Published in final edited form as:

Anesth Analg. 2015 October ; 121(4): 974–980. doi:10.1213/ANE.0000000000000546.

Women's Experiences with Neuraxial Labor Analgesia in the Listening to Mothers II Survey: A Content Analysis of Open-Ended Responses

Laura Attanasio, BA,

Health Policy and Management, University of Minnesota School of Public Health, Minneapolis, Minnesota

Katy B. Kozhimannil, PhD, MPA,

Health Policy and Management, University of Minnesota School of Public Health, Minneapolis, Minnesota

Judy Jou, MA,

Health Policy and Management, University of Minnesota School of Public Health, Minneapolis, Minnesota

Marianne E. McPherson, PhD, MS, and

National Institute for Children's Health Quality, Boston, Massachusetts

William Camann, MD

Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts

Corresponding Author: Laura Attanasio, BA, Health Policy and Management, University of Minnesota School of Public Health, 420 Delaware St. SE, MMC 729, Minneapolis, MN 55455, Telephone: 612-624-6151, Fax: 612-624-2196, attan002@umn.edu.

DISCLOSURES:

Name: Laura Attanasio, BA

Contribution: Ms. Attanasio designed the study, conducted the analysis and led the writing.

Attestation: Ms. Attanasio approved the final manuscript and attests to the integrity of the data and the analysis reported in this manuscript, and is the archival author responsible for maintaining the study records.

Name: Katy B. Kozhimannil, PhD, MPA

Contribution: Dr. Kozhimannil participated in designing the study, interpreting the results, and writing the manuscript.

Attestation: Dr. Kozhimannil approved the final manuscript and attests to the integrity of the data and the analysis reported in this manuscript.

Name: Judy Jou, MA

Contribution: Ms. Jou conducted the qualitative analysis, participated in interpreting the findings, and helped prepare the manuscript.

Attestation: Ms. Jou approved the final manuscript.

Name: Marianne E. McPherson, PhD, MS

Contribution: Dr. McPherson directed the qualitative analysis, participated in interpreting the findings, and helped prepare the manuscript.

Attestation: Dr. McPherson approved the final manuscript.

Name: William Camann, MD

Contribution: Dr. Camann helped design the study, interpret the results, and prepare the manuscript.

Attestation: Dr. Camann approved the final manuscript.

This manuscript was handled by: Cynthia A. Wong, MD

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

The authors declare no conflicts of interest.

Reprints will not be available from the authors.

Abstract

Background—Most women who give birth in United States (US) hospitals receive neuraxial analgesia to manage pain during labor. In this analysis we examined themes of the patient experience of neuraxial analgesia among a national sample of US mothers.

Methods—Data are from the Listening to Mothers II survey, conducted among a national sample of women who delivered a singleton baby in a US hospital in 2005 (N=1,573). Our study population consisted of women who experienced labor, did not deliver by planned cesarean, and who reported neuraxial analgesia use (n = 914). We analyzed open-ended responses about the best and worst parts of women's birth experiences for themes related to neuraxial analgesia using qualitative content analysis.

Results—Thirty-three percent of women (n=300) mentioned neuraxial analgesia in their open-ended responses. We found that effective pain relief was frequently spontaneously mentioned as a key positive theme in women's experiences with neuraxial analgesia. However, some women perceived timing-related challenges with neuraxial analgesia, including waiting in pain for neuraxial analgesia, receiving neuraxial analgesia too late in labor, or feeling that the pain relief from neuraxial analgesia wore off too soon, as negative aspects. Other themes in women's experiences with neuraxial analgesia were information and consent, adverse effects of neuraxial analgesia, and plans and expectations.

Conclusion—Findings from this analysis underscored the fact that women appreciate the effective pain relief that neuraxial analgesia provides during childbirth. While pain control was one important facet of women's experiences with neuraxial analgesia, their experiences were also influenced by other factors. Anesthesiologists can work with obstetric clinicians, nurses, childbirth educators, and with pregnant and laboring patients to help mitigate some of the challenges with timing, communication, neuraxial analgesia administration, or expectations that may have contributed to negative aspects of women's birth experiences.

