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Citation

Sluijs, A. M., Wijma, K., Cleiren, M. P. H. D., Lith, J. M. M. van, & Wijma, B. (2020). Preferred and actual mode of delivery in relation to fear of childbirth. *Journal Of Psychosomatic Obstetrics And Gynecology*, 41(4), 266-274. doi:10.1080/0167482X.2019.1708319



Version: Publisher's Version

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Note: To cite this publication please use the final published version (if applicable).

Preferred and actual mode of delivery in relation to fear of childbirth

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ABSTRACT

Purpose: This prospective cohort study aimed to investigate the interrelation between preferred/actual mode of delivery and pre- and postpartum fear of childbirth (FOC).

Material and methods: Participants from 13 midwifery practices and four hospitals in Southwest Netherlands filled out questionnaires at 30 weeks' gestation ($n=561$) and two months postpartum ($n=463$), including questions on preferred mode of delivery, the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) and Hospital Anxiety Depression Scale (HADS). Results were related to obstetric data.

Results: Both severe FOC (OR 7.0, $p<.001$) and previous Cesarean section (CS) (OR 16.6, $p<.001$) predicted preference for CS. Severe prepartum FOC also predicted actual CS. Preferring a vaginal delivery (VD) and actually having a CS predicted higher postpartum W-DEQ scores (partial $r=0.107$, $p<.05$). Other significant predictors for high postpartum W-DEQ scores were high prepartum W-DEQ (partial $r=0.357$) and HADS anxiety scores (partial $r=0.143$) and the newborn in need of medical assistance (partial $r=-0.169$).

Conclusions: Women preferring a VD but ending up with a CS are at risk for severe FOC postpartum, while the same risk was not demonstrated for women who preferred a CS but had a VD. Prepartum FOC is strongly associated with postpartum FOC, regardless of congruence between preferred and actual mode of delivery.

ARTICLE HISTORY

Received 8 February 2019

Revised 8 August 2019

Accepted 17 December 2019

KEYWORDS

Fear of childbirth; mode of delivery; Cesarean section; anxiety; preference

Introduction

Prospection, i.e. the capacity to think about the future [1], has been a resource for the development of humankind, but has its price, as judgments based on uncontrolled worrying, comprising negative automatic thoughts, play a central role in anxiety disorders [2,3].



By episodic foresight, i.e. the ability to both imagine future situations and organize current actions accordingly [1], a pregnant woman considers what she will experience during pregnancy and how she will manage the delivery to come.

Fear of childbirth (FOC) as measured by the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) reflects pregnant women's specific episodic foresight, covering the woman's expectations prospectively and retrospectively concerning the actual delivery. Severe FOC (defined as W-DEQ A scores ≥ 85) is strongly related to the spectrum of anxiety disorders [4] and

has considerable comorbidity with dysfunctional anxiety even when this does not qualify for an anxiety disorder [5]. This means that what is known about anxiety disorders and dysfunctional anxiety also is relevant to consider for women with severe FOC.

As episodic foresight enables women to prepare for dangers and to consider opportunities to avoid them, many pregnant women with severe FOC in the Western countries prefer to have a non-medically indicated Cesarean section (CS) as the solution of their problem, where severe FOC is associated with a rapid increase of CS on maternal request [6–11].

In the Netherlands, 16% of all deliveries are CSs performed on medical indication [12]. Sometimes, this might be a combined effect of maternal preference with a (minor) medical risk; CS only on maternal request is not registered and probably appears seldom. The Dutch guidelines recommend the obstetric

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caregiver to examine a woman's CS request and offer extra guidance in case of severe FOC [13]. It would be interesting to unravel the interrelation between preference and actual delivery, and its relation to pre and postpartum FOC. Could we confirm that women who prefer a CS have higher FOC than those who prefer a VD, and would women who have a delivery outcome incongruent to their preference (VD or CS) become more negatively affected (have higher postpartum FOC) when their actual delivery is contrary to their episodic foresight?

We formulated two hypotheses:

1. Women who prefer CS during pregnancy but have a VD have higher FOC postpartum than women who prefer a CS during pregnancy and actually undergo a CS.
2. Women who prefer VD during pregnancy but undergo a CS have higher FOC postpartum than women who prefer a VD during pregnancy and have a VD.

