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ORIGINAL RESEARCH

Assessment of childbirth experience over time—A prospective cohort study

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Abstract

Introduction: A woman's childbirth experience is multifaceted and has a great impact on not only the woman, but also the family's health and well-being. Changes in childbirth experience over time have been evaluated with a variety of instruments, at different time points, and with inconsistent findings. In Sweden, the rating of birth experience is routinely collected after birth, but it is still unknown which time point is preferred from a clinical perspective. The primary aim was to investigate changes in childbirth experience over time from childbirth to 6 months postpartum, assessed by both a single and a multi-item instrument. A secondary aim was to test the correlation between these instruments.

Material and Methods: In a prospective cohort study, 320 women were recruited from two Swedish hospitals. Study participants completed a survey at the maternity ward after giving birth, and again three and 6 months postpartum, rating their overall childbirth experience on a single item 10-point numeric rating scale (NRS) and a multi-item instrument, the *Childbirth Experience Questionnaire 2* (CEQ2), encompassing four known dimensions of childbirth: *Perceived safety*, *Own capacity*, *Participation* and *Professional support*. Changes in childbirth experience (NRS and CEQ2) over time were analyzed using the Friedman test. NRS ratings were analyzed in relation to CEQ2 dimensions with Spearman's correlation.

Results: Overall childbirth experience rated using NRS did not change over time. The total CEQ2 score decreased significantly from childbirth to 6 months postpartum ($p < 0.001$). This change was driven by decreased scoring of the domains *Participation* and *Professional support*. The correlations between NRS and CEQ scores were consistent over time, with a moderate to weak correlation of NRS with *Participation* and *Professional support*.

Abbreviations: CEQ2, Childbirth Experience Questionnaire 2; CS, caesarean section; NRS, numeric rating scale; SPR, Swedish pregnancy register; VAS, Visual Analogue Scale.

Susanne Hesselman and Wilma Sten contributed equally to this study.

Conclusions: Women perceive their birthing experience more negatively over time when assessed using the CEQ2 questionnaire, but this was not captured by a single-item question assessing overall childbirth experience.

KEYWORDS
maternal-child nursing, parturition, survey methods, traumatic stress disorders

1 | INTRODUCTION

A woman's experience of childbirth has an impact on both her short-term and long-term health.[1–3] This can be reflected in a woman's self-esteem and mental health, where a positive perception of giving birth can strengthen well-being,[2] but a negative experience can be associated with mental health outcomes, such as postpartum depression or symptoms of posttraumatic stress.[4–8] A negative or traumatic childbirth experience can also influence a woman's future reproduction through a subsequent fear of childbirth, prolonging the pregnancy interval, or even avoiding future pregnancies.[9,10] Furthermore, the mother–child relationship is directly dependent on the mother's mental health. Postpartum depression is related to reduced confidence and less satisfaction during the postpartum period and earlier cessation of breastfeeding.[11]

The prevalence of a negative childbirth experience has been reported to be 7%–12% in Sweden and up to 44% globally. The incidence varies depending on definition, study population, time point, and instrument used for measurement.[12,13] Various risk factors for negative childbirth experience have been identified, including poor self-rated health, smoking, unemployment, fear of childbirth, history of psychiatric care, and labor-related factors such as unplanned caesarean section (CS), instrumental vaginal birth, preterm birth, and neonatal asphyxia.[12–14] In contrast, shared decision-making and involvement in the birthing process, along with a woman's sense of being in control during labor, are associated with a better childbirth experience.[15,16]

There is no standardized instrument for assessing a woman's childbirth experience, and a variety of tools are used in different settings.[17] The *Numerical Rating Scale* (NRS) and *Visual Analogue Scale* (VAS) are two instruments consisting of a single-item question about overall childbirth experience. NRS or VAS are commonly used according to clinical routines in the Nordic countries and in research.[10,18–20] NRS results are collected and reported as a quality measure of childbirth experience on a large scale in the Swedish pregnancy register (SPR), a national quality register of pregnancy and childbirth in Sweden.[21] Despite frequent use, there is no established cut-off to define a negative childbirth experience, and there is no consensus regarding the best follow-up practice in relation to different scores on the NRS.

