



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



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### 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.

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### 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

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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 adherence 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<sup>†</sup>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)<br>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<br>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.

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## 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.

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