

# Class III Obese Women's Preferences and Concerns for Cesarean Skin Incision: A Multicenter Survey

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## Abstract

**Objective** This study aims to assess class III obese women's preferences and concerns regarding cesarean delivery (CD) skin incisions.

**Study Design** Through the National Perinatal Research Consortium (NPRC), women with body mass index  $\geq 40$  kg/m<sup>2</sup> at the time of enrollment completed an anonymous survey in English or Spanish. We evaluated seven domains of preferences and concerns about the cesarean skin incision.

**Results** We surveyed 546 women at five NPRC sites. Median age (interquartile range) was 29 (25, 35) years; 364 (66%) were parous and 161 (30%) had a prior CD. Women self-identified race/ethnicity as White (31%), non-Hispanic Black (31%), Hispanic (31%), other (6%), and not reported (1%). A total of 542 women (99%) rated both delivering the baby in the best possible condition and decreasing incision opening/infection risk as important. Women were less likely to rate other domains as important (all  $p < 0.001$ ), including: having least pain possible,  $n = 521$  (95%); decreasing the risk of complications in the next pregnancy,  $n = 490$  (90%); decreasing interference with breastfeeding,  $n = 474$  (87%); decreasing operative time,  $n = 388$  (71%); and having the least visible incision,  $n = 369$  (68%).

**Conclusion** Women with class III obesity prioritize immediate maternal and fetal safety regarding CD skin incision over other concerns including cosmetic outcome.

## Keywords

- ▶ obesity
- ▶ cesarean delivery
- ▶ patient preference
- ▶ survey

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The prevalence of obesity in general—and class III obesity (body mass index [BMI]  $\geq 40$  kg/m<sup>2</sup>) specifically—has reached epidemic proportions. In the United States, 8% of all reproductive age women have a BMI  $\geq 40$  kg/m<sup>2</sup>, including 7% of White women, 18% of Black women, and 6% of Hispanic women.<sup>1</sup> The prevalence of obesity in women of reproductive age has doubled in the past two decades.<sup>2</sup> Current epidemiological projections anticipate that the prevalence of obesity will continue to increase.<sup>3</sup>

The implications of this epidemic for the care of pregnant women are far reaching. Class III obesity is a well-recognized independent risk factor for cesarean delivery (CD).<sup>4–6</sup> Class III obese nulliparous women are three to four times more likely to undergo CD compared with normal weight women,<sup>5,7</sup> and more than half of multiparous women with class III obesity attempting a vaginal birth after a CD will go on to have a repeat CD.<sup>8</sup> Obesity increases the risk of CD complications, including vertical hysterotomy,<sup>9</sup> postoperative wound infections,<sup>10,11</sup> thromboembolism,<sup>12</sup> and decreased fetal cord blood pH at the time of delivery.<sup>13</sup> There is considerable debate in the obstetric literature regarding the safest type of CD skin incision for women with class III obesity.<sup>14,15</sup> However, there is a paucity of information regarding class III obese women's preferences regarding CD skin incision. The optimal practice of evidence-based medicine includes an understanding of patient preferences, expectations, and goals for health.<sup>16,17</sup> The purpose of this survey was to better understand class III obese women's perceptions and priorities regarding CD skin incision to inform clinical care and interventional studies. We also assessed the women's willingness to participate in a randomized controlled trial (RCT) of skin incision for the CD. We hypothesized that women with class III obesity are more concerned about the safety of skin incision for themselves and their fetus than cosmetic results.

## Material and Methods

We conducted an anonymous survey of women with a BMI  $\geq 40$  kg/m<sup>2</sup> presenting for prenatal care. We surveyed women at five tertiary referral centers belonging to the National Perinatal Research Consortium (NPRC), a collaborative effort between the University of North Carolina, University of Alabama at Birmingham, Columbia University, University of Texas Medical Branch, and the University of Utah. After initial approval at the University of North Carolina—Chapel Hill, the institutional review boards at the other four sites approved this study. Each center provides a wide scope of prenatal services and serves as a referral site for women with high-risk pregnancies. Depending on the center, approximately 10 to 30% of the eligible patient population is primarily Spanish speaking.

Research staff screened prenatal charts and approached eligible women. Women were eligible for participation if they had a BMI  $\geq 40$  kg/m<sup>2</sup>, based on height and weight recorded in the clinical chart, and were able to read English or Spanish sufficiently well to complete the survey. Women were not approached for participation if they primarily spoke a language other than English or Spanish, could not read English or Spanish, or had a BMI  $< 40$  kg/m<sup>2</sup> at enrollment.