Introduction

Use of neuraxial analgesia during childbirth is increasingly common in the United States (US). In the 27 states that adopted revised birth certificates, 61% of women who had vaginal singleton deliveries in 2008 used neuraxial analgesia.¹ The 2005 Listening to Mothers II survey reported that three-quarters of the nationally representative sample used neuraxial analgesia in their recent birth.² Regional estimates of the prevalence of neuraxial analgesia range from 38.2% in a statewide sample in New York (1998–2003)³ to 89% among women giving birth at 1 Chicago hospital (2008–2009).⁴ As with any medical procedure, there are benefits and potential risks. Neuraxial analgesia provides very effective pain relief in labor with minimal effect on the fetus, while allowing the woman to remain alert.⁵ Neuraxial analgesia may be used at any point in labor without increasing the risk of cesarean delivery.^{5–8} However, depending on the technique used, some studies have found neuraxial analgesia to be associated with an increased risk of instrumental delivery, maternal hypotension, and longer second stage of labor.^{5,6}

Extensive research has examined the effectiveness and side effects of different techniques and timing for neuraxial analgesia and many studies have addressed the patient experience

in childbirth more broadly.^{9–11} However, few published studies have addressed the patient experience with neuraxial analgesia, including women's expectations, knowledge, communication with providers, and concurrent experience of other obstetric interventions. One notable exception is the work of Angle et al., who conducted focus groups and semi structured interviews with 28 women at 3 hospitals near Toronto.¹² However, given the context and small sample size, it is unclear whether these results are generalizable to women who give birth in the US. The goal of this secondary analysis was to identify themes of positive or negative experiences with neuraxial analgesia using survey data collected from a large, national sample of childbearing women.

Methods

Data and Sample

The Listening to Mothers II survey was commissioned by Childbirth Connection (<http://www.childbirthconnection.org/>) and implemented by Harris Interactive among a nationally representative sample of US women with singleton hospital births in 2005 ($N=1,573$).^{13,14} Questionnaires were completed online ($n=1,373$) and via telephone interview in order to oversample for Hispanic women, African-American non-Hispanic women, and women without Internet access ($n=200$). Further detail on survey methodology is available in the survey report.² A new wave of the survey has been conducted among women who gave birth in 2011–2012, but these data are not yet publically available.

The survey, which took approximately 30 minutes to complete, addressed many aspects of women's experiences during childbirth, including whether neuraxial analgesia was used. The survey also asked open-ended questions, including questions about the best and worst aspects of childbirth. Most women surveyed (97%) provided responses to these questions. Prior studies using these data have examined various aspects of pregnancy and birth, including labor induction, non-medical pain management, and positive birth experiences,^{15–19} but they have not been used to analyze women's experiences with neuraxial analgesia. This study used existing, de-identified data and was therefore exempt from review by the University of Minnesota IRB (Study Number 1011E92983).

We excluded women who had planned cesarean delivery and those who did not experience labor from the analysis. We further restricted the sample to women who reported that they had, at any time during labor, used “epidural or spinal/intrathecal (medication delivered into spinal column)” as a medication to relieve pain (neuraxial analgesia), yielding a final sample of 914.

Data were from the following open-ended questions asked as part of the Listening to Mothers II survey: 1) “Apart from meeting your new baby, and knowing that your baby had no serious health concerns, what was the best part about your experience of giving birth?” 2) “What's the worst thing that happened to you during your labor and birth?” 3) “Is there anything else you would like to tell us about any aspect of your maternity experience?” These were the only open-ended questions in the survey that did not follow specific multiple-choice questions. The survey contained no specific open-ended questions on neuraxial analgesia.

Analysis

Using qualitative content analysis methods, we analyzed responses to the 3 open-ended questions to identify spontaneous mentions of the patient experience with neuraxial analgesia.^{20,21} Given the lack of prior literature on this topic, we did not begin with preconceived codes or categories, but developed them inductively through examination of the data.^{20,21} Coding was conducted by 2 members of the author team with qualitative research training, with participation and guidance from a third member of the author team who is a trained qualitative researcher. First, we randomly selected a 10% sample for initial codebook development by sorting of randomly generated numbers in Excel. Through an iterative process, we identified codes that recurred in the data and coded subsequent samples, discussing and revising the codebook after each iteration. We compared responses and resolved differences (both in conception of the codes as well as in application of codes to the data) through discussion to arrive at the final coding scheme. As part of the final coding scheme, each code was accompanied by a valence (positive or negative), if applicable. If there was not a clear positive or negative connotation, we did not assign a valence. Some codes were always positive (e.g., “effective pain relief”) or negative (e.g., “negative physical effects”), while others could be assigned either valence (e.g., information and consent). We then divided the data for independent coding using the final coding instrument, with an overlap sample of 50% to confirm common understanding and application of the codes. Each coder recorded themes and reflections based on coding and research team conversations through written memoranda. We reviewed the overlap sample at completion of coding and verified that understandings were aligned between coders. We also computed kappa statistics, a measure of agreement between raters adjusted for chance agreement. The mean was 0.70, indicating acceptable reliability.²² The thematic analysis was conducted using NVivo version 10 qualitative data analysis software (QSR International; Burlington, MA).