Materials and methods

Design and participants

In our study, having a prospective cohort design, we included 13 midwifery practices and 4 hospitals in Southwest Netherlands, comprising both urban and rural areas. Recruitment of participants took place July 2014–May 2015. Inclusion criteria were 30 weeks gestational age, singleton pregnancy, expecting a child without assessed congenital anomalies and understanding written Dutch. Around gestational week 20, potential participants received an information letter about the study with a link to the study website. For those agreeing to participate, email addresses were collected. At 30 weeks of gestation (T1), 827 women received an email requesting them to participate and complete the T1 online questionnaires. We sent maximally two reminders to non-responders. All participants who completed the first questionnaires ($n = 565$) received an email two months postpartum (T2) with a link to the T2 questionnaires; if necessary followed by up to five reminders. Finally, 561 women participated at T1 (response rate 68%) and 463 women (83% of T1 responders) at T2 (Figure 1).

All participants at T1 were asked, and 314 agreed, to sign an informed consent paper form, allowing the researchers to analyze participants' obstetric files. The Medical Ethical Committee of the Leiden University Medical Center approved the study (number P14.057).

T1 measures of main variables

FOC was operationalized by the W-DEQ, version A during pregnancy, and version B postpartum. The W-DEQ is a 33-item self-assessment rating scale. The original Swedish version is well validated [14,15]. The W-DEQ includes 33 statements about giving birth and the respondent is asked to rate to what extent she agrees with the statement (0 = "not at all", 5 = "extremely"; sum score range 0–165). The higher the sum score, the more severe is FOC. A sum score ≥ 85 indicates severe FOC, whereas a sum score 0–84 indicates none to moderate FOC [15]. Wijma et al. [14] found the questionnaire's internal consistency (Cronbach's alpha) to be 0.93/0.94 (version A/B) and the split-half reliability for both versions >0.90 . Cronbach's alpha in the present study was 0.90/0.92 (version A/B).

Preferred mode of delivery was examined by the following question: "If you could choose your mode of giving birth, would you prefer a vaginal delivery or a Cesarean section?" followed by an open question about the reason for the preference.

T1 measures of background variables

Demographic variables. Age, country of origin of participant, marital status, educational level and employment status.

Obstetric variables. Parity, mode (VD or CS) of previous deliveries, low-/high-risk pregnancy (defined as receiving midwife-led care (low risk), or obstetric led care (high risk) at T1).

Psychological variables. Self-reported mental health problems (previous or present) and Hospital Anxiety and Depression Scale (HADS). HADS was used to verify general anxiety/depression. The HADS is a well-validated instrument for assessing symptoms of anxiety disorders and depression in both somatic, psychiatric and primary care populations as well as the general population [16]. HADS has two 7-item subscales; one for anxiety (HADS-A) and one for depression (HADS-D), both having a sum score 0–21. Sum scores ≥ 8 are seen as clinically important signs of anxiety/depression. The Cronbach's alpha in this study for the HADS-A was 0.77 and for the HADS-D 0.72.

T2 measures

FOC was operationalized by the W-DEQ B; see above.

Actual mode of delivery. In 314 cases, we could compare self-reported data with medical file data. Since the information in both data sources proved identical, we applied self-reported data ($n = 463$) to

