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Research Article

Women's Birth Beliefs During Pregnancy and Postpartum in the Netherlands: A Quantitative Cross-Sectional Study

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Introduction: Women and care providers increasingly regard childbirth as a medical process, resulting in high use of medical interventions, which could negatively affect a woman's childbirth experience. Women's birth beliefs may be key to understanding the decisions they make and the acceptance of medical interventions in childbirth. In this study we explore women's beliefs about birth as a natural and medical process and the factors that are associated with women's birth beliefs.

Methods: Data were obtained from a cross-sectional survey of women living in the Netherlands asking them about their experiences during pregnancy and childbirth, including their beliefs about birth as a natural and medical process.

Results: A total of 3494 women were included in this study. Mean scores of natural birth beliefs ranged between 3.73 and 4.01 points, and medical birth belief scores ranged between 2.92 and 3.12 points. There were significant but very small changes between prenatal and postnatal birth beliefs. Regression analyses showed that (previous) childbirth experiences were the most consistent predictor of women's birth beliefs.

Discussion: Women's high scores on natural birth beliefs and lower scores on medical birth beliefs correspond with the philosophy of Dutch perinatal care that considers pregnancy and childbirth to be natural processes. Perinatal care providers must be aware of women's birth beliefs and recognize that they as professionals influence women's birth beliefs. They make an important contribution to women's perinatal experiences, which affects both women's natural and medical birth beliefs.
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INTRODUCTION

Understanding a woman's beliefs about birth can help us better understand her decisions during pregnancy and childbirth.[1] Birth beliefs can be described as the view a person has of the physical nature of childbirth. These beliefs comprise 2 dimensions: seeing birth as a natural process (natural birth beliefs) and regarding birth as a medical event (medical birth beliefs).[2–4] Although they are moderately (negatively) correlated with each other, they do not mirror each other.[5] Most women do not have strictly medical or natural birth beliefs.[6,7]

Women's birth beliefs are shaped by a combination of variables including their physical condition, psychology, and personal characteristics, for example, fertility treatment, anxiety, and stress.[6] Women's birth beliefs and associated risk perceptions are also influenced by past and present experiences—their own and those of others—the organization of perinatal care, and cultural and societal ideas of risk and safety.[1,3,8]

Birth beliefs, including perceptions of risk, play a crucial role in decisions made during pregnancy and childbirth.[1,4,8] When considered in aggregate, the birth beliefs of individual women—and the choices they make—influence the shape and content of perinatal care. When women and their care providers come to see childbirth as fraught with risk, there is an increased willingness to accept medical interventions in childbirth,[9,10] resulting in the medicalization of pregnancy and childbirth.[11]

Women with more medical birth beliefs often see childbirth as a risky and dangerous process that is best managed with medical expertise and modern technology. For them, labor pain is a needless inconvenience.[8,12] Because they see interventions as a way to minimize risk, they are more willing to accept interventions[9,13] and consequently more likely to undergo interventions, such as pharmacologic pain relief, assisted vaginal childbirth, and cesarean birth.[1,9] Women with more natural birth beliefs see childbirth as a physiologic, safe process.[3,12] They have faith that their bodies know how to give birth and perceive pain as an inherent part of the birth process.[3,14,15] Women with stronger natural birth beliefs have a greater desire to avoid medical interventions. They fear a cascade of interventions that could result in poorer outcomes for themselves or their (unborn) child.[16] Given the important

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Quick Points

- Women and care providers increasingly regard childbirth as a medical process, and they are more willing to accept medical interventions.
- Birth beliefs are key to understanding choices made during pregnancy and childbirth.
- Most Dutch women scored high on natural birth beliefs and lower on medical birth beliefs, corresponding with the philosophy of perinatal care in the Netherlands that considers pregnancy and childbirth to be natural processes.
- Women's (previous) childbirth experiences are the most consistent predictor of women's birth beliefs.
- Perinatal care providers need to be aware of women's birth beliefs and recognize the influence they have on women's birth beliefs.

link between women's birth beliefs and the shape of perinatal care, it is critical that we examine those beliefs, a topic that remains underexplored in the Netherlands.

The Organization of Perinatal Care in the Netherlands

There is a great variation in the way perinatal care systems are organized. The Dutch organization of perinatal care is quite unique in the (Western) world. The Dutch system emphasizes the normality of childbirth, resulting in a minimal use of interventions and a high rate of home births.[17,18] Community midwives provide care for women who are healthy (ie, with a low risk for complications). Healthy women can choose between giving birth at home or in the hospital, under the care of their community midwife. When pathology is suspected or complications occur, the midwife will consult or refer to obstetrician-led care in the hospital, either from home or in the hospital depending on where the woman is receiving care.

