings
Butwick <i>et al.</i> (2015) ²⁴	Anesthetic for Cesarean delivery	Maternal age, BMI, gestational age, multiple gestations, pregnancy complications, primary Cesarean delivery, emergency indications	<ul style="list-style-type: none"> • H, NHB, and O more likely to receive general anesthesia for Cesarean delivery
Butwick <i>et al.</i> (2016) ²⁵	Anesthetic for Cesarean delivery	Maternal age, insurance, gestational age, multiple gestation, intrapartum Cesarean delivery, primary Cesarean delivery, hypertensive disorder of pregnancy, emergency nature of Cesarean	<ul style="list-style-type: none"> • H, NHB, and O more likely to receive general anesthesia for Cesarean delivery
Burton <i>et al.</i> (2021) ¹⁷	Anesthetic for Cesarean delivery	Age, primary Cesarean, emergency indication for Cesarean, maternal comorbidities, ASA score	<ul style="list-style-type: none"> • NHB, AI more likely to receive general anesthesia for Cesarean delivery • No significant difference for H, A, PI
Johnson <i>et al.</i> (2019) ²⁶	Postpartum pain score & postpartum opioid analgesia & postpartum pain assessment	Maternal age, BMI, gestational age, parity, history of prior Cesarean, type of hysterotomy, NICU admission,	<ul style="list-style-type: none"> • H, NHB, A—lower number of pain assessments • H, NHB, A, O—lower amount of opioid medication • NHB more likely to experience severe postpartum pain
Badreldin <i>et al.</i> (2019) ²⁷	Postpartum pain score & postpartum opioid analgesia & opioid prescription at discharge	Maternal age, BMI, gestational age, parity, insurance, marital status, substance use/psychiatric history, mode of delivery	<ul style="list-style-type: none"> • H, NHB more likely to experience severe postpartum pain • H, NHB—lower amount of opioid medication • H, NHB less likely to receive opioid prescription
Felder <i>et al.</i> (2022) ²⁸	Postpartum pain score & postpartum opioid analgesia & postpartum pain assessment	N/A	<ul style="list-style-type: none"> • After establishing ERAS, no difference on postpartum pain score, amount of opioid medication received, and number of pain assessments
Lee <i>et al.</i> (2022) ²⁹	Epidural blood patch for postdural puncture headache	21 patient/hospital comorbidity index including age, obesity, and insurance	<ul style="list-style-type: none"> • NHB, O less likely to receive epidural blood patch • No significant difference for H

*NHW = non-Hispanic White; NHB = non-Hispanic Black; H = Hispanic; A = Asian; O = other patients (includes “other” category, Native American and Alaskan Native, and Native Hawaiian and Pacific Islanders); M = missing

†Race and ethnicity separately categorized. W = White; H = Hispanic; NW = non-White

Insurance type did not influence the lower odds of non-Hispanic Black patients receiving labour epidural analgesia.²¹

Three studies compared Asian patients (aOR range, 0.31–1.10),^{19–21} three studies compared other patients (aOR range, 0.70–1.66),^{19,21,22} one study compared Native American patients (aOR, 0.97; 95% CI, N/A; $P = 0.86$),²¹ and one study compared non-White patients to non-Hispanic White patients (aOR, 0.92; 95% CI, 0.78 to 1.28; $P = N/A$).²² Similar to non-Hispanic Black patients, one study based on tertiary academic centre found no difference¹⁹ while studies based on a large database found Asian and other patients to have less odds of receiving labour epidural analgesia.^{20–22}

Labour epidural request timing

One study examined the correlation between parturient’s self-identified race and ethnicity and timing of labour epidural request, using cervical dilation as a time point.²⁴

The study excluded those with contraindications to labour epidural, emergency situations, and planned Cesarean deliveries. They also considered parity, education level, insurance status, labour augmentation, use of *iv* pain medications, labour plan, history of prior labour epidural, mode of delivery, and obstetric services as covariates. The study did not find any significant difference in timing of labour epidural request related to cervical dilation for both Hispanic ethnicity (Beta, 0.50; 95% CI, -0.10 to 1.20;

$P = 0.09$) and African American race (Beta, 0.00; 95% CI, -0.50 to 0.50; $P = 0.96$) patients. Instead, patients with education beyond high school (Beta 0.70; 95% CI, 0.20 to 1.20; $P = 0.01$), labour augmentation (Beta 0.70; 95% CI, 0.30 to 1.10; $P < 0.001$), and those who underwent operative delivery (Beta 1.20; 95% CI, 0.70 to 1.70; $P < 0.001$) were likely to request labour epidural at earlier cervical dilation.²⁴

