



# Predictors of childbirth experience: Prospective observational study in eastern Spain<sup>☆</sup>

F.J. Soriano-Vidal<sup>a,b,c</sup>, A. Oliver-Roig<sup>a,\*</sup>, M. Richart-Martínez<sup>a</sup>, J. Cabrero-García<sup>a</sup>

<sup>a</sup> Department of Nursing, University of Alicante. Spain. Cta. San Vicente del Raspeig s/n 03690 San Vicente del Raspeig, Alicante

<sup>b</sup> Department of Nursing Universitat de València. C/Jaume Roig s/n. 46010 Valencia, Spain

<sup>c</sup> Midwife, Hospital Lluís Alcanyis, Foundation for the Promotion of Health and Biomedical Research in the Valencian Region (FISABIO), Ctra. Xàtiva-Silla, km 2, 46800 Xàtiva, Valencia, Spain

## ARTICLE INFO

### Article history:

Received 12 February 2022

Revised 10 March 2023

Accepted 29 May 2023

## ABSTRACT

**Background:** In recent years, birth experience has been highlighted by national and international organisations as a relevant value in measuring maternal health care quality. According to a standardised tool, we aimed to assess which clinical indicators had the most significant influence on the birth experience.

**Methods:** This prospective observational study was carried out in fourteen hospitals in eastern Spain. 749 women consented to the collection of birth variables at discharge, and subsequently, at 1–4 months, data were collected on the birth experience as measured by the Spanish version of the Childbirth Experience Questionnaire. Next, a linear regression analysis was performed to determine which clinical birth indicators greatly influence the birth experience measure.

**Result:** The study sample ( $n = 749$ ) was predominantly Spanish and primipara, with 19.5% vaginal births. The predictors that emerged in the linear regression model were to have a birth companion ( $B = 0.250$ ,  $p = 0.028$ ), drink fluids during labour ( $B = 0.249$ ,  $p < 0.001$ ), have early skin-to-skin contact ( $B = 0.213$ ,  $p < 0.001$ ) and being transferred to a specialised room for the second stage of labour ( $B = 0.098$ ,  $p = 0.016$ ). The episiotomy ( $B = -0.100$ ,  $p < 0.015$ ) and having an operative birth ( $B = -0.128$ ,  $p < 0.008$ ) showed a negative influence.

**Conclusion:** Our study supports that intrapartum interventions recommended according to clinical practice guidelines positively influence the mother's birth experience. Episiotomy and operative birth should not be used routinely as they negatively influence the birth experience.

© 2023 The Author(s). Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Introduction

Birth has been the leading reason for hospitalisation in our country (Ministry for Health and Social Policy, 2010a), and for most women, it would be the cause of their first contact with health services. Labour and birth are known to be multidimensional, life-changing events (Larkin et al., 2009; van Gennep, 2008). Birth, then, has been described as influential for the individual and society as a whole. A positive childbirth experience has been considered a woman's right, regardless of her social or economic background (Jolivet et al., 2021).

Meanwhile, a negative birth experience has various implications (Larkin et al., 2009). A negative childbirth experience has been closely associated with disrupted maternal psychological and emotional outcomes: posttraumatic stress disorders or postpartum depression (Ayers et al., 2016; Bell and Andersson, 2016; Elmir et al., 2010; Garthus-Niegel et al., 2014). It is already known that it could negatively influence maternal self-esteem and maternal ability to bond with the infant and other family members (Elmir et al., 2010). Furthermore, it could affect the transition to motherhood (Downe et al., 2018; van Gennep, 2008).

Worldwide, there has been a shift in maternity care standards, and the quality of maternity and childbirth care is measured not only on morbidity and mortality outcomes but also on what is relevant to a woman and her well-being (Korst et al., 2018; Renfrew et al., 2014). The childbirth experience has been emphasised as relevant when maternity and childbirth care requires revision (Gregory et al., 2019; Renfrew et al., 2014). In support of this

<sup>☆</sup> @UAPIPP

\* Corresponding author at: Department of Nursing, University of Alicante. Spain. Cta. San Vicente del Raspeig s/n 03690 San Vicente del Raspeig.

E-mail address: [antonio.oliver@ua.es](mailto:antonio.oliver@ua.es) (A. Oliver-Roig).

agenda, the World Health Organization (WHO) has stressed the relevance of positive childbirth experience and published new recommendations (World Health Organization, 2018) for intrapartum care.

As suggested by Korst et al. (2005), predisposing conditions, women's values and preferences and childbirth clinical variables could influence the childbirth experience. Such factors that contribute the most to an improved birth experience should be considered by healthcare providers, as they are closely related to the overall satisfaction with the care received. Then, the quality of obstetric care should be measured regarding women's own experience (Downe et al., 2018; Koblinsky et al., 2016; Renfrew et al., 2014), and patient questionnaires are reliable and practical tools that could be used (Korst et al., 2018; Sawyer et al., 2013).

Different maternity care models during labour have been evaluated in the literature, and they may have various repercussions on a woman's birthing experience (Hodnett et al., 2012; Sandall et al., 2015). Intrapartum care in Spain is organised mainly in obstetric units, with the midwife as the primary independent caregiver for low-risk pregnancies, but based on a hierarchical structure (Sandall, 2015). With obstetricians acting as consultants for almost all pregnancies, the degree of midwifery autonomy varies (Sandall et al., 2015). Additionally, medical interventions are often determined by local protocols and influenced by each hospital's culture (Sandall, 2015); therefore, the care offered may vary from hospital to hospital.