Although the Netherlands still have a high proportion of women giving birth at home and low rates of interventions compared with other Western countries, pregnancy and birth are increasingly medicalized. This medicalization gained momentum after the publication of several studies questioning the safety of home birth and midwife-led care.[19,20] Although not all of these studies were of good quality and there were flaws in in their design,[21,22] the national media broadcasted the results of these studies and questioned the safety of home birth and midwife-led care. This may have had effect on women's attitudes and beliefs about childbirth.[23]

Despite the increasing medicalization, the Netherlands is an interesting place to study women's birth beliefs, as it is still a setting with a relatively high rate of home births and a low rate of interventions in childbirth.[20,21] In this study we wanted to explore women's birth beliefs in the Netherlands during pregnancy and the postpartum period and identify the factors that influence those beliefs.

METHODS

We conducted a cross-sectional survey exploring women's preferences and experiences during pregnancy, birth, and the postpartum period in the Netherlands between February 2019 and February 2020.

Participants

Women were invited to participate in the study via 83 midwifery practices and 9 hospitals across the Netherlands—numbers that reflect the ratio of midwifery practices to hospitals in the Netherlands—and via social media. Women were invited to participate if they were (1) between 12 and 20 weeks pregnant (early pregnancy cohort), (2) more than 32 weeks pregnant (late pregnancy cohort), or (3) between 2 and 12 months postpartum (postpartum cohort). All women in the late pregnancy cohort were asked if they also wanted to fill out a questionnaire after childbirth. If they gave permission, the postpartum questionnaire was sent to them 8 weeks after their due date. Their responses provide an additional longitudinal data set we used to explore the changes in birth beliefs before and after childbirth (pre-post childbirth cohort).

To be included, women had to be at least 18 years of age and have a good command of the Dutch language. We excluded women with a perinatal death or severe neonatal morbidity. All participants provided informed consent and were able to complete the questionnaire online, written (sent by post), or via a telephone interview. If necessary, 2 reminders were sent: the first after one week, the second after 3 weeks. Prior to initiating the survey all respondents signed a written or electronic informed consent, depending on how they completed the survey. This study gained ethics approval through the researchers' institutional Human Research Ethics Committee.

Data Collection

We designed a self-administered questionnaire for each cohort. Each survey included questions about women's background characteristics and tools measuring birth beliefs and anxiety and/or depression. We also asked women about their (previous) childbirth experience in the prenatal cohorts. In the postnatal cohort, we measured satisfaction with the childbirth experience, birth outcomes, and interventions during birth.

This study examined women's natural and medical birth beliefs with the Birth Beliefs Scale (BBS).[6] The BBS used in our study was derived from a previous study in the Netherlands.[24] For that study, the BBS was translated forward and backward from English to Dutch by researchers and

midwives who were fluent in both languages and had expertise in the Dutch perinatal care setting. The original BBS, validated in Israel, had a Cronbach's alpha that ranged from 0.70 to 0.82.[6] The BBS consists of 2 subscales: 5 statements exploring women's beliefs in birth as a natural process and 6 statements exploring women's beliefs in birth as a medical process. Items of the BBS are scored on a Likert scale with scores ranging from 1, "completely disagree," to 5, "completely agree." Scores for each subscale are derived by calculating the mean scores of the responses, resulting in scores between 1 and 5. Those scores constitute the dependent variables *natural birth beliefs* and *medical birth beliefs*. A higher score indicates stronger beliefs about birth as a natural or medical process.

The Patient Health Questionnaire 4-item scale (PHQ-4) measures anxiety and/or depression.[25] The PHQ-4 is a validated self-report questionnaire that consists of a depression scale (Patient Health Questionnaire, 2 items) and an anxiety scale (Generalized Anxiety Disorder scale, 2 items). Items of the PHQ-4 are scored on a Likert scale with response options of "not at all," "several days," "more than half the days," and "nearly every day," scored as 0, 1, 2, 3. Summed scores are rated as normal between 0 and 2 points, mild (3-5 points), moderate (6-8 points), and severe (9-12 points) (Cronbach's alpha 0.82).

Previous childbirth experience was measured in the prenatal cohort of all women who gave birth before. Women were asked to indicate how they experienced their previous childbirth. Responses were measured on a 5-point Likert scale from 1, "overall, it was a very negative experience," to 5, "overall, it was a very positive experience."

Childbirth satisfaction was measured in the postpartum cohort with the Birth Satisfaction Scale-Revised (BSS-R).[26,27] BSS-R is a validated instrument globally endorsed for measuring the outcome of the childbirth experience. The BSS-R measures women's perception of stress experienced during childbirth, quality of care, and women's personal attributes.[26] Items are scored on a Likert scale ranging from 1, "strongly agree," to 5, "strongly disagree." Cronbach's alpha of the Dutch version of the BSS-R is 0.86.[27] The composite BSS-R scores range from 10 to 50. Higher scores indicate greater satisfaction with childbirth.

Furthermore, we asked women in the postpartum cohort to indicate how their experiences fitted with their expectations. Women could give the following answers: 1, "It was generally more negative or worse than I expected;" 2, "Overall, it was generally as I expected;" 3, "It was generally more positive or better than I expected;" or 4, "I had no expectations at all about the course of my upcoming birth."