Anesthesia for Cesarean delivery

Four studies examined racial and ethnic difference in anesthetic choice for Cesarean deliveries. Two studies used national databases^{17,22} and two others studies used multicentre data.^{25,26} Only one paper specified that race and ethnicity were self-reported.¹⁷ All four studies compared both Hispanic and non-Hispanic Black patients to non-Hispanic White patients. Three studies compared non-Hispanic other patients,^{22,25,26} although Butwick *et al.* combined Asian and Native American and Alaskan Natives into the other category because of small sample sizes.²⁶ Burton *et al.* separately evaluated Asian, Native Hawaiian and Pacific Islander, and American Indian and Alaska Native patients.¹⁷

Studies evaluated different covariates. Maternal age (three studies), hypertensive disorder of pregnancy (three studies), history of prior Cesarean delivery (three studies), and emergency indication for Cesarean delivery (three studies) were commonly adjusted variables. Insurance status (two studies), gestational age (two studies), multiple gestation (two studies), attempted labour or induction of labour (two studies), American Society of Anesthesiologists Physical Status classification score, fetal presentation, median income, premature rupture of membrane, and other hospital-related (delivery volume, safety net status) and maternal comorbidities (active smoker, diabetes, and bleeding disorder) were included for adjustments (one study each).

For Hispanic patients, three studies combined race and ethnicity.^{22,25,26} These three studies reported an increased risk of general anesthesia for Hispanic patients during their Cesarean deliveries (aOR range, 1.00 to 1.80) compared with non-Hispanic White patients, after adjusting for covariates. Burton *et al.* evaluated Hispanic as an ethnicity separate from the racial categories and found Hispanic ethnicity was not associated with a significant difference in general anesthesia for Cesarean delivery (aOR, 0.80; 95% CI, 0.63 to 1.00; $P = 0.06$).¹⁷

Studies found non-Hispanic Black (four studies, aOR range, 1.41–1.90)^{17,22,25,26} and non-Hispanic other (three studies, aOR range, 1.20–1.54)^{22,25,26} race was associated with an increased risk of general anesthesia for Cesarean delivery after adjusting for covariates. Burton *et al.* found

Asians (aOR, 0.71; 95% CI, 0.47 to 1.01; $P = 0.07$), and Native Hawaiian and Pacific Islanders (aOR, 1.54; 95% CI, 0.67 to 3.03; $P = 0.27$) were not associated with an increased risk of general anesthesia for Cesarean delivery. Nevertheless, American Indian or Alaska Native race (aOR, 4.55; 95% CI, 2.50 to 8.33; $P < 0.001$) was associated with an increased risk of general anesthesia for Cesarean delivery even after adjustments.¹⁷

Two studies performed sensitivity analyses excluding patients who received neuraxial anesthesia prior to general anesthesia.^{25,26} In both studies, Hispanic, non-Hispanic Black, and non-Hispanic other patients were still at increased risk of general anesthesia even after the adjustments. No studies provided reasons for failed neuraxial anesthesia.

Postpartum pain management

Three studies examined the racial and ethnic disparities in postpartum pain management.^{27–29} All three studies used single-institution data. Two studies specified that race and ethnicity were self-reported.^{27,28} All three studies compared both Hispanic and non-Hispanic Black patients with non-Hispanic White patients. Two studies compared non-Hispanic Asian patients^{27,29} and one study evaluated non-Hispanic other patients.²⁷ The outcome measures included postpartum pain level (all three studies), amount of postpartum opioid administered (three studies), number of postpartum pain assessments that may serve as a proxy for provider bias (two studies), and whether a patient received an opioid prescription at the time of hospital discharge (one study). In the study by Felder *et al.*, racial and ethnic comparisons were a secondary analysis with the primary goal being pre–post comparison of postpartum pain management after establishing an Enhanced Recovery After Surgery (ERAS) protocol.

The studies had various exclusion criteria, including general anesthesia,^{27,28} opioid use disorder,^{27,28} emergency or intrapartum Cesarean deliveries,²⁹ patient-controlled analgesia,²⁷ intensive care unit admission,²⁸ prolonged postpartum admission,²⁷ missing demographic information,²⁷ and hysterectomy.^{27,28} One of the two studies reporting hysterectomy as an exclusion criteria specified Cesarean hysterectomy²⁷ but the other did not.²⁸