It has been previously suggested that during childbirth care, the continuity of care, personal and patient-centred information, and feel that enough time has been devoted to improving the women's experience (Baas et al., 2015; Hodnett et al., 2013; Macpherson et al., 2016). Despite this, further attempts are required to understand childbirth care's complexity (Larkin et al., 2009; Thomson and Downe, 2010), and several factors and professional practices concerning birth experience need to be explored (Macpherson et al., 2016; Pang et al., 2008). An evaluation of maternity care through women's reported outcomes has just begun to be studied, most likely not in such a medicalised healthcare environment (Escuriet et al., 2015). The study aimed to explore which variables best predict the women's reported childbirth experience in Spain.

## Methods

### Settings and design

This is a prospective observational study; that involved fourteen hospitals from Eastern Spain between October 2013 and June 2014. The hospitals involved in the research project were selected according to their adhesion to improvement processes under the national government strategy: "Natural Care for Normal Childbirth" of the Ministry of Health and Consumers' affairs (Ministerio de Sanidad Política Social e Igualdad, 2011a). At the time of the study, intrapartum care was delivered by registered midwives as a leading carer, and consultant obstetricians were present when progress deviated from normal.

### Participants

Women who entered the study were over 18 years, at least 35 weeks of gestation at birth, with a single pregnancy, and without an elective Caesarean section. They could read and speak in Spanish, guaranteeing a complete understanding of the study objectives and tools used during the study and preventing language barriers that could negatively influence the birth experience (Small et al., 2014). Women who had critical illnesses that could interfere with average progress in labour (this may include severe preeclampsia o,

eclampsia, sepsis, and cardiac disease, amongst others) were withdrawn from the analysis of this study.

### Sample size calculation

This study conducted a multiple linear regression analysis without prior predictor selection based on a bivariate analysis of predictors with the outcome. Due to the absence of previous studies that include all independent variables, the necessary sample size for a specific hypothetical effect size on the outcome variable could not be determined. However, simulation-based studies have established that as few as two subjects per variable may be sufficient to estimate regression coefficients adequately. Nevertheless, more conservative rules of thumb necessitate a minimum sample size of 20 subjects per predictor (Austin and Steyerberg, 2015). Our study's sample size was 749 women, and the number of predictors analysed was 17, a ratio of more than 40 subjects per predictor.

### Response variable

The response variable was the experience of birth measured with the CEQ-E (Spanish version of the Childbirth Experience Questionnaire) (Soriano-Vidal et al., 2016). The CEQ-E was designed to study women's perceptions of their first labour and birth and subsequently tested for its use in the Spanish population and multiparous women. The CEQ-E yielded a Cronbach's alpha of 0.88; it included 22 items; the first 19 were scored on a 4-point Likert-type scale, and the three remaining were assessed using a Visual Analogue Scale (VAS). The VAS scores were transformed to a categorical value; 0–40 = 1, 41–60 = 2, 61–80 = 3 and 81–100 = 4. Scores of negatively-worded items were reversed before statistical analysis per the tool's guidelines. Item ratings are aggregated to scale scores by summing the coded values of the items in each scale and dividing by the number of items in that scale. CEQ-E score range from 1 to 4, with higher values indicating more positive experiences. Therefore, higher scores on the scales corresponded to a more positive childbirth experience.

### Data collection

All participants from the study were recruited after admission to the maternity ward by a project's trained staff using a convenience sampling method. Verbal and written information about the voluntary nature of participation and the study's confidentiality was provided, and all participants gave written consent.

During the early postpartum period, questionnaires were obtained on sociodemographic variables and birth data based on the initiative's recommendations for natural birth indicators (Ministerio de Sanidad Política Social e Igualdad, 2011b) that describe the care received. All the indicators were reviewed following Devane et al. (2007) recommendations to enhance their comparability within obstetric literature.

The clinical variables measured were parity, birth plan (yes or no), type of onset of labour (spontaneous or induced), newborn admission to the newborn/special care nursery within 24-hr of birth, early skin-to-skin contact (SSC) initiated in the first 30 min of birth and performed for at least 60 min (Moore et al., 2012). Furthermore, the variables related to birth were: the possibility of having a companion during labour, being allowed to drink fluids during labour, artificial rupture of membranes, being transferred to a specialised birthing room for the second stage of labour, pushing method for the second stage of labour (directed or spontaneous), Kristeller manoeuvre (yes or no), duration of the second stage of labour and overall duration of birth, episiotomy, type of birth (spontaneous vaginal or operative birth that include instru-

mental or intrapartum Caesarean section), epidural analgesia used during labour and the perineal tear after birth (yes or no).

The complete questionnaire that included CEQ-E, with a follow-up survey, was sent via e-mail or regular post when an e-mail was unavailable at 1–4 months postpartum.

#### Data analysis

Results were analysed in frequencies (percentages) for categorical variables, while mean and standard deviations (SD) were used for continuous variables for descriptive measures.

The missing data were handled with multivariate imputation by chained equations (MICE) (White et al., 2011) with 20 dataset imputations as recommended. We assumed that the probability of nonresponse depends on the observed data, not the missing data's values, and hence, unobserved values were assumed to be missing at random (MAR) (Baraldi and Enders, 2010).

We estimated regression models with backward selection on each of the 20 imputed datasets. Next, with predictors statistically significant in half or more of the data sets, we examined the same simultaneous regression model on the 20 datasets. Finally, we pooled the 20 estimates following Rubin's rules (Rubin, 1987).

We used residual regression analysis to examine linearity, normality and homoscedasticity assumptions and calculated VIF to diagnose multicollinearity. Previously, we employed bivariate linearity tests between the predictors and the response variable. For all analyses, a p-value of 0.05 was used as the limit of statistical significance. The statistical programme SPSS 23.0® was used for statistical analysis (SPSS 23.0, SPSS Inc., Chicago, IL, USA).