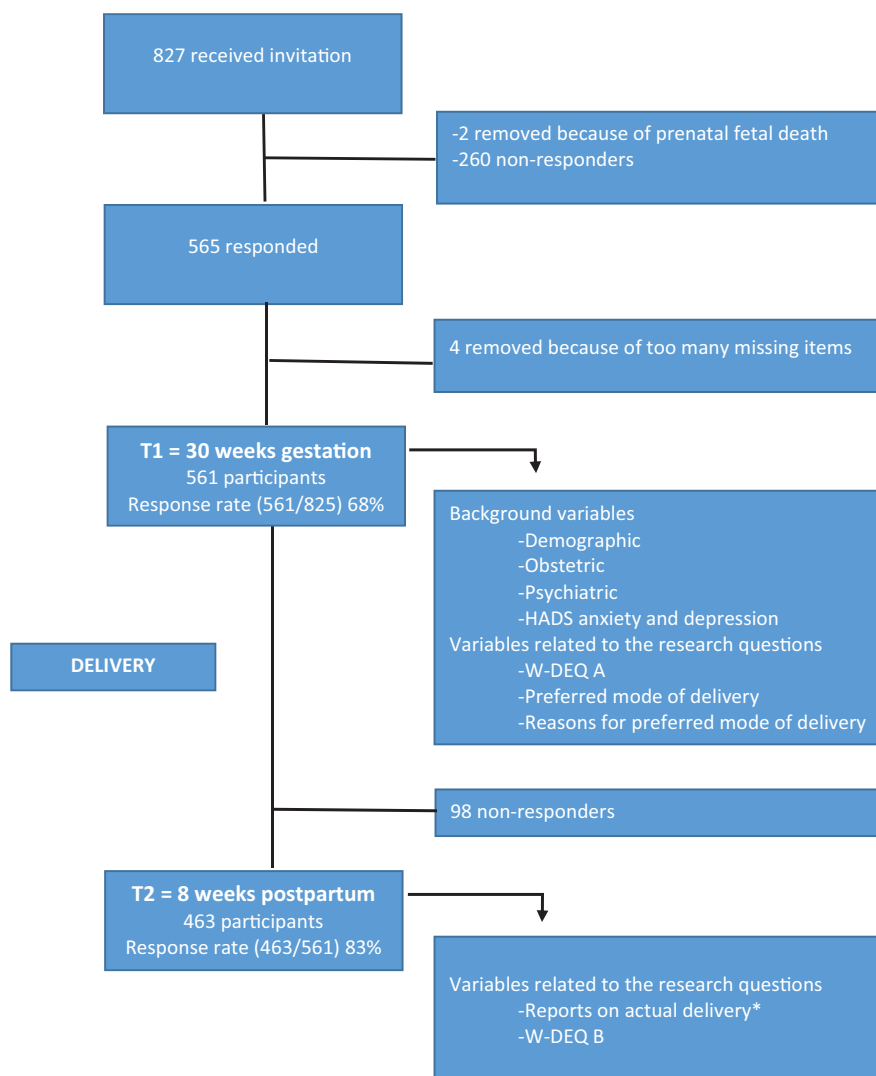


Figure 1. Flowchart and design of the study. *for this variable $n = 492$ as 29 reports could be added from medical files.

maximize the number of participants with available obstetric data, which besides actual mode of delivery also included: indication (in case of CS), and condition of the newborn: good (immediately crying, stayed with mother)/needed help (extra oxygen, afterward back to mother or taken to neonatal intensive care).

Analysis

Participants who provided data for at least one measurement moment were included in the dataset, leading to slightly varying numbers at different time points. For non-responders at T2 who had permitted us access to medical files ($n = 29$), we used those data for actual mode of delivery.

Data were analyzed using the software IBM SPSS Statistics version 20 (IBM SPSS Statistics, Armonk, NY). Statistical significance was defined as $p < .05$. W-DEQ T1 was normally distributed; W-DEQ T2 and HADS

scores were slightly skewed to the right, without consequences for statistical tests. The data had no outliers (tested univariate) and were treated as continuous variables.

Differences between groups were tested by Pearson's chi-square tests for categorical variables and Student's t-test for continuous variables. For comparisons between more than two groups, we used one-way ANOVA. Predictors for preferred mode of delivery were obtained using a logistic regression, with independents based on those T1 variables that showed bivariate $p \leq .05$ results on aforementioned tests on the two preference groups (Table 1). W-DEQ and HADS results were dichotomized for this analysis according to the cut off scores (W-DEQ $< 85/\geq 85$, HADS anxiety $< 8/\geq 8$).

Assuming that each combination of preferred and actual mode of delivery reflects a qualitatively different experience, a new variable was constructed; the

Table 1. Demographic, obstetric and psychological variables reported at T1 (30 weeks of pregnancy) in relation to preferred mode of delivery (total *n*: between 534 and 561).

