Pregnant women's preference for cesarean section and subsequent mode of birth – a six-country cohort study

Abstract

Introduction: The rate of cesarean section (CS) for non-medical reasons has risen and is a concern for health care. Women's preferences may vary across countries for psychosocial or obstetric reasons.

Methods: A prospective cohort study of 6,549 women in routine antenatal care, giving birth in Belgium, Iceland, Denmark, Estonia, Norway or Sweden. Preference for mode of birth was self-reported in mid-pregnancy. Birth outcome data were collected from hospital records.

Results: A CS was preferred by 3.5% of primiparous women and 8.7% of the multiparous women. Preference for CS was associated with severe fear of childbirth, with a negative birth experience in multiparous women, and with depressive symptoms in the primiparous. Women were somewhat more prone to prefer a cesarean in Iceland, OR 1.70 (1.02–2.83), adjusted for age, education, depression, fear of childbirth, history of abuse, previous cesarean and previous negative birth experience. Out of the 404 women who preferred CS during pregnancy, 286 (70.8%) were delivered by CS, mostly for a medical indication. A total of 9% of the cesareans in the cohort had a non-medical indication only.

Conclusions: Women's preference for cesarean section often seems to be due to health concerns. Both medical and psychological factors need to be addressed in antenatal counseling. Obstetricians need to convey accurately to women the risks and benefits of CS in her specific case. Maternity professionals should identify and explore psychosocial reasons for women's preferences.

Introduction

There is growing attention in public discussion to where and how childbirth should take place. While these issues were previously discussed among professionals, obstetricians and midwives who affect the structure of antenatal care and delivery services, the voices of women themselves have recently received attention. In the discussion, stereotypes have emerged. Women are "blamed" for the rise in non-medically indicated caesarean sections (CS) [1]. CS rates are widely acknowledged as having risen above the recommended level for optimizing outcomes for both mother and child. In countries like Norway and Sweden, the most common indication for an elective CS is classified as having been the woman's own request [2,3]. Terms like "too posh to push" [4] have emerged, giving the impression that the attainment of women's rights in the areas of education and social position inevitably leads to the choice of what is regarded as an easy way to give birth. On the one hand; professional critics of the "medicalization" of childbirth sing the praises of "natural birth," giving rise to alternative birth in the public healthcare system [5] offering vaginal birth without traditional anesthesia. At the other end of the spectrum is a trend among professionals to view spontaneous vaginal birth more negatively. For example, one study reported that one-quarter of clinicians – obstetricians, general practitioners and nurses – erroneously believed that CS prevents urinary incontinence and impaired sexual performance [6]. However, current evidence shows limited benefit of a planned CS to the mother when there is no clear obstetric need. Even though no randomized controlled trials of planned CS with cephalic presentation at term were identified in a recent Cochrane review [7], the results of randomized trials of planned CS at term with breech presentation do not indicate any difference in maternal morbidity [8].

The professional responses to the perceived challenge of women who requested a CS without a clear medical indication have varied. In some countries, such as Sweden, Iceland and Norway, “fear of childbirth” teams have been set up in antenatal care. National guidelines [9-13] have emerged that address the issue of how to counsel women and change their attitudes. Cultural factors, the structure of antenatal care and delivery services, as well as how they are funded, are likely to influence preferences for CS [14]. However, it may be argued that the perception of the upcoming birth is deeply embedded in a woman’s personality and prior experiences, including traumas [15-18]. Based on this assumption, reported preference for CS would not be related to external factors and thus may not vary across countries. Nevertheless, countries differ as to their guidelines on whether women’s preferences should be considered when deciding whether or not to perform a CS. At the time of the study, there was no specific diagnosis for CS on maternal request in Belgium, Iceland or Estonia.

The aim of the study was to explore differences between countries as to women’s preferred mode of birth during pregnancy and whether differences between countries could be explained by socio-demographic factors. In addition, we wanted to assess whether a preference for CS during pregnancy actually resulted in delivery by a non-medically indicated CS.

Methods

Bidens is a cohort study of unselected pregnant women in six European countries (Belgium, Iceland, Denmark, Estonia, Norway, and Sweden). It was the result of an EU-funded collaborative project between the Norwegian University of Science and Technology (NTNU)

and partners from the six universities and hospitals. A detailed description of the study sites and participants has been published previously [18].

Recruitment took place between March 2008 and August 2010 at mean gestational age (GA) of 24 weeks. Due to country-specific organization as well as the requirements of local ethics committees, minor variations in the recruitment procedure occurred. All women included in the study consented, completed a questionnaire and allowed collection of data concerning their childbirth. Belgian, Estonian and Swedish women were approached during antenatal care and generally filled out the questionnaire onsite. Danish and Norwegian women were given information about the study at ultrasound screening and subsequently received the questionnaire by mail. Icelandic women received the questionnaires when consenting at ultrasound screening and filled in onsite or returned them by mail. The estimated response rate varied from 50% in Norway to 90% in Estonia. Formal approval by the local ethics committee was obtained at each site [18].