#### Ethics committee

Permission to conduct the study was obtained from the Clinical Research, General Directorate Public Health and Higher Public Health Research Centre; Generalitat Valenciana, Spain. Considerations such as confidentiality, voluntary participation, and complete information on the study's nature were extended to all participants.

## Results

#### Characteristics of the sample

912 eligible women gave consent to be involved in our study. After being contacted via e-mail or regular post, 749 women (82.13%) replied with a complete CEQ-E questionnaire and were included in the final study analysis (Table 1). In the study sample, 93.4% were Spanish women, mainly primiparous (57.7%), with an average age of 33.5 years ( $SD \pm 4.5$ ), and 69.5% came from a higher educational level. 69.4% ( $n = 543$ ) were spontaneous births, 19.5% ( $n = 146$ ) of instrumental deliveries and 8.0% ( $n = 60$ ) of intrapartum Caesarean sections, with an average gestational age of 39.4 weeks ( $SD \pm 1.2$ ).

#### CEQ-E and predictors

The CEQ-E overall mean score was 2.96;  $SD=0.56$ . All potentially predictive variables for the childbirth experience are shown in table 2. The predictors that emerged in the linear regression model were: having a birth companion during labour and birth, being allowed to drink fluids during labour, having an early SSC performed with the newborn for at least 60 min and being transferred to a specialised birthing room for the second stage of labour. Both having had an episiotomy and having an operative birth showed negative weight in the model. The final predictive multiple regression analysis model, with pooled data results, is shown in Table 3.

**Table 1**

Characteristics of the study population  $n = 749$ .

Variables	n	%
<b>Country of origin</b>		
Spain	695	93.4
Others	49	6.6
<b>Cohabitation</b>		
Yes	669	97.2
No	19	2.8
<b>Maternal age, years, mean (SD)</b>	33.5 (4.5)	
<b>Maternal education</b>		
High school or below	210	30.5
College or above	479	69.5
<b>Birth plan presented at birth</b>	196	26.3
<b>Companion during labour</b> (person of her election)	668	96.1
<b>Parity</b>		
Primiparous	432	57.7
Multiparous	317	42.3
<b>Gestational age at birth (weeks), mean (SD)</b>	39.4 (1.2)	
<b>Onset of labour</b>		
Not induced (spontaneous)	494	69.4
Induced	218	30.6
<b>Amniotomy</b>		
Spontaneous	368	53.6
Artificial	319	46.4
<b>Clear liquor</b>	600	87.5
<b>Type of birth</b>		
Spontaneous vaginal	543	72.5
Instrumental vaginal and intrapartum C-section	206	27.5
<b>Epidural analgesia</b>	565	78.5
<b>Perineal tear after birth</b>		
Intact	144	19.2
First degree	155	20.7
Second degree	378	50.5
Third-degree	8	1.1
Fourth-degree	2	0.3
<b>Episiotomy</b>	355	51.2
<b>Labour duration</b>		
< 12 h.	692	95.4
> 12 h.	33	4.6
<b>Skin-to-skin contact*</b>	565	81.5
<b>Apgar score 1 min. mean (SD)</b>	9.05 (1.00)	
<b>Apgar score 5 min. mean (SD)</b>	9.88 (0.43)	
<b>Neonatal weight g. mean (SD)</b>	3292.4 (386.7)	
<b>Neonatal Special Care Unit Admission</b>	36	4.9
<b>CEQ-E total score, mean (SD)</b>	2.96 (0.56)	

\* Initiated within 30 min of birth and performed for at least 60 min\*CEQ-E range from 1 to 4, with higher values representing more positive birth experience.

## Discussion

The study found that the predictors of a positive childbirth experience were to have a companion of the mother's choice during birth, to be allowed to drink fluids during labour and had the opportunity to perform SSC. Moreover, even though our guideline (Ministry for Health and Social Policy, 2010b) recommended remaining in the same room for the birth process, in our study, being transferred to a specialised birthing room for the second stage of labour influenced, the CEQ-E measurements, positively. Conversely, practices such as episiotomy or operative birth (including intrapartum Caesarean section) harmed women's reported experiences.

By analysing our study population's characteristics, we also found that despite institutional efforts, maternity care in the Spanish hospitals participating in the study (Ministry for Health and Social Policy, 2010b) is still highly medicalised. Episiotomy, Kristeller manoeuvre and amniotomy were still above recommendations (Mena-Tudela et al., 2020; Ministry for Health and Social Policy, 2010b). Caesarean-section births in our sample were below national mean rates for the period (22.02%), as only intrapartum Caesarean births were collected for our study (Mena-Tudela et al., 2020).

**Table 2**

Predictive variables. Statistically differences and CI showed using total CEQ-E as a dependant variable.