	Preference vaginal delivery	Preference cesarean section
Age (<i>n</i> = 561)		
≤25	40 (7%)	4 (6.9%)
26–35	415 (74%)	37 (63.8%)
≥36	106 (17.6%)	17 (29.3%)
Country of origin (<i>n</i> = 561)		
The Netherlands	440 (87.5%)	49 (84.5%)
Other	63 (12.5%)	9 (15.5%)
Marital status (<i>n</i> = 560)		
Married or cohabiting	493 (98.2%)	57 (98.3%)
Single mother	9 (1.8%)	1 (1.7%)
Education level completed (<i>n</i> = 561)		
Elementary/high school	50 (9.9%)	11 (19%)
College	127 (25.2%)	14 (24.1%)
University	326 (64.8%)	33 (56.9%)
Employment status (<i>n</i> = 561)		
Fulltime	189 (37.6%)	13 (22.4%)
Part-time	217 (43.1%)	32 (55.2%)
Unemployed/other	97 (19.3%)	13 (22.4%)
Parity (<i>n</i> = 561)**		
Nulliparous	247 (49.1%)	17 (29.3%)
Parous	256 (50.9%)	41 (70.7%)
Previous cesarean section ^a (<i>n</i> = 297)***		
No	230 (89.8%)	11 (26.8%)
Yes	26 (10.2%)	30 (73.2%)
Low-/high-risk pregnancy ^b (<i>n</i> = 561)***		
Low risk	321 (63.8%)	16 (27.6%)
High risk	182 (36.2%)	42 (72.4%)
Fear of childbirth (<i>n</i> = 548)***		
W-DEQ A < 85	449 (91.1)	41 (74.5)
W-DEQ A ≥ 85	44 (8.9)	14 (25.5)
General anxiety (<i>n</i> = 534)*		
HADS anxiety < 8	417 (87.1%)	45 (81.8%)
HADS anxiety ≥ 8	62 (12.9%)	10 (18.2%)
Depression (<i>n</i> = 534)		
HADS depression < 8	453 (94.6%)	51 (92.7%)
HADS depression ≥ 8	26 (5.4%)	4 (7.3%)
Mental health problems actual or in history (<i>n</i> = 534)		
No	387 (80.8%)	46 (83.6%)
Yes	92 (19.2%)	9 (16.4%)

^aOnly for parous women. ^bDefinitions. Low risk: taken care of by a community midwife at 30 weeks of pregnancy; high risk: taken care of by an obstetrician/a clinical midwife at 30 weeks of pregnancy.

p* = .05, *p* < .01, ****p* < .001.

“Preference-Actual mode of delivery-Congruence” (PAC) variable resulting in four outcomes: (1) “Preferred VD - actual mode VD” (VD→VD); (2) “Preferred VD- actual mode CS” (VD→CS); (3) “Preferred CS - actual mode VD” (CS→VD); and (4) “Preferred CS - actual mode CS” (CS→CS).” First, we analyzed changes of mean W-DEQ scores between T1 and T2 for each of the four PAC groups with repeated measures ANOVA. Then, we tested the relation between PAC groups and FOC at T2 with a hierarchical multiple regression analysis.

Results

Preferred mode of delivery. Table 1 shows demographic, psychological and obstetric variables at T1, broken

down by preferred mode of delivery (VD or CS), displaying that a larger proportion of women preferring CS had severe FOC than those preferring VD.

At 30 weeks gestation 10% (*n* = 58) preferred a CS and 90% (*n* = 503) a VD. Frequently mentioned reasons for a CS preference were ‘having had a previous CS’, “difficult or traumatic previous delivery,” and “general health issues.” Other reasons were “being afraid,” “avoiding the pain of VD” and “expecting a big baby.”

Actual mode of delivery. The overall CS rate in our cohort was 17% (85/493) and 51 were emergency CS (EmCS). Indications for elective CS (EICS) (*n* = 34) were: previous CS (*n* = 20), breech position (*n* = 7), placenta praevia (*n* = 1), vasa praevia (*n* = 1), anxiety after a traumatic first delivery (*n* = 1) and other (*n* = 4).

