Fear of childbirth before and after giving birth: Associations with preference for place and mode of birth

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FEAR OF CHILDBIRTH BEFORE AND AFTER GIVING BIRTH

Associations with preference for place and mode of birth

Anne-Marie Sluijs

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General introduction

INTRODUCTION

The interaction of body and mind during the process of childbirth is intriguing. During my work as a midwife, I have accompanied many women in the process of being pregnant, giving birth and becoming a parent. It is striking how a birth-giving woman can be extremely vulnerable and strong at the same time, physically as well as mentally. Every woman experiencing such a life changing, intense, physically heavy process should be able to rely on optimal circumstances: meeting a friendly environment, and feeling supported by people around her, by the obstetric system and by the society in which she lives. But most importantly she needs to rely on herself, dealing with her own thoughts and emotions. Most women are very well equipped to do so, but some experience intense anxiety and are mentally extremely vulnerable in this process.

I have been fascinated by the interaction of anxiety and giving birth; not only in the individual patient but also how anxiety interacts with the changing ideas and practices regarding childbirth in the society and how women make decisions about their own process of giving birth. I have been working as a midwife in a period where there was a huge increase in the use of pain relief, a decrease of home births and an increase in Caesarean sections (CS) and referrals because of induction or augmentation of labour. Are these changes related to fear of childbirth (FOC), pre- and postpartum? And how is FOC interacting with the preferences that women have and with the choices that women make regarding place of giving birth, mode of giving birth and the use of pharmacological pain relief?
My education and work experience in the Netherlands have been in an obstetric system with significant autonomy of midwives and of pregnant women and with a high proportion of home births in comparison with other high-income Western countries. Outside the Netherlands this is considered very positive. In this typical obstetric environment, I wished to explore the prevalence of severe FOC.
During my study in psychology I was able to acquire knowledge about anxiety, anxiety disorders, the interaction of anxiety and post-traumatic stress disorder with depression, about personality, motivation and cognitive biases, about doing research and using statistics. This gave me the tools to look for answers to the aforementioned questions, which inspired me to conduct the research that is documented in this PhD thesis.

The Background section (Section 2) comprises the following: the Dutch obstetric system, a theoretical framework for the development of anxiety disorders and FOC, the assessment and prevalence of FOC, factors associated with FOC, and options for treatment of severe FOC. Section 3 presents the aim and outlines of the thesis.

BACKGROUND

Dutch obstetric system/midwife-led care/home birth

In almost all high-income Western countries, hospital is the ordinary place for giving birth and the choice of a home birth is restricted. In the Netherlands, however, home birth has since long ago been considered a normal option for all women with a low risk of obstetric complications, and therefore those pregnant women are offered the choice of a home- or a hospital birth with their community midwife. Over the past 15 years, the home birth rate has declined from near 30% to 13% (1): which still is a high percentage compared to other high-income Western countries, where the home birth rates range between 0.5 and 2.2% (2). In the Dutch maternity care model, pregnant women receive primary care as long as they have an uncomplicated pregnancy and childbirth. This primary care is offered mostly by independent midwifery practices in the community, and sometimes by general practitioners. Women are referred to secondary obstetrician-led care, when complications are suspected or occur and obstetric attention or interventions may be indicated. Intervention options such as augmentation of labour or instrumental delivery and pharmacological pain relief are only offered in obstetrician-led care. In hospitals, clinical midwives and obstetricians work together in a team with obstetric nurses. Clinical midwives are trained to guide births in secondary care. In this thesis, when I mention obstetrician-led care, this refers to the team of clinical midwives/obstetricians/nurses, i.e. 'obstetric hospital staff'.

The leading guideline for distinguishing between primary (midwife-led) and secondary (obstetrician-led) care is the List of Obstetric Indications (Verloskundige Indicatie Lijst/ VIL) (3). This list of recommendations, put together in cooperation of midwives and obstetricians, indicates whether primary care is sufficient and in which situations a referral to secondary care is suggested. As a result of this risk selection process, primary midwifery-led care during labour is available for women with a low risk for complications. These women can have a home birth or can plan to give birth in the hospital, guided by their own community midwife. In case of a hospital birth, referral during labour means handing over obstetric responsibility from a community midwife to hospital staff, while in case of a home birth it also means a transfer from home to hospital.

A Dutch study (4) with 2060 participants (nulli- and parous women) showed that referral rates (in 2009-2010) were lower in women planning a home birth (31%) than in women planning a hospital birth (47%). Those who planned a home birth were slightly more often parous than women planning a hospital birth (59% vs. 51%). Using numbers of the Dutch perinatal registration, Offerhaus et al. (5) composed referral rates in the Netherlands for

the period 2000-2008. Intrapartum referral rates for low risk women preferring home birth were 49.3% for nulliparous and 14.7% for parous women, while for low risk women preferring hospital birth, intrapartum referral rates were 54.6% for nulliparous and 27.4% for parous women.

If complications occur or when women request pharmacological pain relief, the resulting referral is likely to affect the woman's experience of birth. Studies in the Netherlands showed that referral during labour was associated with a more negative experience of giving birth for nulliparous women, both in the short (6, 7) and the long term (8). However, Wiegers et al. (9) found no difference in experience of giving birth between women being referred after a planned home delivery, and those referred after a planned hospital birth. More recently Geerts et al. (10) showed that women referred after a planned home birth, compared to women referred after a planned hospital birth, did not have a more negative experience of the care given. Furthermore, transfer of care during labour generally lowered feelings of control, but feelings of control were similar for referred women who planned a home or a hospital birth. It should be mentioned that these studies were performed during the period 1991-2010, and that in the Netherlands, over the last 20 years, giving birth has medicalized rapidly (5). The 'birth frame of reference' of all involved and the birth experiences of women have probably shifted over the years by greater accessibility to and increased use of pharmacological pain relief, higher referral rates from midwife-led care to obstetrician-led care, a decrease of homebirth rates and an increase in CS rates.

Theoretical frame of reference of anxiety and fear of childbirth

Anxiety

Anxiety is a functional emotion with the purpose to prepare for, avoid or escape life-threatening or dangerous situations (11). It involves prospection, i.e. the capacity to think about the future (12). In case the future is uncertain, there is a *sense of uncontrollability of the possible future danger*, which evokes a state of helplessness. If anxiety becomes chronic it is no longer functional and can develop into an anxiety disorder. Two closely related strategies to cope with chronic anxiety are *uncontrolled worrying and avoidance* (11). Persons with anxiety problems are easily triggered by negative information, process information selectively and have cognitive biases which often further encourages anxiety (13).

Barlow's theory of triple vulnerability explains the underlying reasons in the development of anxiety disorders (14):

1. Generalized biological vulnerability: some people simply seem more predisposed to be biologically reactive to various environmental stressors, for example people with personality traits like high neuroticism and low extraversion.

2. General psychological vulnerability: a vulnerability that is based on early life experiences that contribute to the development of a sense of having insufficient/ no control over salient events. A sense of uncontrollability, as reflected in a more external locus of control can develop for example because of non-responsive or over-controlling parenting styles. In some cases, this external locus of control contributes to increased negative affect, and ultimately, to clinical symptoms.
3. Specific psychological vulnerability: this is associated with learning experiences that serve to focus anxiety on specific objects or situations, e.g. having experienced sexual abuse. Vicarious conditioning involves developing anxiety or panic in response to witnessing or even being told that a situation is dangerous.

The three vulnerabilities considered in the context of prepartum FOC, may be exemplified by the following. A woman with a family history of depression and anxiety, whose anxiety was easily triggered by dangerous events (generalized biological vulnerability), who had over-controlling parents and did not learn to rely on her own capability to solve problems, and as a result gives responsibility to other persons or circumstances (external locus of control) (general psychological vulnerability) and has a neighbour who lost her child in pregnancy (specific psychological vulnerability). Now that she is pregnant herself, she has severe FOC and becomes dependent on the help of others, resulting in many check-ups and finally into a request for an elective CS.

Fear of childbirth during pregnancy

For pregnant women, giving birth is *a future possible 'dangerous' situation*. It is thus normal for pregnant women to experience at least some anxiety. But sometimes a woman experiences chronic anxiety, when she is so afraid of giving birth that it considerably impairs her personal, social, relational and occupational life and/or her willingness to become pregnant and/or her competence to give birth (15). Wijma and Wijma (15) introduced the term 'childbirth anxiety'. For practical reasons though we will use the term FOC throughout this thesis, as until now FOC is the term most often used for anxiety during pregnancy, delivery and the postpartum period.

For a pregnant woman there are many uncertainties to handle concerning her pregnancy and the upcoming birth. It is uncertain when the birth will take place, how she will experience giving birth, how she can deal with the pain, how much time the birth will take, if any interventions will be necessary, whether the baby will be healthy or not, if any complications will occur, how the recovery of her body will be, how it will feel to be a parent, whether the relation with the partner will change. Becoming a parent is one of the biggest life events and very challenging. Not only physically but also mentally. Especially for anxious women, these uncertainties are difficult to deal with. Many women prepare for giving birth by following childbirth classes, reading information and doing relaxation

exercises. In anxious women, the sense of an uncontrollable future danger may evoke a state of helplessness. They experience *uncontrollable worrying* and, instead of preparing for giving birth, they try to *avoid* everything that has to do with it. *Avoidance* is a strategy that works for persons with for example fear of flying, or fear of spiders, but, in the case of prepartum FOC, the feared situation is slowly approaching and unavoidable.
Often, FOC is not recognized early in pregnancy because many women with FOC avoid talking about giving birth and their fears. However, when pregnancy progresses and the delivery comes closer, anxiety grows and can become so intense that in the end a woman endures the delivery with intense anxiety, or even insists on getting a CS, which in her opinion is the only way to avoid a the feared situation and a catastrophe (15).

According to Wijma and Wijma (15) in *clinical practice*, prepartum FOC can be divided into four categories of severity:

1. Low FOC: the woman has almost no worry about giving birth;
2. Moderate FOC: the woman has troublesome thoughts about giving birth, but expects that she can handle the problem;
3. Severe FOC: the woman's FOC is so intensive, that it interferes with her private, social and working life and influences her willingness to be pregnant and/or ability to give birth;
4. Phobic FOC: the woman suffers from a paralyzing fear that meets the criteria of specific phobia according to DSM-5 (16) .

In this thesis, when we mention research findings, the terms severe FOC and high FOC indicate a W-DEQ sum score of ≥85, whereas the term phobic FOC points to a W-DEQ sum score of ≥100, in agreement with the validation of these cut off scores according to Zar (17).

Fear postpartum/Post-traumatic Stress Disorder (PTSD)
Often FOC does not immediately disappear after giving birth. Several studies have shown that FOC in pregnancy, during and after childbirth are related (18, 19). Generally, FOC decreases from pre- to postpartum, but some women still experience severe or phobic FOC after they have given birth (18). Women who endured giving birth with intense anxiety, afterwards often have a negative appraisal of the delivery and maintain severe FOC after the childbirth, when looking back on giving birth. For a number of women this presents as postpartum PTSD (20). In their systematic review and meta-analysis from 2017, Yildiz et al. (21) mention a mean prevalence of postpartum PTSD of 4,0% in general community samples of postpartum women in several high-income Western countries.
Ayers et al. (20) used the diathesis-stress approach to develop a model in order to understand the risk factors for developing postpartum PTSD. This approach implies that the development of postpartum PTSD depends on a combination of the degree of antepartum vulnerability, risk factors during childbirth and maintaining factors after birth. In their

meta-analysis Ayers et al. identified the following factors that contribute to antepartum vulnerability for postpartum PTSD: previous history of psychiatric disease, depression during the current pregnancy, severe pre-partum FOC and medical complications during childbirth. Risk factors during birth were operative birth (unplanned CS and instrumental delivery), dissociation, lack of support by medical staff, and loss of control during delivery. Maintaining factors after birth for postpartum PTSD were poor coping with childbirth, and stress and depression after childbirth.