Variables	n	%	Mean (SD) CEQ-E <sup>‡</sup>	t.	p.	95% CI of the Difference	
						Lower	Upper
<b>Country of origin</b>							
Spain	695	93.4	2.96 (0.56)	0.15	0.88	−0.15	0.17
Others	49	6.6	2.95 (0.55)				
<b>Birth plan</b>							
Presented at birth	196	26.3	3.01 (0.60)	−1.73	0.08	−0.17	0.01
Not presented at birth	550	73.7	2.94 (0.55)				
<b>Companion during labour</b> (person of her election)							
With companion	668	96.1	3.00 (0.54)	−4.06	<b>&lt;0.001</b>	−0.64	−0.22
Without companion	27	3.9	2.57 (0.63)				
<b>Been allowed to drink fluids during labour</b>							
Allowed	245	40.5	3.18 (0.50)	−7.50	<b>&lt;0.001</b>	−0.41	−0.24
Not allowed	360	59.5	2.85 (0.55)				
<b>Parity</b>							
Primiparous	432	57.7	2.94	−1.28	0.20	−0.13	0.03
Multiparous	317	42.3	2.99				
<b>Onset of labour</b>							
Not induced (spontaneous)	494	69.4	2.92 (0.57)	1.29	0.196	−0.03	0.15
Induced	218	30.6	2.98 (0.55)				
<b>Duration of the second stage of labour</b>							
< 1 h.	99	59.3	3.07 (0.62)	−0.46	0.649	−0.21	0.13
> 1 h.	68	40.7	3.11 (0.47)				
<b>Amniotomy</b>							
Spontaneous	368	53.6	2.94 (0.56)	−0.08	0.94	−0.08	0.08
Artificial	319	46.4	2.95 (0.56)				
<b>Type of birth</b>							
Spontaneous vaginal	543	72.5	3.03 (0.55)	6.04	<b>&lt;0.001</b>	0.18	0.36
Instrumental vaginal and intrapartum C-section	206	27.5	2.76 (0.55)				
<b>Transfer to a specialised birthing room</b>							
Transferred	324	46.8	3.08 (0.53)	−4.34	<b>&lt;0.001</b>	−0.26	−0.10
Not transferred	369	53.2	2.90 (0.56)				
<b>Pushing during 2nd stage of labour</b>							
Spontaneous pushing	313	55.7	3.07 (0.54)	3.50	<b>0.001</b>	0.72	0.26
Directed pushing	249	44.3	2.90 (0.56)				
<b>Kristeller manoeuvre</b>							
Performed	205	30.5	2.91 (0.55)	2.46	<b>0.014</b>	0.023	0.20
Not performed	469	69.5	3.02 (0.54)				
<b>Epidural analgesia</b>							
With epidural analgesia	565	78.5	2.95 (0.55)	0.95	0.34	−0.05	0.15
Without epidural analgesia	154	21.4	2.99 (0.58)				
<b>Episiotomy</b>							
Performed	355	51.2	2.87 (0.55)	4.27	<b>&lt;0.001</b>	0.10	0.26
Not performed	338	48.8	3.05 (0.55)				
<b>Labour duration</b>							
< 12 hrs.	692	95.4	2.96	1.76	0.08	−0.02	0.37
> 12 hrs.	33	4.6	2.79				
<b>Skin-to-skin contact*</b>							
Performed	565	81.5	3.03 (0.53)	−6.60	<b>&lt;0.001</b>	−0.45	−0.24
Not performed	128	18.5	2.68 (0.57)				
<b>Neonatal Special Care Unit Admission</b>							
Neonate admitted	36	4.9	2.77 (0.58)	1.96	<b>0.05</b>	−0.00	0.37
Neonate not admitted	697	95.1	2.96 (0.56)				

\* initiated within 30 min of birth and performed for at least 60 min.

‡ CEQ-E range from 1 to 4, with higher values representing more positive birth experience; p. values in bold for statistically significant values.

**Table 3**Multiple linear regression of experience of labour, pooled data<sup>‡</sup>, n.749.

	B	p.	95% CI for B		R <sup>2</sup>
			Lower	Upper	
Constant	2.494	<0.001	2.26	2.73	Largest value 0.189 Smallest value 0.155
Birth companion	0.250	0.028	0.03	0.47	
Have been allowed to drink fluids during labour	0.249	<0.001	0.17	0.33	
Skin-to-skin*	0.213	<0.001	0.10	0.33	
Transfer to a specialised birthing room	0.098	0.016	0.02	0.18	
Episiotomy	−0.100	0.015	−0.18	−0.02	
Operative birth (includes intrapartum Caesarean section)	−0.128	0.008	−0.22	−0.03	

\* initiated within 30 min of birth and performed for at least 60 min.

‡ value of 20 MICE data sets.



Concerning the clinical variables measured that predicted better CEQ-E values (to have a birth companion, to drink fluids during labour, whether an episiotomy was performed, type of birth and the possibility of early SSC with the newborn) were part of the intrapartum care guidelines (Ministerio de Sanidad Política Social e Igualdad, 2011b; Ministry for Health and Social Policy, 2010b). All of this means that when evidence-based guidelines were followed, and interferences to the physiologic process of childbirth were mitigated, the CEQ-E scores improved accordingly.

Previously, Waldenström et al. (2004) suggested that separating a newborn from his/her mother could negatively influence the maternal childbirth experience, and our results support the same reasoning. Our findings show that SSC contact for at least the first 60 min, beginning within 30 min from birth, has a protective and positive impact on women's overall childbirth experience measured with CEQ-E.

All this, except for being transferred to a specialised birthing room for the second stage of birth. In our study, it was shown to be a variable that, although not recommended according to clinical practice guidelines (Ministry for Health and Social Policy, 2010b), positively influenced the CEQ-E measurement. This variable that measured if women were transferred to a birthing room for the second stage of labour was based on the hospital model that places a woman during the first stage of labour in a standard hospital room to transfer her to a highly specialised area for the actual birth. This moment could be seen as crucial, as this life-changing event is close to its end (Downe et al., 2018), or seen as being in a safer environment with the appropriate equipment for childbirth. However, women's mobilisations during this critical phase are against recommendations as the risks outweigh the benefits (Ministry for Health and Social Policy, 2010b).