Results

Socio-demographic and clinical characteristics of the study population are available in Table 1. Eighty percent of women in the sample had some education beyond high school, 69% were Caucasian non-Hispanic, and 12–13% each were African-American non-Hispanic and Hispanic. Three-quarters of women were married. More than half (54%) reported that a provider tried to induce labor, and 67% reported oxytocin augmentation.

The themes identified and the number of women mentioning each theme in their open-ended responses are reported in Table 2. Nearly one-third of women (n=300) spontaneously mentioned their experiences with neuraxial analgesia in their responses to the survey’s 3 general open-ended questions about giving birth. Positive experiences were common and quite homogenous, mostly were in 2 thematic categories that often overlapped: neuraxial analgesia (usually colloquially referred to as “the epidural”) as simply the “best part” of the birth experience, and neuraxial analgesia providing effective pain relief. In many cases, women mentioned that the pain relief allowed them to “enjoy” their births:

The epidural was excellent since it took away the pain and allowed me to enjoy the process of giving birth.

A few women also appreciated feeling that initiation of neuraxial analgesia was their own choice, the lack of pressure from clinicians, and assistance from hospital staff in deciding about optimal timing:

Early on, the on-call doctor gave me an analgesic without hesitation and came later to help me decide when I needed the epidural. The anesthesiologist was very kind and talked me through the whole procedure.

Negative experiences were more diverse in nature than positive experiences; hence, a more detailed analysis of these experiences is provided below, under the themes of timing, information and consent, adverse experiences with neuraxial analgesia administration, and planning and expectations.

Timing

A frequently mentioned negative theme was the timing of women's neuraxial analgesia experiences. A subtheme in this category was waiting in pain for neuraxial analgesia. Some women reported that the wait was due to anesthesiologist availability:

They didn't give me the epidural early enough. The anesthesiologist was in surgery and so I was in a lot of pain until he could get there.

In other cases, waits were extended because of miscommunication with providers. Women reported particularly negative experiences with long waits when they did not have alternative options for pain management in the interim.

Another timing-related subtheme was initiation of neuraxial analgesia at a point that the woman perceived to be too late in labor. For some women, the problem with this was that they had spent most of labor without pain relief:

I requested [the] epidural when I was 5–6 centimeters dilated. It took a long time to arrive, over an hour... I think I was in transition... Had epidural too late and would have liked to been advised not to take epidural because I was in transition.

Other women reported that neuraxial analgesia was administered so late in labor that it did not become effective when women felt they needed pain relief:

They induced my labor and happened so rapidly the epidural didn't completely take until after she was born. They waited too long to give it to me.

Finally, other women perceived that neuraxial analgesia "wore off too early," reporting that the pain relief from neuraxial analgesia that had previously been adequate was no longer as effective during pushing, and experienced this as a negative feature of their birth experiences:

[The epidural] only helped for a brief period of time...and by the time I was ready to deliver it had worn off completely.

This subtheme was related to women's perceptions of clinicians, as well as information and consent. Some women seemed to perceive this as either a mistake (as in the above example), or a lack of empathy on the part of the clinicians:

I was pushing for three hours (after my epidural had already worn off and the staff refused to refill it) trying to give birth vaginally.

Information and consent

For some women, understanding and being offered multiple options in addition to neuraxial analgesia was an important component of consent for the procedure:

The nurse assigned to me was not helpful in pain management suggestions...and only turned up to say “The anesthesiologist is here giving someone else an epidural, do you want one?”

Women reported problems related to information and consent such as perceiving pressure for neuraxial analgesia, changes to the medication dose without the patient’s knowledge or understanding of the change, and experiencing negative effects from neuraxial analgesia about which the patient did not feel sufficiently informed in advance.