Statistical Analyses

Results for categorical variables are presented as frequencies and percentages; for continuous variables we report means and standard deviations. A Pearson's correlation coefficient was calculated between the 2 subscales of the BBS. We used linear regression analyses to determine the factors associated with women's natural birth beliefs and medical birth beliefs in all 4 cohorts. Categorical variables were recoded into dummy variables. Values of P less than .05 were considered statistically significant. The variables in the regression models are presented as standardized coefficients, allowing easier comparison of the effect size and hence the value and relevance for clinical practice.

To create dummy variables for the linear regression analyses in the pre-post childbirth cohort, prenatal scores on the BBS were split into 3 categories based on their distribution. The outcome constitutes the independent variable prenatal BBS. Low BBS includes scores under the 33rd percentile, average BBS includes scores between the 33rd and 66th percentiles, and high BBS includes scores above the 66th percentile. Paired-samples t tests were used to compare prenatal and postnatal birth belief scores of women in the pre-post childbirth cohort.

The data were analyzed using IBM SPSS Statistics for Windows version 23.0.

RESULTS

Response and Participants

Surveys were distributed to 5118 women (978 during early pregnancy, 1652 during late pregnancy, and 2488 during the postpartum period). In total 3821 surveys were returned (808 during early pregnancy, 1283 during late pregnancy, and 1730 during the postpartum period), resulting in an overall response rate of 74.7%. Three hundred twenty-seven surveys had missing data and were excluded for the final analysis. A total of 678 women completed both the late pregnancy and postpartum survey (52.8% of the women in the late pregnancy cohort completed the postpartum survey, and 39.2% of the women in the postpartum cohort completed the survey during late pregnancy), resulting in an additional pre-post childbirth cohort of 678 women (Figure 1).

Table 1 shows the characteristics of our study population in comparison with the entire population of pregnant women in the Netherlands. Our sample has slightly more women with a high level of education, women who gave birth at home, and women who had a spontaneous vaginal birth. The distribution of women who received midwife-led and obstetrician-led care during pregnancy in our sample is comparable to that of the entire pregnant population in the Netherlands.

Women's Birth Beliefs During the Perinatal Period

Regardless of the phase of the perinatal period, women in our study had higher natural birth belief scores than medical birth belief scores (Table 2).

We examined the association between women's natural and medical birth beliefs during pregnancy and postpartum separately. We found a medium to strong correlation between women's natural and medical birth beliefs, prenatally ($r = -0.480$; $P < .001$) and postnatally ($r = -0.513$; $P < .001$).

Factors Associated with Prenatal Birth Beliefs

Regression analyses of women's birth beliefs during early pregnancy (Table 3) showed that a high level of education (compared with combined middle and low levels of education) and a previous positive childbirth experience were positively associated with women's beliefs in birth as a natural event. Age and being more anxious and/or depressed were negatively associated with natural birth beliefs. Having an