A total of 7,200 pregnant women were recruited. The population size was determined by the primary aim of the Bidens cohort study, which was to assess the association between emotional, physical and sexual abuse and mode of birth [18]. For this study, we excluded 79 women who did not report a preference for cesarean section or vaginal birth, 78 women who lacked information about parity, 167 women who were expecting twins, 297 women whose mode of birth had not been reported, and 30 women lacking all of the answers to one or more of the various types of abuse questions. Of the 6,549 remaining women, 798 were from Belgium, 579 from Iceland, 1,217 from Denmark, 858 from Estonia, 2,177 from Norway and 920 from Sweden. All women had to have sufficient language skills to fill out the questionnaire. Estonian women could fill it out in either Estonian or Russian. Belgian, Icelandic and Danish women younger than 18 years were excluded. Only Danish women from

the local geographic area were invited. Icelandic, Danish and Norwegian women with major fetal pathology were excluded.

The questionnaire included socioeconomic information and several validated self-assessment scales, such as the Edinburgh Depression Scale (short version) [19], the Norvold Abuse Questionnaire (NorAq) [20] and the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ [21].

Preferred mode of birth was assessed by one question—"How would you prefer to give birth?" with four response categories: vaginally, probably vaginally, by cesarean and probably by cesarean. Respondents who indicated that they either wanted or probably wanted CS were classified as preferring CS.

Education was coded at three levels: primary school (9 years), secondary school (fewer than 13 years), and post-secondary school (university or college). Parity was derived from a question about how many children the woman had previously given birth to.

Ethnicity was addressed by asking, "Is your mother tongue other than Swedish? If so, please state the language." Those reporting a language other than Swedish were categorized as non-natives.

Fear of childbirth was assessed by the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ), Version A [22]. The W-DEQ is a 6-point, 33-item self-assessment rating scale with a minimum score of 0 and a maximum of 165. It has been used extensively in various countries and demonstrated good validity. Severe FOC was defined as a total score of 85 or greater [22].

Depression was assessed by the 5-item version of the Edinburgh Depression Scale (EDS-5) [19]. The EDS-5 is a 4-point scale with a minimum score of 0 and a maximum of 15.

It has shown good psychometric properties and may be used instead of the full EDS scale for some scientific purposes [19].

The questions on abuse were taken from the NorAQ (Norvold Abuse Questionnaire), a validated instrument that includes descriptive questions measuring emotional, physical and sexual abuse [20]. A detailed report of the prevalence of abuse in the six participating countries has been published [23]. Women were defined as having experienced any abuse if they answered yes to at least one of the questions about sexual, emotional or physical abuse.

Experience of previous childbirth was assessed by one question, and the woman was said to have had a negative birth experience if she described it as 'mostly negative' or 'very negative' rather than 'mostly positive' or 'very positive.'

Women were asked about the mode of birth of their first and most recent childbirths. For the purpose of this study, the categories of previous cesarean section (CS) and vaginal birth were used. The category of previous vaginal birth included women who indicated only this mode of birth, thus women with no previous CS.

Birth outcome data were collected from electronic patient charts. Indications for CS included fetal distress, dystocia, breech presentation, maternal exhaustion, maternal request, psychosocial factors, other obstetric factors and unknown. CS was defined as non-medically indicated when "maternal request" or "psychosocial factors" were reported. More than one indication could be given. "Non-medical only" meant that no indication was given other than "maternal request" or "psychosocial factors."

The statistical analyses were conducted with PASW 22 software. Cross-tabulation and Pearson's chi-square test were used to analyze proportions and assess differences in women's preferred mode of birth according to country of residence. Logistic binary regression analyses were used to estimate crude odds ratios (ORs) and 95% confidence intervals (CIs) of the association between a preference for CS, as well as psychological and socio-demographic

factors, and obstetric characteristics. We adjusted for “a priori” selected potential confounding variables, based on the literature in the field. For the multivariable analyses with all women 268 were excluded due to missing data, for the analysis for primiparous women 105 women were excluded due to missing data and for multiparous women 163 were excluded due to missing data. Adjusted odds ratios were calculated using country of residence, age, education, being non-native, EDS score greater than or equal to 7, severe fear of childbirth, history of abuse, previous negative birth experience and previous CS in logistic regression models stratified for parity. Belgium was used as the reference country because it reported the fewest women who preferred a CS. All analyses were two-sided at $\alpha = 0.05$.