Assessment and prevalence

The internationally most used measure of pre- and postpartum FOC is the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ). The W-DEQ is a 33-item self-assessment rating scale. Version A measures FOC during pregnancy, and version B postpartum. The original Swedish version is well validated (17, 22). The scale includes 33 statements about giving birth. Each statement is rated from 'not at all' (zero) to 'extremely' (five). Sum scores can vary from zero to 165. The higher the score, the more severe is the FOC. A high score (≥85) is indicative of severe FOC whereas a low score (< 85) indicates low to moderate FOC. A W-DEQ score of ≥ 100 implies phobic FOC (17, 22).

In clinical practice and scientific research, several other ways exist to assess prepartum FOC: the fear of birth scale (FOBS), which is a rating on a Visual Analogue Scale from 1-100 how much one fears giving birth; the Pregnancy Anxiety Questionnaire-Revised 2 (PRAQ-R2) (developed and validated in the Netherlands)(23); and the Childbirth Fear Questionnaire (recently developed in Canada) (24), which provides information about specific childbirth fears.

A questionnaire is a useful screening tool but not sufficient to diagnose severe or phobic prepartum FOC. Obstetric staff could first screen with a questionnaire followed by proper diagnostics by a clinical psychologist or psychiatrist, who is able to make a differential diagnosis and find out if also other mental problems exist than severe prepartum FOC, e.g. depression or other anxiety disorders (15).

In several high-income Western countries, the prevalence of prepartum FOC by means of W-DEQ A is estimated to 7-15% for severe FOC (W-DEQ ≥85) (25-30) and to 2-7% for phobic FOC (W-DEQ ≥100) (27, 30-33). Prevalence numbers of severe FOC from the Netherlands are rare. In a recent study in a Dutch low risk sample using the W-DEQ A (34), the prevalence of severe prepartum FOC was 8%. Another Dutch study, comprising a combined low and high risk sample and using the PRAQ (35), showed a prevalence of high pregnancy related anxiety of 11%. Unfortunately, this number is difficult to compare with other studies because the cut off score (low vs. high level) in this study was not validated.

Associated factors

Parity and FOC

FOC during pregnancy is generally higher in nulliparous than in parous women (36-39). FOC may even be present in non-pregnant women. In nulliparous women, next to a biological and general psychological vulnerability, the specific psychological vulnerability could be related to an earlier life event like being abused in childhood or even be due to stories having been told by family/friends or by having watched a horrific birth scene in a movie. Nevertheless, not all women can relate their fear to such a specific moment. In parous pregnant women, FOC is often related to previous life events but also, many times, to a previous traumatic birth experience (40).

Personality traits/Self-efficacy

There appears to be an association between prepartum FOC and several personality traits, consistent with the generalized biological vulnerability of Barlow's theory. In a Swedish study of 423 nulliparous women, Salomonsson et al. (41) have shown that women with high prepartum FOC more often have low self-efficacy (measured with the Childbirth Self-Efficacy Inventory (42)) than women with low prepartum FOC. In an Australian study of 1410 nulliparous and parous women, Schwartz et al. (43) found that low self-efficacy, high prepartum FOC and depression were all correlated, regardless of parity. Also personality traits like anxiety sensitivity and being short-tempered have shown to be related to prepartum FOC (44).

Violence and abuse

Among the specific psychological vulnerabilities, experiences of violence and abuse belong to the most common factors that are found to be associated with prepartum FOC. In a Norwegian study (45) including 2365 nulliparous and parous pregnant women, 23.9% had experienced childhood abuse, and nulliparous women with a history of childhood abuse reported severe prepartum FOC significantly more often than those without a history of childhood abuse. In parous women with a previous traumatic birth, the recent birth experience was stronger associated with prepartum FOC than childhood abuse. Schroll et al. (46) described similar results: amongst obstetrically low-risk nulliparous women, significantly more women exposed to sexual violence than non-exposed fear the childbirth *postpartum,* but not before or during labour and delivery. Having experienced abuse in healthcare or currently suffering from abuse in healthcare is also related to prepartum FOC in both nulliparous and parous pregnant women (47).

Comorbidity with other mental health problems

FOC distinguishes itself from anxiety disorders or depression, but also often coexists with those mental problems. Mental health problems, especially depression and anxiety

disorders, are more common in women with severe prepartum FOC (48). Storksen et al. (49) could confirm these results in a sample of 1642 nulliparous and parous pregnant women in Norway. In this study the prevalence of prepartum FOC was higher in women who also had anxiety (OR 2.4) or depression (OR 8.4), although the majority (56%) of women with prepartum FOC had neither anxiety nor depression. In a Swedish study of Zar et al. (27) of 453 nulliparous and parous pregnant women, there was a clear relation between both a severe or a more moderate form of prepartum FOC on the one hand and anxiety disorders on the other. Another Swedish study, comprising 1124 nulliparous and parous pregnant women (50), showed that depression in early pregnancy, severe prepartum FOC and pre-traumatic stress (related to the upcoming birth) in late pregnancy were risk factors for PTSD symptoms one month postpartum.

Interventions and complications

The literature describes an association between prepartum FOC and the course of labour, as well as an association between interventions or complications during labour and postpartum FOC.

Several studies show a relation between prepartum FOC and obstetrical complications like preterm birth, prolonged labour and emergency CS in mixed samples of nulliparous and parous women (27, 30) as well as in a nulliparous sample (26, 29, 51). Some studies in samples with mixed parity (39, 52) did not find this relation, which could be due to smaller samples of around 400 participants compared to 1900 or more participants in the other studies.

Women (nulliparous and parous) with severe prepartum FOC more often receive pharmacological pain relief during childbirth (32, 34, 53). The Swedish study by Alehagen et al. (54) (47 nulliparous women) is the only one studying postpartum FOC in women receiving epidural analgesia (EDA). This study showed higher postpartum FOC in women who had received EDA than in those who had not. As this is a small study, more research is needed to find out the relation between pain relief during birth and postpartum FOC.

A complicated pregnancy or delivery like preterm birth, severe preeclampsia, HELLP syndrome, postpartum haemorrhage, emergency CS, and neonatal asphyxia are related to severe postpartum FOC and depression and an increased risk for post-traumatic stress symptoms or PTSD, especially when also prepartum FOC or depression is present (50, 55-57). PTSD, in his turn, is associated with severe prepartum FOC in a subsequent pregnancy. Sometimes such women postpone or even avoid another pregnancy (58).

Maternal request for CS

In the Netherlands, the exact proportion of CS on maternal request is unknown, but approximately 6% of all births are elective CS's, regardless of personal preference (59). A well-considered indication for a CS is important because CS is associated with an increased risk of medical complications and foetal and maternal morbidity and mortality in future pregnancies (60-62).

Prepartum FOC is one of the reasons for CS on mother's request (63, 64). Various studies examined the relation between prepartum FOC and preference for CS (33, 53, 65) and between prepartum FOC and actual mode of birth (53, 66, 67). In Sweden, about 7% of women had a preference for CS at 30 week's gestation, and in both nulliparous and parous women this was related to severe prepartum FOC (33). Haines et al. (53) investigated a combined Swedish and Australian cohort of nulli- and parous pregnant women and compared three groups: a 'fearful' group (n=159), a 'take it as it comes' group (n=130) and a 'self-determiners' group (n=192). The fearful group was more likely to prefer and actually have a CS than the other two groups.

In a European six-country cohort study (65), 2.1–4.3% of the nulliparous women and 6.9–11.9% of the parous women preferred a CS at a mean gestational age of 24 weeks, and the request was related to severe prepartum FOC. In this study, more than 70% of the women with a preference for a CS finally had one. Most CS's, based on "maternal request or psychosocial reasons", also had a concomitant medical indication, i.e. women preferring a CS may have been aware of their medical risk. Thus, according to the researchers, a woman's subjective preference may have been based mainly on her knowledge that a vaginal birth might turn out to be difficult. The researchers also suggest that, on the other hand, obstetricians might have been more willing to find a medical indication to underpin the decision for CS in women with high prepartum FOC and a CS request.

Similarly, the combination of prepartum FOC and being abused in childhood could be a reason for a request for CS. Among abused women (both nulliparous and parous women), a CS on maternal request is more prevalent than among non-abused women (68, 69).

In a Hungarian study by Dweik et al. (70), approximately 12% of 413 nulliparous and parous pregnant women preferred a CS. In nulliparous women, preference for mode of birth and prepartum FOC were not related to CS as actual mode of birth, but in parous women both factors were associated with an actual CS. Dweik et al. (71) also showed that obstetricians have the idea that 30-40 % of women prefer a CS if they could choose. They conclude that against the background of high CS rates in Hungary, non-medical factors, as much related to the obstetricians as to pregnant women's attitudes, play an important role in the decision of actual mode of birth.

To summarise, severe prepartum FOC is related to both a preference for CS and actually having a CS. However, several studies have shown that indications for the actual CS are often medical, or a combination of psychosocial and medical indications (66, 71).
The decision of an actual CS might therefore be related to a combined effect of the pregnant woman's prepartum FOC, her knowledge of her specific medical risk, and the attitude of the medical caregiver.

Congruence of preferred and actual birth situation
How important is congruence of preferred and actual mode of birth for women? A fulfilled request for mode of birth does not guarantee a positive birth experience, as Karlstrom et al. (72) showed. Garthus et al. (56), on the other hand, found that pregnant nulliparous and parous women preferring CS and actual giving birth vaginally, have higher risk for post-traumatic stress symptoms than women who prefer and actually give birth vaginally. Could prepartum FOC play a crucial role for both preference and actual mode of birth and how is postpartum FOC related to congruence between preferred and actual mode of birth? Till now there is only scanty research about the association between prepartum FOC and the preferred and the actual mode of birth.

Treatment options
Counselling or psycho-education by specialized midwives was helpful for pregnant women with moderate prepartum FOC (73), but negative for women with severe or phobic prepartum FOC (74). Rouhe et al. (75) showed in a randomised intervention trial that nulliparous pregnant women with severe prepartum FOC, who participated in a targeted psycho-educative group, had a less fearful childbirth experience and fewer postpartum depressive symptoms than those women who had care as usual, whereas no difference between the two groups was found in the frequency of postpartum post-traumatic stress symptoms.

Women with severe and phobic prepartum FOC should be helped according to best practice for the treatment of phobia, i.e. Cognitive Behaviour Therapy (CBT). Wijma developed a CBT treatment program comprising eight modules (15) which has been evaluated in a vis à vis treatment and as Internet Therapy. Nieminen et al. performed a feasibility study (76) and a qualitative interview study (77) of the effect of this treatment program by means of Internet Cognitive Behavioural Therapy (ICBT). Results were promising, ICBT seems to be feasible for nulliparous women with severe prepartum FOC; it tended to influence self-confidence, gives more realistic expectations towards delivery, partner, child and the staff caring for them. However, the sample (n=23) was small and the study had no comparison group. In a randomized controlled trial, Nieminen et al. compared ICBT for treatment of childbirth related post-traumatic stress symptoms with a waiting list group (78). Such a

study is relevant, because without treatment those women most probably will suffer from severe FOC during a following pregnancy. Fifty-seven severely traumatized women were randomized to either ICBT or a control group. For most women the traumatic delivery had occurred ≥1 year earlier. The RCT showed a decrease of postpartum post-traumatic stress symptoms as well as positive effects on symptoms of depression and quality of life. However, the difference in effect sizes between the treatment and control group were smaller than expected, probable since the sample was small (28 participants in each group) and the control conditions were not totally neutral. The researchers advise an RCT with more participants and a longer follow up period.