A number of instruments have been developed to better reflect the multidimensionality of the childbirth experience. The *Childbirth Experience Questionnaire 2* (CEQ2) measures four specific dimensions of the experience: *Perceived safety*, *Own capacity*, *Participation*, and *Professional support*, and has been considered to have good psychometric properties according to a systematic review evaluating validated instruments measuring childbirth experiences.[17,22,23]

> **Key message**
>
> Women's birthing experience overall, driven by the dimension's participation and professional support, deteriorates over time. This is captured by a multi-item questionnaire, but not by a single-item question assessing overall childbirth experience.

Changes in childbirth experience over time have been evaluated, using a variety of instruments and at different time points, with inconsistent findings. Childbirth experience is commonly reported to be stable, but also to be less positive when assessed at months to years after the birth.[24,25] How women rate their childbirth experience at multiple time points after birth, when using a single-item measurement in clinical practice compared with a multi-item instrument, has to our knowledge not been investigated. In this prospective cohort study, the primary aim was to investigate changes in childbirth experience over time from birth to 6 months postpartum, assessed using both a single and a multi-item instrument. A secondary aim was to test the correlation between these instruments.

2 | MATERIAL AND METHODS

This was a prospective cohort study with assessments at three time points: the first days after birth, and then at 3 and 6 months postpartum.

Recruitment was carried out at the maternity wards of two hospitals in Sweden: one university referral hospital (Uppsala University Hospital) and one regional hospital (Falun hospital). Women were consecutively invited to participate from Uppsala University Hospital from August 2020 to December 2021, and from Falun Hospital from September 2021 to January 2022. Inclusion criteria were: age ≥ 18 years, spontaneous or induced onset of labor, and giving birth to a live infant. In addition, women had to understand Swedish both verbally and in writing to be eligible to participate. Women with planned CS were excluded. On one of the first days after birth, women were informed about the study and invited to participate, and if interested, provided written consent. Participants completed a paper-and-pen survey at the hospital, with an option to consent to follow-up surveys at 3 and 6 months postpartum by providing an e-mail address. At 3 and 6 months, the survey was distributed and completed electronically. The procedure for data collection at baseline followed the clinical routines at both sites, and has been described in detail previously.[18]

To evaluate childbirth experience, a 10-point numerical rating scale (NRS) and the CEQ2 questionnaire were used.

Women were asked to rate their overall childbirth experience on the 10-point NRS, with anchors 1 being a "very poor experience" and 10 being a "very good experience" (clinical routine). The CEQ2 is a 22-item questionnaire about childbirth experience. Nineteen items are statements that are evaluated on a four-point Likert scale, where respondents mark the answer that best reflects their level of agreement (*totally agree*, *mostly agree*, *mostly disagree* and *totally disagree*). Three items examine levels of perceived pain, sense of security, and control on a VAS. The answers to all items are transformed and given a numerical value between 1 and 4. The total CEQ2 score (range 1–4) is calculated as a mean of the responses to all 22 questions to reflect total childbirth experience, with higher scores indicating a more positive childbirth experience. CEQ2 domain scores (range 1–4) are the mean values for the responses to questions related to each of the four dimensions of childbirth experience: *Perceived safety* (sense of security and memories from childbirth), *Own capacity* (sense of control and management of pain), *Participation* (level of involvement in decision-making), and *Professional support* (perceived support and information from care providers).

Sociodemographic and obstetric information collected from the questionnaire included: family/living arrangement (categorized as cohabitant or single mother/other arrangement), level of education (categorized as ≤9, 10–12, or >12 years), counseling received for fear of childbirth during pregnancy (yes or no [y/n]), parity (categorized as primiparous or parous), and mode of birth (categorized as spontaneous vaginal, vacuum extraction, unplanned CS).

