

The impact of obstetric interventions and complications on women's satisfaction with childbirth - a population based cohort study including 16 000 women

Maja Falk

Department of obstetrics and gynecology

Marie Nelson

Department of Obstetrics and Gynecology

Marie Blomberg (✉ marie.blomberg@liu.se)

Department of obstetrics and Gynecology

Research article

Keywords: birth satisfaction, VAS, visual analog scale, mode of delivery, cesarean, induction

Posted Date: August 22nd, 2019

DOI: <https://doi.org/10.21203/rs.2.13381/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Version of Record: A version of this preprint was published on December 11th, 2019. See the published version at <https://doi.org/10.1186/s12884-019-2633-8>.

Abstract

Background: As a quality marker and a tool for benchmarking between units, a visual analogue scale (VAS) (ranging from 1 to 10) to estimate woman's satisfaction with childbirth was introduced in 2014. This study aimed to assess how obstetric interventions and complications affected women's satisfaction with childbirth. **Methods:** A retrospective cohort study including 16,775 women with an available VAS score who gave birth between January 2016 and December 2017. VAS score, maternal and obstetric characteristics were obtained from electronic medical records and crude and adjusted odds ratios (aOR) were calculated. **Results:** The total prevalence of dissatisfaction with childbirth (VAS 1-3) was 5.7%. The main risk factors for dissatisfaction with childbirth were emergency cesarean section, aOR 3.98 95% confidence interval (CI) 3.27-4.86, postpartum hemorrhage ≥ 2000 ml, aOR 1.85 95%CI 1.24-2.76 and Apgar score <7 at five minutes, aOR 2.95 95%CI 1.95-4.47. The amount of postpartum hemorrhage showed a dose-response relation to dissatisfaction with childbirth. Moreover, labor induction, instrumental vaginal delivery, and obstetric anal sphincter injury were significantly associated with women's dissatisfaction with childbirth. 21% of women giving birth during the study period (4429/21,204) had missing values on VAS. A comparison of characteristics between women with and without a recorded VAS score was performed without any significant differences. **Conclusions:** Obstetric interventions and complications, including emergency cesareans section and postpartum hemorrhage, were significantly related to dissatisfaction with childbirth.

Background

The woman's experience of childbirth is an important quality measure in obstetric care. A traumatic birth experience may have both immediate and long-term effects on mother and child. It is a risk factor for developing postpartum depression and maternal fear of childbirth [1,2]. The number of obstetric interventions such as induction of labor and cesarean section (CS) is constantly increasing worldwide [3]. Complications associated with childbirth are rare, especially adverse infant outcome, but postpartum hemorrhage (PPH) and obstetric anal sphincter injury (OASI) occur weekly in most delivery wards. The impact of obstetric interventions and complications on women's experience of childbirth has to some extent been studied by questionnaires [4,5] or qualitative methodology [6]. The Visual Analog Scale (VAS) has earlier been used for assessing satisfaction with childbirth [7,8].

The influence of delivery mode on the woman's experience of childbirth is disputed. Some authors have suggested that women who have an unplanned delivery are less satisfied than women who have a planned delivery [7,8], while others found no association between mode of delivery and satisfaction with childbirth [9,10]. There are also divergent results concerning the association between epidural anesthesia and women's childbirth experience [10-12]. Further the impact of obstetric complications, such as PPH and OASI, on women's childbirth experience is largely unknown.

Therefore this study aimed to assess in a large data set whether obstetric interventions, mode of delivery and obstetric complications affected women's satisfaction with childbirth.

Methods

This retrospective observational cohort study was conducted between January 1, 2016 and December 31, 2017 at seven delivery units in the southeast region of Sweden and included all women with singleton births during the study period. At the start of the study period (2016) the VAS estimation of childbirth satisfaction was well established in routine clinical care and had been practiced in nearly two years. A flow chart of the study population is presented in figure 1.

Figure 1. Flow chart of the study population.

Assessment of satisfaction with childbirth is routinely estimated using a visual analog scale, ranging from 1 to 10, where 10 is most satisfied. There is a written clinical guideline on VAS estimation. The women are asked by the midwife working at the postnatal ward to assess their overall satisfaction with the delivery. The assessment is made after going through the course of the childbirth. The woman is able to ask questions, and get information about why obstetric interventions were made or not. The VAS assessment is made at the end of the dialog. This dialog are performed before discharge and therefore the average time between delivery and VAS assessment is usually 1-2 days. The reported VAS value is then documented in the woman's electronic medical records (EMR).