In contrast, techniques such as episiotomy had negative weight in our analysis. Even though its use should be restricted to specific cases (Ministry for Health and Social Policy, 2010b), our study exhibits that its use in our population exceeded the recommended values (Graham et al., 2005). This should be used to reassess our daily professional practice and reconsider which practices should be of restrictive use because they may disrupt the normal birthing process. The same is true for operative birth, which negatively influenced CEQ-E scores. The operative birth could be enough for lower CEQ-E scores due to perceived loss of control (Waldenström et al., 2004). Besides, during an operative birth, there may be a delay in the mother-infant contact (Rowe-Murray and Fisher, 2001) or even an inability to perform it, which would eventually interfere with the first moments with the newborn (Guittier et al., 2014).

However, several other analysed key variables did not retrieve statistical differences in the CEQ-E scores. This is the case with a birth plan; its value is still confirmed, but its use could be closely linked to better childbirth experiences because of improved patient participation and women's request fulfilment (Mei et al., 2016). The birth plan did not fit into our regression model. One of the reasons could be that its use remains excessively low, and in our region (Soriano-Vidal et al., 2018), a standardised, constricted birth plan template is offered, but the use of personally created ones is limited. To what extent this could influence a woman's experience is yet to be explored.

Additionally, as per previous studies (Hodnett, 2002; Waldenström et al., 2004), we did not find statistical significance in childbirth experience related to pain relief techniques such as epidural analgesia compared to no analgesia. Even though the use of epidural analgesia could be related to the fear associated with childbirth (Saisto et al., 2001), it has been suggested that women who used epidural analgesia during labour received, in general, less continuous labour support than those who did not receive analgesia (Payant et al., 2008). These women are

deprived of professional support, which has been shown as a predisposing factor to foster a positive childbirth experience. The same was with parity, as previous childbirth has been described as a factor that differentially (positively or negatively) could modify the actual childbirth experience (Nilsson and Lundgren, 2009; Stadlmayr et al., 2006). However, it did not fit the linear regression model. Although it has been shown that memories from previous childbirth experiences could persist (Simkin, 1992), other circumstances that occur at each birth, such as the relationship with a professional, could overlay those experiences (Dahlberg and Aune, 2013; Lyberg and Severinsson, 2010).

On the other hand, another technique was routinely performed by professionals like the Kristeller manoeuvre. Even though its use is discouraged, we decided to include it in our study, as still widely underreported (Ministry for Health and Social Policy, 2010b; Rubashkin et al., 2019). Therefore, women were asked whether anyone put pressure on their abdomen at the end of the labour. The Kristeller manoeuvre has still been used, even within hospitals that follow the latest national recommendations (Ministry for Health and Social Policy, 2010b). All the manoeuvres performed must be reported appropriately to allow an in-depth revision and further reflection on their use; meanwhile, healthcare professionals should follow recommendations driven by national guidelines.

Differences between the CEQ-E scores in some predictors are reported. The possibility of having a companion of her choice during labour or having been allowed to drink fluids during labour were predictors reported by women, and the quality of the registers could not be compared with the hospital medical records. Furthermore, although these are practices recommended in clinical guidelines (Ministry for Health and Social Policy, 2010b; World Health Organization, 2018), they have yet to be fully implemented in Spain (Mena-Tudela et al., 2020). It must be understood that clinical practices are not merely isolated elements but are linked to a single unit's organisational level (Renfrew et al., 2014). Refraining from certain practices may be accompanied by other shortcomings undermining the positive childbirth experience.

Our study's strength was being a prospective study, with reported clinical and obstetrical variables compared against a standardised tool to evaluate the childbirth experience. A limitation of our study was the convenience selection of the study cohort. The sample selection resulted in a uniformity of the sample in terms of social class indicators, with the self-selection of the respondents resulting in a self-exclusion of the lower social classes.

Although many obstetric and clinical variables were analysed, the perceived environment and the personal treatment driven by health professionals should be considered in the forthcoming studies. Low values of the  $R^2$  regression model may indicate that experience not only depends on complex indicators such as the type of birth or use of episiotomy but others based on the interpersonal relationship with the health service or its human capital.

## Conclusion

Our study demonstrated that certain clinical interventions could positively impact a woman's childbirth experience, including having a birth companion during labour and birth, being allowed to drink fluids during labour, experiencing early skin-to-skin contact, and being transferred to a specialised birthing room for the second stage of labour. Meanwhile, the study yielded other variables to be considered as they could negatively influence the experience (such as having had an episiotomy or operative birth), and efforts are required to perform them restrictively and only when indicated.

## Ethical statement

Permission to conduct the study was obtained from the Clinical Research, General Directorate Public Health and Higher Public Health Research Centre; Generalitat Valenciana, Spain. Considerations such as confidentiality, voluntary participation, and complete information on the study's nature were extended to all participants.

## Funding

This work has been funded by the project PI11/02124 and PI14/01549 within the Government R&D&I plan 2013–2016 and co-funded by ISCIII General Sub-Directorate for Evaluation and Promotion of research the European Regional Development Fund (FEDER) "A way to make Europe". The funders had no part in collecting, analysing, or interpreting or influencing the writing up of the data.

## Declaration of Competing Interest

The author declared that there were no conflicts of interest concerning the authorship or the publication of this article.

## CRediT authorship contribution statement

**F.J. Soriano-Vidal:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing. **A. Oliver-Roig:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – review & editing, Supervision, Project administration, Funding acquisition. **M. Richart-Martínez:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – review & editing, Project administration, Funding acquisition. **J. Cabrero-García:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Validation, Writing – review & editing, Supervision, Project administration.