Adverse experiences with neuraxial analgesia

Women mentioned problems with neuraxial analgesia administration, which were in 3 categories. First, there were problems with the placement of the neuraxial analgesia, including pain and discomfort during the placement, multiple needle punctures, and difficulty staying still during contractions. Second, many women described situations in which neuraxial analgesia was not as effective as was expected, such as leaving a portion of the body without pain relief, working more on one side of the body than the other, or providing less pain relief than expected, leaving women to continue to cope with more pain than they had anticipated. Third, some women experienced negative physical effects that they attributed to neuraxial analgesia use. The most commonly mentioned was numbness of the legs, which some women perceived as inhibiting pushing:

After receiving the epidural, my left leg went completely numb during labor, making it difficult to push.

Additional negative effects included more generalized numbness, itching, feeling cold or shivering, and a decrease in blood pressure after neuraxial analgesia administration.

Plans and expectations

Women’s experiences with neuraxial analgesia were also affected by their plans (i.e., intention in advance to use neuraxial analgesia) and expectations (i.e., degree of expected pain relief). Several women who had not planned to use neuraxial analgesia, but ultimately did (“unplanned” neuraxial analgesia), mentioned this as a salient aspect of their experience. Some perceived it as a personal failure, while in other cases mild disappointment gave way to acceptance:

I originally wanted to give birth without an epidural, but changed my mind about 14 hours after labor began. For awhile I felt a little guilty about “giving in,” but came to realize that each labor is different and a “woman’s got to do what a woman’s got to do.”

In a few cases, unplanned neuraxial analgesia was an extremely positive facet of the birth experience, marked by substantial gratitude for pain relief upon neuraxial analgesia administration. Expectations were another facet of women's experiences. Some women found that neuraxial analgesia was not as helpful as they had anticipated in controlling their pain; this was experienced negatively regardless of whether the woman had planned in advance to opt for neuraxial analgesia.

Discussion

Our findings underscored women's appreciation of the effective pain relief that neuraxial analgesia provided during childbirth, similar to findings from small interview-based studies.^{12,23} In an era that is increasingly focused on patient-centered care,^{24–27} clinicians seek to understand the ways in which they can effect positive change in the patient's experiences and outcomes. This is now recognized among the key skills of “excellent anesthesiologists.”²⁸ The most frequently cited negative themes were related to timing and adverse experiences with neuraxial analgesia, which were also related to women's perceptions of information/consent.

While consistent with prior studies conducted among smaller or non-US populations of women,^{29,30} our results are unique, because they represent the views of a national sample of women. Anesthesiologists have the capacity to influence several of these factors – either directly through education and patient care or indirectly through input into clinical management or administrative and staffing protocols. In particular, many women mentioned waiting in pain for neuraxial analgesia as a negative aspect of their birthing experience. While immediate availability of an anesthesiologist may not be feasible in all settings, such as a slow-volume obstetric units that do not have a dedicated anesthesiologist, there are opportunities both prenatally and in the intrapartum period to improve communication of this information to the patient.

Although many women mentioned negative aspects of their experience with neuraxial analgesia, our data do not allow us to draw direct conclusions regarding their overall feelings about their choice to use neuraxial analgesia, perceptions of their experiences with labor analgesia, or their satisfaction with their pain relief choices. However, our results suggest that patients perceive negative effects from neuraxial analgesia more frequently than the incidence of actual clinical complications of labor analgesia. Negative effects were reported by 5% of all women in the sample, and by 16% of women who mentioned neuraxial analgesia, while 1 study estimated that clinical complications of labor analgesia occur in only 0.46% of cases.³¹ One example cited by women in this study was leg numbness. Deliberate attention to patient communication around neuraxial analgesia informed consent and enhanced prenatal education may help ensure that women's expectations of neuraxial analgesia are realistic.³² Moreover, recent trends towards lower concentrations of more dilute local anesthetic medications may help mitigate the complaint of leg numbness.³³

In some cases in which women reported that their neuraxial analgesia wore off just before delivery, it is possible that clinicians may have intentionally decreased the dose of epidural

medication to facilitate pushing. It is also plausible that this patient perception was due to increased pain as labor progressed and the fetus descended.³⁴ Better communication among all personnel, including obstetric providers, anesthesia providers, and nurses, both at the time of neuraxial analgesia placement, during later stages of labor, and when or if the decision is made to decrease the medication dose, may help the patient to feel more informed and in control. Similarly, women's perceptions that they received neuraxial analgesia too late in labor point to 2 potential problems with patient education and patient-provider communications. Women may have requested neuraxial analgesia during a window when it was appropriate but not received it in a timely way due to miscommunication or other problems of coordinating logistics. Alternatively, women may have already progressed too far for epidural analgesia to be effective, but received it nonetheless. Providers may wish to consider combined spinal-epidural analgesia for women who request analgesia in advanced labor.

