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Dissatisfaction of women with induction of labour according to parity: results of a population-based cohort study

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### **Highlights**

- Failure to discuss induction with nulliparas in birth classes led to dissatisfaction.
- Nulliparas' lack of participation in the decision making led to dissatisfaction.
- Labour exceeding 24 hours was associated with reduced satisfaction in parous women.
- For all women, more attention should be paid to vaginal discomfort, pain and requests.
- Unexpected events should be discussed postpartum with all women.

Dissatisfaction of women with induction of labour according to parity: results of a population-based cohort study

**Abstract**

**Objective:** To determine the factors associated with dissatisfaction in women whose labour was induced, according to parity.

**Design:** Prospective population-based cohort study.

**Setting:** Seven French perinatal health networks including 94 maternity units

**Participants:** Among 3042 consecutive women who underwent induction of labour (IoL) with a live foetus from November 17 to December 20, 2015, in participating maternity units, this study included the 1453 who answered the self-administered questionnaire about their experience of IoL at two months post-delivery.

**Measurements:** The associations between women's dissatisfaction at two months post-delivery and the characteristics of their pregnancy, labour, and delivery were assessed with multivariable logistic regression models. Analyses were stratified for nulliparous and parous women. Multivariable mixed models were used to take a random effect for the maternity unit into account.

**Findings:** The response rate was 47.8% (n=1453/3042). Overall, 30% of the nulliparous women were dissatisfied (n=231/770) and 19.7% (n=130/659) of the parous women. The specific independent determinants of dissatisfaction for nulliparous women were antenatal birth classes that failed to include discussion of IoL (OR: 2.68, 95% CI [1.37; 5.23]) and lack of involvement in the decision-making process (OR: 1.92, 95% CI [1.23; 3.02]). For the parous women, a specific determinant was a delivery that lasted more than 24 hours (OR: 4.04, 95% CI [1.78; 9.14]). Determinants of maternal dissatisfaction common to both groups were unbearable vaginal discomfort (respectively, OR: 1.98, 95% CI [1.16; 3.37] and OR: 4.23, 95% CI [2.04; 8.77]), inadequate pain relief (respectively, OR: 5.55, 95% CI [3.48;

8.86] and OR: 9.17, 95% CI [5.24; 16.02]), lack of attention to requests (respectively OR: 3.81, 95% CI [2.35; 6.19] and OR: 5.01, 95% CI [2.38; 10.52]), caesarean delivery (respectively, OR: 5.55, 95% CI [3.41; 9.03] and OR: 4.61, 95% CI [2.02; 10.53]) and severe maternal complications (respectively, OR: 2.45, 95% CI [1.02; 5.88] and OR: 5.29, 95% CI [1.32; 21.21]).

**Key conclusions and implications for practice:** To reduce dissatisfaction in nulliparous women, IoL should be discussed during antenatal birth classes and women should be made to feel that they shared in the medical decision to perform IoL. For parous women, care providers should inform them that the duration of delivery may exceed 24 hours. Continuous support for all women during IoL should pay closer attention to vaginal discomfort, pain and women's requests. Postpartum discussions with mothers should be arranged to enable conversation about the experience of unexpected events.

**Keywords:** Induction of labour; prenatal education; decision-making; pain management; satisfaction

## **Introduction**

The rate of induction of labour (IoL) varies significantly by country, ranging from 12% in Sweden (Ekéus and Lindgren, 2016) to 35% in the Netherlands (Christiaens et al., 2013). From 1995 to 2014, this rate doubled in Iceland from 12% to 25% (Swift et al., 2018). In France, a recent study (MEDIP) found a mean rate of around 20%, fluctuating significantly between maternity units providing the same level of care (from 7.7% to 33.0%) (Blanc-Petitjean et al., 2018). This variation may be explained by the low level of evidence for some medical indications for labour induction (Haute Autorite de Sante, 2009): IoL should be clinically justified after weighing the risks of induction against those of continuing the pregnancy. Thus, its use for improving birth outcomes for women at or beyond term remains a controversial subject, but there is no consensus about its optimal timing, which warrants further investigation (Keulen et al., 2018; Middleton et al., 2018). Some observational studies have shown that IoL is associated with an increase in the rate of emergency caesarean sections, compared with expectant management (Glantz, 2010; Pyykönen et al., 2018; Zhao et al., 2017). Conversely, recent research suggests that in low-risk patients elective IoL at 39 weeks of gestation is associated with a significantly lower caesarean rate (Grobman et al., 2018; Sotiriadis et al., 2018). In this situation of uncertainty, the information provided to patients must be clear and their choice must be taken into consideration. The process of shared decision making, which serves to reduce conflict and enhance satisfaction (Kinnersley et al., 2013), must be adhered to, especially as IoL has been shown to be associated with lower satisfaction than spontaneous labour (Shetty et al., 2005). The experience of childbirth for women undergoing IoL also differs according to parity (Henderson and Redshaw, 2013). These points are important because the impact of the experience of childbirth affects mothers' emotional well-being and their early interactions with the child and may contribute to the development of depression or post-traumatic stress (Creedy et al., 2000; Skari et al., 2002).