## Acknowledgements

The authors would like to thank all the mothers who participated in the study and the healthcare professionals for contributing to the sample collection. This study has been funded by the Project PI11/02124 and PI14/01549 within the Government R&D&I plan 2013–2016 and co-funded by Carlos III Health Institute (ISCIII) General Sub-Directorate for Evaluation and Promotion of research the European Regional Development Fund (FEDER) "A way to make Europe".

## References

- Austin, P.C., Steyerberg, E.W., 2015. The number of subjects per variable required in linear regression analyses. *J. Clin. Epidemiol.* 68, 627–636. doi:[10.1016/j.jclinepi.2014.12.014](https://doi.org/10.1016/j.jclinepi.2014.12.014).
- Ayers, S., Bond, R., Bertullies, S., Wijma, K., 2016. The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. *Psychol. Med.* 46, 1121–1134. doi:[10.1017/S0033291715002706](https://doi.org/10.1017/S0033291715002706).
- Baas, C.I., Erwich, J.J.H.M., Wiegers, T.A., de Cock, T.P., Hutton, E.K., 2015. Women's suggestions for improving midwifery care in the Netherlands. *Birth* 42, 369–378. doi:[10.1111/birt.12185](https://doi.org/10.1111/birt.12185).
- Baraldi, A.N., Enders, C.K., 2010. An introduction to modern missing data analyses. *J. Sch. Psychol.* 48, 5–37. doi:[10.1016/j.jsp.2009.10.001](https://doi.org/10.1016/j.jsp.2009.10.001).
- Bell, A.F., Andersson, E., 2016. The birth experience and women's postnatal depression: a systematic review. *Midwifery* 39, 112–123. doi:[10.1016/j.midw.2016.04.014](https://doi.org/10.1016/j.midw.2016.04.014).
- Dahlberg, U., Aune, I., 2013. The woman's birth experience—the effect of interpersonal relationships and continuity of care. *Midwifery* 29, 407–415. doi:[10.1016/j.midw.2012.09.006](https://doi.org/10.1016/j.midw.2012.09.006).
- Devane, D., Begley, C.M., Clarke, M., Horey, D., OBoyle, C., 2007. Evaluating maternity care: a core set of outcome measures. *Birth* 34, 164–172. doi:[10.1111/j.1523-536X.2006.00145.x](https://doi.org/10.1111/j.1523-536X.2006.00145.x).