The SPR[21] and the electronic medical records provided information about maternal age at birth (years), Swedish origin, self-rated health before pregnancy assessed on a single-item five-point Likert scale categorized as poor (*very poor*, *poor* and *neither poor nor good*) or good (*very good* and *good*),[26] pre-pregnancy psychiatric care, and any of the pre-pregnancy medical conditions: diabetes mellitus, thrombosis, lung disease/asthma, SLE, endocrine disorder, chronic kidney disease, epilepsy, inflammatory bowel disease, or chronic hypertension. Obstetric characteristics included gestational length at birth (<37 weeks equal preterm), induced onset of labor, Apgar score at 5 min of age < 7, and postpartum hemorrhage ≥1000 mL.

2.1 | Statistical analysis

Descriptive statistics were used to describe the characteristics of the study cohort, the group lost to follow-up, and reports of the overall childbirth experience on NRS, CEQ2 total and CEQ2 domains at birth, and at 3 and 6 months. The total scores of NRS and CEQ2, and the scores of the CEQ2 domains *Perceived safety*, *Own capacity*, *Participation* and *Professional support* were presented as median values and interquartile range (IQR) due to non-normally distributed data. Change in childbirth experience (NRS and CEQ2) between birth, three and six months was explored using the Friedman test, followed by post-hoc testing by means of the Wilcoxon test. Bonferroni correction for multiple testing was applied for post-hoc tests, with the statistical significance set to p-value <0.017. In accordance with previous research, NRS ratings were grouped as: *negative* (NRS scores 1–4), *mixed* (NRS scores 5–6) or *positive* (NRS scores 7–10) childbirth experience.[18] Changes in the distribution of NRS groups between time points were evaluated using the McNemar test. NRS scores (1–10) were analyzed in relation to the CEQ2 total score and domain scores at birth, 3 and 6 months postpartum using Spearman's correlation, presented as correlation coefficients (r). Data were processed and analyzed using the statistical software IBM SPSS Statistics for Windows (Version 29.0.2.0 Armonk, NY: IBM Corp).

For visual exploration, trajectories between the three subgroups of NRS from birth to 3 and 6 months were illustrated using a Sankey plot, showing individual transitions from a negative, mixed, or positive childbirth experience to another subgroup over time. The graph was generated using R Statistical Software version 4.2.1 (R Core Team, Vienna, Austria) by the Uppsala Clinical Research Center.

3 | RESULTS

A total of 320 women completed the survey at all three time points (corresponding to 53% of the women who initially consented to follow-up) and constituted the study population (Figure 1). Sociodemographic and obstetric characteristics are presented in Table 1. Women's median age was 32 years (IQR 29–35), and the majority were Swedish born and cohabitant with a partner. There was a slight predominance of nulliparous women. The majority gave birth spontaneously vaginally.

As shown in Table 2, overall childbirth experience as measured by NRS did not change over time, with a median score of 8 (IQR 7–9) at all assessments ($p = 0.476$). The total CEQ2 score decreased over time, from 3.47 (IQR 3.17–3.66) at birth to 3.38 (IQR 3.01–3.64) at 3 months and 3.35 (IQR 2.94–3.63) at 6 months ($p < 0.001$) postpartum (Table 2). A decrease was observed for the domains *Participation* and *Professional support* ($p < 0.001$), while the score for *Perceived safety* did not change ($p = 0.097$), and the score for *Own capacity* increased slightly from birth to 3 months (Table 2, Figure S1a–d).

At birth, the rate of negative childbirth experience (NRS 1–4) was 8%, mixed (NRS 5–6) 10%, and positive (NRS 7–10) 82%. At 3 and 6 months, 11% reported a negative, 11% a mixed, and 78% a positive childbirth experience. The McNemar test showed no significant changes in the distribution of NRS groups over time (Figure 2). The distributions of overall childbirth experience (negative, mixed, positive) and participants lost to follow-up at different time points