Accordingly, to improve the experience of patients with IoL, we sought to answer two questions: Which women are most at risk of dissatisfaction? What modifiable determinants of this dissatisfaction might enable us to adapt our practices to reduce its level? Our thorough search of the literature found no population-based studies in a developed country assessing quantitatively the determinants of maternal satisfaction for any method of IoL or any gestational age. In developing countries, only one study has examined this question in a population of women with labour induced, without taking parity into account (Ezeanochie et al., 2013). Our aim is to identify the determinants of dissatisfaction in women whose labour was induced, according to parity.

## **Methods**

The MEDIP study was an observational prospective cohort study, the main objective of which was to evaluate perinatal outcome according to method of IoL in France. Our aim here is to examine one of its secondary objectives maternal dissatisfaction. The MEDIP study took place in November and December, 2015, in 94 French maternity units that accounted for 18% of all French maternity units and covered a sixth of the annual deliveries in France. Their characteristics were similar to those of French maternity facilities as a whole (Blanc-Petitjean et al., 2018). The study consecutively included all women with labour induction and a live fetus. During the data collection period, 15,103 women gave birth in participating maternity units, 3171 (21.0%) of them had IoL with a live fetus, and 3042 (95.9%) agreed to participate in the MEDIP study. For this secondary study objective, the population analysed was the same as that for the principal outcome: women with induction of labour and a live foetus (i.e., the only exclusion criterion was intrauterine foetal death). As no validated scale exists for measuring satisfaction for labour induction, we developed a specific questionnaire based on dimensions of this subject that have been extensively studied, such as pain relief (Smith et al 2011), attention to women's requests, meeting expectations of labour and delivery (Shetty et



al., 2005) and duration of labour (Henderson and Redshaw, 2013; Shetty et al., 2005); we also considered dimensions that have been explored less frequently, such as vaginal discomfort (Boulvain et al., 2008; Irion et al., 1998). The questions were discussed and validated by a scientific committee composed of a multidisciplinary team of perinatal professionals (midwife, gynaecologist/obstetrician), epidemiologists, and user representatives. The self-administered questionnaire developed by the committee was sent either by postal mail (49.0%) or by email (51.0%) at two months after delivery to all women included in the study (Appendix). Three paper or electronic reminders were sent before treating the woman as a non-responder.

Women's overall satisfaction regarding labour and delivery was measured with a 5-point Likert-like scale. For the analysis of dissatisfaction, the replies *not really satisfied*, *dissatisfied*, and *very dissatisfied* were grouped and defined as "*dissatisfied*"; the replies *very satisfied* or *satisfied* were grouped and defined as "*satisfied*".

Data about the characteristics of the women, pregnancy, labour, and delivery came from their medical files. The women's characteristics that we studied were: maternal age, region of birth (Europe, North Africa, sub-Saharan Africa, other), marital/partner status, parity (nulliparous, parous), and body mass index (BMI) before pregnancy ( $\text{kg/m}^2$ ). The pregnancy characteristics analysed were: status of the maternity unit of delivery (university public, other public, private), spontaneous pregnancy, antenatal birth classes (none; yes but labour induction was not discussed; yes, with labour induction discussed).

The characteristics of labour were the source of labour induction request and woman reaction, with the woman reaction (the woman; the medical staff, and the woman agreed; the staff, and the woman agreed after a long discussion; the staff, and the woman felt she had no choice), indication for IoL (medical indication, no medical indication), mode of staff decision for IoL (staff meeting; individual physician decision; systematically according to a protocol), oral

information before IoL, Bishop score (continuous), method of labour induction (cervical ripening or oxytocin administration).