- Downe, S., Finlayson, K., Oladapo, O., Bonet, M., Gülmezoglu, A.M., 2018. What matters to women during childbirth: a systematic qualitative review. *PLoS One* 13, e0194906. doi:[10.1371/journal.pone.0194906](https://doi.org/10.1371/journal.pone.0194906).
- Elmir, R., Schmied, V., Wilkes, L., Jackson, D., 2010. Women's perceptions and experiences of a traumatic birth: a meta-ethnography. *J. Adv. Nurs.* 66, 2142–2153. doi:[10.1111/j.1365-2648.2010.05391.x](https://doi.org/10.1111/j.1365-2648.2010.05391.x).
- Escuriat, R., White, J., Beeckman, K., Frith, L., Leon-Larios, F., Loytved, C., Luyben, A., Sinclair, M., van Teijlingen, E., 2015. Assessing the performance of maternity care in Europe: a critical exploration of tools and indicators. *BMC Health Serv. Res.* 15, 491. doi:[10.1186/s12913-015-1151-2](https://doi.org/10.1186/s12913-015-1151-2).
- Garthus-Niegel, S., Knoph, C., von Soest, T., Nielsen, C.S., Eberhard-Gran, M., 2014. The role of labor pain and overall birth experience in the development of posttraumatic stress symptoms: a longitudinal cohort study. *Birth* 41, 108–115. doi:[10.1111/birt.12093](https://doi.org/10.1111/birt.12093).
- Graham, I.D., Carroli, G., Davies, C., Medves, J.M., 2005. Episiotomy rates around the world: an update. *Birth* 32, 219–223. doi:[10.1111/j.0730-7659.2005.00373.x](https://doi.org/10.1111/j.0730-7659.2005.00373.x).
- Gregory, K.D., Korst, L.M., Saeb, S., McCulloch, J., Greene, N., Fink, A., Fridman, M., 2019. Childbirth-specific patient-reported outcomes as predictors of hospital satisfaction. *Am. J. Obstet. Gynecol.* 220. doi:[10.1016/j.ajog.2018.10.093](https://doi.org/10.1016/j.ajog.2018.10.093), 201.e1–201.e19.
- Guittier, M.J., Cedraschi, C., Jamei, N., Boulvain, M., Guillemin, F., 2014. Impact of mode of delivery on the birth experience in first-time mothers: a qualitative study. *BMC Pregnancy Childbirth* 14, 254.
- Hodnett, E.D., 2002. Pain and women's satisfaction with the experience of childbirth: a systematic review. *Am. J. Obstet. Gynecol.* 186, S160–S172. doi:[10.1067/mob.2002.121141](https://doi.org/10.1067/mob.2002.121141).
- Hodnett, E.D., Downe, S., Walsh, D., 2012. Alternative versus conventional institutional settings for birth. In: Hodnett, E.D. (Ed.), *Cochrane Database of Systematic Reviews*. John Wiley & Sons, Ltd, Chichester, UK doi:[10.1002/14651858.CD000012.pub4](https://doi.org/10.1002/14651858.CD000012.pub4).
- Hodnett, E.D., Gates, S., Hofmeyr, G.J., Sakala, C., 2013. Continuous support for women during childbirth. *Cochrane Database System. Rev.* doi:[10.1002/14651858.CD003766.pub5](https://doi.org/10.1002/14651858.CD003766.pub5), 2013.
- Jolivet, R.R., Gausman, J., Kapoor, N., Langer, A., Sharma, J., Semrau, K.E.A., 2021. Operationalizing respectful maternity care at the healthcare provider level: a systematic scoping review. *Reprod. Health* 18, 194. doi:[10.1186/s12978-021-01241-5](https://doi.org/10.1186/s12978-021-01241-5).
- Koblinsky, M., Moyer, C.A., Calvert, C., Campbell, J., Campbell, O.M.R., Feigl, A.B., Graham, W.J., Hatt, L., Hodgins, S., Matthews, Z., McDougall, L., Moran, A.C., Nandakumar, A.K., Langer, A., 2016. Quality maternity care for every woman, everywhere: a call to action. *Lancet* 388, 2307–2320. doi:[10.1016/S0140-6736\(16\)31333-2](https://doi.org/10.1016/S0140-6736(16)31333-2).
- Korst, L.M., Fridman, M., Saeb, S., Greene, N., Fink, A., Gregory, K.D., Lu, M.C., Reyes, C., Hobel, C.J., Chavez, G.F., 2018. The development of a conceptual framework and preliminary item bank for childbirth-specific patient-reported outcome measures. *Health Serv. Res.* 53, 3373–3399. doi:[10.1111/1475-6773.12856](https://doi.org/10.1111/1475-6773.12856).
- Korst, L.M., Gregory, K.D., Lu, M.C., Reyes, C., Hobel, C.J., Chavez, G.F., 2005. A framework for the development of maternal quality of care indicators. *Matern. Child Health J.* 9, 317–341. doi:[10.1007/s10995-005-0001-y](https://doi.org/10.1007/s10995-005-0001-y).
- Larkin, P., Begley, C.M., Devane, D., 2009. Women's experiences of labour and birth: an evolutionary concept analysis. *Midwifery* 25. doi:[10.1016/j.midw.2007.07.010](https://doi.org/10.1016/j.midw.2007.07.010).
- Lyberg, A., Severinsson, E., 2010. Midwives' supervisory styles and leadership role as experienced by Norwegian mothers in the context of a fear of childbirth. *J. Nurs. Manage.* 18, 391–399. doi:[10.1111/j.1365-2834.2010.01083.x](https://doi.org/10.1111/j.1365-2834.2010.01083.x).
- Macpherson, I., Roqué-Sánchez, M.V., Leggett, B.N., Fuertes, F., Segarra, I., 2016. A systematic review of the relationship factor between women and health professionals within the multivariate analysis of maternal satisfaction. *Midwifery* 41, 68–78. doi:[10.1016/j.midw.2016.08.003](https://doi.org/10.1016/j.midw.2016.08.003).
- Mei, J.Y., Afshar, Y., Gregory, K.D., Kilpatrick, S.J., Esakoff, T.F., 2016. Birth plans: what matters for birth experience satisfaction. *Birth* 43, 144–150. doi:[10.1111/birt.12226](https://doi.org/10.1111/birt.12226).
- Mena-Tudela, D., Iglesias-Casas, S., González-Chordá, V.M., Cervera-Gasch, Á., Andreu-Pejó, L., Valero-Chillerón, M.J., 2020. Obstetric violence in Spain (Part II): interventionism and medicalization during birth. *Int. J. Environ. Res. Public Health* 18, 199. doi:[10.3390/ijerph18010199](https://doi.org/10.3390/ijerph18010199).
- Ministerio de Sanidad Política Social e Igualdad, 2011a. *Estrategia Nacional de Salud Sexual y Reproductiva Madrid*.
- Ministerio de Sanidad Política Social e Igualdad, 2011b. *Estrategia Nacional de Salud Sexual y Reproductiva Madrid*.
- Ministry for Health and Social Policy, 2010a. *Clinical Practice Guideline On Care in Normal Childbirth [Spanish]* Vitoria-Gasteiz.
- Ministry for Health and Social Policy, 2010b. *Clinical Practice Guideline On Care in Normal Childbirth [Spanish]* Vitoria-Gasteiz.
- Moore, E.R., Anderson, G.C., Bergman, N., Dowswell, T., 2012. Early skin-to-skin contact for mothers and their healthy newborn infants. In: Moore, E.R. (Ed.), *Cochrane Database of Systematic Reviews*. John Wiley & Sons, Ltd, Chichester, UK doi:[10.1002/14651858.CD003519.pub3](https://doi.org/10.1002/14651858.CD003519.pub3).
- Nilsson, C., Lundgren, I., 2009. Women's lived experience of fear of childbirth. *Midwifery* 25, e1–e9. doi:[10.1016/j.midw.2007.01.017](https://doi.org/10.1016/j.midw.2007.01.017).
- Pang, M.W., Leung, T.N., Lau, T.K., Hang Chung, T.K., 2008. Impact of first childbirth on changes in women's preference for mode of delivery: follow-up of a longitudinal observational study. *Birth* 35, 121–128. doi:[10.1111/j.1523-536X.2008.00225.x](https://doi.org/10.1111/j.1523-536X.2008.00225.x).
- Payant, L., Davies, B., Graham, I.D., Peterson, W.E., Clinch, J., 2008. Nurses' intentions to provide continuous labor support to women. 37, 405–414. <https://doi.org/10.1111/j.1552-6909.2008.00257.x>