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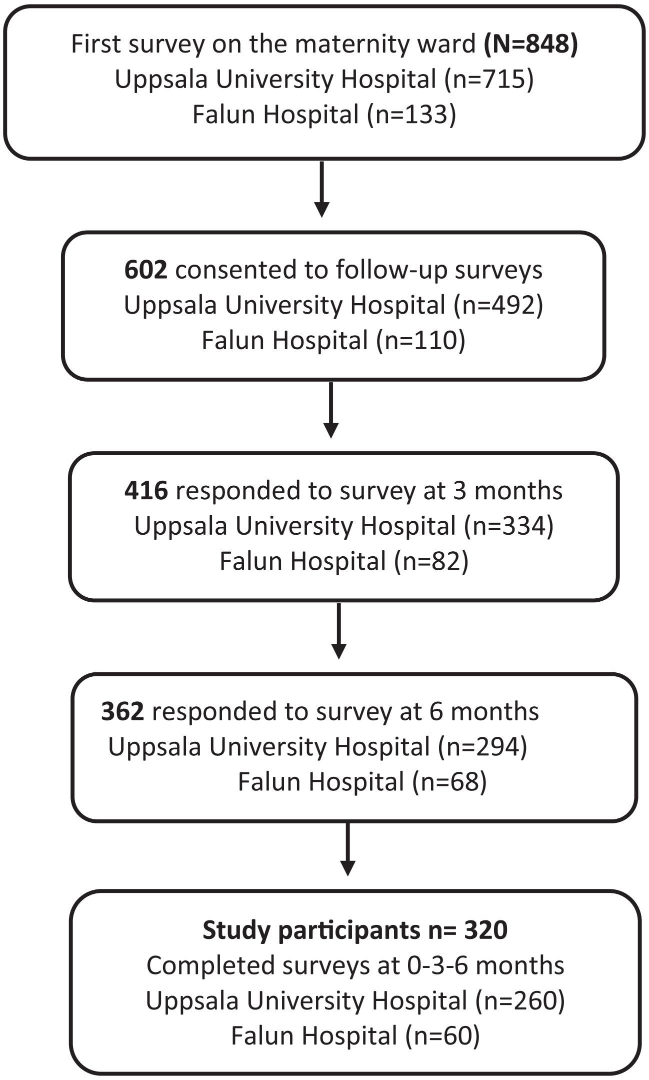

FIGURE 1 Flowchart and number of study participants.

TABLE 1 Sociodemographic and obstetric characteristics of the study participants, $n = 320$.

	***n* (%)**
Age (years), median [IQR]	32 [29–35]
Swedish origin	265 (82.8)
Missing	*26 (8.1)*
Level of education (years)	
≤9	7 (2.2)
10–12	95 (29.7)
>12	218 (68.1)
Family/living arrangement	
Cohabitant	315 (98.4)
Single mother/other arrangement	4 (1.3)
Missing	*1 (0.3)*
Poor self-rated health before pregnancy	26 (8.1)
Missing	*40 (12.5)*
Pre-pregnancy psychiatric care	21 (6.6)
Missing	*26 (8.1)*
Pre-pregnancy medical condition[a]	15 (4.7)
Missing	*26 (8.1)*
Primiparous	167 (52.2)
Counseling received for fear of childbirth	35 (10.9)
Gestational length (weeks), median [IQR]	40 [39–41]
Preterm	19 (5.9)
Induction of labor	94 (29.4)
Missing	*5 (1.6)*
Mode of birth	
Spontaneous vaginal	252 (78.8)
Vacuum extraction	33 (10.3)
Unplanned CS	35 (10.9)
Postpartum hemorrhage ≥ 1000 mL	40 (12.5)
Apgar score < 7 at 5 min	7 (2.2)
Missing	*6 (1.9)*

Abbreviations: IQR, interquartile range; CS, caesarean section.
[a]Diabetes mellitus, thrombosis, lung disease/asthma, SLE, endocrine disorder, chronic kidney disease, epilepsy, inflammatory bowel disease, or chronic hypertension.

and trajectories are presented in Figure 3. Overall, the majority rated their childbirth experience the same over time, with only a few moving between categories of negative, mixed, and positive. Spearman's correlation analyses demonstrated a strong correlation between NRS and the total CEQ2 score at all three time points ($r = 0.71–0.76$), but the correlation was moderate for the dimensions *Participation* ($r = 0.43–0.56$) and *Professional support* ($r = 0.45–0.48$) (Table 3).

Non-responders to the follow-up surveys (totally or partly) are described in Supplemental Table S1. Responders were, to a higher extent, Swedish-born primiparous women. Overall childbirth experience at baseline for non-responders of the surveys was: negative 6.9%, mixed 9.5%, and positive 83.1% with a total median CEQ of 3.42 (IQR 3.07–3.64).