Haptotherapy involves both the pregnant woman and her partner and focuses on mental as well as physical preparation for giving birth by relaxation exercises and focus on awareness of the body, which stimulates the woman's confidence in her ability to give birth to the baby vaginally. In a Dutch RCT of 134 nulliparous and parous pregnant women with severe prepartum FOC, Klabbers et al. (79) compared haptotherapy for severe prepartum FOC with care as usual and with psycho-education via the Internet. During pregnancy, prenatal distress symptoms and prenatal depressive symptoms were lower in the haptotherapy group after treatment, and participants in the haptotherapy group also had less postpartum FOC and fewer postpartum PTSD symptoms than women in the two comparison groups.

Eye-movement desensitization and reprocessing (EMDR) for the treatment of childbirth-related PTSD has been described in one pilot study (80) as well as in one case study (81). The EMDR method consists of a structured treatment concept for traumatic experiences. A randomised controlled study with the aim to determine whether EMDR therapy is a safe and effective treatment for pregnant women with childbirth-related PTSD or with severe FOC is on-going (82).

The use of debriefing interventions postpartum in women with a potentially traumatic delivery experience was analysed in a Cochrane database review (83). Eight publications were included. It was concluded that there is little or no evidence to support either a positive or an adverse effect of psychological debriefing in order to prevent psychological trauma in birth-giving women. The Cochrane review also suggests that improved emotional care from health professionals may be needed in order to reduce the risk of a traumatic birth in those delivery settings with high rates of obstetric interventions.

To summarize, for moderate prepartum FOC psycho-education in pregnancy or haptotherapy could be sufficiently helpful. For severe-phobic prepartum FOC, CBT is the recommended treatment as it has been proven effective for a long range of anxiety

disorders and phobias, and this seems also to be valid for postpartum PTSD. Until now there is no convincing evidence for the use of EMDR for childbirth-related PTSD, but studies are ongoing.

AIM OF THE THESIS

The aim of this thesis is to contribute to the knowledge of pre- and postpartum FOC by focusing on preferences/decisions that women make regarding place of giving birth, mode of giving birth and the use of pharmacological pain relief. We measured FOC both pre- and postpartum to study if the actual place or mode of giving birth and receiving pain relief were related to postpartum FOC.
The studies for this thesis were embedded in the Dutch obstetric system, where midwives have an independent profession and where home birth is an accepted option for women with a low-risk pregnancy.

We formulated the following research questions:
In three separate Dutch cohorts,

1. What is the prevalence of severe pre- and postpartum FOC in a low-risk sample from 2005 and in a combined low and high-risk sample from 2015/2016?
2. In two low-risk samples (from 2005 and from 2015/2016)
    a. is prepartum FOC associated to preference for home or hospital birth;
    b. is the place of giving birth of mothers/sisters of the pregnant woman related to her own preferred place of giving birth? (in the 2005 study)
    c. is pre- and/or postpartum FOC associated to medical problems or interventions (in the 2005 study) or to being referred from midwife-led care to obstetrician-led care (in the 2015 study);
    d. does incongruence of preferred and actual place of birth relate to postpartum FOC?
3. In a high-risk sample (from 2012)
    a. is prepartum FOC associated to a request for pharmacological pain relief;
    b. do women who receive pain relief have lower FOC postpartum than women who do not;
    c. is there a difference in postpartum FOC between women who receive Remifentanil PCA and women receiving epidural analgesia?
    4. In a combined low- and high-risk sample (from 2015/2016)
    a. what percentage of women prefers a CS as mode of delivery;
    b. is prepartum FOC associated to preferred and/or actual mode of delivery;
    c. does incongruence of preferred and actual mode of delivery relate to postpartum FOC?

GENERAL OUTLINE

This thesis describes data from three different studies.

We performed two prospective cohort studies, with participants completing questionnaires pre- and postpartum:

1. In 2005, in Leiden and surrounding villages, the participants were 108 women with low risk for obstetric complications under care of community midwives (research question 1 (**Chapter 2)** and 2 (**Chapter 3**).
2. In 2015-2016 in the Western South-Holland region, the participants were 561 women (including women with low or high risk of obstetric complications), who had been recruited by community midwives and hospitals (research question 1,2 and 3) (**Chapter 5 and 6**). This study was named Florence study.

We did a sub-analysis of data from a multicentre, randomised, controlled, equivalence trial, the RAVEL study (84).

3. The RAVEL study was performed in 2012 and participants were 911 medium high-risk pregnant women, who had been recruited from 15 hospitals throughout the Netherlands, and who completed questionnaires pre- and postpartum (research question 4) (**Chapter 4**).

Chapter 2 describes the prevalence of severe prepartum FOC in a cohort of Dutch low risk pregnant women. The relation of prepartum FOC with medical interventions like pharmacological pain relief and mode of delivery was studied as well as the relation of those interventions to postpartum FOC.

The same low-risk cohort is studied in **Chapter 3**. Here, we will report on prepartum FOC and its relation with preferred place of delivery. Likewise, we examine the relation of women's preferred place of giving birth in relation to the place where mothers and sisters of the pregnant women gave birth.

Chapter 4 describes the association of prepartum FOC with a request for pharmacological pain relief during childbirth. Additionally, the relation of pain relief with postpartum FOC and the possible difference in postpartum FOC after the use of epidural or Remifentanil PCA was studied.

Chapter 5 reports the results of the study performed in 2015, consisting of low- and high-risk pregnant women. We analysed the relation of FOC pre- and postpartum with preferred and actual mode of birth.

The low-risk cohort of 2015 comprised the participants for the study described in **Chapter 6**. Here we studied the relation of preferred and actual location of giving birth. Another subject of study was the interaction of pre- and postpartum FOC with referral.

Chapter 7 comprises the general discussion and clinical implications of the thesis.

REFERENCES

1. Perined. Perinatal care in the Netherlands 2016 (Perinatale Zorg in Nederland) 2016. Utrecht: Perined; 2018.
2. Zielinski R, Ackerson K, Kane Low L. Planned home birth: benefits, risks, and opportunities. International journal of women's health. 2015;7:361-77.
3. Health care insurance board (Ziekenfondsraad). Obstetric Manual (Verloskundig vademecum indicatielijst). Amstelveen, The Netherlands1999 1999.
4. Geerts CC, Klomp T, Lagro-Janssen ALM, Twisk JWR, van Dillen J, de Jonge A. Birth setting, transfer and maternal sense of control: results from the DELIVER study. BMC Pregnancy and Childbirth. 2014;14.
5. Offerhaus PM, de Jonge A, van der Pal-de Bruin K, Hukkelhoven CWPM, Scheepers PLH, Lagro-Janssen ALM. Change in primary midwife-led care in the Netherlands in 2000-2008: A descriptive study of caesarean sections and other interventions among 789,795 low risk births. Midwifery. 2014;30(5):560-6.
6. Kleiverda G, Steen AM, Andersen I, Treffers PE, Everaerd W. PLACE OF DELIVERY IN THE NETHERLANDS - ACTUAL LOCATION OF CONFINEMENT. European Journal of Obstetrics Gynecology and Reproductive Biology. 1991;39(2):139-46.
7. Christiaens W, Gouwy A, Bracke P. Does a referral from home to hospital affect satisfaction with childbirth? A cross-national comparison. BMC Health Services Research. 2007 jul 12;7:109.
8. Rijnders M, Baston H, Schonbeck Y, van der Pal K, Prins M, Green J, et al. Perinatal factors related to negative or positive recall of birth experience in women 3 years postpartum in the Netherlands. Birth. 2008;35(2):107-16.
9. Wiegers TA, van der Zee J, Keirse M. Transfer from home to hospital: What is its effect on the experience of childbirth? Birth-Issues in Perinatal Care. 1998;25(1):19-24.
10. Geerts CC, van Dillen J, Klomp T, Lagro-Janssen ALM, de Jonge A. Satisfaction with caregivers during labour among low risk women in the Netherlands: the association with planned place of birth and transfer of care during labour. BMC Pregnancy Childbirth. 2017;17(1):229.
11. Barlow DH. Anxiety and its disorders. 2nd edition ed. New York: Guilford Press; 2004.
12. Suddendorf TB, A;Miloyan, B;. Prospection and natural selection. Current Opinion in Behavioral Sciences. 2018;24:26-31.
13. Ouimet AJ, Gawronski B, Dozois DJA. Cognitive vulnerability to anxiety: A review and an integrative model. Clinical Psychology Review. 2009;29(6):459-70.
14. Suarez LM, Bennett SM, Goldstein CR, Barlow DH. Understandign Anxiety Disorders from a "Triple Vulnerability" Framework. In: Antony MM, Stein MB, . editors. Oxford handbook of anxiety and related disorders. Oxford: Oxford University Press; 2008.
15. Wijma K, Wijma B. A woman afraid to deliver: how to manage childbirth anxiety. In: Paarlberg KM, van de Wiel HBM, editors. Bio-psycho-social Obstetrics and Gynecology. Switzerland: Springer international publishing; 2017.
16. Association AP. Diagnostic and statistical manual of mental disorders. 5 ed. Washington DC2013.
17. Zar M. Diagnostic aspects of fear of childbirth. Linköping: Linköping University; 2001.
18. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.

19. Alehagen S, Wijma B, Wijma K. Fear of childbirth before, during, and after childbirth. Acta Obstet Gynecol Scand. 2006;85(1):56-62.
20. Ayers S, Bond R, Bertullies S, Wijma K. The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. Psychological medicine. 2016;46(6):1121-34.
21. Yildiz PD, Ayers S, Phillips L. The prevalence of posttraumatic stress disorder in pregnancy and after birth: A systematic review and meta-analysis. J Affect Disord. 2017;208:634-45.
22. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19(2):84-97.
23. Huizink AC, Delforterie MJ, Scheinin NM, Tolvanen M, Karlsson L, Karlsson H. Adaption of pregnancy anxiety questionnaire-revised for all pregnant women regardless of parity: PRAQ-R2. Archives of Womens Mental Health. 2016;19(1):125-32.
24. Fairbrother N, Thordarson DS, Stoll K. Fine tuning fear of childbirth: the relationship between Childbirth Fear Questionnaire subscales and demographic and reproductive variables. Journal of Reproductive and Infant Psychology. 2018;36(1):15-29.
25. Lukasse M, Schei B, Ryding EL, Bidens Study G. Prevalence and associated factors of fear of childbirth in six European countries. Sexual & Reproductive Healthcare. 2014;5(3):99-106.
26. Ryding EL, Wijma B, Wijma K, Rydhstrom H. Fear of childbirth during pregnancy may increase the risk of emergency cesarean section. Acta Obstet Gynecol Scand. 1998;77(5):542-7.
27. Zar M, Wijma K, Wijma B. Relations between anxiety disorders and fear of childbirth during late pregnancy. Clinical Psychology & Psychotherapy. 2002;9(2):122-30.
28. Spice K, Jones SL, Hadjistavropoulos HD, Kowalyk K, Stewart SH. Prenatal fear of childbirth and anxiety sensitivity. J Psychosom Obstet Gynaecol. 2009;30(3):168-74.
29. Adams SS, Eberhard-Gran M, Eskild A. Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery. BJOG-An International Journal of Obstetrics and Gynaecology. 2012;119(10):1238-46.
30. Nilsson C, Hessman E, Sjoblom H, Dencker A, Jangsten E, Mollberg M, et al. Definitions, measurements and prevalence of fear of childbirth: a systematic review. BMC Pregnancy and Childbirth. 2018;18.
31. Rouhe H, Salmela-Aro K, Toivanen R, Tokola M, Halmesmaki E, Saisto T. Obstetric outcome after intervention for severe fear of childbirth in nulliparous women - randomised trial. BJOG-An International Journal of Obstetrics and Gynaecology. 2013;120(1):75-84.
32. Rouhe H, Salmela-Aro K, Halmesmaki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG. 2009;116(1):67-73.
33. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section--a cross-sectional study at various stages of pregnancy in Sweden. Acta Obstet Gynecol Scand. 2009;88(7):807-13.
34. Logtenberg SLM, Verhoeven CJ, Rengerink KO, Sluijs AM, Freeman LM, Schellevis FG, et al. Pharmacological pain relief and fear of childbirth in low risk women; secondary analysis of the RAVEL study. BMC Pregnancy and Childbirth. 2018;18.
35. Koelewijn JM, Sluijs AM, Vrijkotte TGM. Possible relationship between general and pregnancy-related anxiety during the first half of pregnancy and the birth process: a prospective cohort study. BMJ Open. 2017;7(5).
36. Toohill J, Fenwick J, Gamble J, Creedy DK. Prevalence of childbirth fear in an Australian sample of pregnant women. BMC Pregnancy and Childbirth. 2014;14.