FOC at T1 and T2. For the total group the mean W-DEQ score at T1 was 62 (SD 19, range 12–124), and at T2 51 (SD 24, range 8–135). At T1, 10% and at T2 6% had severe FOC (W-DEQ score ≥85).

Interrelations of preferred mode of delivery, actual mode of delivery and FOC. Table 2 presents the distribution of women following the four PAC modes and their W-DEQ scores at T1 and T2, subdivided according to parity and previous obstetric history.

Of all nulliparous women 6% (14/230) preferred a CS and of those 43% (6/14) actually had a CS. Of nulliparous preferring a VD, 19% (40/216) actually had a CS of which the majority was EmCS (74%).

Of parous women with a history of only a VD 5% (10/214) preferred a CS, but all 10 had a VD. Of the 204 women preferring a VD, 198 (97%) had a VD. Of parous women with a history of CS 46% (22/48) preferred VD and of those 55% had a VD. 54% (26/48) preferred a CS, and among those, 78% had an elective CS, while 9% had an emergency CS and 13% had a VD.

What is the relation between prepartum FOC and preferred mode of delivery?

In the total sample severe FOC, and in parous women a previous CS, strongly correlated to CS preference (Table 3).

We performed a logistic regression analysis using prepartum data to predict prepartum preference of mode of delivery. Independent variables evaluated were background variables at T1 that showed a significant bivariate relationship with preferred mode (Table 1). The following (dichotomous) variables were evaluated as predictors: W-DEQ < 85/≥85, parity, previous CS, low-/high-risk pregnancy and HADS anxiety

Table 2. W-DEQ scores in nulliparous and parous women at T1 (30 weeks of gestation, n = 492) and T2 (8 weeks postpartum, n = 455) distributed over four PAC groups, subdivided according to parity and previous obstetric history.

Preferred → actual mode of delivery (PAC)	W-DEQ T1 (Total n = 492)		W-DEQ T2 (Total n = 455 [#])		Severe FOC T2 (W-DEQ ≥ 85) n (%)	PAC Divided for parity/previous mode of delivery	W-DEQ T1 (total n = 492)		W-DEQ T2 (total n = 455 [#])		W-DEQ T2 EmCS/EICS					
	n	M/SD	n	M/SD			n	M	Min-max	n	M	Min-max	n	M	Min-max	
VD→VD	386	59.9/18.2	361	47.4/22.1	15 (4%)	Nulliparous	176	64.7	20-109	166	49.5	10-102	-	-		
						Parous previous VD	198	55.4	12-114	184	44.7	8-118	-	-		
						Parous previous CS	12	64.3	47-77	11	61	29-93	-	-		
VD→CS	56	65.3/16.9	49	64.6/28.7	7 (15%)	Nulliparous	40	66.0	26-105	35	68.0	15-135	EmCS	26	77.1	34-135
						Parous previous VD	6	69.2	42-92	4	57	21-111	EICS	9	53.2	15-96
						Parous previous CS	10	60.1	29-79	10	45.5	18-85	EmCS	4	57	21-111
CS→VD	21	79.5/21.4	19	63.6/25.0	3 (16%)	Nulliparous	8	70.9	34-94	8	58.0	20-117	-	-		
						Parous previous VD	10	89.2	56-124	8	68.6	48-92	-	-		
						Parous previous CS	3	70.3	58-84	3	65.3	54-73	-	-		
CS→CS	29	68.3/21.2	26	57.6/24.6	3 (12%)	Nulliparous	6	85.3	50-112	6	65.3	42-104	EmCS	2	65	60-70
						Parous previous VD	0			0			EICS	4	65.5	42-104
						Parous previous CS	23	63.9	39-110	20	55.3	17-108	EmCS	2	52	45-59
													EICS	18	55.7	17-108

[#]n drop outs = 37.

PAC: preferred actual congruence of mode of delivery; VD: vaginal delivery; CS: cesarean section; FOC: fear of childbirth; EmCS: emergency CS; EICS: elective CS.