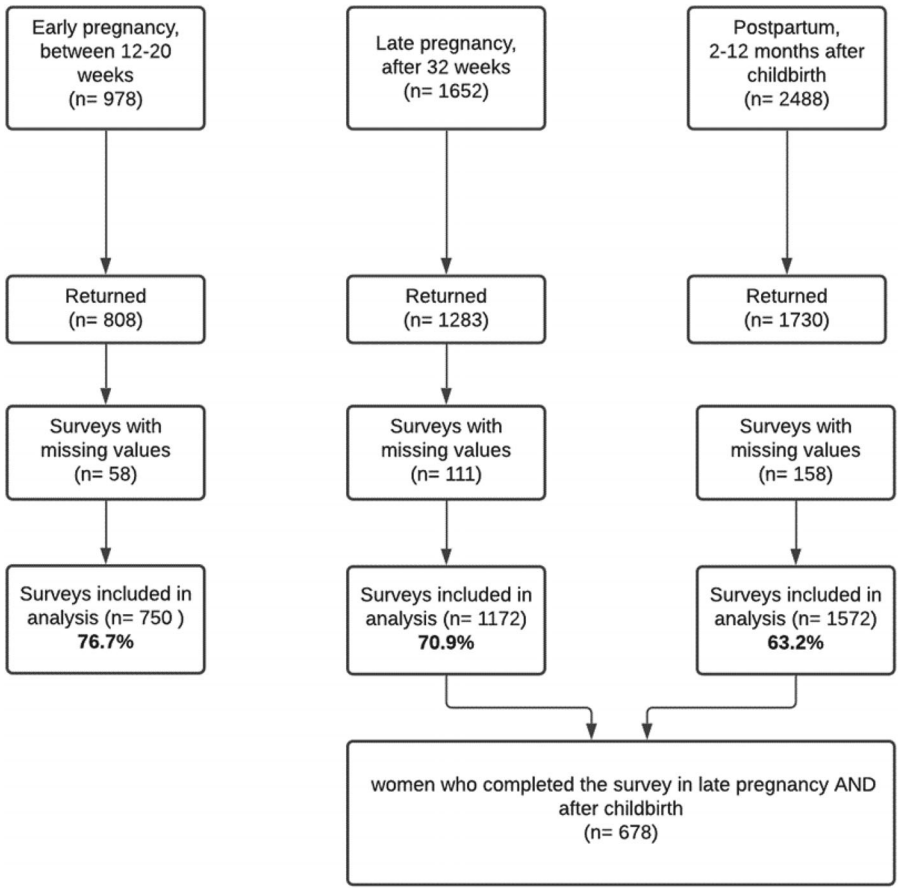

Figure 1. Response Rate of the Surveys

obstetrician as main health care provider (compared with a midwife) and being more anxious and/or depressed were positively associated with medical birth beliefs. Mirroring the findings on natural birth beliefs, having a high level of education and previous positive childbirth experiences were negatively associated with medical birth beliefs.

Looking at women's birth beliefs during late pregnancy, we found that a previous positive childbirth experience and attending antenatal classes were positively associated with women's beliefs in birth as a natural event and that having an obstetrician as main care provider was negatively associated with that belief. Having an obstetrician as main care provider, a previous negative childbirth experience, and being more anxious and/or depressed were positively associated with medical birth beliefs. A high level of education and attending antenatal classes were negatively associated with medical birth beliefs (Table 3).

Factors Associated with Birth Beliefs After Childbirth

In the regression models that we compiled to analyze women's birth beliefs in the postpartum cohort (Table 4), having a birth at home (compared with an obstetrician-led hospital birth) and childbirth satisfaction were positively associated with women's beliefs that birth is a natural event. Being multiparous, having used pharmacologic pain relief, and having a cesarean birth were negatively associated with one's belief in birth as a natural process. Age, being multiparous, use of pharmacologic pain relief, a cesarean birth, and experiences better than expected or having no expectation (compared with experiences that were the same as expected) were positively associated with medical birth belief scores. Having a high level of education, a referral during childbirth, home birth, and childbirth satisfaction were negatively associated with medical birth belief scores (Table 4).

Prenatal to Postpartum Changes of Women's Birth Beliefs

We found significant, but very small, changes between mean scores of prenatal and postnatal birth beliefs in the pre-post childbirth cohort. The mean (SD) score of natural birth beliefs declined 0.19 (0.072) points (95% CI, −0.24 to −0.13), and the mean (SD) score of medical birth beliefs increased with 0.09 (0.87) points (95% CI, 0.02-15) after the women had given birth (Table 5). There was a decrease in natural birth belief scores among 53.4% of the women, 11.9% had equal scores, and 34.7% had higher natural birth belief scores after birth. Furthermore, 42.6% of the women had lower medical birth belief scores, 7.4% had equal scores, and 50.0% had increased medical birth belief scores after birth.

Change of women's birth belief scores in the pre-post childbirth cohort was calculated as the difference between the

Table 1. Characteristics of the Respondents and Characteristics of the General Dutch Population of Women Giving Birth in 2019

Characteristics	Early Pregnancy Cohort (n = 750)	Late Pregnancy Cohort (n = 1172)	Postpartum Cohort (n = 1574)	Pre-Post Childbirth Cohort (n = 678)	Dutch Population
Parity, n (%)					
Nulliparous	258 (34.4)	441 (37.6)	751 (47.7)	324 (47.8)	43.8[a]
Multiparous	492 (65.6)	731 (62.4)	823 (52.3)	354 (52.2)	56.1[a]
Age, mean (SD), y	30.4 (4.18)	30.4 (4.38)	31.2 (4.51)	31.1 (4.67)	NA
Level of education, n (%)					
Low	46 (6.1)	58 (4.9)	40 (2.5)	16 (2.4)	9.9[b]
Middle	293 (39.1)	431 (36.8)	526 (33.4)	218 (32.2)	35.2[b]
High	410 (54.7)	683 (58.3)	1007 (64.0)	444 (67.8)	53.7[b]
Missing	1		1		
Marital status, n (%)					
Married/living together	720 (96.0)	1141 (97.4)	1531 (97.3)	662 (97.6)	NA
Living apart together	6 (0.8)	5 (0.4)	7 (0.4)	3 (0.4)	NA
Single	13 (1.7)	19 (1.1)	30 (1.9)	11 (1.6)	NA
Unknown	11 (1.5)	7 (0.6)	6 (0.4)	2 (0.3)	NA
Ethnicity, n (%)					
Dutch	668 (89.1)	1037 (88.5)	1404 (89.2)	604 (89.1)	white 86.3[a]
Non-Dutch	82 (10.9)	134 (11.4)	169 (10.7)	73 (10.8)	white 11.8[a]
Unknown			1 (0.1)	1	
Main care provider, n (%)					
Midwife	675 (90.0)	963 (82.2)			86.9 start antenatal care[c]
Obstetrician	37 (4.9)	116 (9.9)			13.1 start antenatal care[c]
Mixed care	38 (5.1)	93 (7.9)			
Place of birth, n (%)					
Home birth			444 (28.2)	186 (27.4)	13.4[a]
Midwife-led hospital			333 (21.2)	152 (22.4)	15.3[a]
Hospital			797 (50.6)	340 (50.1)	71.3[a]
Medical interventions, n (%)					
Referral during childbirth			497 (31.6)	232 (34.2)	21.9[a]
Induction of labor			373 (23.7)	162 (23.9)	24.8[a]
Augmentation of labor			341 (21.7)	164 (24.2)	NA
Pharmacologic pain relief			469 (29.8)	216 (31.9)	42.0[a]
Birth mode, n (%)					
Spontaneous birth			1271 (80.7)	546 (80.5)	74.1[a]
Instrumental vaginal birth			131 (8.3)	64 (9.4)	7.1[a]
Cesarean birth			172 (10.9)	68 (10.0)	15.3[a]
BSS-R,[d] mean (SD)			38.41 (6.72)	38.40 (6.51)	