37. Jokic-Begic N, Zigic L, Nakic Rados S. Anxiety and anxiety sensitivity as predictors of fear of childbirth: different patterns for nulliparous and parous women. Journal of psychosomatic obstetrics and gynaecology. 2014;35(1):22-8.
38. Rouhe H, Salmela-Aro K, Halmesmaki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG. 2009;116.
39. Fenwick J, Gamble J, Nathan E, Bayes S, Hauck Y. Pre- and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women. J Clin Nurs. 2009;18(5):667-77.
40. Dencker A, Nilsson C, Begley C, Jangsten E, Mollberg M, Patel H, et al. Causes and outcomes in studies of fear of childbirth: A systematic review. Women Birth. 2018.
41. Salomonsson B, Gullberg MT, Alehagen S, Wijma K. Self-efficacy beliefs and fear of childbirth in nulliparous women. Journal of Psychosomatic Obstetrics & Gynecology. 2013;34(3):116-21.
42. Lowe NK. Maternal confidence for labor: development of the Childbirth Self-Efficacy Inventory. Research in nursing & health. 1993;16(2):141-9.
43. Schwartz L, Toohill J, Creedy DK, Baird K, Gamble J, Fenwick J. Factors associated with childbirth self-efficacy in Australian childbearing women. Bmc Pregnancy and Childbirth. 2015;15.
44. Ryding EL, Wirfelt E, Wangborg IB, Sjogren B, Edman G. Personality and fear of childbirth. Acta Obstet Gynecol Scand. 2007;86(7):814-20.
45. Lukasse M, Vangen S, Oian P, Kumle M, Ryding EL, Schei B, et al. Childhood Abuse and Fear of Childbirth-A Population-based Study. Birth-Issues in Perinatal Care. 2010;37(4):267-74.
46. Schroll AM, Tabor A, Kjaergaard H. Physical and sexual lifetime violence: Prevalence and influence on fear of childbirth before, during and after delivery. Journal of Psychosomatic Obstetrics & Gynecology. 2011;32(1):19-26.
47. Lukasse M, Schroll AM, Karro H, Schei B, Steingrims-Dottir T, Van Parys AS, et al. Prevalence of experienced abuse in healthcare and associated obstetric characteristics in six European countries. Acta Obstetricia Et Gynecologica Scandinavica. 2015;94(5):508-17.
48. Rouhe H, Salmela-Aro K, Gissler M, Halmesmaki E, Saisto T. Mental health problems common in women with fear of childbirth. BJOG-An International Journal of Obstetrics and Gynaecology. 2011;118(9):1104-11.
49. Storksen HT, Eberhard-Gran M, Garthaus-Niegel S, Eskild A. Fear of childbirth; the relation to anxiety and depression. Acta Obstet et Gynecol Scand. 2012;91.
50. Soderquist J, Wijma B, Thorbert G, Wijma K. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. BJOG. 2009;116(5):672-80.
51. Laursen M, Johansen C, Hedegaard M. Fear of childbirth and risk for birth complications in nulliparous women in the Danish National Birth Cohort. BJOG. 2009;116(10):1350-5.
52. Johnson R, Slade P. Does fear of childbirth during pregnancy predict emergency caesarean section? BJOG. 2002;109(11):1213-21.
53. Haines HM, Rubertsson C, Pallant JF, Hildingsson I. The influence of women's fear, attitudes and beliefs of childbirth on mode and experience of birth. BMC Pregnancy Childbirth. 2012;12:55.
54. Alehagen S, Wijma B, Wijma K. Fear of childbirth before, during, and after childbirth. Acta Obstetricia et Gynecologica Scandinavica. 2006;85(1):56-62.
55. Stramrood CA, Wessel I, Doornbos B, Aarnoudse JG, van den Berg PP, Schultz WC, et al. Posttraumatic stress disorder following preeclampsia and PPROM: a prospective study with 15 months follow-up. Reproductive sciences (Thousand Oaks, Calif). 2011;18(7):645-53.

56. Garthus-Niegel S, von Soest T, Knoph C, Simonsen TB, Torgersen L, Eberhard-Gran M. The influence of women's preferences and actual mode of delivery on post-traumatic stress symptoms following childbirth: a population-based, longitudinal study. BMC Pregnancy and Childbirth. 2014;14.
57. Dikmen-Yildiz P, Ayers S, Phillips L. Longitudinal trajectories of post-traumatic stress disorder (PTSD) after birth and associated risk factors. Journal of Affective Disorders. 2018;229:377-85.
58. Gottvall K, Waldenstrom U. Does a traumatic birth experience have an impact on future reproduction? BJOG. 2002;109(3):254-60.
59. Nederland. Spr. Perinatale zorg in Nederland 2007 (Perinatal care in the Netherlands 2007). Utrecht: The Netherlands Perinatal Registry (Stichting perinatale registratie Nederland); 2011.
60. Schuitemaker N, vanRoosmalen J, Dekker G, vanDongen P, vanGeijn H, Gravenhorst B. Maternal mortality after cesarean section in The Netherlands. Acta Obstetricia et Gynecologica Scandinavica. 1997;76(4):332-4.
61. Souza JP, Gulmezoglu AM, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, et al. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. BMC Medicine. 2010;8.
62. Kamilya G, Seal SL, Mukherji J, Bhattacharyya SK, Hazra A. Maternal mortality and cesarean delivery: An analytical observational study. Journal of Obstetrics and Gynaecology Research. 2010;36(2):248-53.
63. Melender HL. Fears and coping strategies associated with pregnancy and childbirth in Finland. J Midwifery Womens Health. 2002;47(4):256-63.
64. Graham WJ, Hundley V, McCheyne AL, Hall MH, Gurney E, Milne J. An investigation of women's involvement in the decision to deliver by caesarean section. British Journal of Obstetrics and Gynaecology. 1999;106(3):213-20.
65. Ryding EL, Lukasse M, Kristjansdottir H, Steingrimsdottir T, Schei B. Pregnant women's preference for cesarean section and subsequent mode of birth - a six-country cohort study. Journal of Psychosomatic Obstetrics & Gynecology. 2016;37(3):75-83.
66. Ryding EL, Lukasse M, Van Parys AS, Wangel AM, Karro H, Kristjansdottir H, et al. Fear of Childbirth and Risk of Cesarean Delivery: A Cohort Study in Six European Countries. Birth-Issues in Perinatal Care. 2015;42(1):48-55.
67. Karlstrom A, Nystedt A, Johansson M, Hildingsson I. Behind the myth - few women prefer caesarean section in the absence of medical or obstetrical factors. Midwifery. 2011;27(5):620-7.
68. Lukasse M, Vangen S, Oian P, Schei B. Fear of childbirth, women's preference for cesarean section and childhood abuse: a longitudinal study. Acta Obstetricia et Gynecologica Scandinavica. 2011;90(1):33-40.
69. Schei B, Lukasse M, Ryding EL, Campbell J, Karro H, Kristjansdottir H, et al. A History of Abuse and Operative Delivery - Results from a European Multi-Country Cohort Study. Plos One. 2014;9(1).
70. Dweik D, Girasek E, Toreki A, Meszaros G, Pal A. Women's antenatal preferences for delivery route in a setting with high cesarean section rates and a medically dominated maternity system. Acta Obstetricia et Gynecologica Scandinavica. 2014;93(4):408-15.
71. Dweik D, Girasek E, Meszaros G, Toreki A, Kereszturi A, Pal A. Non-medical determinants of cesarean section in a medically dominated maternity system. Acta Obstet Gynecol Scand. 2014;93(10):1025-33.

72. Karlstrom A, Nystedt A, Hildingsson I. A comparative study of the experience of childbirth between women who preferred and had a caesarean section and women who preferred and had a vaginal birth. Sexual & Reproductive Healthcare. 2011;2(3):93-9.
73. Toohill J, Fenwick J, Gamble J, Creedy DK, Buist A, Turkstra E, et al. A Randomized Controlled Trial of a Psycho-Education Intervention by Midwives in Reducing Childbirth Fear in Pregnant Women. Birth-Issues in Perinatal Care. 2014;41(4):384-94.
74. Ryding EL, Persson A, Onell C, Kvist L. An evaluation of midwives' counseling of pregnant women in fear of childbirth. Acta Obstetricia Et Gynecologica Scandinavica. 2003;82(1):10-7.
75. Rouhe H, Salmela-Aro K, Toivanen R, Tokola M, Halmesmaki E, Ryding EL, et al. Group psychoeducation with relaxation for severe fear of childbirth improves maternal adjustment and childbirth experience- a randomised controlled trial. Journal of Psychosomatic Obstetrics & Gynecology; 1/2/2015: Taylor & Francis; 2015. p. 1-9.
76. Nieminen K, Andersson G, Wijma B, Ryding EL, Wijma K. Treatment of nulliparous women with severe fear of childbirth via the Internet: a feasibility study. Journal of psychosomatic obstetrics and gynaecology. 2016;37(2):37-43.
77. Nieminen K, Malmquist A, Wijma B, Ryding EL, Andersson G, Wijma K. Nulliparous pregnant women's narratives of imminent childbirth before and after internet-based cognitive behavioural therapy for severe fear of childbirth: a qualitative study. BJOG : an international journal of obstetrics and gynaecology. 2015;122(9):1259-65.
78. Nieminen K, Berg I, Frankenstein K, Viita L, Larsson K, Persson U, et al. Internet-provided cognitive behaviour therapy of posttraumatic stress symptoms following childbirth-a randomized controlled trial. Cognitive behaviour therapy. 2016;45(4):287-306.
79. Klabbers GA, Wijma K, Paarlberg KM, Emons WHM, Vingerhoets A. Haptotherapy as a new intervention for treating fear of childbirth: a randomized controlled trial. Journal of psychosomatic obstetrics and gynaecology. 2017:1-10.
80. Sandstrom M, Wiberg B, Willman AK, Wikman M, Hogberg U. A pilot study of eye movement desensitisation and reprocessing treatment (EMDR) for post-traumatic stress after childbirth. Midwifery. 2008;24(1):62-73.
81. Forgash C, Leeds A, Stramrood CAI, Robbins A. Case Consultation: Traumatized Pregnant Woman. Journal of Emdr Practice and Research. 2013;7(1):45-9.
82. Baas MA, Stramrood CA, Dijksman LM, de Jongh A, van Pampus MG. The OptiMUM-study: EMDR therapy in pregnant women with posttraumatic stress disorder after previous childbirth and pregnant women with fear of childbirth: design of a multicentre randomized controlled trial. European journal of psychotraumatology. 2017;8(1):1293315.
83. Bastos MH, Furuta M, Small R, McKenzie-McHarg K, Bick D. Debriefing interventions for the prevention of psychological trauma in women following childbirth. The Cochrane database of systematic reviews. 2015(4):Cd007194.
84. Freeman LM, Bloemenkamp KW, Franssen MT, Papatsonis DN, Hajenius PJ, Hollmann MW, et al. Patient controlled analgesia with remifentanil versus epidural analgesia in labour: randomised multicentre equivalence trial. BMJ-British Medical Journal. 2015;350.