4 | DISCUSSION

When assessing childbirth experience using a multi-item instrument (CEQ2), ratings decreased from birth to 6 months postpartum, suggesting that women perceive their childbirth experience as more negative over time. However, this decrease was reflected in only two of the CEQ2 domains: *Participation* and *Professional support*. There was no change in *Perceived safety* over time, but ratings of *Own capacity* increased from birth to 3 months postpartum. In addition, no significant differences were observed in NRS ratings between the three assessments, and most women remained in the same NRS category (negative, mixed or positive childbirth experience) over time. There was a strong correlation between NRS scores and the total CEQ2 score; however, only a moderate correlation was observed between NRS scores and the CEQ2 dimensions *Participation* and *Professional support*.

TABLE 2 Median scores of NRS, total CEQ2, and CEQ2 domains at 0, 3, and 6 months postpartum, and *p*-values for differences between scores at each time point ($n=320$).

	Birth (0 months)	3 months	6 months		0–3 months	3–6 months	0–6 months
	Median [IQR]			*p*-value[c]	*p*-value[d]		
NRS (1–10)	8 [7–9]	8 [7–9]	8 [7–9]	0.476			
CEQ2 (1–4)	3.47 [3.17–3.66]	3.38 [3.01–3.64]	3.35 [2.94–3.63]	<0.001	<0.001	<0.001	<0.001
Perceived safety	3.50 [3.00–3.83]	3.50 [2.83–3.83]	3.33 [2.83–3.83]	0.097	n/a	n/a	n/a
Own capacity	2.75 [2.25–3.13]	2.75 [2.38–3.25]	2.75 [2.26–3.13]	0.026	0.001	0.172	0.053
Participation[a]	4.00 [3.67–4.00]	3.67 [3.00–4.00]	3.67 [3.00–4.00]	<0.001	<0.001	0.015	<0.001
Professional support[b]	4.00 [3.60–4.00]	3.80 [3.40–4.00]	3.60 [3.20–4.00]	<0.001	<0.001	<0.001	<0.001

[a]Missing $n=2$.

[b]Missing $n=1$.

[c]Friedman's test, statistical significance *p*-value <0.05.

[d]Wilcoxon test Bonferroni-correction for multiplicity: statistical significance *p*-value <0.017.

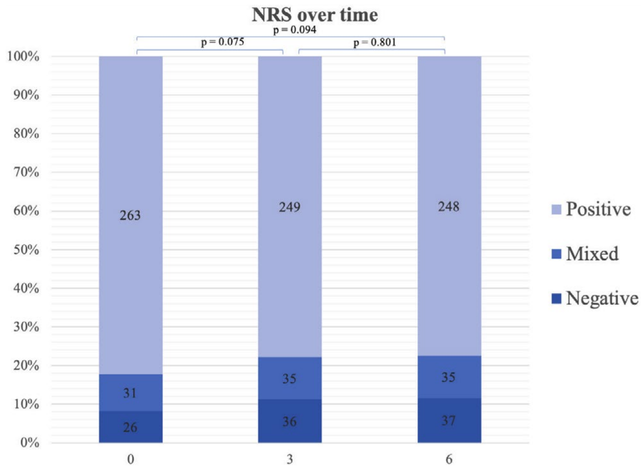

FIGURE 2 Negative, mixed, and positive overall childbirth experience according to NRS at time points 0, 3, and 6 months postpartum ($n=320$).