The delivery characteristics were the induction-to-delivery interval (<6 h, [6-12[, [12-24[, >24 h), epidural analgesia, gestational age at birth (<37 weeks of gestation, 37-41 weeks, > 41 weeks), mode of delivery (spontaneous vaginal, instrumental delivery, caesarean), perineal trauma (none, perineal tears, episiotomy), and neonatal hospitalisation. Severe maternal complications included severe postpartum haemorrhage defined by blood loss equal to or greater than 1000 ml or surgical complication or hysterectomy or intrauterine balloon tamponade or transfusion or maternal transfer to intensive care unit.

The variables related to the experience of IoL were: vaginal discomfort (none, tolerable, unbearable), satisfaction with pain relief and/or support during uterine contractions (very satisfied and satisfied vs. dissatisfied and very dissatisfied), ability to express requests and impression they were heard, labour as expected, acceptable duration of labour, and delivery as expected. For these last 4 variables, the replies *absolutely agree*, *agree* and *more or less agree* were grouped and defined as "*satisfied*", the replies *neither yes nor no*, *more or less disagree*, *disagree*, and *completely disagree* were grouped and defined as "*dissatisfied*".

#### Statistical analysis

The quantitative variables are described by their means and standard deviations (SD), and the qualitative variables as percentages. The association between maternal dissatisfaction and individual characteristics was studied in the univariate analysis separately for nulliparous and parous women and tested with the Chi<sup>2</sup> test or Student t test (all continuous variables normally distributed). The associations were then studied with multivariable logistic regression models. Because of the interaction observed between parity and satisfaction, we estimated two multivariable logistic models, one for nulliparous and one for parous women. Multivariable mixed models were used to take a random effect for maternity unit into account. The variables

that were significantly associated with maternal dissatisfaction in the univariate analysis were included in the multivariable models, except for some collinear variables that would have resulted in over-adjustment. The variables integrated simultaneously in the multivariable models were: source of labour induction request and woman reaction, antenatal birth classes, medical indication for IoL, oral information before IoL, duration of delivery, epidural analgesia, vaginal discomfort, pain relief and/or help during uterine contractions, expression of requests and impression they were heard, mode of delivery, neonatal hospitalisation and severe maternal complications. The method of induction and the Bishop score were not included in the model because they were highly correlated with duration of delivery. The odds ratios (OR) and their 95% confidence intervals were estimated, and Wald tests used to study the significance of the OR in each model. The number of missing data items was specified if > 5%. Statistical analyses were performed with Stata 15 software (Stata Corp., College Station, TX, US).

## Ethics

The protocol for the MEDIP study was recorded in the ClinicalTrials.gov database (NCT02477085). The regional ethics committee (*Comité de protection des personnes d'Ile de France* - 2015-May - DAP 21bis), the national ethics committee for the treatment of medical data (*Comité consultatif sur le traitement de l'information en matière de recherché* - 15.609) and the French data protection agency (*Commission Nationale de l'Informatique et des Libertés* - MMS/VCS/AR1510301) approved this study.

## Results

The response rate for the two-month post-delivery questionnaire was 47.8% (n=1453/3042). Respondents and non-respondents differed significantly for several variables (all  $p < 0.05$ ): respondents were older, more frequently married to their partner and nulliparous, had a lower mean BMI, and differed for place of birth. There were no significant differences in terms of practice-related characteristics, except respondents gave birth at a higher gestational age ( $p < 0.01$ ) and had more frequent perineal tears ( $p = 0.02$ ; Appendix). Among women who responded to the questionnaire, 30% of the nulliparous women were dissatisfied (n=231/770) and 19.7% (n=130/659) of the parous women.

Among the respondents, the pregnancy characteristics of the nulliparous women did not differ significantly between satisfied and dissatisfied women, except for antenatal birth classes ( $p = 0.01$ ; Table 1). Of the IoL characteristics, significant differences were observed for the decision making process for IoL ( $p < 0.01$ ). Dissatisfied nulliparous women had received oral information before IoL significantly less often, had lower mean Bishop scores, and required cervical ripening more often ( $p < 0.01$ ; Table 2). A significantly larger percentage of these dissatisfied nulliparous women had a duration of labour exceeding 12 hours ( $p < 0.01$ ), caesarean delivery, and severe maternal complications ( $p < 0.01$ ), and a smaller percentage had epidural analgesia ( $p < 0.01$ ; Table 3). Every variable related to the experience of IoL was significantly associated with dissatisfaction in nulliparous women ( $p < 0.01$ ; Table 4).