< 8/≥8. Results (Table 4) show that preference for CS was predicted by severe FOC (Exp(B) 7.0, B coeff 2.0, $p < .001$), and by being parous with a previous CS (Exp(B) 16.6, B coeff 2.8, $p < .001$). The substantial proportion of explained variance (Nagelkerke $R^2 = 0.36$) of this model indicates a strong relationship.

What is the relation between prepartum FOC and actual mode of delivery?

The same logistic regression analysis was performed to predict actual mode of delivery ($\chi^2 = 117.5$, $df = 5$, $p < .001$, Nagelkerke $R^2 = 0.35$). Results show that severe FOC at T1 was a significant predictor for an actual CS (Exp (B) 2.3, B coeff 0.84, $p = .049$), also when adjusted for parity and obstetric history with previous CS, low-/high-risk pregnancy and HADS anxiety at T1.

How is (in)congruence between preferred and actual mode of delivery related to pre and postpartum FOC (total sample)?

In order to assess whether the four PAC groups systematically differed in their W-DEQ scores pre and postpartum, a repeated measures ANOVA was performed, entering the W-DEQ mean scores, time (T1, T2) as within subjects variable, and the PAC groups as independent variable. The results showed a significant interaction effect of time and PAC groups ($F = 3.41$, $df = 3$, $p = .017$); the VD→CS group showed less decrease of W-DEQ scores from pre- to postpartum than the other PAC groups. Bonferroni *post-hoc* tests showed that the VD→VD group, here used as basic group, had the lowest mean W-DEQ scores at both T1 and T2.

In order to examine the differences more closely, a hierarchical multiple regression analysis in three blocks was performed with the W-DEQ T2 mean-score as dependent variable. This allows for a consecutive evaluation of variables on the gestation time-line, progressing from easily/early accessible variables to more complex/in depth variables. After the PAC groups in the first block, obstetrical (second block) and psychological variables (third block) were entered in separate, consecutive steps in order to be able to observe shifts of the weight of predictor variables, when new ones were taken into account. This allows a more concise evaluation of the role of variables from each domain. In a first analysis block, three contrasts (with VD→VD): VD→CS, CS→CS and CS→VD were entered as independent dummy variables. In a second stepwise block,

Table 3. Logistic regression for variables predicting preferred mode of delivery (VD or CS) ($\chi^2 = 100.7$, $df = 5$, $p < .001$, Nagelkerke $R^2 = 0.36$).

	B	S.E.	Wald	df	Exp(B)	95% CI. for EXP(B)
Severe FOC T1 (W-DEQ A ≥ 85)	1.95	0.44	20.07	1.0	7.04***	3.0–16.5
Parous without previous CS (contrast with nulliparous)	−0.58	0.45	1.71	1.0	0.56	0.2–1.3
Parous with previous CS (contrast with nulliparous)	2.81	0.46	37.11	1.0	16.63***	6.7–41.1
Low-/high-risk pregnancy	0.56	0.40	1.99	1.0	0.16	0.8–3.8
Anxiety T1 (HADS anxiety ≥ 8)	−0.03	0.44	0.00	1.0	0.95	0.4–2.3

*** $p < .001$; T1 = 30 weeks of gestation.

Table 4. Three block hierarchical multiple regression analysis for variables predicting W-DEQ score postpartum ($F(9,445) = 20.3$, $p < .001$, adjusted $R^2 = 0.28$).

	Standardized coefficient beta (after block 3)	t	Partial r after block 1	Partial r after block 2	Partial r after block 3
BLOCK 1: Preferred-Actual mode of delivery-Congruence(PAC)					
VD→CS	0.101	2.276	0.224***	0.113*	0.107*
CS→CS	0.005	.114	0.102*	0.048	0.005
CS→VD	0.035	.843	0.139**	0.129**	0.040
BLOCK 2:					
Obstetric variables					
Condition of the newborn (good/needed medical assistance)	−0.160	−3.611	−	−0.182***	−0.169***
Parity (nulliparous/parous)	−0.055	−1.269	−	−0.139**	−0.060
Low-/high-risk pregnancy	0.061	1.421	−	0.104*	0.067
BLOCK 3:					
Psychological variables					
W-DEQ T1	0.362	8.065	−	−	0.357***
HADS anxiety T1	0.131	3.047	−	−	0.143**
Mental health problems at T1 or in past (no/yes)	0.082	2.020	−	−	0.095*
Adjusted R^2	−	−	0.06	0.11	0.28