Results

The preferred mode of birth and actual rate of CS in the six countries are shown in Table 1, stratified for parity. There were differences among the countries, with Belgian women, both primi- and multiparous, most often preferring a vaginal birth without hesitation ($P<0.001$). Women were least prone to prefer a CS in Belgium (2.1% of the primiparous women, 6.0% of the multiparous women). A total of 3.5% of primiparous women preferred a CS, with Estonia, Sweden and Iceland reporting the highest proportion (4.0-4.3%). This difference in primiparous women was not significant. A total of 8.7% of multiparous women stated a preference for CS, with Danish women reporting the highest (11.9%) ($P<0.05$). Gestational age when filling out the questionnaire (Table 1) differed between countries (<0.001), but was not associated with a preference for CS (Table 2).

The associations between socio-demographic, psychological and obstetric variables and a preference for CS are shown in Table 2. Age over 30, multiparity, symptoms of

depression, severe fear of childbirth, a history of abuse, and being non-native seemed to be more common in women with a preference for CS. For multiparous women, a negative birth experience and a previous CS were also associated with a preference for CS. Education of more than13 years seemed to protect against a preference for CS.

Adjusted associations between a preference for CS and the country of residence are shown in Table 3. When all women (N=6549) were entered in the model, country lost its significance for both primiparous and multiparous women. When all women were included, a preference for CS was associated with being Icelandic, adjusted OR 1.70 (1.02-2.83).

Of the 404 women who preferred CS during pregnancy, 286 (70.8%) gave birth by CS and 17 (4.2%) by vacuum extraction, while 101 (25%) had a spontaneous vaginal birth. A total of 237 (58.7%) women with a preference for CS had an elective CS, compared with 257 women (4.2%) without such a preference (P=0.000). A total of 49 (12.1%) women with a preference for CS had an emergency CS compared with 494 (8.0%) without such a preference (P<0.01).

The indications differed between women with and without a preference for CS (Table 4). Fetal distress, dystocia and breech were more common in the 751 women who had not reported a preference for CS during their pregnancy (P<0.01). A non-medical indication was more common in the 404 women with a preference for CS during pregnancy (P<0.01); “other medical” indications were also more prevalent (P<0.01). A total of 94 women (9.1%) had no indication entered other than maternal request or psychosocial reasons, which were more common in those with a preference for CS reported in mid-pregnancy than in those who preferred a vaginal birth at that time (27.3% vs 2.1%, P<0.01).

Despite a preference for CS during pregnancy, 118 out of 404 (29.2%) women gave birth vaginally. Compared with those who had CS, these women were younger (55.9% vs. 35.8% under 30, P<0.01), more often primiparous (40.9% vs. 21.0%, P<0.01) and had

reported severe fear of childbirth (40.7% vs 25.8%, P>=0.0104). Giving birth vaginally despite having preferred a CS was most common in Sweden (40.4%) and least common in Denmark (13.1%), with Belgium at 25.8%, Iceland at 36.8%, Estonia at 32.7% and Norway at 32.3% (P<0.01). Among the 100 multiparous women with no previous vaginal birth and a preference for CS, only 14 gave birth vaginally.

Discussion

In this six-country cohort study, 2.1-4.3% of primiparous women and 6.9-11.9% of multiparous women preferred a CS according to their statement at mean GA of 24 weeks. Higher age, lower education, depressive symptoms, history of abuse, severe fear of childbirth, a negative previous birth experience and at least one previous CS were associated with preference for CS. After adjusting for demographic, psychological and obstetric factors, country of residence lost its significance in both primi- and multiparous women. The majority of cesareans with a non-medical indication entered had a concomitant medical indication. A total of 9% of abdominal deliveries had a non-medical indication only.

The finding that 6.2% of unselected pregnant women stated a preference for CS is low but comparable to previous Scandinavian research [22,24,26-27]. According to a review that included 38 studies worldwide (including few Asian and African studies), the overall pooled preference was 15.6% [28], with the highest rates in the Americas. Most of the differences between the countries in our study disappeared when all the a priori selected confounders were adjusted for in the logistic regression models. Thus, the low tendency of Belgian women to prefer a CS may be due to younger age and less experiences of emotional, physical and sexual abuse [23]. Possibly they have great respect for and trust in their obstetrician and expect that

the doctor knows best. So, they do not define a preference but instead wait for the doctor to decide. The actual rate of CS at least for primiparous Belgian women was not low but average.

Even when women preferred a CS, the actual indications for CS were mostly medical. Thus, a woman's subjective preference may have been based mainly on her knowledge that a vaginal birth could prove difficult. For instance primiparous women over 35 three times more often preferred a CS. It is well known that older primiparous women risk more complications of pregnancy and birth. Our findings also support the conclusion that maternal request is taken into consideration by obstetricians in the countries studied when there are relative indications for a CS. This hypothesis is in accordance with other studies showing that CS is more commonly performed on maternal request when there are relative but not absolute indications for an elective CS [28].