In the multilevel logistic regression model, factors significantly associated with nulliparous dissatisfaction included antenatal birth classes that did not discuss IoL (OR: 2.68, 95% CI [1.37; 5.23]), a staff decision for induction about which the woman felt that she had no choice (OR: 1.92, 95% CI [1.23; 3.02]), unbearable vaginal discomfort (OR: 1.98, 95% CI [1.16; 3.37]), dissatisfaction with pain relief or lack of support during uterine contractions (OR: 5.55, 95% CI [3.48; 8.86]), lack of attention to requests (OR: 3.81, 95% CI [2.35; 6.19]),

caesarean delivery (OR: 5.55, 95% CI [3.41; 9.03]) and severe maternal complications (OR: 2.45, 95% CI [1.02; 5.88]; Table 5).

Among the parous women, those who were satisfied and dissatisfied did not differ significantly in their pregnancy characteristics, except for antenatal childbirth classes ( $p=0.02$ ; Table 1). These groups also differed in their decision making process ( $p<0.01$ ). Dissatisfied multiparous women had a medical indication for induction more frequently ( $p<0.01$ ), received oral information before IoL less frequently ( $p<0.01$ ), had a lower mean Bishop score ( $p<0.01$ ), and had induction start by cervical ripening more often ( $p<0.01$ ; Table 2). Moreover, their duration of labour exceeded 12 hours more often ( $p<0.01$ ), as did their rates of caesarean delivery and severe maternal complications ( $p<0.01$ ; Table 3). Again, every variable related to the experience of IoL was significantly associated with dissatisfaction in parous women ( $p<0.01$ ; Table 4).

In the multilevel logistic regression model, factors significantly associated with parous dissatisfaction included duration of labour exceeding 24 hours (OR: 4.04, 95% CI [1.78; 9.14]), unbearable vaginal discomfort (OR: 4.23, 95% CI [2.04; 8.77]), dissatisfaction with pain relief or lack of support during uterine contractions (OR: 9.17, 95% CI [5.24; 16.02]), lack of attention to requests (OR: 5.01, 95% CI [2.38; 10.52]), caesarean delivery (OR: 4.61, 95% CI [2.02; 10.53]) and severe maternal complications (OR: 5.29, 95% CI [1.32; 21.21]; Table 5).

## **Discussion**

This study identified several factors associated with dissatisfaction with IoL. Some differed according to parity, while others were shared between the two groups.

For nulliparous women, the results were consistent with those of a systematic review of qualitative studies suggesting that women who undergo IoL need better preparation about its

practical aspects (Coates et al., 2019). Dissatisfaction may be explained by the difference between the expected and actual experience of IoL (Shetty et al., 2005). Moreover, dissatisfaction was also associated with a decision making process not perceived as shared. Qualitative studies have reported that women usually feel unable to participate in the decision-making process and that they require good quality information in an adequate format at the appropriate moment (Coates et al., 2019; Lou et al., 2018). Evidence-based recommendations for standardising the way to inform women about IoL, during antenatal birth classes or when IoL is decided, are needed (Ferguson et al., 2013; Gagnon and Sandall, 2007). They might help to better involve women and thus contribute to greater satisfaction with IoL.

For multiparous women, the only specific factor associated with dissatisfaction was a duration of delivery greater than 24 hours. Even for these women, who are generally told that this delivery will be faster than their first, the interval between induction and delivery may seem excessive for them. This underlines the importance of avoiding generalisations about the duration of labour to reduce dissatisfaction resulting from unrealistic expectations (Henderson and Redshaw, 2013; Shetty et al., 2005).

The factors associated with dissatisfaction that were common to both nulliparous and parous women concerned the experience of labour and delivery. These factors can be regrouped into pain (related to uterine contractions and vaginal discomfort), expectations that are not heard, and outcomes that are not expected after IoL (caesarean section and severe maternal complications). Inadequate pain relief, related to uterine contractions, was the main determinant of dissatisfaction, despite the existence of pharmacological and non-pharmacological methods of analgesia (Jones et al., 2012; Smith et al., 2018, 2011). Studies investigating satisfaction, regardless of study design and socio-economic, cultural, and contextual differences, have reported this systematically, even recently (Henderson and