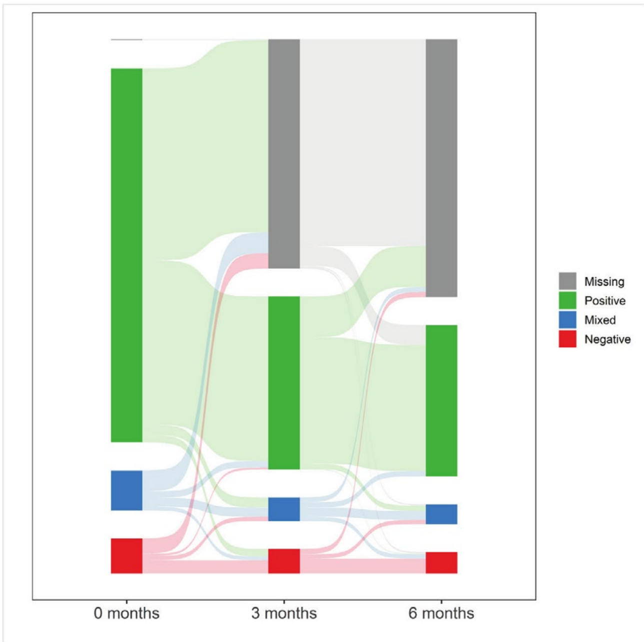

FIGURE 3 Sankey plot of transition between overall childbirth experience by NRS rating groups (negative, mixed, positive) postpartum ($n=848$).

The findings in this study may indicate that the 10-point NRS is too "blunt" to capture a decrease in the assessment of childbirth experience over time that is observed with a multifaceted questionnaire. Birthing is a subjective experience, and satisfaction with childbirth is dependent on multiple factors, for example, but not restricted to, pain relief, support, and sense of control.[27] Despite the widespread use of NRS/VAS ratings in a clinical context, an assessment using a single-item tool might have poor correlation with more extensive, validated questionnaires.[28] The CEQ was developed in order to better capture the multidimensional nature of childbirth experience and has been further tested and validated.[22,29] Results from this cohort indicate that although a strong correlation between NRS scores and total CEQ2 scores is observed over time, this is more driven by the dimensions *Perceived safety* and *Own capacity* than by *Participation* and *Professional support*.

The present results are in line with results from a cohort study encompassing 2428 women, and a secondary analysis of a randomized controlled trial of 905 participants. These showed that although global ratings of childbirth experience are largely stable over time, 24% in the cohort study and 40% in the trial reported a more negative perception of their childbirth experience one and 5 years later compared with their initial assessment.[24,25] In the present cohort, with a shorter time frame postpartum, the majority of NRS assessments remained stable, and no specific transition between the negative, mixed and positive groups could be identified. In contrast, when childbirth experience was assessed with a multi-item instrument, we found an overall more negative experience over time. This is in contrast to a previous smaller study of 78 primiparous women using the CEQ questionnaire, where the CEQ score remained unchanged from 1 week to 3 months postpartum.[30] However, a larger cohort study encompassing 201 women, using a different time frame,

TABLE 3 Spearman's correlation analyses between overall childbirth experience (NRS 1–10) and CEQ2 total and domain scores at 0, 3, and 6 months postpartum ($n = 320$).

	Time after birth (months)	*r*
CEQ2 total	0[a]	0.71
	3	0.76
	6	0.74
Perceived safety	0	0.70
	3	0.76
	6	0.74
Own capacity	0	0.61
	3	0.71
	6	0.71
Participation	0[a]	0.43
	3	0.51
	6	0.56
Professional support	0[b]	0.45
	3	0.47
	6	0.48

Note: Correlations $p < 0.01$.
[a]Missing $n = 2$.
[b]Missing $n = 1$.

found that the overall CEQ score deteriorated from 1 to 6 weeks postpartum.[31] In line with previous studies, we found that women scored the domains *Participation* and *Professional support* lower over time.[30,31] Lack of professional support during labor, feelings of being neglected, and non-shared decision-making are known risk factors for a negative childbirth experience,[32] which could have long-lasting consequences.[3]

The observed higher CEQ2 scores at birth compared with later assessments could be related to feelings of relief and a sense of survival immediately after birth, or euphoria over the newborn.[24,25,32] Another explanation for initial higher scores may be related to social desirability bias, since ratings after birth were collected on the maternity ward.[33] A less positive childbirth experience over time could also reflect unhappiness with postnatal health care, postpartum depression, or feelings of being neglected or unsupported postpartum.[34,35] Various national data report lower satisfaction with postnatal care compared to antenatal and labor care, emphasizing the importance of organizing postpartum health care better.[36] Further, a systematic review from 2019 concluded that women who had a traumatic or negative childbirth experience reported that their needs to discuss this experience were unmet, resulting in the women feeling neglected during the postpartum period.[11]