Younger primiparous women with severe fear of childbirth more often gave birth vaginally despite a preference for CS during pregnancy, much as was the case in a Swedish study in 2008 [30]. These women may have changed their preference before actually giving birth (perhaps following targeted care for fear of childbirth), or the findings may indicate that their requests were not granted. If the latter is true, the result may be an increased risk of PTSD following childbirth [31]. On the other hand, one study showed that performing CS on request did not reduce the risk of fear of childbirth during subsequent pregnancies [32]. These primiparous women probably want more children in the future, and psychological treatment seems to be worthwhile [33-35]. In countries where a CS cannot be purchased or chosen freely by pregnant women, counseling requires both psychological and obstetric insight in order to reach a well-founded and mutually acceptable decision about the mode of birth [12, 36].

In Hildingsson's study [30], 45% of the women who wished for a CS in mid-pregnancy ended up having a CS. In a Norwegian study, 48% of those with a preference for CS in pregnancy subsequently had a CS [37]. In the present study, over 70% of women with a

preference for CS eventually had one. This could mean that women in our part of the world have recently won greater influence over mode of birth or that they have attained increased insight into medical indications.

It is notable that the actual rate of CS in primiparous women during the time of the study was 17.3%, while only 3.5% of them stated a preference for CS in mid-pregnancy. In the multiparous, with 192/3326=5.8% having a previous CS and no vaginal birth, 5.5% of the women would prefer a CS, and the CS rate was 14.4. Finding ways of ensuring a safe vaginal birth, especially for a first baby, is an important task for obstetricians and midwives. A good enough experience for the parents is an obvious secondary goal. Continuous support during childbirth is a well-known recommendation [38].

One of the strengths of our study is that it is based on non-selected group of pregnant women. Another merit of the study is its follow-up design. Birth outcomes were recorded independently of responses during pregnancy. The participation rate varied among the countries, but the background characteristics did not indicate any significant selection bias when compared to information from official health records, except that the participants, as in many other studies, were more educated than the national average.

This study has certain limitations. Our results concerning comparison between countries should be interpreted with caution because of the differences in recruitment mentioned in the methods section. The four Scandinavian countries are quite homogenous concerning their health care system. Estonia and Belgium differ somewhat, but small differences in women's preference for CS were found. Adding other possible predictors of women's preference for CS might have altered the results. The response mode was not a variable in the analysis because it was not specifically reported, for example in Estonia where the women could either fill in the questionnaire on site or at home. The Danish participants came from the capital, while those from Sweden were recruited in a medium-sized city and the

other countries had a more diverse sample. Given differences in CS rates and indications in various parts of the country, it is reasonable to assume that Swedish women from the capital would have preferred a CS more often. Then again, confounders such as age and education with geographical variations might have affected the results. A better design would have been a participation of several sites in all the participating countries. Categorizing age and years of education may lead to type II errors with respect to these variables. Using different cut-off points for categorized variables may have produced different results. In our study the term "mother tongue" was used as a proxy variable for ethnicity, nationality, cultural background [25]. If data of birth-country or nationality had been available, he classification might have been more accurate.

Partner preferences, however interesting [26] they might be, were outside the scope of this study. Organization of childbirth care is another factor that may influence women's preference for CS. Main caregiver and continuity of care was not reported in this study. Perhaps women with better antenatal care would be less prone to prefer a CS?

Women with insufficient knowledge of the country's main languages could not participate. A recent Swedish study, using translations of the questionnaire to 8 languages, showed a higher prevalence of childbirth fear in foreign-born women [39]. Preference for mode of birth may also vary by other cultural factors, such as a high prevalence of CS in country of origin, or (well-grounded) fear for surgery in a less developed home country. Thus, we cannot know in how our results would have been affected if women lacking command of the national language(s) had been able to participate.

The questionnaire was filled out only once during pregnancy at a mean of 24 weeks. Women's preferences may have changed with higher GA. Some studies have showed a higher prevalence of serious fear of childbirth, an important risk factor for preference of CS [22,27], in later pregnancy [27], and some have not [22]. In Laursen's large study [40] the same

prevalence of fear of childbirth was found in early and late pregnancy, but half of the women only reported fear at one of the two times. In our study, GA was not associated with preference for CS.

This is a study from northern Europe and the sample of countries is not random. We cannot generalize our findings to other parts of the world. The conditions that pregnant women face are not the same in countries with a different, non-egalitarian healthcare system. The conditions that obstetricians work under are also different, which may influence their propensity to prescribe or approve a cesarean.

Conclusion

The notion that healthy, highly educated, low-risk women often prefer an "unnecessary" CS seems to be unfounded, at least in these six non randomly selected countries in northern Europe. On the contrary, there was a tendency for highly educated women to prefer vaginal birth. Most CS based on "maternal request or psychosocial reasons" also had a concomitant medical indication, so women preferring a CS may have been aware of their medical risk. A preference for CS during pregnancy most often resulted in a subsequent CS. Preference for CS was a marker for psychological problems. Providing adequate counseling in order to make the best possible choices, from both an obstetric and a psychological point of view, in consultation with pregnant women should be a priority. Psychosocial reasons for women's preferences should be adequately explored and other help than surgery provided when appropriate. Psychological competence within antenatal care is necessary.