2

No relationship between fear of childbirth and pregnancy-/delivery-outcome in a low-risk Dutch pregnancy cohort delivering at home or in hospital

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ABSTRACT

Objective: To examine the relationship of fear of childbirth (FOC), general anxiety and depression during pregnancy and postpartum with birth complications.

Methods: For this prospective cohort study 105 healthy women with low-risk pregnancies (until at least 30 weeks gestation) completed the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) and the Hospital Anxiety and Depression Scale (HADS) at 30 weeks gestation and six weeks postpartum. These results were related with delivery characteristics.

Results: FOC during pregnancy was not related to complications during labour and delivery. In a regression analysis, both multiparity and medical interventions were predictors for higher postpartum FOC. A positive correlation was found between FOC during pregnancy and FOC at six weeks postpartum, corrected for complications during childbirth ($r=0.45$, $p<0.001$).

Conclusions: The birth giving process was not related to FOC during pregnancy, but the pre-partum level of FOC certainly is predictive of the level of postpartum FOC, suggesting that FOC as measured during gestation may influence the interpretation of the birth experience itself. We did find a positive relationship between both parity and medical interventions during childbirth and FOC postpartum.

INTRODUCTION

Women with high fear of childbirth (FOC) during pregnancy run several risks. They are inclined to have a negative experience of their delivery, independent from obstetric complications, but they have also more often birth related complications and a higher risk for e.g. postpartum FOC or even PTSD and depression.(1-3) Therefore, FOC and its risks have been studied extensively. These studies show that many pregnant women experience some degree of FOC. Around 25% of all pregnant women report FOC to such an extent that it is influencing them and 6–10% of pregnant women report severe fear of childbirth (SFOC), interfering significantly with their daily routines, professional life, social activities or relationships(4-8).

Quite a few studies show that women with elevated levels of FOC during pregnancy also have more fear during and after delivery (9, 10). These studies have suggested a vicious cycle phenomenon, i.e. women experience during labour what they already feared, which in turn influences their postpartum FOC. In this manner, FOC not only influences the experience of childbirth but also the first period of interaction with the baby(11, 12). Furthermore, women with FOC are at higher risk of experiencing a disturbed emotional balance and even depression in the first months after delivery(13, 14).

Several studies, however with some exceptions (15, 16), found a relationship between FOC and complications during pregnancy and delivery, like high FOC related to prolonged labour or emergency Caesarean section (CS) (17, 18).

The relationship between mode and progress of delivery with FOC postpartum is more evident. Studies show that high FOC postpartum is more common in women who had an instrumental vaginal delivery, emergency CS or fetal compromise during delivery(8, 12-16). Such deliveries can lead to trauma anxiety as seen in Post Traumatic Stress Disorder (PTSD) and to FOC in subsequent pregnancies(1-3, 13-15).

Several of these studies have had miscellaneous samples, where those with risk for pregnancy and delivery complications not were separated from those without(8, 10, 19, 20). This means that at least a part of the included women in these studies had a high risk pregnancy, i.e. that their FOC might have been connected to real threats to the child or the women themselves. Thus, previous studies cannot tell how much FOC in principal emerged from the individual women's psychological framework and how much FOC was related to possible pregnancy and delivery complications.

Moreover, it might be assumed that, besides psychological individual characteristics, the environment where pregnancy care takes place (midwifery practice or hospital) and the variation in medical background of the caregiver (midwife or gynaecologist) could be related to the level of FOC(16).

In Dutch obstetrical care, women are classified by the midwife as having a low risk pregnancy, and can start pregnancy care in an independent midwifery practice. These low-risk pregnant women are free to choose the place of giving birth, at home or in

the hospital. This situation facilitated us to study a pure low-risk sample and follow the course of FOC from before to after delivery, being able to study the relation of FOC with labour and delivery related problems when the starting-point is the expectancy of a pure uncomplicated delivery.
Many studies have identified general anxiety and depression as valuable factors to identify women's psychological condition during pregnancy and postpartum. The importance of the differences between FOC and these psychological domains is demonstrated in various studies(9, 21, 22). To be sure that FOC was an authentic variable not mixed up with these other psychological variables, we also measured general anxiety and depression separately.

Thus, we had the following aims for the study:
1. To analyse the relationship between FOC during pregnancy and problems during labour;
2. To examine the relationship between problems during labour with postpartum FOC;
3. To study the relationship between FOC during pregnancy and postpartum.

To assure FOC principally emerging from the individual women's psychological framework, we would only include women with pure low-risk pregnancies. To be able to identify the meaning of FOC as such, we also would measure general anxiety and depression.

MATERIALS AND METHODS

Subjects
The study had a prospective cohort design. Participants completed questionnaires in gestation week 30 (T1) and six weeks postpartum (T2).
All participants were fluent in Dutch. Eligible participants were nulliparous and parous women in gestation week 30, who had been classified as low risk by their midwife. Apart from experiencing good general health, participants had uncomplicated family, medical, and obstetric histories according to the Obstetric Manual(23).
The study was coordinated by the first author (AS) at the Department of Obstetrics and Gynaecology, Leiden Academic Medical Centre. Five midwifery practices in the vicinity of Leiden participated, two located in cities, the other three were more or less rural. Via meetings and a written instruction, midwives were informed how to invite pregnant women to join the study and how to respond to possible questions from potential participants.
From November 2005 until March 2006, all women matching inclusion criteria were invited by their midwife. Potential participants received an information letter, consent form and the questionnaires. The midwives explained the general outlines of the study, asked

women to read the information at home and then decide whether or not to participate. The research coordinator contacted the midwives weekly. Delivery characteristics were collected by care giving midwives and sent to the research coordinator.
Six weeks postpartum (T2), questionnaires were sent out to the women who had participated at T1.

A total of 54% (n=194) of those who matched the inclusion criteria (n=358) were asked by the midwives to participate. The major reason given by the midwives for not passing the invitation on to all potential participants was that they had simply forgotten. The women who were asked but declined participation were registered as decliners (5%, n=10). Reasons for declining were: too busy, not interested, participating in another study or problems with partner. Fifty-six percent (n=108 of 194) returned their questionnaires and consent form, some of them after two reminders. Three women were excluded *post hoc* because they didn't match the inclusion criteria. Six women did not receive the questionnaires at T2 because they had moved. At T2 the response rate was 87 % (n=89 of 108) of those who responded at T1.
Representativeness of the sample was checked at one practice by comparing the participating women of one practice with characteristics of the total patient stock of that practice in 2003. The mean age and ethnicity of the study group was the same as in the total patient stock in 2003. However, the study group included a higher proportion of nulliparous women, more referrals to a gynaecologist and more hospital deliveries.

Measures

Demographic data

The questionnaire comprised questions on general characteristics like level of education, marital status, preferred place of delivery and reasons for that preference and, at T2, some open questions about participants' evaluation of the delivery.

Wijma Delivery Expectancy/Experience Questionnaire

FOC was operationalised by the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ, version A during pregnancy and B postpartum). The W-DEQ is a well validated 33-item questionnaire, designed to measure FOC as operationalised by the cognitive appraisal of the delivery. This self-assessment rating scale has six scale steps per item, ranging from 'not at all' to 'extremely', minimum score 0 and a maximum score 165. Previously the internal reliability according to Crohnbach's alpha was 0.93, and the split-half reliability for both versions >0.90 (21).

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) is a 14-item self-report screening scale, originally developed to indicate anxiety and depressive states in medical out-patient clinic (24),(25). It contains two 7-item scales, one for anxiety and one for depression, both with a score range 0-21.

Obstetrical data

After delivery, the following obstetrical data were collected: gravidity, parity, gestational age at the time of delivery, place of delivery, referral to a gynaecologist and reason why, duration of first phase of delivery, duration of second phase of delivery, induction of labour, augmentation of labour, use of pain relief (pethidine or epidural), mode of delivery (spontaneous vaginal, vacuum extraction or Caesarean section), baby's gender, birth weight, Apgar Score (5 minutes after birth) and referral to the neonatology unit.

Statistics

Prior to analysis, the W-DEQ and HADS scores at T1 and T2 were examined for missing values, outliers and deviation from normal distribution. For the W-DEQ, to have a valid sum score, we allowed a maximum of two missing items. A missing item was assigned the mean score of all other items of that specific participant's scale.

Obstetrical variables were summarised in a limited number of underlying dimensions, by an exploratory principal component analysis (PCA), resulting in three factors, which had eigenvalues >1, together accounting for a cumulative variance of 50.9 per cent. Factor 1 included the variables duration of first stage, augmentation of labour, use of pain relief, referral to a gynaecologist and place of delivery. This factor was interpreted as representing "Medical Intervention", offering its heading. Factor 2 included the variables gravidity, parity and duration of second stage. These variables are predominantly related to "Parity", and the factor was named as such. Factor 3 included the variables weeks of gestation at time of delivery, birth weight and admission to the neonatology unit. These variables can be seen as related to "Prematurity", which was named as the third component.

The factors were constructed by first computing each variable's standardized (z-) value, on the basis of Blom's formula. Reliability for each factor was then evaluated. Cronbach's alpha for the three factors were 0.85 (Medical Intervention), 0.84 (Parity) and 0.67 (Prematurity). Deemed sufficiently reliable, the three factors were constructed, using the un-weighted sum of the standardized variables. As expected, the factor Parity was negatively related to Medical Interventions ($r = -0.41$, $p<0.001$). Other inter-factor correlations were not significant.

Post hoc power analyses with G*Power 3 (26) revealed that the power of the multiple regression analyses in our studies was reasonable, with N=105 at T1 sufficient to detect a medium to small effect (f^2 = .16) on T1, and to detect a medium-large effect (f^2 = .20) for analyses involving T2 (N=82). In view of the assumed population size (the estimated low-risk population within the area studied) the sample size was low, but deemed acceptable.

RESULTS

Description of the study sample

Mean age of the participants in this study was 32.1 years (SD = 4.0). This is slightly higher than the general Dutch female population giving birth (M= 31.1(27)) Nearly all participants were married or cohabited. The mean level of education was around higher education/bachelor level. Five percent of the sample was not originally Dutch compared to 18 percent of the general Dutch population giving birth(27). Delivery characteristics are shown in Table I. In our study, in the period from 30 weeks gestation to delivery, 37.5 % participants were referred to a gynaecologist. In the Netherlands in 2005, 34% of the pregnant women who started their pregnancy care with a midwife were referred to a gynaecologist during gestation and another 15% were referred during labour(28). In the nulliparous group 37.5 % gave birth at home and 62.5% in the hospital (either by being referred after 30 weeks gestation or by own choice). In the parous group these numbers were 70.7% and 29.3% respectively.

General trends of fear of childbirth (W-DEQ)

The data showed neither extreme outliers nor extreme skewness or kurtosis.

W-DEQ scores were not correlated with educational level. W-DEQ scores at T1 for nulliparous women were significantly higher than for parous women (65.8 vs. 57.6, p=0.05), see Table II. W-DEQ scores during pregnancy correlated significantly with W-DEQ scores 6 weeks postpartum (n=83, r= 0.40, p<0.001). Overall, fear levels in women decreased in the postpartum period with an average of 8.8 points on the W-DEQ (n=82, paired t =3.17, 95% CI 3.16-13.81, p<0.01).

Table I: Numbers and percentages of delivery characteristics.