Johnson *et al.* and Badreldin *et al.* evaluated different covariates.^{27,28} Both studies evaluated maternal age, body mass index, gestational age, parity, and previous Cesarean delivery. Johnson *et al.* also evaluated type of hysterectomy and neonatal intensive care admission while Badreldin *et al.* further evaluated insurance type, marital status, prior substance/psychiatric history, and the mode of the delivery. Felder *et al.* did not control for other covariates in their analysis of racial and ethnic disparities. No paper adjusted

for pain level when evaluating the amount of postpartum analgesia.^{27,29}

Although all three papers evaluated Hispanic patients, the results varied. For postpartum pain level, one study found that Hispanic patients were more likely to suffer a severe postpartum pain level (5 or greater on 0–10 visual analog scale) than non-Hispanic White patients (aOR, 1.61; 95% CI, 1.26 to 2.06; $P < 0.001$),²⁸ while another found no significant difference ($P = 0.32$) in prevalence of first 24 hr severe postpartum pain level, although this study used a score of 7 or greater as a cutoff for severe pain.²⁷ Felder *et al.* also noted no significant difference in pain level after establishing an ERAS protocol. One study noted Hispanic patients were likely to receive fewer pain assessments,²⁷ but the other study found no differences.²⁹ Two studies found Hispanic patients were likely to receive a lower amount of postpartum opioids^{27,28} while one study found no differences.²⁹ Badreldin *et al.* also found that Hispanic patients were less likely to receive opioid prescription at the time of discharge (aOR, 0.80; 95% CI, 0.67 to 0.96; $P < 0.001$).

Two studies^{27,28} found non-Hispanic Black patients were more likely to suffer severe postpartum pain (Badreldin *et al.*: aOR, 2.18; 95% CI, 1.63 to 2.91; $P < 0.001$) and receive fewer postpartum opioid, while one noted no difference.²⁹ Non-Hispanic Black patients were also less likely to receive opioid prescription at the time of discharge (aOR, 0.78; 95% CI, 0.62 to 0.98; $P < 0.001$).²⁸ Studies disagreed on the difference in postpartum pain assessment between non-Hispanic Black patients and non-Hispanic White patients.^{27,29} Both non-Hispanic Asian and non-Hispanic other patients received fewer postpartum opioids than non-Hispanic White patients did, although only the non-Hispanic Asian patients were likely to receive fewer pain assessments and less likely to complain of a severe postpartum pain level.²⁷

Epidural blood patch for postdural puncture headaches

Using the New York database, Lee *et al.* conducted a cross-sectional study to evaluate the association of race and ethnicity with the frequency and timing of the epidural blood patch for managing postdural puncture headaches.³⁰ The authors did not specify whether race and ethnicity were self-reported. The authors compared Hispanic, non-Hispanic Black, and non-Hispanic other after combining Asian or Pacific Islanders and Native American patients as others due to low counts. After adjusting for age, insurance, obesity, obstetric comorbidity index, Cesarean delivery, neuraxial contraindications, and hospital characteristics, the authors found the odds of receiving an epidural blood patch was lower for non-Hispanic Black (aOR, 0.80; 95% CI, 0.67 to 0.94; $P = \text{NA}$) and other (aOR, 0.85;

95% CI, 0.73 to 0.99; $P = \text{NA}$) patients when compared with non-Hispanic White patients, but not for Hispanic patients (aOR, 1.11; 95% CI, 0.94 to 1.30; $P = \text{NA}$). The authors also noted that the epidural blood patch occurred at a later time point for Hispanic, non-Hispanic Black, and non-Hispanic other patients.³⁰

Discussion

In this scoping review, we summarized the existing literature on racial and ethnic disparities in obstetric anesthesia. We found a limited number of studies in the field; those that existed were primarily focused on the use of anesthesia and analgesia during labour and delivery. The literature focused predominantly on comparing Hispanic and non-Hispanic Black patients with non-Hispanic White patients. Taken as a whole, both Hispanic and non-Hispanic Black patients are more likely to undergo general anesthesia for Cesarean deliveries, and both Hispanic and non-Hispanic Black patients receive fewer postpartum pain assessments than non-Hispanic White patients do and are less likely to receive postpartum opioid analgesia or opioid prescription at the time of discharge.