Acknowledgements

The Bidens study was supported by the Daphne II Program, European Commission for Freedom, Security, and Justice, Brussels, Belgium (Grant no. JLS/2006/DAP-1/242/W30-CE-0120887/00-87) and by [removed for blind review].

Declaration of Interest statement

The authors have no conflicts of interest to report.

References

1. Klein MC. Quick fix culture: the caesarean-section-on-demand debate. Birth. 2004;31:161-4.
2. Kolås T, Hofoss D, Daltveit AK, Nilsen ST, Henriksen T, Häger R, Ingemarsson I, Øian P. Indications for cesarean deliveries in Norway. Am J Obstet Gynecol 2003;188:864-7.
3. Stjernholm YV, Petersson K, Eneroth E. Changed indications for cesarean sections. AOGS 2010;89:49-53.
4. Weaver J, Magill-Cuerden J. "Too posh to push": The rise and rise of a catchphrase. Birth 2013;40:264-71.
5. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models of care for childbearing women. Cochrane Database Syst Rev. 2013 Jul 22;3: DOI: 10.1002/14651858.CD004667.pub3. Review.

6. Klein MC, Kaczorowski J, Hall VA, Fraser W, Liston RM, Eftekhary S, et al. The attitudes of Canadian maternity care practitioners towards labour and birth: many differences but important similarities. J Obstet Gynaecol Can 2009;31:827-40.
7. Lavender T, Hofmeyr GJ, Neilson JP, Kingdon C, Gyte GM. Caesarean section for non-medical reasons at term. Cochrane Database Syst Rev. 2012 Mar 14: DOI: 10.1002/14651858.CD004660.pub3. Review.
8. Hannah ME, Hannah WJ, Hewson SA et al. Planned caesarean section versus vaginal birth for breech presentation at term: a randomized multicenter trial. Term Breech Trial Collaborative group. Lancet 2000;356:1375-83.
9. Danish Society of Obstetrics and Gynecology [Internet]. c 2006 [cited 2015 April 10], Available from; http://www.dsog.dk/obstetrik/.
10. Caesarean Section: National Institute of Health and Clinical Excellence Guideline; 2nd ed. London; RCOC; 2011
11. American College of Obstetricians and Gynecologists. ACOG committee opinion no. 559: Cesarean delivery on maternal request. Obstet Gynecol 2013;121:904-7.
12. Wiklund I, Andolf E, Lilja H, Hildingsson I. Indications for cesarean section on maternal request–Guidelines for counseling and treatment. Sex Reprod Healthc 2012;33:99-106.
13. Norvegian society of Gynecology and Obstetrics [Internet]. c 2014 [cited 2015 April 10], Available from; http://www.legeforeningen.no/fagmed/Norsk-gynekologisk-forening/Veiledere/Veileder-i-fodselshjelp-2014/Keisersnitt.
14. Soltani H, Sandall J. Organisation of maternity care and choices of mode of birth: A worldwide view. Midwifery 2012;28:146-9.
15. Tschudin S, Alder J, Hendriksen S, Bitzer J, Popp KA, Zanetti R, Hösli I, Holzgreve W, Geissbuhler V. Previous birth experience and birth anxiety: predictors of caesarean on demand? J Psychosom Obstet Gynaecol 2009;30:175-80.
16. Handelzalts JE, Fisher s, Lurie S et al. Personality, fear of childbirth and cesarean section on demand. AOGS 2012;91:16-21.

17. Nerum H, Halvorsen L, Straume B, Sørlie T, Øian P. Different labour outcomes in primiparous women that have been subjected to childhood sexual abuse or rape in adulthood: a case-control study in a clinical cohort. BJOG 2013;120:487-95.
18. Schei B, Lukasse M, Ryding EL, Campbell J, Karro H, Kristjansdottir H, et al. A history of abuse and operative delivery–Results from a European multi-country cohort study. PloS one 2014;91:e87579.
19. Eberhard-Gran M, Eskild A, Samuelsen S, Tambs K. A short matrix-version of the Edinburgh Depression Scale. Acta Psychiatr Scand 2007;1163:195-200.
20. Swahnberg IM, Wijma B. The NorVold Abuse Questionnaire (NorAQ): validation of new measures of emotional, physical, and sexual abuse, and abuse in the health care system among women. Eur J Public Health 2003; 13(4): 361-6.
21. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol 1998;19:84-97.
22. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section – a cross-sectional study at various stages of pregnancy in Sweden. Acta Obstet Gynecol Scand 2009;887:807-13.
23. Lukasse M, Schroll AM, Ryding EL, et al. Prevalence of emotional, physical and sexual abuse among pregnant women in six European countries. Acta Obstet Gynecol Scand 2014;93:669-77.
24. Hildingsson I, Rådestad I, Rubertsson C, Waldenström U. Few women wish to be delivered by caesarean section. BJOG 2002;109:618-23.
25. Finnbogadottir H, Dykes AK, Wann-Hansson C. Prevalence of domestic violence during pregnancy and related risk factors: a cross-sectional study in southern Sweden. BMC Womens Health. 2014;14:63.
26. Hildingsson I. Swedish couple's attitudes towards birth, childbirth fear and birth preferences and relation to mode of birth – a longitudinal cohort study. Sex Reprod Healthc 2014;5:75-80.
27. Rouhe H, Salmela-Aro K, Halmesmäki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG 2009;116:76-73.