VAS scores were extracted from women's EMRs as the main outcome variable in the present study. The VAS score was further dichotomized into dissatisfaction (VAS 1-3) and satisfaction with childbirth (VAS 4-10). This categorization was based on the current clinical recommendation to offer extra psychosomatic support to women scoring VAS 1-3, in order to enable their processing of a putative traumatic experience.

Demographic and obstetrical exposure data were collected from the EMR. Maternal characteristics extracted were maternal age at delivery, body mass index (measured upon enrollment at the antenatal care center) and parity. Maternal age at delivery was coded as <25 years; 25–35 years; >35 years. Body Mass Index (BMI) was coded according to the WHO classification of adult weight: underweight (<18.5 kg/m²), normal weight (18.5-24.9 kg/m²), overweight (25-29.9 kg/m²), obesity class I (30-34.9 kg/m²), obesity class II (35-39.9 kg/m²), and obesity class III (>40 kg/m²) [13]. Parity was recoded into primiparas and multiparas.

Obstetric exposure variables extracted were delivery start, epidural anesthesia, labor augmentation (oxytocin), mode of delivery, OASI, PPH and Apgar score at five minutes. PPH was coded as <500 ml; 500-999 ml; 1000-1999 ml; ≥2000 ml, and Apgar score at five minutes was coded as <4; <7; ≥7. Forthcoming variables were binary: epidural anesthesia (yes or no) and OASI (yes or no). Delivery start was divided into spontaneous, induction of labor and elective CS. Mode of delivery was categorized into four groups: normal vaginal delivery, instrumental vaginal delivery (vacuum extraction or forceps), elective CS and emergency CS.

Obstetric interventions and complications were then related to dissatisfaction with childbirth (VAS 1-3).

Statistical analysis

Data were analyzed using SPSS Version 24. Descriptive statistics were presented as mean score, standard deviation, and absolute and relative frequency. Maternal characteristics were investigated using chi-squared tests for categorical variables and t-tests for numerical variables. Women with and without a documented VAS score were compared concerning certain characteristics. Obstetric variables were entered in univariable and multivariable logistic regression analyses to evaluate the outcomes. Reference categories for the analyses were chosen as follows: spontaneous delivery start, no epidural anesthesia, no labor augmentation (oxytocin), normal vaginal delivery, no OASI, PPH <500 ml and Apgar ³7. Crude and adjusted odds ratios (ORs and aORs) were calculated with 95% confidence intervals (CI). In the multivariate analyses, adjustments were made concurrently for the maternal characteristics significantly associated with birth satisfaction. Epidural anesthesia was further adjusted for mode of delivery. All analyses were two-sided, and P-values less than 0.05 were considered as statistically significant.

This study was approved by the Regional Ethical Review Board in Linköping (Dnr 2018/337-31).

Results

In the study population, 69 % (11,493/16,775) of the women were very satisfied with childbirth and chose the three highest VAS scores (8, 9 or 10). However, 953 (5.7%) women reported VAS 1-3. Among the 16,775 women included in this study, the mean VAS score was 7.94 (SD 2.1). The mean maternal age was 29.7 years (range 14-49 years, SD 5.0). Forty percent (n = 6,632) of the women were primiparas and 54 percent (n = 8,722) were classified as normal weight (BMI 18-24.9 kg/m²). Table 1 presents a cross-tabulation of maternal characteristics in the study population according to satisfaction with childbirth.

No association was found between BMI and satisfaction with childbirth. Likewise, no difference in satisfaction with childbirth was shown when comparing normal weight women with the rest of the women in the study sample (p=0.052). Primiparas and women >35 years were more likely to report dissatisfaction.

The results of the univariable and multivariable logistic regression analyses including obstetric characteristics before delivery are presented in table 2.

Induction of labor (aOR 1.69, 95% CI 1.44-1.98), epidural anesthesia (aOR 1.90, 95% CI 1.64-2.20) and oxytocin augmentation (aOR 2.11, 95% CI 1.83-2.44) were found to be independent risk factors for dissatisfaction with childbirth. When epidural anesthesia was further adjusted for mode of delivery, the intervention was still a significant risk factor for dissatisfaction with childbirth (aOR 1.75, 95% CI 1.50-2.04).

The results from the analyses of mode of delivery are presented in table 3.