The data on labour epidural use by Hispanic and non-Hispanic Black patients were mixed. Two studies that used data from urban academic centres found no significant difference in labour epidural use by Hispanic and non-Hispanic Black patients, while studies using larger database studies found Hispanic and non-Hispanic Black race were associated with lower labour epidural use rate. This may represent differences in the institutions' population size. Academic centres also tend to perform better on providing quality patient experience, services, and equitable treatment.^{31,32}

Studies in this review considered heterogeneous covariates, making it challenging to draw large-scale conclusions or compare results between the studies. Several studies in this review reported racial and ethnic disparities observed in their unadjusted models becoming no longer significant when adjusted for other covariates such as socioeconomic indicators and language.^{18,19,26}

The preference of labour pain management options is unique for each patient and may be affected by individual, cultural, and religious beliefs.³³ Active engagement between the patients and the clinicians helps to facilitate a shared decision-making process. Language barriers and limited access to health services may preclude disadvantaged patients from making an informed decision about their peripartum care. Nevertheless, it is imperative for health care providers to ensure that patient preferences are not grounded in transient beliefs based on unequal

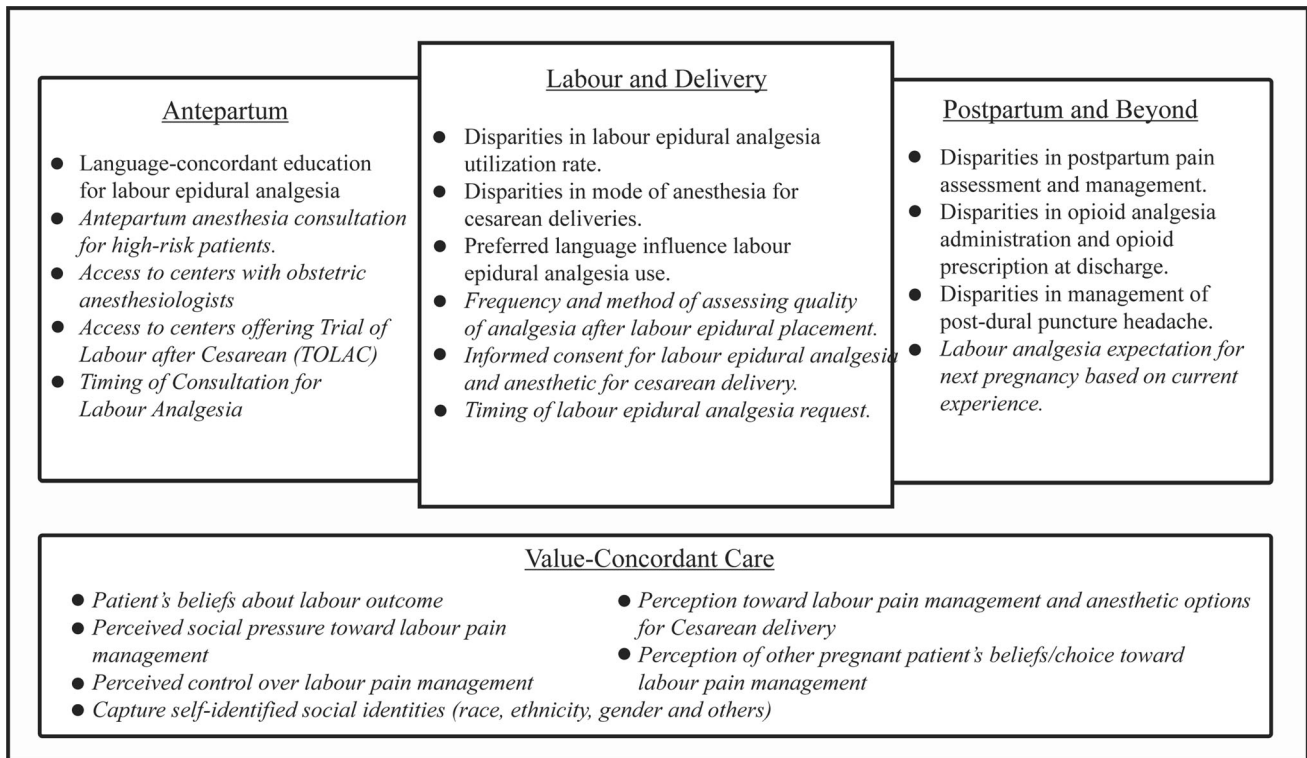


Fig. 2 An evidence map of racial and ethnic disparities in obstetric anesthesia. *Italics* indicate recommended future research efforts.

access to health care or misperceptions of the risks and the benefits associated with care provided.

Evidence map and future research agenda

In Fig. 2, we provide an evidence map for racial and ethnic disparities in obstetric anesthesia. The map highlights current literature on racial and ethnic disparities in obstetric anesthesia and provides insights on gaps in the literature. Therefore, we organized the evidence by phases of peripartum care and we propose topics for future research (in italics) with recommendations as follows.