Abbreviations: BBS-R, Birth Satisfaction Scale-Revised; NA, not available.
[a] General perinatal care population in the Netherlands in 2019, Dutch Perinatal Registry (Perined).[28]
[b] General Dutch population between 25 and 45 years in 2019, Statistics Netherlands.[29]
[c] Dutch Perinatal Registration (PRN) records ethnicity, whereas we recorded the country of birth in our study; therefore, this is shown differently in the table.
[d] Range BSS-R 10 to 50.

postnatal birth belief scores and the prenatal scores. The outcomes of that calculation constitute the variables *changed natural birth beliefs* and *changed medical birth beliefs*. In these analyses, the changed natural birth beliefs and changed medical birth beliefs were the dependent variables.

Use of oxytocin during childbirth, an assisted vaginal birth, and childbirth satisfaction were positively associated with the change of natural birth belief scores; this means higher postnatal natural birth belief scores than prenatal. A midwife-led home birth, a referral during childbirth,

Table 2. Women's Birth Beliefs During the Perinatal Period		
	Natural Birth Beliefs	Medical Birth Beliefs
Cohort	Mean (SD)	Mean (SD)
Whole data set		
Early pregnancy cohort (n = 750)	3.75 (0.56)	3.12 (0.54)
Late pregnancy cohort (n = 1172)	3.87 (0.54)	2.97 (0.61)
Postpartum cohort (n = 1574)	4.01 (0.62)	3.00 (0.67)
Longitudinal data set (n = 678)		
Late pregnancy cohort	3.91 (0.53)	2.92 (0.61)
Postpartum cohort	3.73 (0.47)	3.01 (0.67)

childbirth satisfaction, and a worse than expected experience (compared with an experience that was the same as expected) were negatively associated with the change of medical birth beliefs. Pharmacologic pain relief and an experience better than expected were positively associated with the change of medical birth belief scores. Both medical and natural prenatal birth beliefs had an effect on the change in women's beliefs after childbirth in the expected direction: women with low prenatal scores were likely to have higher scores after childbirth, and women with high prenatal scores were likely to have lower scores after childbirth, all other variables being equal (Table 6).

DISCUSSION

The aims of this study were to explore women's birth beliefs in the Netherlands during pregnancy and the postpartum period and to identify the factors affecting these birth beliefs. In general, the women in our study had higher beliefs about birth as a natural process compared with their beliefs about birth as a medical process. There was a very slight shift in these beliefs after childbirth: women's beliefs in birth as a natural process decreased, and their belief in birth as a medical event increased. Our multiple regression analyses showed that women's beliefs about birth—as natural or medical—were strongly influenced by women's (previous) childbirth experiences.

Our findings are congruent with an earlier study of women in Israel that found that women had stronger beliefs about birth as a natural process and weaker beliefs about birth as a medical process.[4] However, the women in our study—from the Netherlands—generally had stronger natural birth beliefs and weaker medical birth beliefs compared with women in Israel and women in Turkey.[4,30] Birth beliefs and associated perceptions of risk are related to cultural norms and societal ideas about birth and its associated risk and safety.[1,13,31] The Dutch perinatal care system is well known for its low rate of interventions and its emphasis on the normality of childbirth,[17,18] whereas Israel and Turkey have a more medicalized perinatal care system.[32,33] The differences we found highlight the effect of cultural and social values about childbirth on the beliefs of women.

Not surprisingly, we found that women's childbirth experiences were the most consistent predictor of women's birth beliefs. Multiparous women with previous positive experiences had prenatally stronger natural birth beliefs and weaker medical birth beliefs than nulliparous women. Multiparous women with a previous negative experience had stronger medical birth beliefs during pregnancy. Women who were more satisfied with their actual childbirth experience had stronger natural birth beliefs and weaker medical birth beliefs after childbirth. Even though women's natural birth beliefs became slightly weaker after childbirth, the change was smaller if women were more satisfied with their childbirth experience. The change in women's medical birth beliefs became stronger after childbirth if they were unsatisfied with their childbirth experience.