Emergency CS was the strongest predictor of reporting dissatisfaction with childbirth (aOR 3.98, 95% CI 3.27-4.86). Similarly, an instrumental vaginal delivery was an independent risk factor for dissatisfaction with childbirth (aOR 2.89, 95% CI 2.32-3.60), compared to a normal vaginal delivery. No significant association was found between elective CS and dissatisfaction with childbirth (aOR 1.12, 95% CI 0.83-1.50), using normal vaginal delivery as a reference. Obstetric complications after delivery in relation to dissatisfaction with childbirth are presented in table 4.

The multivariable analyses identified OASI as an independent risk factor for dissatisfaction with childbirth (aOR 2.07, 95% CI 1.51-2.83). PPH of all degrees was also significantly associated with a negative experience, compared with bleeding <500 ml. The adjusted analyses indicated a dose-response relation between amount of bleeding and dissatisfaction with childbirth, the more severe the bleeding, the greater the risk of dissatisfaction. Likewise, the immediate well-being of the infant seemed to highly influence the woman's reported VAS score. Apgar score <7 at five minutes after delivery was found to be statistically significantly associated with dissatisfaction with childbirth (aOR 2.95, 95% CI 1.95-4.47), compared with the reference category Apgar ³7. Apgar score <4 was not related to dissatisfaction with childbirth but low numbers were included in that analysis.

Due to 21% (4429/21,204) missing values on VAS in women giving birth during the study period a comparison of available characteristics between women with and without a recorded VAS score was performed. The results of the analyses are presented in table 5.

The mean age of the study population (29.7 years) was similar to the mean age of the women without VAS (29.6 years) ($p=0.377$). The mean BMIs were also comparable between the groups (25.3 versus 25.8 kg/m²), although the difference was statistically significant ($p<0.001$). Moreover, 64% of the women excluded were multiparas, compared to 59% in the study population ($p<0.001$).

Discussion

This large cohort study showed that obstetric interventions and complications were strongly related to women's satisfaction with childbirth. The strongest risk factors for dissatisfaction were emergency CS, instrumental vaginal delivery, PPH and Apgar score <7 at five minutes. Furthermore, induction of labor, epidural anesthesia, oxytocin augmentation and OASI were significantly associated with women's dissatisfaction with childbirth.

Mode of delivery did highly influence women's satisfaction with childbirth. Emergency CS and instrumental vaginal delivery were strongly related to a reported dissatisfaction with childbirth. These findings are consistently supported by literature [7,8,14,15]. Although, one study pointed out the importance of separating forceps and vacuum extraction when evaluating birth experience based on findings of an increased risk of post-traumatic symptoms in women who had a forceps-assisted vaginal birth, but no such increased risk after vacuum extraction [16]. Since our study did not differentiate between these types of instrumental delivery, we cannot be certain if forceps and vacuum extraction are equally related to a negative birth experience. Prior research has suggested lack of control, insufficient involvement in decision-making and complications for mother or child as potential risk factors for a negative experience of childbirth [12,16]. These factors may explain the lower degree of satisfaction following an unexpected intervention such as instrumental vaginal delivery or emergency CS. Interestingly elective CS did not protect against dissatisfaction with childbirth when comparison was made with normal vaginal delivery. This result contradicts prior research which has described elective CS as being related to a better birth experience [7]. In the present study, Apgar score <7 at five minutes and PPH ³ 2000 ml were highly associated with dissatisfaction with childbirth. These findings further strengthen the suggestion that "complications for mother or child" have a great impact on maternal satisfaction [17]. There was a dose-response relation between degree of PPH and dissatisfaction with childbirth. Lower satisfaction among women with PPH regardless of degree implies that this complication may be even more traumatic for the women than the caregivers are aware of. The explanation for the lower satisfaction could be the loss of consciousness and the reaction to the blood, from both the woman and her partner. Other reasons may also include additional interventions, such as pain, suturing, blood transfusions, anemia and prolonged recovery after delivery. The risk dissatisfaction with childbirth was doubled when suffering an OASI. A follow-up study showed poorer quality of life 10 years postpartum among women suffering an OASI, compared to women without an OASI [18]. To our knowledge, no previous study has focused on the relationship between OASI and women's overall satisfaction shortly after delivery. An OASI may be traumatic for the mother at an early stage, since it often leads to additional immediate interventions such as pain analgesia and suturing after delivery. Worries about future problems due to the injury may also reduce satisfaction. There is an ongoing discussion whether extra follow-up of these women should be offered.