* $p < .05$, ** $p < .01$, *** $p < .001$; T1 = 30 weeks of gestation.

we evaluated the obstetric variables: parity, low-/high-risk pregnancy and condition of the newborn at 5 min. In a third block, the T1 psychological variables were evaluated for their contribution: W-DEQ, HADS anxiety, HADS depression and “mental health problems at T1 or in past.”

Results according to hypothesis 1 and 2

In line with the repeated measures ANOVA, after the first block, all three PAC groups differed from the basic VD→VD group (Table 4). After entering obstetric variables (block 2), the VD→CS and CS→VD predicted higher W-DEQ T2 scores than the VD→VD group. After additionally adding psychological predictors (block 3), only the VD→CS predicted higher W-DEQ T2 scores than the VD→VD group. Accordingly, hypothesis 1 was not while hypothesis 2 was confirmed in our model.

In the third block, HADS depression failed to contribute to the variance. The strongest predictors for high W-DEQ scores postpartum were high prepartum W-DEQ and HADS anxiety scores, a history of mental health problems and the newborn in need of medical assistance.

Discussion

The distribution of our sample reflects Dutch population data, with 17% undergoing CS and half of them being emergent. Almost all participants preferred a VD. The minority preferring a CS suffered more often from severe FOC pre partum than those preferring a VD.

The difference of actual CS between the groups preferring a CS or a VD is noteworthy, though expected in view of episodic foresight. Of those nulliparous women preferring a CS 43% (6/14) actually

had a CS, a high percentage when compared with those who preferred a VD (19% having CS, and mainly EmCS). The nulliparous preferring CS also had high FOC, which is a significant predictor of actually having a CS. Half of the parous who previously underwent CS preferred to have a CS again and most underwent CS. For the total sample severe FOC was a strong predictor of preference for a CS (Table 3) and of actually having a CS (not displayed in a table).

The VD→VD group had the lowest FOC levels both pre and postpartum. The episodic foresight of those women comprises confidence and they get what they expect.

In all three groups VD→VD, CS→CS and CS→VD postpartum FOC decreased, but in the VD→CS group the levels remained unchanged (increased slightly in nulliparous). This might be explained by the unexpected and probable alarming hassles the women in this group encountered. For those preferring a VD, the decision for a CS probably was unexpected as 69% (34/49, Table 2) of the CS was EmCS. Moreover, according to their foresight, these women were unprepared for the CS, which may have induced fear. Many of these women may also have experienced intense fear for their own or their baby's life/health. Earlier, in Dutch women, we also found a correlation between medical interventions and high postpartum FOC [17]. Likewise Ryding [18] showed EmCS being related to negative mental reactions postpartum.

For women preferring VD, an EICS seems to have less impact (lower postpartum FOC, Table 2) than an EmCS (not tested in a regression analysis), which could be due to the fact that these women were able to prepare for the CS. Remarkable is that in women preferring CS, the ones with highest postpartum FOC had had an EICS. For this group, where FOC was high even prepartum, having time to prepare for the EICS did not affect their postpartum FOC.

The CS→VD group stands out in our opinion, having high prepartum FOC and mostly no medical reason for a CS (3/21 had a previous CS). Their postpartum levels of FOC did not differ from the levels of the corresponding congruent group CS→CS. This absence of difference should, however, be interpreted cautiously, due to the small numbers of CS in our sample. According to the Dutch guideline for women with a CS request [13], the obstetric caregiver should first examine what the exact reason for this request is, counsel about (dis)advantages of both VD and CS and offer extra guidance/treatment in case of severe FOC. If women are willing to have a VD, they have time to adjust their expectations, their episodic foresight

might change and they can prepare for a VD. When they succeed to have a VD, many women feel empowered by the idea they "did give birth themselves." [19] This was supported by the comments that women gave in our questionnaire.