Our finding that unplanned epidurals can result in mixed feelings, even when excellent clinical pain relief is achieved, is consistent with prior studies.³⁵ It may be beneficial to include discussion of the possibility of an unplanned epidural as a component of antenatal education. Advanced planning is strongly related to neuraxial analgesia use: up to 98% of women planning to have neuraxial analgesia during labor and delivery do so.⁴ However, approximately 60% of women who intend to give birth without neuraxial analgesia do, in fact, receive neuraxial analgesia during labor,^{4,36} and many women who intend to avoid the use of neuraxial analgesia have misperceptions about the procedure or its consequences.³⁷

In addition, anesthesiologists can collaborate with labor and delivery staff to ensure that women have access to a range of both pharmacologic and nonpharmacologic pain relief options. Antenatal discussion of pain management choices is often led by obstetricians and childbirth educators, who may be nurses, midwives, doulas or others interested in, and variably trained in, childbirth preparation. However, anesthesiologists in both academic and nonacademic medical centers can play a role in educating and informing their colleagues to ensure that the women they encounter as patients in labor have been educated and informed about anesthesiologists' role in labor pain management and the options available to patients. Access to multiple methods of pain management, especially when circumstances necessitate a delay in administration of neuraxial analgesia, may address some of the concerns uncovered in this analysis. Also, having neuraxial analgesia presented as 1 alternative among several pain relief options was mentioned by some women as an important aspect of informed consent. The use of nitrous oxide may be an ideal adjunct in this situation.³⁸ However, although common in other countries, nitrous oxide is currently only rarely available in the US for labor analgesia. Various medical staff (e.g., nurses) and nonmedical support personnel (e.g., trained birth attendants such as doulas) may be resources in collaborative efforts to ensure that women in labor receive patient-centered pain management care.^{39,40}

In addition to intrapartum care, anesthesiologists could play a collaborative or consultative role in the development of curricula and hospital-specific information for childbirth education programs. If provided prenatally, during the course of medical visits or in conjunction with hospital tours and registration/admission processes, information about

what patients can expect in terms of pain relief options and potential wait times may help to inform expectations.

Team-based learning and communication approaches have enhanced performance, effectiveness, and satisfaction among clinicians working in obstetric and perinatal cases,^{41–45} including obstetric anesthesia management.⁴⁶ Cross-disciplinary cooperation and policy may improve the patient experience with neuraxial analgesia. Information about patient pain relief desires and standardized language for communicating decisions to administer anesthesia could be routinely included in patient hand-offs.

A strength of this study is that it provides new data on the patient experience with neuraxial analgesia. However, the findings must be considered in light of some limitations. The qualitative analysis was limited by the brevity of open-ended responses and the lack of direct questions about neuraxial analgesia or global assessments of the women's satisfaction with neuraxial analgesia. Because women were not directly asked about their experiences with neuraxial analgesia, those who did mention it in their open-ended responses may not be representative of the whole sample. Women who mentioned neuraxial analgesia may have had unusually positive or negative experiences. Because this was a secondary data analysis, we were unable to follow up with women about their responses. The survey was conducted among women who gave birth in 2005; a similar analysis using more recent data may provide additional insight. Future research may be conducted using the Listening to Mothers III data. Additionally, data are based on women's self-report and contain no information about specific medications or techniques used, and we were unable to corroborate reports of neuraxial analgesia use with other sources such as medical records. Women provided their own perspectives on their experiences, which may not reflect actual clinical care given. Hospital and provider variability, which we were unable to capture, may also influence women's experiences. Nonetheless, the frequency with which neuraxial analgesia was mentioned in the open-ended responses underscores its importance to women's overall childbirth experiences. Our study offers information from a national sample about how neuraxial analgesia affects women's birth experiences and provides insights into the ways that clinicians can improve pain management, communication, and overall experiences with neuraxial analgesia.