The finding of epidural anesthesia to be an independent risk factor for dissatisfaction with childbirth is supported by Ulfsdottir et al. and Waldenström et al [10,15]. In contrary, Hodnett and Carquillat et al. found no significant association between epidural and birth experience [11,12]. The relationship between labor satisfaction and pain analgesia is complex. Women are more likely to receive analgesia when the delivery is longer or more complicated and this should be kept in mind when the results of this study are interpreted [19]. Another possible explanation for lower satisfaction in women receiving an epidural might be selection bias. Stadlmayr and colleagues stated that a request for epidural anesthesia was related to high levels of physical discomfort and low emotional adaptation [20]. Induction of labor is a common obstetric intervention, with an increasing rate over the last few decades in Sweden. Our results showed that women who were induced were at higher risk of experiencing the delivery in a negative way. In

agreement with our findings, studies have reported a significant association between labor induction and a negative experience of childbirth [15,20]. An explanation for less satisfaction among women who are induced could be the complications that may follow the intervention.

The present study has certain strengths. To our knowledge, this study has the largest number of women by the time of date compared to previous studies in the same field, which gave the study sufficient power to evaluate satisfaction with childbirth according to labor characteristics. The broad inclusion of not only healthy women in seven different hospitals reduced the risk of selection bias. Furthermore, the high compliance of VAS (79%) increases the likelihood of the study sample being representative. These advantages make the results of this study likely to be generalizable to other populations in high income countries. Although there were statistically significant differences between women with and without a recorded VAS score, no clinically relevant differences appeared. Another advantage of this study is that all variables studied in relation to birth satisfaction were prospectively documented in the EMR and therefore recall bias could be avoided. Furthermore, the large sample size made it possible to also study rare outcomes in relation to satisfaction with birth, such as low Apgar score and OASI. The process of estimating satisfaction with childbirth using VAS was clinically well-established at the time of the study start. Woman's satisfaction was evaluated by a midwife who was not a part of the care team during labor. Consequently, it was possible for the woman to give honest responses to the VAS assessment, without fear of hurting anyone's feelings. VAS has been validated concerning birth experience by comparing VAS with the W-DEQ questionnaire (The Wijma Delivery Expectancy/Experience Questionnaire) [4] for assessing experience of childbirth. The results showed a significant correlation between the two measurements and that VAS was easier to use than the questionnaire [10].

The present study has several limitations. The purpose of this study was to evaluate how obstetric interventions and complications affected women's satisfaction with childbirth overall. Focusing on clinically relevant groups; for example women with PPH, not necessarily to imply causality between the exposure and the outcome. Another limitation is that only factors available in the EMR could be evaluated. There might be other putative confounding factors (not available in the EMR) such as socioeconomic status that could have affected our results. Our definition of dissatisfaction (VAS 1-3) was based on the current clinical guideline to offer extra psychosomatic support to women scoring below 4. Another definition might have been correct and rendered other results. The point in time when the satisfaction with childbirth was measured can also be debated. In this study, the measuring of satisfaction occurred just a few days after delivery. Soet el al stated that initial positive feelings towards giving birth might influence the women's rating of satisfaction [22]. This was possible for the women included in our study. The high compliance and the equal evaluation of all women included in the study may overcome the possible shortcoming of immediate assessment.

Another major limitation is that we have no knowledge about factors that could have positively influenced women's estimated satisfaction with birth such as caregiver support and involvement in decision-making [6].

Conclusions

Several obstetric interventions and complications seemed to influence the woman's satisfaction with childbirth. The strongest independent risk factors for reporting dissatisfaction with childbirth were emergency CS, instrumental vaginal delivery, PPH and Apgar <7 at five minutes after delivery. Other variables significantly associated with dissatisfaction included labor induction, epidural anesthesia, oxytocin augmentation, and OASI. There might be clinical implication of these findings. Women requesting for labor induction or elective CS could be informed that the overall satisfaction with childbirth was not better or even less after these interventions compared to spontaneous onset of labor and normal delivery. Secondly our findings might increase delivery staff's awareness of the negative impact of relatively common obstetric complications, such as PPH, on women's satisfaction with childbirth.