28. Mazzoni A, Althabe F, Liu NH, Bonotti AM, Gibbons L, Sanchez AJ, Belizan JM. Women's preference for caesarean section: a systematic review and meta-analysis of observational studies. BJOG 2011;118:391-9.
29. Karlström A, Nystedt A, Johansson M, Hildingsson I. Behind the myth – few women prefer caesarean section in the absence of medical or obstetrical factors. Midwifery 2011;27:620-7.
30. Hildingsson I. How much influence do women have on mode of delivery? A follow-up study of women's preferences in early pregnancy. Midwifery 2008;24:46-54.
31. Garthus-Niegel S, von Soest T, Knoph C, Simonsen TB, Torgersen L, Eberhard-Gran M. The influences of women's preferences and actual mode of delivery on posttraumatic stress symptoms: a population-based, longitudinal study. Birth 2014;41:108-25.
32. Hildingsson I, Nilsson C, Karlström A, Lundgren I. A longitudinal survey of childbirth-related fear and associated factors. J Obstet Gynecol Neonatal Nurs 2011;40:523-43.
33. Rouhe H, Salmela.Aro K, Toivanen R, Tokola M, Halmesmäki E, Ryding EL, Saisto T. Group psychoeducation with relaxation for severe fear of childbirth improves maternal adjustment and childbirth experience – a randomized controlled trial. J Psychosom Obstet Gynaecol 2015;36:1-9.
34. Nieminen K, Malmquist A, Wijma B, Ryding EL, Andersson G, Wijma K. Nulliparous pregnant women's narratives of imminent childbirth before and after internet-based cognitive behavioural therapy for severe fear of childbirth: a qualitative study. BJOG 2015;122:. 1259-65
35. Nerum H, Halvorsen L, Sörlie T, Öian P. Maternal request for caesarean section due to fear of birth: can it be changed through crisis-oriented counselling? Birth 2006;128:1388-91.
36. Tucker Edmonds B. Curr Opin Obstet Gynecol. Shared decision-making and decision support: their role in obstetrics and gynecology 2014;26:523-30.
37. Fugleness D, Aas E, Botter G, Öian P, Kristiansen IS. Maternal preference for cesarean delivery: do women get what they want? Obstet Gynecol 2012;120:252-60.

38. Hodnett ED, Gates S, Hofmeyr GJ, Sakala C. Continuous support for women during childbirth. Cochrane Database Syst Rev 2013;7.
39. Ternström E, Hildingsson I, Haines H, Rubertsson C. Higher prevalence of childbirth related fear in foreign born pregnant women – findings from a community sample in Sweden. Midwifery. 2015;31:445-50.
40. Laursen M, Hedegaard M, Johansen C. Fear of childbirth, predictors and temporal changes among nulliparous women in the Danish National Birth Cohort. BJOG. 2008;115:354-60.

Current knowledge on the subject

- Cesarean section on maternal request has become increasingly common
- Women's preference for cesarean section varies among countries
- Countries differ as to their guidelines on whether women's preferences should be considered when deciding whether or not to perform a CS.

What this study adds

- In northern Europe 3.5% of primiparous and 8.7% of multiparous pregnant women stated a preference for cesarean section; 70% of them eventually had a cesarean
- Differences among countries were largely explained by known socioeconomic and obstetrical factors
- Most cesareans for non-medical reasons had a concomitant medical indication

Table 1. Preferred and mode of delivery, gestational age for reporting preference and actual rate of CS birth, by country and parity, the Bidens cohort study 2008–2010, N=6549
* Pearson's X^2, [§]One way Anova