Women's (previous) experiences, both positive and negative, are associated with the medicalization of childbirth.[34,35] Women's experiences during pregnancy and childbirth shape their birth beliefs and affect their choices and decisions during pregnancy.[12] A previous Dutch study found that traumatic experiences could lead to a request for a cesarean in subsequent pregnancies—even when there was no medical indication—or to the choice of a home birth in spite of a high-risk pregnancy.[36] Overall having a positive childbirth experience is more closely associated with a desire for a natural birth in a subsequent pregnancy.[8,37] The more women believe birth to be a natural process and the less they believe it is a medical event, the more likely they are to avoid medical birth–related choices like induction of labor or epidural analgesia.[4] These findings confirm that if we wish to counteract the medicalization of childbirth, we need to improve women's experiences. More postive experiences will strengthen natural birth beliefs and weaken medical birth beliefs, influencing women's birth choices.

Our study also suggests that women's overall perceptions of their childbirth experiences have a greater influence on their beliefs about birth than do medical interventions. This may be explained by the fact that women perceived childbirth-related factors both positively and negatively.[38] Women who experience complications or medical interventions during childbirth do not have a negative recall of their overall childbirth experience if they felt safe and received good care during childbirth. The opposite is also true. A woman with an uncomplicated birth may have a negative experience if she felt unsafe and received poor care.[39,40] It is therefore likely that care providers' attitudes and behavior are of more importance to women's birth beliefs than interventions and mode of childbirth.

Table 3. Factors Associated with Women's Birth Beliefs During Pregnancy

	Natural Birth Beliefs						Medical Birth Beliefs					
	Early Pregnancy Cohort			Late Pregnancy Cohort			Early Pregnancy Cohort			Late Pregnancy Cohort		
Predictors	Unstandardized Coefficients	Standardized Coefficients	*P* Value	Unstandardized Coefficients	Standardized Coefficients	*P* Value	Unstandardized Coefficients	Standardized Coefficients	*P* Value	Unstandardized Coefficients	Standardized Coefficients	*P* Value
Age	−0.015	−0.117	.003	−0.005	−0.040	.21	0.002	0.014	.72	0.005	0.038	.24
Level of education (high)	0.088	0.078	.04	0.056	0.051	.09	−0.146	−0.136	<.001	−0.148	−0.120	<.001
Anxiety/depression (PHQ-4)	−0.031	−0.102	.005	−0.008	−0.028	.33	0.032	0.109	.003	0.030	0.094	.001
Fertility treatment	−0.072	−0.034	.35	−0.102	−0.046	.10	0.127	0.064	.09	−0.56	−0.022	.43
Main care provider (ref. midwife)												
Mixed care	0.001	0.000	.99	0.001	0.000	>.99	−0.004	−0.002	.96	0.299	0.147	<.001
Obstetrician	−0.151	−0.058	.10	−0.256	−0.142	<.001	0.191	0.078	.03	0.132	0.058	.04
Previous childbirth experience (ref. no previous experience)												
Negative	−0.032	−0.016	.67	−0.063	−0.033	.28	0.018	0.010	.80	0.163	0.075	.01
Neutral	−0.016	−0.010	.78	−0.096	−0.061	.06	0.060	0.041	.32	0.023	0.013	.69
Positive	0.260	0.228	<.001	0.160	0.145	<.001	−0.123	−0.113	.008	−0.045	−0.036	.30
Antenatal classes	—	—	—	0.110	0.197	<.001	—	—	—	−0.083	−0.131	<.001
Adjusted R^2	7.9%		<.001	9.5%		<.001	7.0%		<.001	8.4%		<.001

Abbreviations: —, not included as a predictor variable; PHQ-4, Patient Health Questionnaire 4-item scale.