Acknowledgments

Funding: This research was supported by a grant from the Eunice Kennedy Shriver National Institutes of Child Health and Human Development (NICHD; grant number R03HD070868) and the Building Interdisciplinary Research Careers in Women's Health Grant (grant number K12HD055887) from NICHD, the Office of Research on Women's Health, and the National Institute on Aging, at the National Institutes of Health, administered by the University of Minnesota Deborah E. Powell Center for Women's Health.

References

1. Osterman MJK, Martin JA. Epidural and spinal anesthesia use during labor: 27-state reporting area, 2008. National vital statistics reports. 2011; 59 Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_05.pdf.
2. Declercq, ER.; Sakala, C.; Corry, MP.; Applebaum, S.; Risher, P. Listening to Mothers II: Report of the Second National Survey of Women's Childbearing Experiences. New York, NY: Childbirth Connection; 2006.

3. Glance LG, Wissler R, Glantz C, Osler TM, Mukamel DB, Dick AW. Racial differences in the use of epidural analgesia for labor. *Anesthesiology*. 2007; 106:19–25. [PubMed: 17197841]
4. Toledo P, Sun J, Grobman WA, Wong CA, Feinglass J, Hasnain-Wynia R. Racial and ethnic disparities in neuraxial labor analgesia. *Anesth Analg*. 2012; 114:172–8. [PubMed: 22075013]
5. Anim-Somuah M, Smyth R, Jones L. Epidural versus non-epidural or no analgesia in labour. *Cochrane Database Syst Rev*. 2011; 12:CD00031.
6. Holck G, Camann W. Controversies in obstetric anesthesia. *J Anesth*. 2012; 27:412–422. [PubMed: 23184158]
7. Wong CA, Scavone BM, Peaceman AM, McCarthy RJ, Sullivan JT, Diaz NT, Yaghmour E, Marcus RL, Sherwani SS, Sproviero MT, Yilmaz M, Patel R, Robles C, Grouper S. The risk of cesarean delivery with neuraxial analgesia given early versus late in labor. *N Engl J Med*. 2005; 352:655–665. [PubMed: 15716559]
8. Ohel G, Gonen R, Vaida S, Barak S, Gaitini L. Early versus late initiation of epidural analgesia in labor: does it increase the risk of cesarean section? A randomized trial. *Am J Obstet Gynecol*. 2006; 194:600–5. [PubMed: 16522386]
9. Lally JE, Murtagh MJ, Macphail S, Thomson R. More in hope than expectation: a systematic review of women's expectations and experience of pain relief in labour. *BMC Med*. 2008; 6:7. [PubMed: 18366632]
10. Fair C, Morrison T. The relationship between prenatal control, expectations, experienced control, and birth satisfaction among primiparous women. *Midwifery*. 2012; 28:39–44. [PubMed: 21458895]
11. Green JM. Expectations, experiences, and psychological outcomes of childbirth: a prospective study of 825 women. *Birth*. 1990; 17:15–24. [PubMed: 2346576]
12. Angle P, Landy CK, Charles C, Yee J, Watson J, Kung R, Kronberg J, Halpern S, Lam D, Lie LM, Streiner D. Phase 1 development of an index to measure the quality of neuraxial labour analgesia: exploring the perspectives of childbearing women. *Can J Anaesth*. 2010; 57:468–78. [PubMed: 20229219]
13. Taylor H, Brenner J, Overmeyer G, Siegel JW, Terhanian G. Touchdown! Online polling scores big in November 2000. *Public Perspect*. 2001; 12:38–39.
14. Terhanian G, Bremer J, Smith R, Thomas R. Correcting data from online surveys for the effects of nonrandom selection and nonrandom assignment. *Harris Interactive White Paper*. 2000:1–13.
15. Declercq E, Lobbok MH, Sakala C, O'Hara MA. Hospital practices and women's likelihood of fulfilling their intention to exclusively breastfeed. *Am J Public Health*. 2009; 99:929–935. [PubMed: 19299680]
16. Kozhimannil KB, Attanasio LB, McGovern PM, Gjerdingen DK, Johnson PJ. Reevaluating the relationship between prenatal employment and birth outcomes: A policy-relevant application of propensity score matching. *Womens Health Issues*. 2012; 23:e77–e85. [PubMed: 23266134]
17. Attanasio LB, Kozhimannil KB, McGovern PM, Gjerdingen DK, Johnson PJ. The impact of prenatal employment on breastfeeding intentions and breastfeeding status at one week postpartum. *J Hum Lact*. 2013; 29:620–628. [PubMed: 24047641]
18. Attanasio LB, McPherson M, Kozhimannil KB. Positive childbirth experiences in U.S. hospitals: A mixed methods analysis. *Matern Child Health J*. 2014; 18:1280–1290. [PubMed: 24072597]
19. Kozhimannil KB, Johnson PJ, Attanasio LB, Gjerdingen DK, McGovern PM. Use of nonmedical methods of labor induction and pain management among U.S. Women *Birth*. 2013; 40:227–36.
20. Hsieh H-F, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res*. 2005; 15:1277–88. [PubMed: 16204405]
21. Mayring P. Qualitative Content Analysis. *Forum: Qualitative Social Research*. 2000; 1 Available at: <http://www.qualitative-research.net/index.php/fqs/article/viewArticle/1089/2385>. Retrieved March 11, 2014.
22. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977; 33(1):159–174. [PubMed: 843571]
23. Hidaka R, Callister LC. Giving birth with epidural analgesia: the experience of first-time mothers. *J Perinat Educ*. 2012; 21:24–35. [PubMed: 23277728]