Redshaw, 2013; Jay et al., 2018; Van der Gucht and Lewis, 2015). Women's experience of pain relief depends on multiple and complex factors, and beyond better consideration and relief of pain during labour, it has been suggested that future research is necessary to explore the role of antenatal childbirth classes to prepare women better for pain management (Van der Gucht and Lewis, 2015). While pain related to uterine contractions is widely known, vaginal discomfort has been poorly assessed. Previous studies have looked only at the vaginal discomfort associated with the insertion of a cannula into the cervix (Beckmann et al., 2017; Boulvain et al., 2008; Irion et al., 1998). The identification of vaginal discomfort here in women undergoing IoL by oxytocin administration indicates that it is due to other factors, a major one of which is likely to be vaginal examinations. This finding suggests that these should be kept to a minimum (Shetty et al., 2005). Among the other shared determinants of dissatisfaction was the lack of an appropriate, personalised response to requests. This is likely to be due to underrecognition of the needs of women undergoing induction, as they require different support than those who have spontaneous labour (Henderson and Redshaw, 2013). Unexpected IoL outcome (caesarean or severe maternal complications) were also associated with dissatisfaction, which is also known to affect mothers' emotional well-being. Although we found no evidence to support routine debriefing for women who perceive giving birth as psychologically traumatic (Bastos et al., 2015), care providers should discuss these events with women during the postpartum period, to help them to feel less guilty and to identify early on the women at risk of depression or post-traumatic stress (Dikmen-Yildiz et al., 2018; Ricbourg et al., 2015; Simpson and Catling, 2016).

The strengths of this study include the large sample size, which is for the most part representative of the French population of women giving birth. Although the response rate may be considered a limitation, it is nonetheless consistent with the rate expected for post-event mail questionnaires and has been observed elsewhere (Henderson and Redshaw, 2013).

This leads to the question of when the data collection should occur; in this study, it took place two months postpartum, a choice that could result in recall-related bias. However, delaying it until after discharge and using self-administered questionnaires was chosen to avoid “courtesy” or “social desirability” bias but also to prevent the masking of dissatisfaction by the strong positive emotions related to childbirth itself (Sando et al, 2017). This time point also enabled women to respond before returning to work (usually after 10 weeks post-delivery in France). Another pertinent limitation is the absence of a validated questionnaire to measure women’s experience of IoL. A validated tool to report the experience of women undergoing induction was reported, but only after the start of the study and only for cervical ripening (Beckmann et al., 2017). Another limitation concerns other factors potentially related to patient satisfaction that were not evaluated in this study, such as the organisation of the maternity unit and the individual relationship created between the woman and the care provider (Akuamoah-Boateng and Spencer, 2018). However, multivariable mixed models were used to take into account a random effect for the maternity unit and therefore its organisation, but the MEDIP study did not collect data on patient-carer pairs. Such data would be useful in future studies to investigate the effect of individual relationships on satisfaction.

## **Conclusion**

For nulliparas, failure to discuss induction in birth classes and lack of participation in decision making led to dissatisfaction. Labour exceeding 24 hours was associated with reduced satisfaction in parous women. For all women, more attention should be paid to vaginal discomfort, pain and maternal requests; unexpected events also should be discussed postpartum with all women. The results of this study strongly suggest a need to improve the shared decision-making process for IoL



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Table 1. Characteristics of women and pregnancy according to maternal satisfaction, stratified by parity

	Nulliparous			Parous		
	Satisfied n= 539	Dissatisfied n=231	<i>p</i>	Satisfied n=529	Dissatisfied n=130	<i>p</i>
Mean maternal age, years (SD)	30.0 (5.2)	30.5 (4.6)	0.26	32.8 (4.5)	32.4 (4.4)	0.35
Place of maternal birth <sup>a</sup> , n (%)			0.64			0.37
Europe	370 (80.4)	169 (84.5)		362 (81.7)	91 (82.7)	
North Africa	46 (10.0)	17 (8.5)		51 (11.5)	8 (7.3)	
Sub-Saharan Africa	17 (3.7)	5 (2.5)		16 (3.6)	7 (6.4)	
Other	27 (5.9)	9 (4.5)		14 (3.2)	4 (3.6)	
Living with a partner, n (%)	471 (97.7)	210 (97.7)	0.92	474 (97.7)	118 (96.7)	0.52
BMI before pregnancy, kg/m <sup>2</sup> mean (SD)	24.5 (5.8)	24.1 (5.2)	0.43	24.6 (5.1)	25.4 (5.1)	0.10
Status of the maternity unit of delivery, n (%)			0.06			0.43
University public	168 (31.2)	67 (29.0)		137 (25.9)	41 (31.5)	
Other public	180 (33.4)	97 (42.0)		189 (35.7)	43 (33.1)	
Private	181 (35.4)	67 (29.0)		203 (38.4)	46 (35.4)	
Spontaneous pregnancy, n (%)	491 (92.5)	210 (91.3)	0.59	508 (96.9)	124 (95.4)	0.38
Antenatal birth classes, n (%)			0.01			0.02
No	94 (17.5)	28 (12.1)		309 (58.5)	64 (50.0)	
Yes, induction of labour not discussed	221 (41.1)	121 (52.4)		99 (18.8)	38 (29.7)	
Yes, induction of labour discussed	223 (41.5)	82 (35.5)		120 (22.7)	26 (20.3)	