Table 4. Factors Associated with Women's Birth Beliefs After Childbirth

	Natural Birth Beliefs			Medical Birth Beliefs		
Predictors	Unstandardized Coefficients	Standardized Coefficients	*P* Value	Unstandardized Coefficients	Standardized Coefficients	*P* Value
Parity (multiparous)	−0.089	−0.072	.004	0.077	0.057	.03
Age	−0.005	−0.031	.19	0.009	0.059	.02
Level of education (high)	−0.023	−0.018	.43	−0.117	−0.084	<.001
Anxiety/depression (PHQ-4)	−0.008	−0.025	.26	0.002	0.007	.79
Medical interventions						
Referral	0.037	0.28	.24	−0.073	−0.051	.040
Pharmacologic pain relief	−0.213	−0.157	<.001	0.203	0.138	<.001
Use of oxytocin	0.016	0.016	.56	0.005	0.004	.82
Mode of birth (ref. spontaneous)						
Instrumental vaginal birth	−0.036	−0.016	.49	−0.023	−0.010	.70
Cesarean birth	−0.295	−0.148	<.001	0.133	0.062	.02
Place of birth (ref. obstetrician-led hospital)						
Home birth	0.184	0.134	<.001	−0.391	−0.261	<.001
Midwife-led hospital	−0.036	−0.024	.39	0.009	0.005	.85
Experience versus expectation (ref. the same)						
Experience worse than expected	0.062	0.041	.23	−0.068	−0.042	.24
Had no expectations about childbirth	−0.048	−0.036	.26	0.112	0.078	.02
Experience better than expected	−0.017	−0.012	.68	0.113	0.076	.02
Childbirth experience (BSS-R)	0.033	0.362	<.001	−0.023	−0.231	<.001
Adjusted R^2	29.6%		<.001	22.1%		<.001

Abbreviations: BSS-R, Birth Satisfaction Scale-Revised; PHQ-4, Patient Health Questionnaire 4-item scale.

Table 5. Change in Birth Belief Scores After Giving Birth

Phase of the perinatal period	Natural Birth Beliefs Range of Change: Mean (SD), −0.19 (0.72); Min −2.00; Max +2.20			Medical Birth Beliefs Range of Change: Mean (SD): 0.09 (0.87); Min −2.67; Max +2.83		
	Decreased 53.4% (n = 362)	Equal 11.9% (n = 81)	Increased 34.7% (n = 235)	Decreased 42.6% (n = 289)	Equal 7.4% (n = 50)	Increased 50.0% (n = 339)
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
Prenatal scores	4.21 (0.44)	3.85 (0.31)	3.48 (0.40)	3.27 (0.50)	3.04 (0.53)	2.61 (0.53)
Postnatal scores	3.49 (0.44)	3.85 (0.31)	4.04 (0.36)	2.57 (0.59)	3.04 (0.53)	3.40 (0.51)

We found that pregnant women with an obstetrician as the main care provider had stronger beliefs about birth as a medical process and weaker beliefs about birth as a natural process than women who received care from a midwife. The same is true for women with an obstetrician-led hospital birth compared with women with midwife-led home birth. In general, midwives and obstetricians have different attitudes about childbirth.[41] Midwives are seen as having greater faith in birth as a natural process than do obstetricians, who have a more medical approach to childbirth.[42] However, it is important to point out that women who receive care from a community midwife in the Netherlands are more likely to have uncomplicated pregnancies and births, whereas women with more complicated pregnancies receive care from obstetricians. As a consequence, it is difficult to infer which underlying factors in our study—care providers' attitudes and behavior or biomedical problems—influence women's birth beliefs. Nevertheless, it is essential to be aware of the impact of care

Table 6. Effect of sociodemographic and Childbirth-Related Factors on the Change of Women's Birth Belief Scores After Giving Birth

	Change of Natural Birth Beliefs			Change of Medical Birth Beliefs		
Predictors	Unstandardized Coefficients	Standardized Coefficients	*P* Value	Unstandardized Coefficients	Standardized Coefficients	*P* Value
Parity (multiparous)	−0.043	−0.030	.326	0.123	0.071	.051
Age	0.007	0.040	.166	0.001	0.005	.893
Level of education (high)	−0.009	−0.006	.831	−0.093	−0.051	.111
Anxiety/depression (PHQ-4)	0.001	0.002	.939	0.009	0.018	.549
Medical interventions						
Referral	0.024	0.016	.574	−0.127	−0.070	.044
Pharmacologic pain relief	0.081	0.053	.093	0.257	0.138	<.001
Use of oxytocin	0.147	0.052	.005	0.036	0.021	.624
Mode of birth (ref. spontaneous)						
Instrumental vaginal birth	0.287	0.069	<.001	0.102	0.035	.304
Cesarean birth	0.120	0.050	.077	0.182	0.063	.062
Place of birth (ref. obstetrician-led hospital)						
Midwife-led home birth	−0.066	−0.041	.302	−0.266	−0.137	.004
Midwife-led hospital	−0.023	−0.014	.688	0.078	0.038	.352
Experience (ref. the same)						
Experience worse than expected	0.020	0.012	.700	−0.177	−0.088	.018
Had no expectations	0.028	0.017	.495	0.030	0.015	.612
Experience better than expected	−0.053	−0.033	.241	0.157	0.081	.016
Prenatal BBS (ref. average)						
Low	0.576	0.377	<.001	0.682	0.380	<.001
High	−0.619	−0.402	<.001	−0.565	−0.297	<.001
Childbirth experience (BSS-R)	0.052	0.475	<.001	−0.026	−0.197	<.001
Adjusted R^2	58.2%		<.001	40.6%		<.001

Abbreviations: BBS, Birth Beliefs Scale; BSS-R, Birth Satisfaction Scale-Revised; PHQ-4, Patient Health Questionnaire 4-item scale.

providers' behavior on women's birth beliefs. Women who have care providers with whom they shared their birth beliefs and who understood their preferences and choices increased their confidence and trust.[43] Yet care providers do not always investigate women's birth beliefs and the reasons women prefer medical over natural birth.[44] Being pregnant and giving birth is a process, and a woman's birth beliefs should be discussed before labor begins. By examining women's birth beliefs prenatally, care providers can increase women's confidence and trust, understand women's decisions, and increase their knowledge. This will contribute to positive experiences and may strengthen women's beliefs in birth as a natural process.