Abbreviations

VAS visual analogue scale

CS cesarean section

PPH postpartum hemorrhage

OASI obstetric anal sphincter injury

EMR electronic medical records

BMI Body Mass Index

Declarations

Ethics approval and consent to participate: Approval of the study was obtained from the Regional Ethical Review Board in Linköping (Dnr 2018/337-31).

Consent for publication: Not applicable

Availability of data and material: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

Funding: This study was supported by an unrestricted grant from the Östergötland County Council. The funding body had no involvement in the design of the study, the data collection, the analyses and interpretation or the manuscript preparation.

Authors' contributions: MB designed the study, interpreted the data, and wrote the manuscript. MF performed the statistical calculations, interpreted the data and wrote the manuscript. MN and MF

extracted and collected all data from EMR. All authors read and approved the final manuscript.

Acknowledgements: Not applicable

References

1. Bell AF, Andersson E. The birth experience and women's postnatal depression: A systematic review. *Midwifery*. 2016;39:112-23.
2. Størksen HT, Garthus-Niegel S, Vangen S, Eberhard-Gran M. The impact on previous birth experience on maternal fear of childbirth. *Acta Obstet Gynecol Scand*. 2013;92:318-24.
3. Boerma T, Ronsmans C, Melesse DY, Barros AJD, Barros FC, Juan L, et al. Global epidemiology of use of and disparities in caesarean sections. *Lancet*. 2018;392:1341-8.
4. 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.
5. Alfaro Blazquez R, Chorchon S, Ferrer Ferrandiz E. Validity of instruments measuring the satisfaction of a woman and her partner with care received during labour and childbirth: Systematic review. *Midwifery*. 2017;55:103-12.
6. Hauck Y, Fenwick J, Downie J, Butt J. The influence of childbirth expectations on Western Australian women's perceptions of their birth experience. *Midwifery*. 2007;23:235-47.
7. Schindl M, Birner P, Reingrabner M, Joura E, Husslein P, Langer M. Elective cesarean section vs. spontaneous delivery: a comparative study of birth experience. *Acta Obstet Gynecol Scand*. 2003;82:834-40.
8. Handelzalts JE, Waldman Peyser A, Krissi H, Levy S, Wiznitzer A, Peled Y. Indications for Emergency Intervention, Mode of Delivery, and the Childbirth Experience. *PLoS One*. 2017;12.
9. Larsson C, Saltvedt S, Edman G, Wiklund I, Andolf E. Factors independently related to a negative birth experience in first-time mothers. *Sex Reprod Healthc*. 2011;2:83-9.
10. Ulfsdottir H, Nissen E, Ryding EL, Lund-Egloff D, Wiberg-Itzel E. The association between labour variables and primiparous women's experience of childbirth; a prospective cohort study. *BMC Pregnancy Childbirth*. 2014;14:
11. Hodnett ED. Pain and women's satisfaction with the experience of childbirth: a systematic review. *Am J Obstet Gynecol*. 2002;186:S160-72.
12. Carquillat P, Boulvain M, Guittier MJ. How does delivery method influence factors that contribute to women's childbirth experience? *Midwifery*. 2016;43:21-8.
13. World Health Organization. Obesity: Preventing and managing the global epidemic. World Health Organ Technical Report Series. 2000;894:1-253.
14. Smarandache A, Kim TH, Bohr Y, Tamim H. Predictors of a negative labour and birth experience based on a national survey of Canadian women. *BMC Pregnancy Childbirth*. 2016;161:114.

15. Waldenström U, Hildingsson I, Rubertsson C, Rådestad I. A negative birth experience: prevalence and risk factors in a national sample. *Birth*. 2004;31:17-27.
16. Elvander C, Cnattingius S, Kjerulff KH. Birth experience in women with low, intermediate or high levels of fear: findings from the first baby study. *Birth*. 2013;40:289-96.
17. Henriksen L, Grimsrud E, Schei B, Lukasse M. Factors related to a negative birth experience – A mixed methods study. *Midwifery*. 2017;51:33-9.
18. Samarasekera DN, Bekhit MT, Wright Y, Lowndes RH, Stanley KP, Preston JP, et al. Long-term anal continence and quality of life following postpartum anal sphincter injury. *Colorectal Dis*. 2008;10:793-9.
19. Morgan BM, Bulpitt CJ, Clifton P, Lewis PJ. Analgesia and satisfaction in childbirth (the Queen Charlotte's 1000 Mother Survey). *Lancet*. 1982;2:808-10.
20. Stadlmayr W, Schneider H, Amsler F, Bürgin D, Bitzer J. How do obstetric variables influence the dimensions of the birth experience as assessed by Salmon's item list (SIL-Ger)? *Eur J Obstet Gynecol Reprod Biol*. 2004;115:43-50.
21. Hendersen J, Redshaw M. Women's experience of induction of labor: a mixed methods study. *Acta Obstet Gynecol Scand*. 2013;92:1159-67.
22. Soet JE, Brack GA, Dilorio C. Prevalence and predictors of women's experience of psychological trauma during childbirth. *Birth*. 2003;30:36-46.