4.1 | Strengths and limitations

A strength of this study is the longitudinal study design, including three time points for measurement of both overall and multidimensional childbirth experience. The design was appropriate for the aims of investigating if there is a change in childbirth experience over time at a group level and to explore correlations between two different instruments. Statistical methods considering data properties and dependence between groups were used, and *p*-values were corrected for multiple testing to reduce spurious statistical differences, which is another strength. It should be acknowledged that comparing medians and using nonparametric tests can decrease the granulation of results and lead to a more conservative estimate of differences between groups. This could potentially increase a type 2 error, especially for the 10-point NRS scale. The response rate of 53% for follow-up measurements at multiple time points could be considered both adequate and restricted. Given that this is a prospective cohort study with more than one time point for follow-up, the response rate can be regarded as acceptable.

However, potential selection bias regarding participation must be acknowledged. The study was limited to Swedish-speaking women. Women in our study were older, more well-educated, and more often born in Sweden (83% vs. 76%) compared to the general pregnant population in Sweden according to public health data available from the SPR.[21] Despite a potential selection bias of study participants in our study, the rate (8.1%) of negative childbirth experience, defined as NRS <5, is in accordance with the rate (8.4%) reported in a Swedish population-based study of primiparous women,[13] and comparable with non-responders at the three or six-month surveys (6.9%). Although the majority of participants were from the university referral hospital, the proportion of follow-up was balanced between the two hospitals. There is no established cut-off to define a negative childbirth experience. Mäkelä et al. found that a cut-off value of VAS 5 at multiple points after birth has good clinical predictive properties for post-traumatic symptoms one year after birth.[37]

4.2 | Clinical implications

Identifying women who have had a negative childbirth experience is essential, since a negative experience may have a great impact on women's mental health, and on family and future reproductive health.[9] In order to give timely supportive measures, the optimal time point for childbirth experience assessments should be identified and used. Further, identification of predisposing and prognostic factors of deteriorated childbirth experience to tailor postpartum care would be of clinical value. We found that women's perception of their childbirth experience deteriorates over time when using a multidimensional assessment tool, implying that a later follow-up of childbirth experience might be more adequate in terms of long-term health than assessment at birth. However, a single-item question and the use of NRS at follow-up appear more limited for capturing the transition to a more negative childbirth experience, and only moderately correlate with the dimensions *Professional support* and *Participation*. Women scored these dimensions less positively over time, which emphasizes the importance of individual support and of shared decision-making during childbirth.

Single-item instruments, such as NRS and VAS, are convenient to use in clinical settings compared to more extensive ones, which may warrant their use for measuring overall childbirth experience. However, the limitations of NRS in reflecting experiences related to *Professional support* and *Participation* should be recognized. To identify women with support needs after negative childbirth experiences, a conversation about the experience is needed in addition to NRS assessments also among women who rated high on the NRS.

5 | CONCLUSION

This study indicates that women perceive their childbirth experience more negatively over time. The change could be captured with a multi-item questionnaire. The CEQ2 questionnaire is a validated instrument used to understand the multidimensional birthing experience, but might be too extensive to use in a clinical context. There is a need for a less comprehensive, yet multidimensional, tool to measure childbirth experience. In order to identify women with support needs after a negative childbirth experience, repeated ratings are warranted. If a 10-point NRS is used it needs to be supplemented by a conversation about the experience, since NRS may not capture a decrease in assessment of childbirth experience over time.

AUTHOR CONTRIBUTIONS

SH, AW, and FV conceived the study and planned the analysis. WS performed the analysis and wrote the first draft with technical and intellectual support from SH and FV. YS and AW made critical input to the analysis, interpretation of results, and the manuscript. All authors approved the final manuscript.

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DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICS STATEMENT

The study received ethical approval from the Swedish Ethical Review Authority on April 15, 2020 (2019-06534) with amendment on December 2, 2020 (2020-05397). Women were informed about the study and gave written consent at the maternity ward after childbirth. The participants could choose to not answer follow-up surveys that were sent out via e-mail, or to withdraw their consent at any time.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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