Delivery characteristics		Numbers/mean	Percentages/ min-max
Place of delivery	Home	54	51.9
	Hospital	50	48.1
Parity	Nulliparous	61	58.7
	Parous	43	41.3
Referral to gynaecologist	No	65	62.5
	Yes	39	37.5
Induction of labour	No	95	91.3
	Yes	9	8.7
Pain relief	No	86	82.7
	Pethidine	11	10.6
	Epidural	7	6.7
Syntocinon stimulation	No	84	80.8
	Yes	20	19.2
Mode of delivery	Spontaneous vaginal	91	87.5
	Vacuum	9	8.7
	CS	4	3.8
Sex of the baby	Female	45	43.7
	Male	58	56.3
Apgar score 5 min.	7	1	1
	8	1	1
	9	17	16.3
	10	85	81.7
Admission of baby to	No	98	95.1
Neonatology	Yes	5	4.9
Duration of first phase,	Nulliparous	10 hours	
Mean	Parous	5 hours	
Duration of second phase	Nulliparous	53 min.	
Mean	Parous	13 min.	
Birthweight, mean		3585 gr.	2070gr.- 4960 gr.

Table II. Mean scores of W-DEQ and HADS for nulli- and multiparous women at T1 (30 weeks gestation) and T2 (6 weeks after delivery).

Parity		WDEQ T1	WDEQ T2	HADS Anxiety T1	HADS Anxiety T2	HADS Depression T1	HADS Depression T2
Nullipara	Mean	65.82	54.52	4.95	5.04	3.56	3.30
	Std. Deviation	13.93	22.74	3.11	3.20	2.25	2.67
	N	61	46	61	46	61	46
Multipara	Mean	57.56	52.31	5.95	6.30	5.02	4.78
	Std. Deviation	21.98	28.08	3.13	3.16	2.52	2.69
	N	43	36	43	37	43	37
Total	Mean	62.40	53.55	5.37	5.60	4.16	3.96
	Std. Deviation	18.08	25.09	3.14	3.23	2.47	2.76
	N	104	82	104	83	104	83

Depression and general anxiety (HADS)

The HADS data were first examined for anomalies. There was one outlier for the anxiety score at T2; her data were deleted from further analysis. The variables showed neither extreme skewness nor kurtosis.

We compared the mean HADS score of our sample with a Dutch sample of low risk non-pregnant women, aged between 25 and 39 years, selected from General Practices in the vicinity of Leiden(29). The mean HADS score of our sample was similar to the Dutch population mean score (unpaired t-test; t=1.75, CI 95%= -0.07-1.27, p=0.08).

Parous participants, compared to nulliparous, showed significantly higher depression scores during pregnancy (Unpaired t-test t=3.0, 95%CI= 2.7 - 0.6, p<0.001) as well as 6 weeks postpartum (Unpaired t-test t=2.43, 95%CI= 2.5 - 0.3, p=0.02).

To examine a possible shared variance between W-DEQ and HADS scores, we performed multiple correlation tests for the whole group of nulliparous and parous women. After Bonferroni correction, to reduce the α-error, we used a significance level of p<0.01. During pregnancy, the W-DEQ and HADS anxiety scores correlated low but significantly (r=0.26, p< 0.01) but the W-DEQ and the HADS depression scores did not (r=0.15, p=0.12). At 6 weeks postpartum, W-DEQ and HADS scores did not correlate (anxiety r=0.15, p=0.17, depression r=0.26, p=0.02), indicating no shared variance (R^2) between both measures. This confirms that W-DEQ and HADS address different contents; the W-DEQ specifically measures FOC while the HADS measures general anxiety and depression.

Research question 1. To determine which of the delivery related factors were associated with W-DEQ and HADS scores during pregnancy, backward regression analyses were performed on W-DEQ scores and HADS anxiety/depression scores at 30 weeks gestation (T1). The delivery characteristics Parity, Medical Intervention and Prematurity were entered as independent variables. The significant models that were found with the beta values are shown in Table III.

Results show that W-DEQ, HADS anxiety and HADS depression scores at T1 have neither a relationship with Medical Intervention, nor with Prematurity. Of the three independent variables entered, only Parity has a significant but modest contribution: multiparity predicted lower W-DEQ scores and higher HADS depression scores. The explained variance of W-DEQ and HADS scores by the total model using Parity as the only significant delivery characteristic was low (adjusted R2 <0.10). This means that in general there was no positive relationship between the three variables FOC, general anxiety and depression during pregnancy on the one hand, and problems during labour and delivery on the other hand.

Table III: Beta weights and significance levels in backward regression analyses on W-DEQ and HADS scores at 30 weeks gestation (T1) with the delivery characteristics Parity, Medical Intervention and Prematurity (N=78).

	Medical Intervention	Parity	Prematurity	Model	Adjusted R^2
W-DEQ T1	-	β= -0.24 (p= 0.02)	-	$F_{(1,77)}$= 6.26 (p< 0.01)	0.06
Anxiety T1	-	-	-	-	-
Depression T1	-	β= 0.31 (p=0.01)	-	$F_{(1.77)}$=8.2 (p=0.01)	0.09

Research question 2. In order to determine which delivery related variables (predictors) were related to W-DEQ and HADS scores after delivery (criterion variables), backward regression analyses were performed for W-DEQ scores 6 weeks postpartum, for W-DEQ change scores and for HADS anxiety and depression subscales separately. The W-DEQ change score was computed using a formula including the raw regression weight (b) of T2 on T1 ($WDEQ_{change}$ = $WDEQ_{T2}$ - 0.55 * $WDEQ_{T1}$). Rather than using raw difference scores to measure change, which is statistically less desirable(30), the difference score between the observed and the predicted score at six weeks postpartum was used. This results in a better view on how the individual development of FOC differs from the general development in the sample. The same delivery characteristics Parity, Medical Intervention and Prematurity were entered in the model. The significant models that were found with the beta values are shown in Table IV. The results show that for the HADS, of the

three independent variabless entered, only Parity contributed significantly, however only modestly. Thus, multiparity predicted higher postpartum HADS depression and anxiety scores. No relation was found for Medical Intervention and Prematurity with HADS scores. The percentage of explained variance of HADS scores was low (<10%). The regression analysis on the T2 W-DEQ scores and W-DEQ-change showed that Multiparity and Medical Intervention around childbirth independently predicted a higher level of postpartum FOC and higher W-DEQ-change scores. Prematurity had no relationship with either the postpartum FOC score nor with W-DEQ-change.

This means that parous women with problems during labour, except for prematurity, show higher postpartum levels of FOC. No relation was found for birth related problems during labour with depression and general anxiety postpartum.

Table IV: Beta weights and significance levels in backward regression analyses onW-DEQ and HADS scores at six weeks postpartum (T2) with the delivery characteristics Parity, Medical Intervention and Prematurity (N=78).

	Medical Intervention	Parity	Prematurity	Model	Adjusted R^2
W-DEQ T2	β = 0.48 (p<0.001)	β = 0.26 (p= 0.03)	-	$F_{(2.76)}$ = 8. 4 (p<0.001)	0.16
W-DEQ change	β = 0.51 (p<0.001)	β = 0.41 (p<0.001)	-	$F_{(2.76)}$= 11.2 (p<0.001)	0.23
Anxiety T2	-	β= 0.24 (p=0.03)	-	$F_{(1.77)}$=4.8 (p= 0.03)	0.05
Depression T2	-	β= 0.28 (p= 0.01)	-	$F_{(1.77)}$=6.5 (p= 0.01)	0.07

Research question 3. Our third research question concerned the presence of a direct relationship between pre- and postpartum FOC, corrected for the level of problems experienced around childbirth.

To examine this, we corrected the T2 score on the W-DEQ by computing the z-residual score on the W-DEQ at T2 in a multiple regression analysis, after that the three delivery components (Parity, Medical Intervention and Prematurity) were entered as independent variables (using the enter method). These together explained 16 per cent of the variance on T2. The resulting residual still correlated significantly with the W-DEQ score on T1 (r=0.45, p<0.001). This means that there was a positive relationship between levels of FOC during pregnancy and postpartum, irrespective of problems during labour.

DISCUSSION

In this explicitly medically low-risk sample, we investigated variables related to the psychological well-being of pregnant women. As expected and in accordance with previous studies (9, 15, 16, 20), at 30 weeks gestation, FOC was higher in nulliparous than in parous. One explanation could be that nulliparous do not really know what to expect and thus, in general, have more anticipatory FOC than parous women.
No relationship was found between FOC, general anxiety and depression during pregnancy, and problems during labour and delivery. Unlike other studies in undifferentiated samples (15, 18, 19, 31), we did not find any significant relationship between FOC at 30 weeks gestation with complications during delivery; neither with the number of Caesarean sections, nor with a longer duration of the first phase of the delivery. One possible explanation is that in an explicitly medically low-risk sample, the rate of expected complications is relatively low. Indeed, in our sample, the Caesarean section rate was only 3.8%. Since the variance of FOC is low, the power of finding a significant relationship with complications is low. Likewise, we did not find any relationship between general anxiety and depression, and delivery characteristics.

We found a positive association between problems during delivery and postpartum FOC, but not for general anxiety or depression postpartum. The results from our study show that low risk parous women, when referred to a gynaecologist and having had one or more interventions at delivery (such as pain relief, augmentation of labour or assisted delivery) report higher postpartum FOC than during pregnancy. An interesting pattern emerges when looking at the W-DEQ change from pre- to postpartum. Whereas parous women are relatively less anxious during pregnancy than nulliparous, the pattern reverses when a (unexpected) medical complication occurs during delivery. This is most strongly visible when examining the change in FOC (Table IV). The women in our study with highest postpartum FOC and highest increase of FOC from pre- to postpartum had respectively a shoulder dystocia of the fourth child and an emergency Caesarean section due to foetal distress during the induction of labour. The woman with the shoulder dystocia during delivery described the worst experience of her delivery as follows: “The panic in the room during the moment of shoulder dystocia and the fear for the life of my daughter”. The woman with the emergency Caesarean section described that “Not having control over my body and the feeling that I didn’t have a real delivery because of the Caesarean section” were the worst experiences of her delivery. Probably, in this low-risk parous group, medical intervention at delivery time comes even more unexpected since there was no indication of such intervention at 30 weeks gestation. The phenomenon of high fear after childbirth with unexpected complications was also found by Ryding et al.(32), who found 55% of women with an emergency Caesarean

section experiencing intense fear for their own life or that of their baby. A high level of FOC in such situations is a risk factor for e.g. postpartum depression and postpartum PTSD(1-3, 13-15) .

Our third research question was on the relationship between pre- and postpartum FOC, independent of birth related obstetric problems. In line with the results of Zar et al.(9) and Alehagen et al.(10), a positive correlation of FOC during pregnancy and at six weeks postpartum was found. Generally, for the entire group, FOC had decreased after delivery. In this study, with a low-risk sample without outspoken reasons to expect complications, we could show that women with higher FOC levels during pregnancy are inclined to have higher FOC postpartum, independent of obstetric complications. This confirms what Zar et al.(33) described as a 'vicious cycle phenomenon': "during labour women experience what they are afraid of, which in turn influences their FOC postpartum", which means that for women with the same kind of obstetric complication, the level of prepartum FOC predicts their postpartum level of FOC, i.e. how threatening they will appraise this situation.
In clinical care it is logic to draw attention to those who are distressed because of obstetric problems. Our result shows that a separate screening for FOC, independent from women's physical condition, might be an option in clinical practice, as FOC has so many consequences of various kinds.

In our study, during pregnancy, FOC and general anxiety only marginally correlated, whereas FOC and depression did not correlate at all. This differs from what is found in other studies(9, 34-36). As our sample comprises primarily women with a pregnancy considered to be low risk, the FOC level in our study will most probably be lower than in the general Dutch population of pregnant women, which partly could explain these findings.