- Renfrew, M.J., McFadden, A., Bastos, M.H., Campbell, J., Channon, A.A., Cheung, N.F., Silva, D.R.A.D., Downe, S., Kennedy, H.P., Malata, A., McCormick, F., Wick, L., Declercq, E., 2014. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. *Lancet* 384, 1129–1145. doi:[10.1016/S0140-6736\(14\)60789-3](https://doi.org/10.1016/S0140-6736(14)60789-3).
- Rowe-Murray, H.J., Fisher, J.R.W., 2001. Operative intervention in delivery is associated with compromised early mother-infant interaction. *Br. J. Obstet. Gynaecol.* 108, 1068–1075. doi:[10.1016/S0306-5456\(01\)00242-X](https://doi.org/10.1016/S0306-5456(01)00242-X).
- Rubashkin, N., Torres, C., Escuriet, R.R., Dolores Ruiz-Berdún, M., 2019. Just a little help”: a qualitative inquiry into the persistent use of uterine fundal pressure in the second stage of labor in Spain. *Birth* 46, 517–522. doi:[10.1111/birt.12424](https://doi.org/10.1111/birt.12424).
- Rubin, D.B., 1987. Multiple imputation for nonresponse in surveys. *Wiley Series in Probability and Statistics*. John Wiley & Sons, Inc., Hoboken, NJ, USA doi:[10.1002/9780470316696](https://doi.org/10.1002/9780470316696).
- Saisto, T., Kaaja, R., Ylikorkala, O., Halmesmäki, E., 2001. Reduced pain tolerance during and after pregnancy in women suffering from fear of labor. *Pain* 93, 123–127. doi:[10.1016/S0304-3959\(01\)00302-5](https://doi.org/10.1016/S0304-3959(01)00302-5).
- Sandall, J., 2015. Place of birth in Europe. *Entre Nous The European Magazine for Sexual and Reproductive Health* 81, 16–17.
- Sandall, J., Soltani, H., Gates, S., Shennan, A., Devane, D., 2015. Midwife-led continuity models versus other models of care for childbearing women. In: Sandall, J. (Ed.), *Cochrane Database of Systematic Reviews*. John Wiley & Sons, Ltd, Chichester, UK, pp. 10–13. doi:[10.1002/14651858.CD004667.pub4](https://doi.org/10.1002/14651858.CD004667.pub4).
- Sawyer, A., Ayers, S., Abbott, J., Gyte, G., Rabe, H., Duley, L., 2013. Measures of satisfaction with care during labour and birth: a comparative review. *BMC Pregnancy Childbirth* 13, 108. doi:[10.1186/1471-2393-13-108](https://doi.org/10.1186/1471-2393-13-108).
- Simkin, P., 1992. Just another day in a woman's life? Part II: nature and consistency of women's long-term memories of their first birth experiences. *Birth* 19, 64–81. doi:[10.1111/j.1523-536X.1992.tb00382.x](https://doi.org/10.1111/j.1523-536X.1992.tb00382.x).
- Small, R., Roth, C., Raval, M., Shafiei, T., Korfker, D., Heaman, M., McCourt, C., Gagnon, A., 2014. Immigrant and non-immigrant women's experiences of maternity care: a systematic and comparative review of studies in five countries. *BMC Pregnancy Childbirth* 14. doi:[10.1186/1471-2393-14-152](https://doi.org/10.1186/1471-2393-14-152).
- Soriano-Vidal, F.J., Oliver-Roig, A., Cabrero-García, J., Congost-Maestre, N., Dencker, A., Richart-Martínez, M., 2016. The Spanish version of the Childbirth Experience Questionnaire (CEQ-E): reliability and validity assessment. *BMC Pregnancy Childbirth* 16, 372. doi:[10.1186/s12884-016-1100-z](https://doi.org/10.1186/s12884-016-1100-z).
- Soriano-Vidal, F.J., Vila-Candel, R., Soriano-Martín, P.J., Tejedor-Tornero, A., Castro-Sánchez, E., 2018. The effect of prenatal education classes on the birth expectations of Spanish women. *Midwifery* 60, 41–47. doi:[10.1016/j.midw.2018.02.002](https://doi.org/10.1016/j.midw.2018.02.002).
- Stadlmayr, W., Amsler, F., Lemola, S., Stein, S., Alt, M., Bürgin, D., Surbek, D., Bitzer, J., 2006. Memory of childbirth in the second year: the long-term effect of a negative birth experience and its modulation by the perceived intranatal relationship with caregivers. *J. Psychosom. Obstetr. Gynecol.* 27, 211–224. doi:[10.1080/01674820600804276](https://doi.org/10.1080/01674820600804276).
- Thomson, G.M., Downe, S., 2010. Changing the future to change the past: women's experiences of a positive birth following a traumatic birth experience. *J. Reprod. Infant Psychol.* 28, 102–112. doi:[10.1080/02646830903295000](https://doi.org/10.1080/02646830903295000).
- van Gennep, A., 2008. *Los Ritos De paso. Les rites De Passage 1969* [Spanish]. Alianza Editorial, Madrid.
- Waldenström, U., Hildingsson, I., Rubertsson, C., Rådestad, I., 2004. A negative birth experience: prevalence and risk factors in a national sample. *Birth* 31, 17–27. doi:[10.1111/j.0730-7659.2004.0270.x](https://doi.org/10.1111/j.0730-7659.2004.0270.x).
- White, I.R., Royston, P., Wood, A.M., 2011. Multiple imputation using chained equations: issues and guidance for practice. *Stat. Med.* 30, 377–399. doi:[10.1002/sim.4067](https://doi.org/10.1002/sim.4067).
- World Health Organization, 2018. *WHO recommendations: Intrapartum Care For a Positive Childbirth Experience* Geneva.