<sup>a</sup>Missing data: n=110 (14.3%) for nulliparous and n=106 (16.1%) for parous.

Table 2. Induction of labour characteristics according to maternal satisfaction, stratified by parity

	Nulliparous		<i>p</i>	Parous		<i>p</i>
	Satisfied n=539	Dissatisfied n=231		Satisfied n=529	Dissatisfied n=130	
Source of labour induction request and woman reaction, n (%)			<0.01			<0.01
Woman	31 (5.8)	11 (4.9)		85 (16.3)	10 (7.8)	
Staff, woman agreed immediately	351 (66.0)	103 (45.4)		335 (64.2)	70 (54.3)	
Staff, woman agreed after long discussion	30 (5.6)	15 (6.6)		45 (8.6)	12 (9.3)	
Staff, woman felt she had no choice	120 (22.6)	98 (43.2)		57 (11.0)	37 (26.7)	
Indication for labour induction (IoL), n (%)			0.85			<0.01
Medical indication	515 (95.6)	220 (95.2)		433 (82.0)	120 (92.1)	
No medical indication	24 (4.5)	11 (4.8)		95 (18.0)	10 (7.7)	
Mode of decision, n (%)			0.73			0.68
Staff meeting	87 (17.0)	43 (19.2)		103 (20.4)	27 (22.1)	
Individual physician decision	298 (58.1)	129 (57.6)		316 (62.5)	71 (58.2)	
Systematic decision according to a protocol	128 (25.0)	52 (23.2)		87 (17.2)	24 (19.7)	
Oral information before IoL, n (%)	499 (92.9)	188 (81.4)	<0.01	489 (93.0)	105 (80.8)	<0.01
Bishop score, mean (SD)	3.9 (1.8)	3.4 (1.9)	<0.01	4.4 (1.9)	3.9 (1.7)	<0.01
Method of IoL, n (%)			<0.01			<0.01
Cervical ripening	391 (72.5)	195 (84.4)		233 (44.0)	76 (58.5)	
Oxytocin administration	148 (27.5)	36 (15.6)		296 (56.0)	54 (41.5)	

Table 3. Delivery characteristics according to maternal satisfaction, stratified by parity

	Nulliparous		<i>p</i>	Parous		<i>p</i>
	Satisfied n= 539	Dissatisfied n=231		Satisfied n=529	Dissatisfied n=130	
Duration of labour in h, n (%)			<0.01			<0.01
[0-6[	53 (10.0)	24 (10.5)		214 (40.8)	28 (21.7)	
[6-12[	173 (32.7)	42 (18.3)		157 (30.0)	39 (30.2)	
[12-24[	158 (29.9)	82 (35.8)		89 (17.0)	33 (25.6)	
[24-208]	145(27.4)	81 (35.4)		64 (12.2)	29 (22.5)	
Epidural analgesia, n (%)	492 (91.3)	194 (84.0)	<0.01	457 (86.4)	108 (83.1)	0.33
Gestational age at birth in weeks, n (%)			0.05			0.64
<37	28 (5.2)	18 (7.8)		13 (2.5)	5 (3.8)	
[37-41[	309 (57.3)	111 (48.1)		345 (65.3)	81 (62.8)	
≥41	202 (37.5)	102 (44.2)		170 (32.2)	43 (33.3)	
Mode of delivery, n (%)			<0.01			<0.01
Spontaneous vaginal	304 (56.4)	71 (30.7)		473 (89.4)	99 (76.2)	
Instrumental delivery	123 (22.8)	46 (19.9)		25 (4.7)	7 (5.4)	
Caesarean	112 (20.8)	114 (49.4)		31 (5.9)	24 (18.5)	
Episiotomy <sup>a</sup> , n (%)	150 (27.8)	56 (24.6)	0.35	41 (7.8)	8 (6.2)	0.54
Neonatal hospitalisation, n (%)	35 (6.5)	22 (9.5)	0.14	28 (5.3)	13 (10.1)	0.04
Severe maternal complications <sup>b</sup> , n (%)	17 (3.2)	21 (9.1)	<0.01	9 (1.7)	7 (5.4)	0.02