Tables

Table 1. Maternal characteristics of the study population.

	Dissatisfaction with childbirth VAS 1-3 (n = 953)	Satisfaction with childbirth VAS 4-10 (n = 15 822)	Total (N = 16775)	P-value
Maternal age (years)				
Mean [SD]	30.2 [5.0]	29.6 [5.0]	29.7 [5.0]	0.001*
<25	101 (10.6)	2237 (14.1)	2338 (13.9)	0.006*
25-25	700 (73.5)	11 327 (71.6)	12 027 (71.7)	
>35	142 (14.9)	2098 (13.3)	2240 (13.4)	
Missing n	10	160	170	
Body Mass Index				
<18.5	14 (1.5)	365 (2.4)	379 (2.3)	0.079
18.5-24.9	469 (49.2)	8253 (54.3)	8722 (52.0)	
25-29.9	274 (28.8)	4212 (27.7)	4486 (26.7)	
30-34.9	107 (11.2)	1669 (11.0)	1776 (10.6)	
35-39.9	42 (4.4)	542 (3.6)	584 (3.5)	
>40	15 (1.6)	185 (1.2)	200 (1.2)	
Missing n	32	596	628	
Parity				
Primiparas	499 (52.4)	6133 (38.8)	6632 (39.5)	<0.001*
Multiparas	438 (46.0)	9468 (60.0)	9906 (59.1)	

Missing n	16	221	237	
-----------	----	-----	-----	--

VAS: visual analog scale. Categorical data are presented as number and (%). *P-values <0.05 were considered as statistically significant.

Table 2. Obstetric interventions and risk of dissatisfaction with childbirth.

	Total number of births N=16775	Dissatisfaction with childbirth VAS 1-3		
		Number n (%)	Crude OR (95% CI)	Adjusted OR (95% CI) ^a
Delivery start				
Spontaneous	13071	669 (5.1)	ref.	ref.
Induction	2655	232 (8.7)	1.78 (1.52- 2.07)	1.69 (1.44-1.98)
Elective CS	1049	52 (5.0)	0.97 (0.72- 1.29)	1.00 (0.74-1.34)
Epidural anesthesia	6074	509 (8.4)	2.11 (1.85- 2.41)	1.90 (1.64-2.20)
Yes	10 701	444 (4.1)	ref.	ref.
No				
Oxytocin augmentation	6455	561 (8.7)	2.41 (2.11- 2.75)	2.11 (1.83-2.44)
Yes	10 320	392 (3.8)	ref.	ref.
No				

OR: odds ratio; CI: confidence interval; CS: cesarean section. ^aAdjusted for maternal age and parity.

Table 3. Mode of delivery and risk of dissatisfaction with childbirth.

	Total number of births N = 16775	Dissatisfaction with childbirth VAS 1-3		
		Number n (%)	Crude OR (95% CI)	Adjusted OR (95% CI) ^a
Normal vaginal delivery	13990	625 (4.5)	ref.	ref.
Instrumental vaginal delivery	852	119 (14.0)	3.47 (2.81-4.28)	2.89 (2.32-3.60)
Elective CS	1049	52 (5.0)	1.11 (0.83-1.49)	1.12 (0.83-1.50)
Emergency CS	884	157 (17.8)	4.62 (3.82-5.59)	3.98 (3.27-4.86)

OR: odds ratio; CI: confidence interval; CS: cesarean section. ^aAdjusted for maternal age and parity.

Table 4. Obstetric complications and risk of dissatisfaction with childbirth.