	Belgium n=798	Iceland n=579	Denmark n=1217	Estonia n=858	Norway n=2177	Sweden n=920	Total N=6549	P-value
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	
Primiparous	n=430	n=227	n=706	n=400	n=932	n=528	n=3223	
1. Vaginally	366 (85.1)	140 (61.7)	547 (77.5)	240 (60.0)	663 (71.1)	379 (71.8)	2335 (72.4)	<0.001*
2. Probably vaginally	55 (12.8)	78 (34.4)	136 (19.3)	143 (35.8)	236 (25.3)	127 (24.1)	775 (24.0)	
3. Probably CS	5 (1.2)	5 (2.2)	14 (2.0)	11 (2.8)	22 (2.4)	9 (1.7)	66 (2.0)	
4. Caesarean Section	4 (0.9)	4 (1.8)	9 (1.3)	6 (1.5)	11 (1.2)	13 (2.5)	47 (1.5)	
Preference for CS (3 & 4)	9 (2.1)	9 (4.0)	23 (3.3)	17 (4.3)	33 (3.5)	22 (4.2)	113 (3.5)	0.529*
GA reporting preference *mean (SD)*	*25.8 (9.4)*	*20.9 (2.4)*	*22.3 (3.9)*	*22.8 (5.1)*	*24.7 (4.7)*	*28.4 (1.5)*	*24.4 (5.5)*	<0.001[§]
Delivered by CS	74 (17.2)	35 (15.4)	139 (19.7)	74 (18.5)	147 (15.8)	89 (16.9)	558 (17.3)	0.004*
Multiparous	n=368	n=352	n=511	n=458	n=1245	n=392	n=3326	
1. Vaginally	328 (89.1)	251 (71.3)	381 (74.6)	295 (64.4)	958 (76.9)	320 (81.6)	2533 (76.2)	<0.001*
2. Probably vaginally	18 (4.9)	72 (20.5)	69 (13.5)	128 (27.9)	168 (13.5)	47 (12.0)	502 (15.1)	
3. Probably CS	10 (2.7)	16 (4.5)	18 (3.5)	19 (4.1)	30 (2.4)	6 (1.5)	99 (3.0)	
4. Caesarean Section	12 (3.3)	13 (3.7)	43 (8.4)	16 (3.5)	89 (7.1)	19 (4.8)	192 (5.8)	
Preference for CS (3 & 4)	22 (6.0)	29 (8.2)	61 (11.9)	35 (7.6)	119 (9.6)	25 (6.4)	291 (8.7)	0.012*
GA reporting preference *mean (SD)*	*26.1 (9.5)*	*21.1 (2.5)*	*22.4 (4.0)*	*22.5 (5.0)*	*24.8 (4.7)*	*29.0 (2.0)*	*24.4 (5.5)*	<0.001[§]
Delivered by CS	44 (12.0)	51 (14.5)	97 (19.0)	64 (14.0)	180 (14.5)	43 (11.0)	479 (14.4)	0.026*

Table 2. Associated factors for women with a preference for birth by CS, the Bidens cohort study 2008–2010, N=6549

	Preferred birth by CS n=404	Preferred vaginal birth n=6145	Crude OR	Pearson's X^2
	n (%)	n(%)	OR (95% CI)	P value
Age				
<25	36 (8.9)	798 (13.0)	1	<0.001
25–30	132 (32.8)	2569 (41.8)	1.14 (0.78–1.66)	
31–35	143 (35.5)	1987 (32.4)	1.60 (1.10–2.32)	
≥35	92 (22.8)	788 (12.8)	2.59 (1.74–3.85)	
Education				
≤9 years	22 (5.5)	200 (3.3)	1	0.001
10–13 years	125 (31.3)	1534 (25.1)	0.74 (0.46–1.19)	
≥13 years	252 (63.2)	4374 (71.6)	0.52 (0.33–0.83)	
Parity				
Primiparous	113 (28.0)	3110 (50.6)	1	<0.001
Multiparous	291 (72.0)	3035 (49.4)	2.64 (2.11–3-30)	
Gestational age filling out form n=6487				0.491
<21	114 (28.7)	1648 (27.1)	1	
21–28	200 (50.4)	3017 (49.5)	0.96 (0.76–1.21)	
≥28	83 (20.9)	1425 (23.4)	0.84 (0.63–1.13)	
Symptoms of depression (EDS-5 score ≥7)	67 (17.0)	519 (8.5)	2.19 (1.66–2.89)	<0.001
Severe Fear of childbirth (W-DEQ ≥85)	112 (30.4)	595 (9.9)	3.67 (3.13–5.03)	<0.001
Non-native	41 (10.3)	451 (7.4)	1.44 (1.03–2.01)	0.035
A history of abuse				
Childhood sexual abuse	58 (14.4)	667 (10.9)	1.38 (1.03–1.84)	0.030
Adult sexual abuse	41 (10.1)	370 (6.0)	1.76 (1.25–2.48)	0.001
Any sexual abuse	87 (21.5)	945 (15.4)	1.51 (1.18–1.93)	0.001
Childhood physical abuse*	56 (13.9)	591 (9.6)	1.51 (1.13–2.03)	0.006
Adult physical abuse	97 (24.0)	1034 (16.8)	1.56 (1.23–1.98)	<0.001
Any physical abuse*	139 (34.4)	1455 (23.7)	1.69 (1.37–2.09)	<0.001
Childhood emotional abuse	58 (14.4)	728 (11.6)	1.25 (0.94–1.67)	0.113
Adult emotional abuse	52 (12.9)	616 (10.0)	1.33 (0.99–1.79)	0.067
Any emotional abuse	92 (22.8)	1138 (18.5)	1.30 (1.02–1.65)	0.006
Any abuse*	188 (46.5)	2341 (38.1)	1.41 (1.16–1.73)	0.001
Previous negative birth experience §n=3326	111 (38.1)	457 (15.1)	3.48 (2.69–4.50)	<0.001
Previous CS and no previous vaginal birth §n=3326	100 (34.4)	92 (3.0)	16.7 (12.2–23.0)	<0.001