Research staff reviewed clinical charts and screened eligible participants. Anonymous surveys were distributed and collected by the research staff to eligible women only. As part of the questionnaire, women were asked to self-report their height and most recent weight. We did not collect the enrollment BMI. Self-reported height and weight were used to calculate BMI described in this article, however, all women, regardless of their self-reported BMI, had an actual enrollment BMI  $\geq 40$  kg/m<sup>2</sup> at the time of survey completion. A questionnaire using a five-point Likert scale was developed. Seven domains were assessed, including: having the least visible scar, having the least pain after the operation, decreasing how long the operation lasts, decreasing the risk that the incision opens or gets infected, not interfering with breastfeeding, decreasing risk of complications in the next pregnancy, and delivering the baby in the best condition possible. Respondents could mark the following choices: important, somewhat important, no opinion, not very important, not at all important. An optional write-in space was available for any further comments or concerns regarding skin incision. Participant comments were analyzed and grouped into themes by one author (M. C. S.) and reviewed for agreement by a second author (R. K. E.). Disagreements of thematic concentration were discussed and reviewed by the entire group until consensus was achieved. Other items in the survey included information on self-report of age, height and weight, race/ethnicity, parity, and number of the previous CDs. We include the survey as a supplementary online file (available in the online version).

Survey data were analyzed using chi-square or Fisher exact tests, as appropriate. For the purposes of this analysis, we combined “important” and “somewhat important” as one response and combined “not very important” and “not at all important” into one response. We reviewed women's “write-in” comments for main themes not captured in the seven domains.

## Results

From April to September 2014, 546 women completed the questionnaire, 90% in English, and 10% in Spanish. Of the 575 women approached for participation, 95% completed the survey. ► **Table 1** displays patient characteristics. The median (interquartile range) BMI calculated from self-reported height and weight was 43 kg/m<sup>2</sup> (40.6, 46.7). Of note, while all women in this study had an actual BMI  $\geq 40$  kg/m<sup>2</sup> at enrollment, 17% of the women in this study self-reported a BMI  $< 40$  kg/m<sup>2</sup>.

Nearly all women rated the risk of wound infection and safety of baby as important. Compared with these two domains, women were less likely to report the other domains as important (all  $p < 0.0001$ ). We compared other domains to the risk of wound infection and safety of baby as these two domains were rated as most important among our respondents. Other domains in decreasing order of frequency included: decreasing the risk of complications in the next pregnancy, decreasing interference with breastfeeding, decreasing operative time, and having the least visible incision—see ► **Table 2**.

**Table 1** Participant characteristics

Characteristics	N = 546
<b>Age (y)</b>	
< 20	18 (3)
20–34	384 (71)
≥ 35	138 (25)
Missing	6 (1)
<b>Nulliparous</b>	
Missing	7 (1)
<b>Prior cesarean deliveries</b>	
0	379 (69)
≥ 1	170 (30)
Missing	6 (1)
<b>Prior vaginal deliveries</b>	
0	296 (54)
≥ 1	250 (45)
Missing	8 (1)
<b>Race/ethnicity</b>	
White	170 (31)
Black	171 (31)
Hispanic	171 (31)
Other	28 (6)
Missing	6 (1)
<b>Language</b>	
English	494 (90)
Spanish	54 (10)

Note: Data are presented as *n* (%).

There were significant differences in maternal characteristics related to responses for four domains: having the least pain, decreasing interference with breastfeeding, having the least visible scar, and decreasing complications in the next pregnancy. Nulliparous women (*n* = 172; 93%) were less likely to rate least pain as important compared with multipa-

rous women (*n* = 341; 96%) (*p* = 0.005). More nulliparous women rated decreasing complications in the next pregnancy as important compared with multiparous women (93 vs. 88%; *p* = 0.01). Black women (*n* = 139; 81%) were less likely to rate decreasing interference with breastfeeding as important compared with white (*n* = 150; 88%), Hispanic (*n* = 151; 89%), or women self-reporting race/ethnicity as “other” (*n* = 27; 96%) (*p* = 0.04). Spanish-speaking women (*n* = 53, 98%) were also more likely to rate decreasing interference with breastfeeding as important compared with English-speaking women (*n* = 419; 85%) (*p* = 0.03). Black women (*n* = 131; 77%, *p* < 0.0001) and Hispanic women (*n* = 126; 74%, *p* < 0.0001) were more likely than White women (*n* = 89; 53%) to report that the least visible scar is important. Desire for least visible scar did not differ by BMI (*p* = 0.12), prior CD (*p* = 0.18), or language preference (*p* = 0.29). There were no differences in preference in responses among women with and without a prior CD (all *p* ≥ 0.05), except for interference with breastfeeding (80 vs. 90%, *p* = 0.01).