Persons with anxiety problems are easily triggered by negative information, process information selectively and have cognitive biases which often further encourage anxiety [20]. It became clear that prepartum anxiety (high prepartum W-DEQ and HADS anxiety scores) and mental health problems were predisposing factors for postpartum high FOC. Logically, another factor intensifying postpartum FOC was a bad condition of the neonate immediately postpartum (Table 4).

All in all, could it be that women's episodic foresight influences the way their delivery history develops? It appeared that women preferring to have a CS from the outset feared the delivery significantly more than those who preferred a VD. Moreover, the proportion of nulliparous women who had a CS was larger in the CS preference than in the VD preference group (43%/19%). Most likely these women take their high FOC with them when it is their day. Could it be that their FOC is so intrusive that obstetric hassles emerge, ending up with a CS? If so, the biological link conveying this is unknown but constitutes an interesting field of future research.

Notwithstanding the advanced service and support given in many Western countries during pregnancy and Labor, prepartum severe FOC often plays a significant role during delivery, and may propel into continued severe FOC postpartum [21], no matter if the delivery was obstetrically normal. Like in others with severe anxiety problems, pregnant women's worries (here naturally focused on the delivery to come) appear resistant to ordinary antenatal care. Support and special treatment, based on proper diagnostics, is necessary [22–25].

Severe FOC appeared in all the four PAC groups. As expected, the VD→VD group had the lowest percentage (8%) (Table 2), but still constitutes a considerable group of the pregnant population.

Our block-wise analysis of predictors also sheds some light on identifying risks even when, in practice, elaborate gestation data are not yet available or elaborate psychological assessment is not possible. Already from the plain (PAC) observation that hope or expectation was not met (VD→CS and CS→VD) we may expect higher FOC. This effect becomes more nuanced when taking actual obstetric variables into account. If we know these, they largely take over

explanatory power from the PAC variable. Lastly and very importantly: if we also know pre-delivery FOC, our prediction of the *post-hoc* situation greatly improves.

Strengths and limitations

Some strengths of the study are the good response rate among T1 participants and its prospective and longitudinal design. The self-reported variables seemed to be as reliable as notations in medical records. FOC was measured with an established and broadly validated instrument (W-DEQ), used in many countries.

We asked participants “if it were up to me”. when addressing their personal preference of delivery. This approximation of “free choice” is probably the closest possible honest response one can obtain. Probably, therefore, our 10% preferring an elective CS is higher than in some other studies.

Yet, the study also has limitations. One problem is that the group preferring a CS is relatively small and in all four PAC groups the range of min–max values of W-DEQ scores is large, accentuating great individual differences, and underlining that clinical practice requires an individual approach.

Another limitation is the small numbers in some subgroups. Although this allowed us to make conclusions where differences were demonstrated, it restricted our possibilities to make valid conclusions when no differences between groups were found. A larger sample would have allowed closer examination of β -errors.

Another drawback, inherent to the design of the study, is that preference for mode of delivery was reported at 30 weeks gestation. Between then and the actual delivery the woman’s preference might have changed and/or her obstetric situation may have caused a decision for an EICS. For this specific group of women (VD→CS), the unexpectedness of the event may have been different. In future studies, it is wise to have in between assessment of change of preference, and relabel a group to VD→EICS for a separate analysis.

Conclusion

Particularly at risk for severe FOC postpartum is women preferring a VD but ending up with a CS, while we could not demonstrate the same risk for women who preferred a CS but had a VD. FOC during pregnancy is strongly associated with postpartum

FOC, regardless of congruence between preferred and actual mode of delivery. Severe FOC prepartum is also a predictor of finally giving birth by CS. The mechanisms involved may be numerous and different, which is an underexplored but relevant field for future research.

Acknowledgments

The authors thank the participating women, midwifery practices and hospitals for their cooperation in this study.

Ethics approval

The study was approved by the Medical Ethical Board of the Leiden University Medical Center (P14.057).

Disclosure statement

The authors report no declaration of interest.

Funding

This work was supported by Koninklijke Nederlandse Organisatie voor Verloskundigen, KNOV (Dutch royal organisation of midwives) [PhD scholarship GR/173029/3].

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