- *Assess for value concordance of obstetric anesthesia care provided.* Value-concordant care, or how well the medical management or treatment aligns with the patient's preferences,³⁴ highlights that a clinical decision is unique for each patient. Patients may choose to decline labour epidural analgesia.^{35–37} Among nulliparous patients, those who planned to receive labour epidural analgesia had significantly higher rates of epidural use than those who did not.³⁸ Discouragement from family and friends was cited as one of the major reasons for declining labour epidural among the predominantly Hispanic population.³⁹ Considering most of the studies included in this review were observational studies, it is difficult to

measure the patient's intent or preference in receiving labour epidural. Nevertheless, it is important to ensure that preferences are not grounded in transient beliefs based on unequal access to health care or misperceptions of the risks and benefits.⁴⁰

- *Determine if a language barrier modulates racial and ethnic disparities in obstetric anesthesia.* Language barriers have been associated with decreased patient comprehension, deferring necessary clinical care, and poor adherence to treatment recommendations.^{41–43} Nevertheless, language barriers can be addressed. Future work should examine if language access with concordant clinicians or via professional interpreters could mitigate racial and ethnic disparities in obstetric anesthesia.
- *Explore potential disparities other racial and ethnic groups experience.* Six studies evaluated Asian patients. Only one study separately categorized Native Americans. Butwick *et al.* combined Asians, Native Americans, and Alaskans into an "other" group. Although race and ethnicity are considered a proxy to measuring cultural, social, and environmental influences on health,⁴⁴ current patterns of racial and ethnic heterogeneity in the USA, with increasing prevalence of multiracial and multiethnic population, may present challenges for using existing racial and ethnic classification to draw meaningful conclusions.⁴⁵

In fact, “some other race,” which was intended to be a small residual category in the U.S. census survey, became the third largest race group in 2010.⁴⁶

- *Evaluate for systemic bias.* All studies included in this review focused on a labouring patient as a subject of analysis. Future studies should consider evaluating the effect of a potential systemic bias on racial and ethnic disparities in obstetric anesthesia. Limited access to health care centres with trained anesthesia providers could contribute to inequity of care. Furthermore, provider bias has been associated with systemic racism and poor clinical outcomes in other health care arenas.⁴⁷ Providers have obligations to ensure patients can make appropriate decisions regardless of their health literacy or language barrier by developing an individualized approach to patient interaction.⁴⁸
- *Explore disparities beyond labour and delivery encounters.* As the role of obstetric anesthesiologists expands beyond providing intrapartum care, studies should focus on identifying potential disparities in the antepartum and postpartum settings. Inequity in accessing high-risk antepartum management may predispose patients to an increased risk of significant peripartum mortality. Antenatal consultation has also shown to reduce decisional conflict among a patient planning vaginal delivery.⁴⁹ Disparities in referral may affect decision-making processes and lead to poor outcomes or satisfaction.
- *Explore regional and state-by-state differences in racial and ethnic disparities.* Within the USA, there are heterogeneous state patterns in racial and ethnic disparities. Some states have greater racial income, life expectancy and health insurance gaps than others.⁵⁰ Studies done in one region of the USA should not be generalized to other regions and future efforts should focus on exploring regional variation in racial and ethnic disparities of obstetric anesthesia.
- *Standardize the collection and reporting of one’s race and ethnicity.* Out of 15 studies, nine explicitly stated that race and ethnicity was self-reported. As race and ethnicity are social constructs, self-identification is the most accurate way to capture the data. Even then, no studies described the method in which self-reporting of race and ethnicity occurred, whether it be checkboxes or open-ended text fields. There are inherent challenges in collecting and presenting race and ethnicity data.⁵¹ Flanagan *et al.* recently published an editorial in JAMA with recommendations and suggestions on reporting of race and ethnicity in medical and scientific studies.⁵² Race and

ethnicity, as social constructs, continue to evolve and their use in research continues to be interrogated.

This review has several limitations. We intentionally only included USA-based studies and those published in English. Racial and ethnic disparities are products of social constructs and investigations on other nations warrant separate reviews. We also did not exhaustively search social science databases or evaluate grey literature for inclusion in this review, and we only included quantitative studies. Our search focused on five databases that contain a large bulk of the health and clinical evidence. Second, although we focused on health services or outcomes related to obstetric anesthesia, clinical decisions for labouring patients are shared between anesthesiologists, obstetricians, and other stakeholders.⁶ Findings may reflect clinical views or systematic issues outside of obstetric anesthesia. We also searched for articles published in 2000 and beyond and may have missed key articles published earlier. Finally, because observational studies generally do not lend themselves to the commonly used quality assessment scales, data interpretation and practice recommendations are limited.^{53,54}

Despite these limitations, this scoping review provides a synthesis of recent literature on racial and ethnic disparities in obstetric anesthesia in the USA. We found evidence of large differences in key facets of obstetric anesthesia care, including pain management. Further work is needed to examine these differences in consideration of patient preferences and expectations.

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