A total of 116 women (21%) submitted optional “write-in” comments regarding the CD. Of these 17 (15%) women specifically mentioned that they desired a “bikini” or transverse skin incision. The majority of comments provided clarification on the seven themes assessed in the survey questions. However, women described an additional seven themes: least time in the hospital, ease of postoperative care, individualization, operative technique, requesting more information/own research, and impact on the ability to attempt a vaginal birth after cesarean (VBAC) in the next pregnancy. Women's concerns regarding VBAC were the most frequent domain mentioned, and it is evident that many women do not differentiate between the skin and uterine incision (→ **Table 3**).

With regard to willingness to participate in a RCT of CD skin incision, women 20 to 34 years old were more likely to report willingness to participate than women aged ≥ 35 or < 20 (*p* = 0.006). Black (28%) and Hispanic (32%) women were also more likely to report a willingness to participate than White (18%) and other women (14%) (*p* < 0.0001). Of the women surveyed, 141 (26%) agreed that they would participate in an RCT of CD skin incision, and 194 (35%) were unsure if they would participate.

**Table 2** Survey responses

Domain	Important	No opinion	Not important	No response	<i>p</i> Value
Decreasing risk of incision opening or infection	542 (99.3)	1 (0.2)	3 (0.6)	–	Reference
Deliver baby in best condition possible	542 (99.3)	2 (0.35)	2 (0.35)	–	> 0.99
Having least pain	519 (95.0)	9 (1.7)	18 (3.3)	–	< 0.001
Decreasing risk of complication in next pregnancy	488 (89.4)	28 (5.1)	27 (4.9)	3 (0.6)	< 0.001
Decreasing interference with breastfeeding	472 (86.5)	43 (7.8)	30 (5.5)	1 (0.2)	< 0.001
Decreasing operative time	387 (70.9)	85 (15.5)	71 (13.0)	3 (0.5)	< 0.001
Least visible	367 (67.2)	40 (7.3)	139 (25.5)	–	< 0.001

Note: Data are presented as *n* (%). The *p* values represent chi-square comparisons of proportion of women answering “important,” “no opinion,” “not important,” and “no response” compared with the reference—responses for risk of infection.

**Table 3** Main themes of write in comments

Theme	Representative quotes
Recovery time	"That it would not interfere with me being able to take care of the baby once we return home"
VBAC/uterine incision	"Whatever is safest for baby and I, and gives me the best chance for VBAC for any future births"
	"How does the uterus heal from being cut different ways, importance of VBAC education for next baby"
	"Bikini cut or transverse scar leaves a minimal risk for future VBACs whereas the vertical incision T-incision and J-incision all lead to higher risks for VBACs through uterine rupture and to scar at maximum is 1.9% without induction according to the ACOG"
Postoperative care	"The cleaning and treating after left the hospital"
	"To make sure we talk about how to clean the incision to keep it from getting to be a big problem"
	"Reducing drainage, swelling, that it is easy to care for at home postop"
Individualization	"The way you are closed up depending on the size of the female"
	"Incision type based on individual patient. For a larger woman a vertical incision, in my opinion, would heal better"
Operative technique	"It more worries me about how roughly they pull the baby out"
	"Cut gently, handle tissue gently"
	"Do not use staples"
	"Type/method used to close the incision, that is, staples, stitched that have to be removed, dissolvable stiches"
Requesting more information/own research	"I'd want to know more research on pros/cons of the different incisions and make it myself. From my research, bikini seems to always be best in almost any size woman depending on anatomy"
	"Due to excess skin what would be the risk with a transverse"
Prior scar	"I already had a cesarean delivery with a transverse incision and the recuperation went very well. For this pregnancy I would like to have the same"
	"I had two up and down due to emergencies for me it has to do with the best for my child. Up and down is not a scar that is not always nice looking but when you look at your child its all worth it. It's not all about vanity to me"

Abbreviations: ACOG, the American Congress of Obstetricians and Gynecologists; post-op, postoperative; VBAC, vaginal birth after cesarean.

## Comment

The results of our survey demonstrate that pregnant women with class III obesity are highly invested in their own safety and that of their fetus. Above all else, they desire the safest approach to CD skin incision.