24. Bardes CL. Defining “Patient-Centered Medicine. *N Engl J Med*. 2012; 366:782–783. [PubMed: 22375968]
25. Gillick MR. The critical role of caregivers in achieving patient-centered care. *JAMA*. 2013; 310:575–576. [PubMed: 23867885]
26. Kerr EA, Hayward RA. Patient-centered performance management: enhancing value for patients and health care systems. *JAMA*. 2013; 310:137–8. [PubMed: 23839743]
27. Barry MJ, Edgman-Levitan S. Shared decision making--pinnacle of patient-centered care. *N Engl J Med*. 2012; 366:780–1. [PubMed: 22375967]
28. Larsson J, Holmström IK. How excellent anaesthetists perform in the operating theatre: a qualitative study on non-technical skills. *Br J Anaesth*. 2013; 110:115–21. [PubMed: 23048067]
29. Kangas-Saarela T, Kangas-Kärki K. Pain and pain relief in labour: parturients’ experiences. *Int J Obstet Anesth*. 1994; 3:67–74. [PubMed: 15636920]
30. Shapiro A, Fredman B, Zohar E, Olsfanger D, Jedeikin R. Delivery room analgesia: An analysis of maternal satisfaction. *Int J Obstet Anesth*. 1998; 7:226–230. [PubMed: 15321184]
31. Cheesman K, Brady JE, Flood P, Li G. Epidemiology of anesthesia-related complications in labor and delivery, New York State, 2002–2005. *Anesth Analg*. 2009; 109:1174–81. [PubMed: 19762746]
32. Broaddus BM, Chandrasekhar S. Informed consent in obstetric anesthesia. *Anesth Analg*. 2011; 112:912–5. [PubMed: 21430036]
33. Hawkins J, Arens J, Bucklin B, Connis RT, Dailey PA, Gambling DR, Nickinovich DG, Polley LS, Tsen LC, Wlody DJ, Zuspan KJ. Practice guidelines for obstetric anesthesia: An updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia. *Anesthesiology*. 2007; 106:843–863. [PubMed: 17413923]
34. Capogna G, Celleno D, Lyons G, Columb M, Fusco P. Minimum local analgesic concentration of extradural bupivacaine increases with progression of labour. *Br J Anaesth*. 1998; 80:11–3. [PubMed: 9505770]
35. Kannan S, Jamison RN, Datta S. Maternal satisfaction and pain control in women electing natural childbirth. *Reg Anesth Pain Med*. 2001; 26:468–72. [PubMed: 11561269]
36. Goldberg A, Cohen A, Lieberman E. Nulliparas’ preferences for epidural analgesia: their effects on actual use in labor. *Birth*. 1999; 26:139–43. [PubMed: 10655812]
37. Toledo P, Sun J, Peralta F, Grobman WA, Wong CA, Hasnain-Wynia R. A qualitative analysis of parturients’ perspectives on neuraxial labor analgesia. *Int J Obstet Anesth*. 2013; 22:119–23. [PubMed: 23462298]
38. Likis FE, Andrews JC, Collins MR, Lewis RM, Serogy JJ, Starr SA, Walden RR, McPheeters ML. Nitrous oxide for the management of labor pain: a systematic review. *Anesth Analg*. 2014; 118:153–67. [PubMed: 24356165]
39. Simkin P. Moving beyond the debate: a holistic approach to understanding and treating effects of neuraxial analgesia. *Birth*. 2012; 39:327–32. [PubMed: 23281955]
40. Kozhimannil KB, Hardeman RR, Attanasio LB, Blauer-Peterson C, O’Brien M. Doula care, birth outcomes, and costs among Medicaid beneficiaries. *Am J Public Health*. 2013; 103:e113–e121. [PubMed: 23409910]
41. Mayer CM, Cluff L, Lin W-T, Schade Willis T, Stafford RE, Williams C, Suanders R, Short KA, Lenfestey N, Kane HL, Amoozegar JB. Evaluating efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units. *Jt Comm J Qual Patient Saf*. 2011; 37:365–74. [PubMed: 21874972]
42. Brodsky D, Gupta M, Quinn M, Smallcomb J, Mao W, Koyama N, May V, Waldo K, Young S, Pursley DM. Building collaborative teams in neonatal intensive care. *BMJ Qual Saf*. 2013; 22:374–82.
43. Sheppard F, Williams M, Klein VR. TeamSTEPPS and patient safety in healthcare. *J Healthc Risk Manag*. 2013; 32:5–10. [PubMed: 23335296]
44. Miller KK, Riley W, Davis S, Hansen HE. In situ simulation: a method of experiential learning to promote safety and team behavior. *J Perinat Neonatal Nurs*. 2008; 22:105–113. [PubMed: 18496069]