It should be noted that the sample size was relatively small to reliably detect small significant effects. The percentage of non-native Dutch women giving birth in our sample (5%) is low compared to the general Dutch population. This was probably due to the inclusion criterion of being fluent in Dutch as well as the location of the participating midwifery practices with fewer non-native Dutch women than some practices in the bigger cities in the Netherlands. FOC is expected to be higher in women with less social and psychological resources(37). This is especially the case for women from ethnic minorities and consequently, the FOC level reported in this study may be an underestimation of level of FOC in the general Dutch population. Analysis of the available reasons for non-response suggests that there may have been more psychological problems in the group that declined participation. On the other hand, one may expect that the latter type of

bias could also be present in other studies. It is to be expected that FOC level of a low-risk pregnancies population will be lower than one including high-risk pregnancies. Women with knowledge on having a higher risk for complications presumably are prone to have higher FOC as well. This could be studied in future research.

CONCLUSION

In this Dutch low-risk sample, FOC during pregnancy was not found to relate to problems experienced during labour and delivery. We did find a positive relationship between parity and medical interventions during childbirth and FOC postpartum as well as a positive correlation of FOC during pregnancy and 6 weeks postpartum, irrespective of problems during childbirth. It appears that in this low-risk sample, the process of giving birth is not markedly related to the level of FOC during pregnancy, but that the pre-partum level of FOC certainly is predictive of the level of postpartum FOC, suggesting that FOC as measured during gestation may influence the interpretation of the birth experience itself.

REFERENCES

1. Soderquist J, Wijma B, Thorbert G, Wijma K. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. BJOG. 2009;116(5):672-80.
2. Ryding EL, Wijma K, Wijma B. Psychological impact of emergency Cesarean section in comparison with elective Cesarean section, instrumental and normal vaginal delivery. Journal of Psychosomatic Obstetrics and Gynecology. 1998;19(3):135-44.
3. Olde E, van der Hart O, Kleber R, van Son M. Posttraumatic stress following childbirth: A review. Clinical Psychology Review. 2006;26(1):1-16.
4. Areskog B, Uddenberg N, Kjessler B. Fear of Childbirth in Late Pregnancy. Gynecologic and Obstetric Investigation. 1981;12(5):262-6.
5. Hall WA, Hauck YL, Carty EM, Hutton EK, Fenwick J, Stoll K. Childbirth Fear, Anxiety, Fatigue, and Sleep Deprivation in Pregnant Women. Jognn-Journal of Obstetric Gynecologic and Neonatal Nursing. 2009;38(5):567-76.
6. Geissbuehler V, Eberhard J. Fear of childbirth during pregnancy: a study of more than 8000 pregnant women. J Psychosom Obstet Gynaecol. 2002;23(4):229-35.
7. Waldenstrom U, Hildingsson I, Ryding EL. Antenatal fear of childbirth and its association with subsequent caesarean section and experience of childbirth. BJOG. 2006;113(6):638-46.
8. Spice K, Jones SL, Hadjistavropoulos HD, Kowalyk K, Stewart SH. Prenatal fear of childbirth and anxiety sensitivity. J Psychosom Obstet Gynaecol. 2009;30(3):168-74.
9. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.
10. Alehagen S, Wijma B, Wijma K. Fear of childbirth before, during, and after childbirth. Acta Obstet Gynecol Scand. 2006;85(1):56-62.
11. Areskog B, Uddenberg N, Kjessler B. Background factors in pregnant women with and without fear of childbirth. Journal of Psychosomatic Obstetrics & Gynecology. 1983;2(2):102-8.
12. Feldman R, Granat A, Pariente C, Kanety H, Kuint J, Gilboa-Schechtman E. Maternal depression and anxiety across the postpartum year and infant social engagement, fear regulation, and stress reactivity. J Am Acad Child Adolesc Psychiatry. 2009;48(9):919-27.
13. Areskog B, Uddenberg N, Kjessler B. Postnatal emotional balance in women with and without antenatal fear of childbirth. Journal of Psychosomatic Research. 1984;28(3):213-20.
14. Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. General Hospital Psychiatry. 2004;26(4):289-95.
15. Johnson R, Slade P. Does fear of childbirth during pregnancy predict emergency caesarean section? BJOG. 2002;109(11):1213-21.
16. Fenwick J, Gamble J, Nathan E, Bayes S, Hauck Y. Pre- and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women. J Clin Nurs. 2009;18(5):667-77.
17. Johnson RC, Slade P. Obstetric complications and anxiety during pregnancy: is there a relationship? J Psychosom Obstet Gynaecol. 2003;24(1):1-14.
18. Laursen M, Johansen C, Hedegaard M. Fear of childbirth and risk for birth complications in nulliparous women in the Danish National Birth Cohort. BJOG. 2009;116(10):1350-5.
19. Ryding EL, Wijma B, Wijma K, Rydhstrom H. Fear of childbirth during pregnancy may increase the risk of emergency cesarean section. Acta Obstet Gynecol Scand. 1998;77(5):542-7.

20. Rouhe H, Salmela-Aro K, Halmesmaki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG. 2009;116(1):67-73.
21. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19(2):84-97.
22. Zar M, Wijma K, Wijma B. Relations between anxiety disorders and fear of childbirth during late pregnancy. Clinical Psychology & Psychotherapy. 2002;9(2):122-30.
23. Health insurance board (Ziekenfondsraad). Obstetric Manual (Verloskundig vademecum indicatielijst). Amstelveen, The Netherlands 1999.
24. Spinhoven PH, Ormel J, Sloekers PPA, Kempen GIJM. A validation study of the Hospital Anxiety and Depression scale (HADS) in different groups of Dutch subjects. Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences. 1997;27(2):363-70.
25. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatrica Scandinavica. 1983;67(6):361-70.
26. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods. 2007;39(2):175-91.
27. National statistics office (Centraal Bureau voor de Statistiek). Various characteristics of birth (geboorte naar diverse kenmerken) 2008.
28. Stichting perinatale registratie Nederland. Perinatale zorg in Nederland 2005 (Perinatal care in the Netherlands 2005). Utrecht; 2008 2008.
29. de Waal MWM, Arnold IA, Spinhoven P, Eekhof JAH, Assendelft WJJ, van Hemert AM. The role of comorbidity in the detection of psychiatric disorders with checklists for mental and physical symptoms in primary care. Social Psychiatry and Psychiatric Epidemiology. 2009;44(1):78-85.
30. Visser RA. On quantitative longitudinal data in psychological research. Leiden1982.
31. di Renzo GC. A multicentric study on fear of childbirth in pregnant women at term. Journal of Psychosomatic Obstetrics & Gynecology. 1984;3(3-4):155-63.
32. Ryding EL, Wijma K, Wijma B. Experiences of emergency cesarean section: A phenomenological study of 53 women. Birth. 1998;25(4):246-51.
33. Zar M. Diagnostic aspects of fear of childbirth. Linköping: Linköping University; 2001.
34. Ryding EL, Wirfelt E, Wangborg IB, Sjogren B, Edman G. Personality and fear of childbirth. Acta Obstet Gynecol Scand. 2007;86(7):814-20.
35. Soderquist J, Wijma K, Wijma B. Traumatic stress in late pregnancy. J Anxiety Disord. 2004;18(2):127-42.
36. Saisto T, Salmela-Aro K, Nurmi JE, Halmesmaki E. Psychosocial characteristics of women and their partners fearing vaginal childbirth. BJOG. 2001;108(5):492-8.
37. Laursen M, Hedegaard M, Johansen C. Fear of childbirth: predictors and temporal changes among nulliparous women in the Danish National Birth Cohort. BJOG. 2008;115(3):354-60.

3

Does fear of childbirth or family history affect whether pregnant Dutch women prefer a home- or hospital birth?

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ABSTRACT

Objective: It is a generally accepted idea that women who give birth at home are less fearful of giving birth than women who give birth in a hospital. We explored fear of childbirth (FOC) in relation to preferred and actual place of delivery. Since the Netherlands has a long history of home birthing, we also examined how the place where a pregnant woman's mother or sisters gave birth related to the preferred place of delivery.

Design: A prospective cohort study.
Setting: Five midwifery practises in the region Leiden/Haarlem, the Netherlands.
Participants: 104 Low risk nulliparous and parous women.

Method: Questionnaires were completed in gestation week 30 (T1) and six weeks postpartum (T2).

Measurements and findings: No significant differences were found in antepartum FOC between those who preferred a home or a hospital delivery. Women with a strong preference for *either* home or hospital had lower FOC (mean W-DEQ=60.3) than those with a weak preference (mean W-DEQ=71.0), t (102) = -2.60, p = 0.01. The place of delivery of close family members predicted a higher chance (OR 3.8) of the same place being preferred by the pregnant woman. Pre- to postpartum FOC increased in women preferring home- but having hospital delivery.

Key conclusions: The idea that FOC is related to the choice of place of delivery was not true for this low risk cohort. Women in both preference groups (home and hospital) made their decisions based on negative and positive motivations. Mentally adjusting to a different environment than that preferred, apart from the medical complications, can cause more FOC postpartum.

Implications for practice: The decreasing number of home births in the Netherlands will probably be a self-reinforcing effect, so in future, pregnant women will be less likely to feel supported by their family or society to give birth at home. Special attention should be given to the psychological condition of women who were referred to a place of delivery and caregiver they didn't prefer, by means of evaluation of the delivery and being alert to anxiety or other stress symptoms after delivery. These women have higher chance of fear postpartum which is related to a higher risk of psychiatric problems.

INTRODUCTION

It is a generally accepted idea that women who prefer a home birth have less fear of childbirth (FOC) compared to those who prefer giving birth in a hospital. The Netherlands has a long history of home deliveries, and is therefore an ideal place to study this assumption in combination with an examination of its relation to the place where a pregnant woman's mother or sisters gave birth.

Home vs. hospital deliveries

In the Netherlands, pregnant women at low risk for complications during pregnancy and birth can decide to give birth either at home or in hospital, both under the supervision of a midwife. Childbirth is defined as a normal physiological process and a family event (1). This perception is reflected in the organisation of obstetric care and supported by the empirical evidence on the safety of home births (2-4). However, family history also matters. Women tend to take experiences within the family concerning the place and progress of birth as a model, and harmonize their preferences and choices with their mother's and sisters' experiences.

The preference for home birth, as reported in Dutch studies, is related to the confidence of family and friends in home birth (5), higher education (in highly urbanized areas) (6), the comfortable/familiar surroundings at home and the wish for personal autonomy (7). Factors associated with a preference for hospital birth are expectations of hospital care when giving birth, the expected safety in the hospital, and the wish to minimize risks (8, 9). In rural areas in the Netherlands (10) home birth is still the most common choice for women with a low risk pregnancy. In all other Western countries, hospital birth is the standard choice or even mandatory, whereas giving birth at home is unusual and considered as an 'alternative' option. In other countries than the Netherlands the choice of home birth has been found to be related to having control and continuity (11), to being older, married and well-educated (12-16) and to being less anxious about the impending birth (13).

Fear of childbirth

It has been shown that pregnant women with high pre-partum FOC also have high FOC postpartum, no matter what obstetric complications they experience (17, 18). The level of postpartum FOC indicates how women look back on giving birth, and high levels of FOC are related to higher risk for psychiatric problems, in particular depression, post-traumatic stress disorder (19) and difficulties in a healthy mother-child bonding (20).

Women who start labour at home, but are referred to a hospital because of medical complications, have to deal with their cognitive dissonance associated with their preferred and actual place of giving birth, on top of coping with the medical problems.

In the present study we examined how congruence between the preferred and actual place of birth influences postpartum FOC.

In summary, we formulated the following research questions for the study:

1. Is preference for home or hospital birth related to antepartum FOC ?
2. Is the participant's preference for place of birth related to the birth experience and the place where mothers or sisters gave birth?
3. How are congruence between preferred and actual place of birth, and referral to the obstetrician related to postpartum FOC?