<sup>a</sup> For women with vaginal delivery; <sup>b</sup> Maternal complications included severe postpartum haemorrhage defined by blood loss  $\geq 1000$  ml or surgical complication or hysterectomy or intrauterine balloon tamponade or transfusion or maternal transfer to intensive care

Table 4. Experience of labour and delivery, associated with maternal dissatisfaction

	Nulliparous		<i>p</i>	Parous		<i>p</i>
	Satisfied n=539	Dissatisfied n=231		Satisfied n=529	Dissatisfied n=130	
Vaginal Discomfort, n (%)			<0.01			<0.01
None	310 (57.9)	91 (39.6)		347 (66.2)	58 (45.0)	
Tolerable	162 (30.3)	77 (33.5)		143 (27.3)	37 (28.7)	
Unbearable	63 (11.8)	62 (27.0)		34 (6.5)	34 (26.4)	
Dissatisfaction with pain relief or help with uterine contractions, n (%)	69 (13.0)	102 (45.3)	<0.01	75 (14.8)	77 (61.1)	<0.01
No consideration of women's requests, n (%)	63 (11.7)	132 (57.6)	<0.01	34 (6.5)	48 (37.5)	<0.01
Labour not as expected, n (%)	226 (42.1)	205 (89.1)	<0.01	125 (23.8)	116 (89.9)	<0.01
Non-acceptable duration of labour, n (%)	139 (26.0)	156 (68.7)	<0.01	75 (14.3)	80 (62.5)	<0.01
Delivery not as expected, n (%)	229 (42.7)	211 (93.0)	<0.01	118 (22.6)	112 (86.2)	<0.01

Table 5. Factors associated with maternal dissatisfaction, stratified by parity<sup>a</sup>

	<i>p</i>	Nulliparous n=705 aOR [95% CI] <sup>b</sup>	<i>p</i>	Parous n=585 aOR [95% CI] <sup>b</sup>
Antenatal birth classes				
No		1.00		1.00
Yes, induction of labour not discussed	<b>0.004</b>	<b>2.68 [1.37; 5.23]</b>	0.127	1.67 [0.86; 3.25]
Yes, induction of labour discussed	0.055	1.98 [0.98; 4.00]	0.791	1.09 [0.56; 2.13]
Source of labour induction request and woman reaction, n (%)				
Staff, woman agreed immediately		1.00		1.00
Women	0.904	0.94 [0.36; 2.47]	0.545	0.75 [0.30; 1.89]
Staff, woman agreed after long discussion	0.353	1.52 [0.63; 3.70]	0.736	0.85 [0.32; 2.23]
Staff, woman felt she had no choice	<b>0.004</b>	<b>1.92 [1.23; 3.02]</b>	0.343	1.43 [0.68; 3.02]
Medical indication of IoL	0.008	0.39 [0.13; 1.12]	0.330	1.57 [0.63; 3.92]
Oral information before IoL	0.045	0.51 [0.26; 0.99]	0.172	0.55 [0.23; 1.30]
Duration of labour (hours)				
[0-6[		1.00		1.00
[6-12[	0.310	0.66 [0.30; 1.47]	0.256	1.50 [0.75; 3.01]
[12-24[	0.364	1.42 [0.66; 3.06]	0.148	1.77 [0.82; 3.83]
[24-208]	0.289	1.50 [0.70; 3.30]	<b>0.001</b>	<b>4.04 [1.78; 9.14]</b>
Epidural analgesia	0.585	0.83 [0.42; 1.62]	0.858	1.07 [0.50; 2.31]
Unbearable vaginal discomfort	<b>0.012</b>	<b>1.98 [1.16; 3.37]</b>	<b>&lt;0.001</b>	<b>4.23 [2.04; 8.77]</b>
Inadequate relief of pain or help with uterine contractions	<b>&lt;0.001</b>	<b>5.55 [3.48; 8.86]</b>	<b>&lt;0.001</b>	<b>9.17 [5.24; 16.02]</b>
No consideration of woman's requests	<b>&lt;0.001</b>	<b>3.81 [2.35; 6.19]</b>	<b>&lt;0.001</b>	<b>5.01 [2.38; 10.52]</b>
Mode of delivery				
Spontaneous vaginal delivery		1.00		1.00
Instrumental delivery	0.063	1.68 [0.97; 2.91]	0.831	0.86 [0.22; 3.37]
Caesarean	<b>&lt;0.001</b>	<b>5.55 [3.41; 9.03]</b>	<b>&lt;0.001</b>	<b>4.61 [2.02; 10.53]</b>
Neonatal hospitalisation	0.064	2.20 [0.95; 5.06]	0.149	2.13 [0.76; 5.92]
Severe maternal complications <sup>b</sup>	<b>0.044</b>	<b>2.45 [1.02; 5.88]</b>	<b>0.019</b>	<b>5.29 [1.32; 21.21]</b>