	Total number of births N = 16775	Dissatisfaction with childbirth VAS 1-3		
		Number n (%)	Crude OR (95% CI)	Adjusted OR (95% CI) ^a
Obstetric anal sphincter injury				
Yes	390	53 (13.6)	2.71 (2.01-3.64)	2.07 (1.51-2.83)
No	16384	900 (5.5)	ref.	ref.
Missing n	1			
Postpartum hemorrhage		543 (4.6)	ref.	ref.
<500 ml	11876	288 (7.7)	1.75 (1.51-2.03)	1.65 (1.42-1.92)
500–999 ml	3725	82 (10.1)	2.34 (1.83-2.98)	2.11 (1.65-2.72)
1000–1999 ml	815	27 (16.8)	4.21 (2.76-6.42)	4.11 (2.68-6.30)
≥2000 ml	161			
Missing n	198			
Apgar score at 5 min				
<4	19	3 (15.8)	3.00 (0.88-10.28)	2.57 (0.74-8.89)
<7	179	28 (15.6)		2.95 (1.95-4.47)
≥7	16559	918 (5.5)	3.16 (2.10-4.76)	ref.
Missing n	37		ref.	

OR: odds ratio; CI: confidence interval. ^aAdjusted for maternal age and parity.

Figures

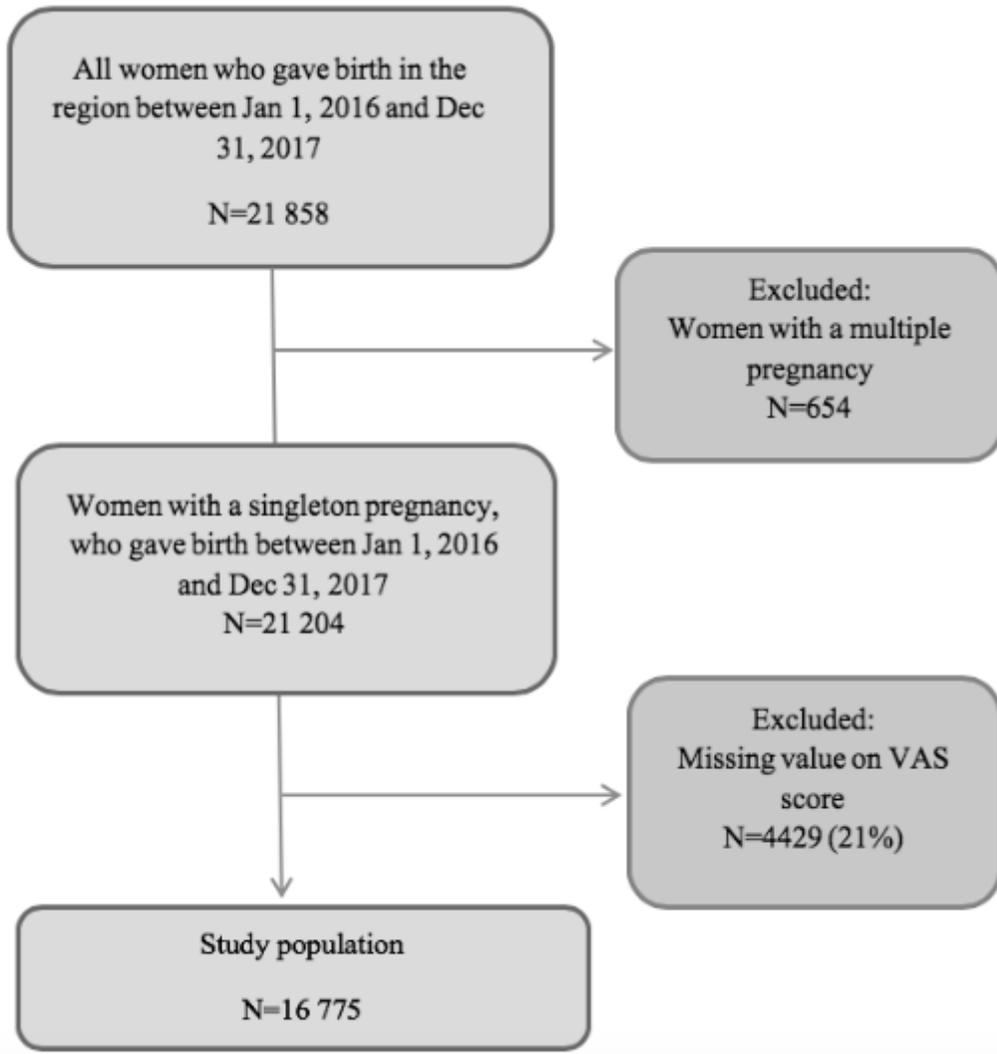


Figure 1

Flow chart of the study population.