Our regression analyses of the change in women's birth beliefs after childbirth produced some unexpected and counterintuitive results. Use of oxytocin and assisted vaginal birth increased women's beliefs in birth as a natural event. A previous Canadian ethnographic study found that women (and midwives as well) are flexible and can incorporate mainstream medical interventions within their views about birth as a natural process.[45] Brubaker suggests that a medical birth is so commonplace for the contemporary generation of pregnant women that it may *seem* natural for individual women regardless of interventions used.[5] However, based on our study, we cannot say whether this is a possible explanation for the unexpected effect of oxytocin and an assisted vaginal childbirth on changing women's natural birth beliefs. Further research is needed to explore women's views about what is normal and the acceptance of medical interventions during childbirth and how this shapes women's birth beliefs.

In addition, we found that prenatal birth beliefs were correlated with the change in birth beliefs after birth. An Israeli study noted the effect of self-fulfilling prophecies on beliefs after giving birth.[46] Women with stronger medical birth beliefs are more willing to accept and undergo interventions.[13,47] This subsequently strengthens their medical birth beliefs after childbirth.[46] Women with higher natural birth beliefs have a stronger desire to avoid medical interventions and are more likely to give birth naturally,[16] strengthening their natural birth beliefs.[46] However, our study found that women who had high natural birth belief scores before birth were more likely to have lower natural birth belief scores after childbirth. This is likely a ceiling effect: high scores prenatally make it impossible to rise further after childbirth and typically regress toward the mean.

Strengths and Limitations

Our study has both strengths and limitations. The Netherlands is a unique place to study women's birth beliefs. It is one of the few countries in the Western world with a perinatal care system that emphasizes the physiologic process of pregnancy and childbirth. To our knowledge, this is the first quantitative study that explores women's birth beliefs in the Netherlands during pregnancy and the postpartum period. Furthermore, our results are based on a large sample of 1922 pregnant women and 1572 women during the postpartum period spread throughout the Netherlands. At the same time, our longitudinal data set of 678 women allowed us to investigate whether and how women's birth beliefs change after childbirth.

Our study was limited by the fact that we had little direct control over the inclusion process used by care providers and in responding to social media requests. Our participants are not entirely comparable with the general population of women who give birth in the Netherlands. The level of education of the women in our sample was slightly higher. Furthermore, the questionnaires were only available in the Dutch language, resulting in the underrepresentation of those who live in the Netherlands but do not speak the language, including people with a (recent) migration background.

Our study population also included more women who experienced physiologic childbirth compared with the total Dutch population (more home births, less pharmacologic pain relief, and fewer cesarean births). Our results found significant effects of home birth, use of pharmacologic pain relief, and a cesarean birth on women's birth belief scores. It is unclear if the overrepresentation of home births and underrepresentation of pharmacologic pain relief and cesareans may have contributed to more pronounced differences between natural and medical birth belief scores after childbirth.

Our cross-sectional observational study can only identify potential association between women's birth beliefs and personal and childbirth-related characteristics; it cannot determine causal association. Finally, we found that personal and childbirth-related characteristics explain a weak to moderate percentage of the variance of women's birth beliefs during pregnancy and postpartum.

We know from other studies that the organization of perinatal care and societal and cultural themes related to pain, risk, and safety affect women's birth beliefs and the care decisions they make.[8,48] However, an in-depth investigation about the influence of organization of care and societal and cultural aspects was beyond the scope of our study. Further research, done in a variety of cultural and societal contexts, is needed to better understand how women's birth beliefs are created by these contextual factors.

CONCLUSION

Our results confirm that, in general, women in the Netherlands have strong natural and weaker medical birth beliefs, which correspond with the Dutch birth philosophy that pregnancy and childbirth are physiologic processes. Childbirth experiences had a larger effect on women's birth beliefs than having had medical interventions. Perinatal care providers need to be aware of what women believe about birth and how they themselves influence those birth beliefs. The contribution they make to women's perinatal experiences affects what women believe and the choices they make for care in the future.

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Ethical approval was obtained on December 10, 2018, from the Human Research Ethics Committee of METC Z, Heerlen, Netherlands (registry number: METCZ20180121). All women were informed about the study and gave their informed consent to participate. Privacy and confidentiality of all study information were maintained. All methods were conducted in accordance with the relevant guidelines and regulations of the Declaration of Helsinki.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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