45. Riley W, Davis S, Miller KM, Hansen H, Sweet RM. Detecting breaches in defensive barriers using in situ simulation for obstetric emergencies. *Qual Saf Health Care*. 2010; 19:i53–6. [PubMed: 20724391]
46. Pratt SD. Focused review: simulation in obstetric anesthesia. *Anesth Analg*. 2012; 114:186–90. [PubMed: 22025491]

Table 1

Characteristics of respondents to the Listening to Mothers II survey who did not have a planned cesarean, experienced labor, and used neuraxial analgesia (n=914).

	<i>n</i> (%)
Educational attainment	
High school or less	186 (20.4)
Some college/Associate's degree	420 (46.0)
Bachelor's degree	195 (21.3)
Graduate education/degree	113 (12.4)
Race/ethnicity	
Caucasian, non-Hispanic	631 (69.0)
African American, non-Hispanic	112 (12.3)
Hispanic	116 (12.7)
Other/Multiple race	55 (6.0)
Age	
18–24	218 (23.9)
25–29	329 (36.0)
30–34	246 (26.9)
35 or older	121 (13.2)
Insurance type	
Public coverage	337 (36.9)
Private coverage	558 (61.1)
No reported coverage	19 (2.1)
Census Region	
Northeast	133 (14.6)
Midwest	228 (24.9)
South	346 (37.9)
West	207 (22.6)
Married	671 (73.4)
Born in United States	866 (94.7)
Already has children (parity>1)	502 (54.9)
Unintended pregnancy	382 (41.8)
Previous cesarean delivery	39 (4.3)
Received fertility treatment to become pregnant	38 (4.2)
Belief that birth is process not to interfere with unless medically necessary	414 (45.3)
Maternity provider attempted labor induction	491 (53.7)
More than 3 ultrasounds	323 (35.3)
Use of synthetic oxytocin	612 (67.0)
Felt pressured to have an epidural	67 (7.3)

Table 2

Frequency of themes related to neuraxial analgesia among women who experienced labor and reported using neuraxial analgesia during their recent birth in the Listening to Mothers II survey (n=914).

	N
<i>Neuraxial analgesia as “best part” of birth experience</i>	52
<i>Effective pain relief</i>	47
<i>Challenges related to timing of neuraxial analgesia</i>	
Waiting in pain	31
Administered late in labor	15
Wore off too soon	23
<i>Information and consent</i>	21
<i>Adverse experiences</i>	
Problems with placement	34
Less effective than expected	58
Negative physical effects	50
<i>Plans and expectations for neuraxial analgesia</i>	20

Of the 914 women who experienced labor and used neuraxial analgesia, 300 women mentioned neuraxial analgesia in their responses to the open-ended survey questions. Some women's responses were coded for more than one theme.