Despite women's desire for the safest CD skin incision, providers cannot definitely provide a consistent evidence-based answer to which type of skin incision is, in fact, the safest for women with class III obesity. There are numerous studies, none of which are RCTs, which have assessed the risks associated with the type of skin incision among obese pregnant women undergoing CD. Results are varied, with four studies indicating an increased risk of wound complication with vertical skin incision,<sup>10,18-20</sup> four studies showing no difference in complications based on incision type,<sup>11,21-23</sup> and one study indicating vertical skin incision having a lower risk of wound complication.<sup>15</sup> There is even less information regarding which incision type maximizes fetal safety. Ed-

wards et al (2013) demonstrated that among women with class II or III obesity, a transverse abdominal incision, compared with a vertical incision, is associated with a 3.4 relative risk (95% confidence interval: 1.56-7.42) of an umbilical base deficit 12 mmol/L or more.<sup>13</sup> Thus, while women with class III obesity are at high risk of CD, obstetricians and women are indeed left in an evidence-conflicted zone with regard to safest skin incision. There is one single center RCT currently underway that aims to assess wound complication rates with vertical compared with Pfannenstiel incisions among women with BMI  $\geq 40$  kg/m<sup>2</sup> (Clinicaltrials.gov identifier NCT01897376). While we eagerly await the results of this RCT, we suggest that there may be continued equipoise regarding the maternal and neonatal risks, other than wound complication, associated with CD skin incisions.

Shared decision-making is now frequently used in health care as a means to achieve improved patient satisfaction and outcomes.<sup>24,25</sup> Obese pregnant women are less likely than nonobese pregnant women to verbalize opinions for fear of

**Table 4** Recommended approach for discussion of CD for women with class III obesity

• Elicit women's concerns and preferences about CD and operative technique
• Discuss increased risk of CD for women with Class III obesity during prenatal care
• Describe the difference between skin and uterine incisions at the time of CD
• Review risks, benefits, and unknowns about safety of skin incision techniques for maternal and fetal outcomes
• Review risks and benefits of uterine incisions in current and future pregnancies
• Discuss plan for skin closure technique
• Discuss implications of various techniques for skin and uterine incision on options for delivery route in next pregnancy
• Review postoperative care, including possibility of frequent visits if wound complication arises

Abbreviation: CD, cesarean delivery.

stigmatization and humiliation by health care providers and a perception of depersonalized care as a result of their obesity.<sup>26–28</sup> Numerous studies have demonstrated the importance of CD in women's understanding of themselves, their bodies and their birth experience.<sup>29–31</sup> In qualitative studies, women undergoing CD report as particularly disturbing the lack of communication with the medical team during the CD and a perceived loss of individualized care, as their personal birth experience was replaced with a highly medicalized procedure.<sup>29</sup> The women interviewed after an emergency CD echo this sentiment: lack of control and communication is highly traumatic.<sup>32</sup> In a nationwide survey, obstetric providers reported preferentially using Pfannenstiel over vertical abdominal incisions for CD of pregnant women with class III obesity, and patient preference was not an important factor in physicians' decision-making regarding the type of the abdominal incision.<sup>33</sup>

The main strength of this study is that we employed a multicenter approach to eliciting the preferences and concerns of women with class III obesity. We anticipate that this survey will help us better plan a multicenter RCT of skin incision. Based on the results of this survey, if we enrolled 80% of women who strongly agreed or agreed that they would participate in an RCT and 30% of patients who were unsure, we project that we would be able to enroll 31% of eligible women at NPRC sites into an RCT of CD skin incision.

Limitations of this study include that our five sites are all referral centers for women with complicated pregnancies. Therefore, the results of this survey may not be generalizable to all practice settings. Despite all women in the study having an actual BMI  $\geq 40$  kg/m<sup>2</sup>, almost one-fifth of our participants self-reported a BMI of  $< 40$  kg/m<sup>2</sup>. Because the surveys were anonymous and BMI at enrollment was not collected, we were unable to correlate enrollment and self-reported BMI. While this may be viewed as a limitation, it also serves to provide insight that a substantial number of pregnant women with class III obesity, in fact, do not report a height and/or weight consistent with their enrollment BMI and possibly view themselves as less significantly obese than they are. We did not have a comparison group of women without class III obesity. While women with BMI  $< 40$  kg/m<sup>2</sup> may have similar preferences and concerns for CD incision, the debate in the literature regarding which is the least morbid skin incision for

CD focuses primarily on the most obese women, since they have the highest risk of CD complications and a Pfannenstiel or other low-transverse skin incision is favored in nonobese women and women with lesser obesity.<sup>10,11,15</sup>

Until more definitive studies are available regarding the comparative safety of various skin incisions among pregnant obese women, we suggest that providers discuss CD skin incision options with patients, including areas of uncertainty; to lead to shared decision-making between a woman and her provider. We outline recommendations for important discussion points regarding CD for clinicians counseling women with class III obesity (**→ Table 4**). Our study also reveals that there may be a misconception among women regarding the difference between the skin and uterine incisions and the implications on maternal and fetal outcomes in the current and subsequent pregnancies. Eliciting a woman's concerns and priorities regarding her incision may allow for a joint decision that maximizes safety, and improves patient satisfaction.

#### Conflict of Interest

None.

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