* excluded mild physical abuse in childhood, §multiparous women only

Table 3. Adjusted association between preference to give birth by CS and country of participation, the Bidens cohort study 2008–2010, N=6549

	Preference for birth by CS (n=404)		
	Model 1α	Model β	Model 3 δ
	All women n=6281	Primiparous women only n=3118	Multiparous women only n=3163
Country			
Belgium	1	1	1
Iceland	1.70 (1.02–2.83)	1.88 (0.71–4.92)	1.63 (0.86–3.10)
Denmark	1.37 (0.86–2.18)	1.18 (0.51–2.73)	1.68 (0.91–3.10)
Estonia	1.30 (0.79–2.11)	1.51 (0.63–3.56)	1.36 (0.72–2.55)
Norway	1.54 (1.01–2.35)	1.27 (0.58–2.61)	0.92 (0.53–1.60)
Sweden	0.82 (0.49–1.37)	1.16 (0.50–2.71)	0.70 (0.34–1.43)
Age			
<25	1	1	1
25-30	1.60 (1.05–2.44)	1.47 (081–2.69)	1.14 (0.56–2.34)
31-35	2.18 (1.41–3.35)	1.60 (0.79–323)	1.33 (0.64–2.76)
≥35	3.38 (2.13–5.36)	3.52 (1.60–7.72)	1.66 (0.78–3.53)
Education			
≤ 9 years	1	1	1
10–13 years	0.88 (0.51–1.52)	1.13 (0.44–2.90)	0.68 (0.33–1.40)
≥13 years	0.56 (0.32–0.96)	0.55 (0.21–1.44)	0.52 (0.25–1.05)
EDS-5 Score ≥7	1.75 (1.28–2.40)	1.90 (1.10–3.31)	1.39(0.90–2.15)
Severe Fear of childbirth	3.41 (2.64–4.40)	3.75 (2.36–5.94)	2.38 (1.65–3.42)
A history of any abuse	1.09 (0.87–1.37)	1.36 (0.89–2.09)	0.91 (0.68–1.23)
Non-native	1.28 (0.87–1.89)	1.60 (0.85–3.03)	1.21 (0.69–2.15)
Previous negative birth experience			2.96 (2.16–4.08)
Previous CS and no previous vaginal birth			17.41 (12.02–25.21)

α X^2 (df14, n=6281)=171.08 p<0.001 Cox & Snell R square 0.027, Nagelkerke R square=0.076, correct classified 94.3%

β X^2 (df14, n=3118)=73.09 p<0.001 Cox & Snell R square 0.023, Nagelkerke R square=0.094, correct classified 96.8%

δ X^2 (df16, n=3163)=350.55 p<0.001 Cox & Snell R square 0.106, Nagelkerke R square=0.245, correct classified 91.8%

Table 4. Indication for CS among women delivered by CS by wish for CS: number and percent in the Bidens study 2008–2010, N=6549

Indications*	Women delivered by CS=1037			
	wish for CS n=286	No wish for CS n=751	Total n=1037	Chi-square test
	n (%)	n (%)	n (%)	P-value
Fetal distress	17 (5.9)	195 (26.0)	212 (20.4)	<0.001
Dystocia	13 (4.5)	183 (24.4)	196 (18.9)	<0.001
Exhausted mother	4 (1.4)	4 (0.5)	8 (0.8)	0.227$^{\alpha}$
Breech presentation	13 (4.5)	171 (22.8)	184 (17.7)	<0.001
Other medical	157 (54.9)	258 (34.4)	415 (40.0)	<0.001
Psychosocial	22 (7.7)	3 (0.4)	25 (2.4)	<0.001
Maternal request	91 (31.8)	37 (4.9)	128 (12.3)	<0.001
Either maternal request or psychological reason	101 (35.3)	40 (5.3)	141 (13.6)	<0.001
Only non-medical	78 (27.3)	16 (2.1)	94 (9.1)	<0.001
Reason not known	14 (4.9)	27 (3.6)	41 (4.0)	0.337

*more than one indication could be given, therefore column totals add up to more than total for the column $^{\alpha}$Fisher's Exact Test