<sup>a</sup> All variables were integrated simultaneously; <sup>b</sup> Adjusted for maternity unit status, BMI, gestational age; <sup>b</sup> Severe postpartum haemorrhage defined by blood loss  $\geq 1000$  ml or surgical complication or hysterectomy or intrauterine balloon tamponade or transfusion or maternal transfer to intensive care

Appendix. Characteristics of patients according to whether they responded to the questionnaire

	Responder n=1453	Non-responder n=1589	<i>p</i>
Mean maternal age, years (SD)	31.2 (4.9)	30.5 (5.5)	<0.01
Place of maternal birth <sup>a</sup> , n (%)			<0.01
Europe	1003 (81.9)	833 (63.7)	
North Africa	123 (10.0)	289 (22.1)	
Sub-Saharan Africa	45 (3.7)	99 (7.6)	
Other	54 (4.4)	86 (6.6)	
Living with a partner, n (%)	1286 (97.5)	1314 (94.3)	<0.01
Nulliparous, n (%)	777 (53.8)	718 (45.5)	<0.01
BMI before pregnancy, kg/m <sup>2</sup> (SD)	24.5 (5.2)	24.9 (5.2)	0.02
Status of maternity unit, n (%)			0.26
University public	415 (28.6)	506 (31.8)	
Other public	520 (35.8)	551 (34.7)	
Private	518 (34.7)	552 (33.5)	
Spontaneous pregnancy, n (%)	1349 (94.3)	1498 (95.7)	0.08
Medical indication, n (%)	1037 (90.1)	1429 (90.2)	0.94
Mode of decision, n (%)			0.63
Staff meeting	263 (19.0)	293 (16.7)	
Individual physician decision	826 (59.6)	898 (60.4)	
According to a protocol	296 (21.4)	297 (20.0)	
Gestational age in weeks, n (%)			<0.01
<37	65 (4.5)	96 (6.0)	
[37-41]	859 (59.3)	999 (63.0)	
>41	524 (36.2)	490 (30.9)	
Bishop score, n (%)			0.91
<4	575 (41.4)	625 (41.5)	
[4-5[	518 (37.3)	552 (36.6)	
≥6	297 (21.4)	331 (22.0)	
Cervical ripening, n (%)	91 (62.7)	970 (61.2)	0.40
Epidural analgesia, n (%)	1259 (86.7)	1393 (87.7)	0.40
Mode of delivery, n (%)			0.30
Spontaneous vaginal	954 (66.0)	1004 (63.5)	
Instrumental vaginal	203 (14.0)	226 (14.3)	
Caesarean	289 (20.0)	350 (22.2)	
Time to delivery <24 h, n (%)	1103 (77.4)	1231 (78.9)	0.34
Episiotomy <sup>b</sup> , n (%)	257 (22.3)	237 (19.3)	0.07
Perineal tear <sup>b</sup> , n (%)	613 (53.1)	592 (48.2)	0.02
Postpartum haemorrhage severe, n (%)	38 (2.6)	41 (2.6)	0.95
Severe maternal complications, n (%)	54 (3.7)	56 (3.7)	0.78
Neonatal hospitalisation, n (%)	98 (6.8)	131 (8.3)	0.12

<sup>a</sup>Missing data: n=228 (15.7%) for responder and n=282 (17.7%) for no-responder;

<sup>b</sup>For women with vaginal delivery



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