MATERIALS AND METHODS

Subjects

The study had a prospective cohort design. The participants completed questionnaires in gestation week 30 (T1) and six weeks postpartum (T2).

All participants were fluent in Dutch. Eligible participants were nulliparous and parous women in gestation week 30, who had been classified as low risk by their midwife. Apart from experiencing good general health, the participants had uncomplicated family, medical, and obstetric histories according to the Dutch Obstetric Manual (21). The study was coordinated by the first author (AS) at the Department of Obstetrics and Gynaecology, Leiden Academic Medical Centre. Five midwifery practices in the vicinity of Leiden participated, two urban, the other three more or less rural. In meetings and a written instruction, midwives were informed about how to invite pregnant women to join the study and how to respond to possible questions from potential participants.

From November 2005 until March 2006, midwives invited pregnant women who matched the inclusion criteria to participate in the study. Potential participants received an information letter, a consent form and paper questionnaires. The midwives explained the purpose and outline of the study, then they asked the women to read the information at home and decide whether or not to participate. Birth characteristics were collected by the caregiving midwives and sent to the research coordinator.

Six weeks postpartum (T2), questionnaires were sent out to the women who had participated at T1.

The midwives asked a total of 54% (n=194) of those who matched the inclusion criteria (n=358) to participate. The major reason given by the midwives for not passing the invitation on to all potential participants was that they had simply forgotten. The women who were asked but who declined to participate were registered as decliners (n=10, 5%). Reasons for declining were: too busy, not interested, or participating in another study. Fifty-six percent (n=108 of 194) of those invited returned their questionnaires and consent

form, some of them after two reminders. Three women were excluded post hoc because they did not match the inclusion criteria. Six women did not receive the questionnaires at T2 because they had moved without reporting their new address. At T2 the response rate was 87% (n=89 of 108) of those who responded at T1.
The representativeness of the sample was examined by comparing the characteristics of participating women from one of the participating practices with characteristics of the total patient stock of that practice in 2003. The mean age and ethnicity of the study group turned out to be the same as in the total patient stock in 2003. However, the study group included a higher proportion of nulliparous women, and more women who had been referred to an obstetrician and given birth in a hospital.

Measures

Biographical data

This questionnaire comprised questions on general background characteristics such as educational level, marital status and age. At Time 1, at 30 weeks pregnant, women were asked about their preferred place of birth and reasons for this preference as well as their mother's and sisters' history: place where mothers and sisters had given birth, about pain experience, complications and labour-progress of those deliveries. Possible answers for preferred place of birth were further classified as indicating a "strong" or "weak" preference for home or hospital respectively. Six weeks postpartum (Time 2), participants answered questions about their birth experience.

Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ)

FOC was operationalised by the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ, version A and B). The W-DEQ is a well validated and internationally used 33-item questionnaire, designed to measure FOC as operationalised by the cognitive appraisal of giving birth(22). Version A measures FOC before childbirth, while version B is used to measure FOC after childbirth. This self-assessment rating scale has six scale steps per item, ranging from 'not at all' (0) to 'extremely' (5). A total score is calculated by the un-weighted score of all items, with a minimum of 0 and a maximum of 165. A higher score on W-DEQ is associated with higher FOC. In the present study, the internal reliability, as estimated with Cronbach's α, was 0.90. The split-half reliability was ≥ 0.85 for both versions.

Obstetrical data

The following data were abstracted from the participants' medical record: parity, gestational age at time of birth, referral to obstetrician and reason for referral, actual place of birth, actual mode of birth, (type of) pain relief, and Apgar score at five minutes postpartum.

Referral to an obstetrician

In order to study the effects of referral to an obstetrician and congruence of preferred and actual place of birth, there are a limited number of possible combinations concerning congruence in place of birth, in combination with referral, which are as follows (see also Table 1):

- Group 1 *Home preferred/Home birth*, *no referral*: women in this group preferred to give birth at home and actually did so without referral to an obstetrician.
- Group 2 *Hospital preferred/Hospital birth*, *no referral*: women in this group preferred and actually had a hospital birth without referral to an obstetrician; the midwife of the midwifery practice supervised the whole birthprocess.
- Group 3 *Hospital preferred/Hospital birth*, *with referral*: women in this group preferred to give birth in a hospital and actually did so, but were referred to an obstetrician during labour.
- Group 4 *Home preferred/Hospital birth, with referral*: women in this group preferred to give birth at home, but were referred to an obstetrician during labour and therefore had their actual birth in the hospital.
- Group 5 *Hospital preferred/Home birth*, *no referral*: women in this group preferred to give birth in a hospital and actually gave birth at home. This may occur in cases where birth progresses very quickly, and there is little time for transport to hospital. In that case, the midwife and the woman in labour (with her partner) may decide to stay at home to avoid giving birth in a car. No referrals took place in this group.

Analysis

Prior to the analysis, the W-DEQ scores at Time 1 and Time 2 were examined for missing values, outliers and deviation from normal distribution. To have a valid sum score for the W-DEQ, we allowed a maximum of two missing items. A missing item was assigned the mean score for all other valid item scores of that particular participant. For statistical analyses we used IBM SPSS Statistics 20. Comparisons between two groups were tested by Pearson's Chi square tests for categorical variables and with a Student's t-test for continuous variables. Comparisons between more than two groups were tested with a one-way ANOVA. Changes of W-DEQ scores from pre- to postpartum were tested with repeated measures ANOVA. Predictors for preferred place of birth were tested with logistic regression. The W-DEQ score was used as a continuous variable.

RESULTS

The participants' mean age was 32.1 years (SD = 4.0). Nearly all participants were married or cohabiting. The mean level of education was at higher education/bachelor level. Five percent of the sample were non-native Dutch, compared to 18 percent of the general Dutch birth-giving population (23). Most women preferred home birth (60.6%). Fig.1 shows the distribution of strong and weak preferences during pregnancy for a home or hospital birth. The most common reasons for preferring a home birth were: "Home is a known and trusted environment" (54%) and "Feeling comfortable at home" (8%). Less often mentioned reasons were: "No need to travel to the hospital, too many people around in the hospital, the situation is not personal enough, fear of hospital, good experiences when delivering at home at preceding birth". The most common reasons for preferring a hospital birth were: "Feeling safer in the hospital" (33%) and "Environment with adequate help in case of problems" (19%). Less often mentioned reasons for a hospital birth were: "Complications (minor) during previous birth (home or hospital), more peace (no phone calls, no children around), the home situation not being suited for home birth (too many stairs)". Of all participants in the current study, 51.9% eventually gave birth at home, and 48.1 % in the hospital.

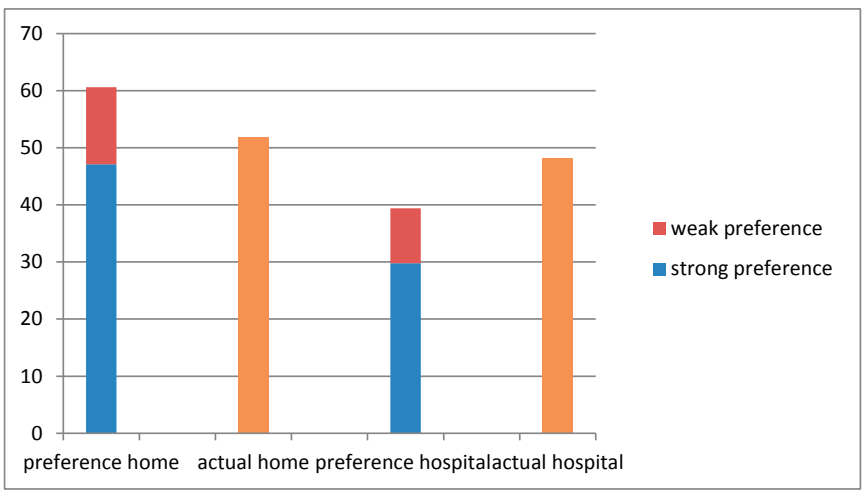

Fig.1 Percentage of women at 30 weeks pregnant with strong/weak preference for giving birth at home/in a hospital and percentage of women actually giving birth at home/in a hospital

The W-DEQ scores showed neither extreme outliers nor extreme skewness or kurtosis. The mean W-DEQ score was 62.8 (sd=18.1) at gestation week 30 and decreased to 53.9 (sd=25.1) at six weeks postpartum. The W-DEQ was used to measure differences in fear scores, we didn't use any cut-off scores in our analysis.

Is FOC when 30 weeks pregnant related to preference for home or hospital birth?
The answer is "no". At T1, FOC did not differ between the groups who preferred a home (Groups 1 and 4: W-DEQ = 61.7) or a hospital birth (Groups 2, 3 and 5: W -DEQ =64.6) (p= 0.88) (see also Table1). The logistic regression test also confirmed that anxiety during pregnancy (operationalized as W-DEQ score at T1) does, in itself not predict the preferred place of birth (OR 1.02, 95% CI 0.99-1.05).
However, *strength* of preference did relate significantly to level of FOC, i.e. W-DEQ scores. Women with a strong preference for *either* home or hospital were generally less afraid of childbirth (mean W-DEQ=60.3) than those with a weak preference (mean W-DEQ=71.0), t (102) = -2.60, p = 0.01, mean difference -10.7 (95% CI -18.8- -2.6).

Is the participant's preference for place of birth related to the birth experience and the place where mothers or sisters gave birth?
The answer is "yes". Preference for place of birth is influenced by place of birth of mothers or sisters, $\chi^2(1, N=101) = 7.11$, p=.01. This was also shown in a logistic regression test, performed with preferred place of birth as the independent variable, while potentially predictive variables were W-DEQ score at T1 (pre-partum FOC), place of birth of mothers or sisters, as well as the evaluation of the deliveries of mothers or sisters, in terms of speed of progress (0-5), pain experience (0-5) and complications (0-5). After deletion of 14 cases with missing values on one of the predictive variables, 92 cases were available for analysis: 56 with a preference for home birth and 36 with a preference for hospital birth. In the resulting equation, only place of birth of mothers or sisters was predictive (OR 3.8; 95% CI 1.4-10.2), the same place being the preferred place of birth of the pregnant woman, independently of *how* the pregnant women evaluated the deliveries of their mothers or sisters.

How are congruence between preferred and actual place of birth and referral to an obstetrician related to postpartum FOC?
FOC (mean W-DEQ scores) for the groups with the five possible outcomes of congruence of place of birth, in combination with referral are given in Table 1 and in Figure 2.
The pre- to postpartum change in mean W-DEQ score between the five groups, tested in a repeated measures' ANOVA, turned out to be significant (F=3.23, Df=4, p= .017). Only Group 4 (*Home preferred/Hospital birth after referral*) evidenced a pre-postpartum increase in FOC, whereas the other groups showed a decrease (Figure 2).

Table 1. W-DEQ scores at 30 weeks pregnant (T1) and six weeks postpartum (T2) for nulli- and parous women, for the five congruence/referral groups

		Mean W-DEQ (sd) T1	Mean W-DEQ (sd) T2
Gr.1: Preferred home, home birth, no referral		61,6 (19.6)	45,9 (22,4)
	N	46	37
Gr.2: Preferred hospital, hospital birth, no referral		70,4 (16,6)	57 (28,4)
	N	10	7
Gr.3: Preferred hospital, hospital birth, with referral		66,7 (15,5)	64,1 (23,4)
	N	22	18
Gr.4: Preferred home, hospital birth, with referral		59,6 (12,6)	69,7 (24,6)
	N	15	12
Gr. 5: Preferred hospital, home birth, no referral		49,4 (21.8)	31,8 (19,1)
	N	8	6
Total		62,3 (18,1)	53,5 (25,4)
	N	101	80

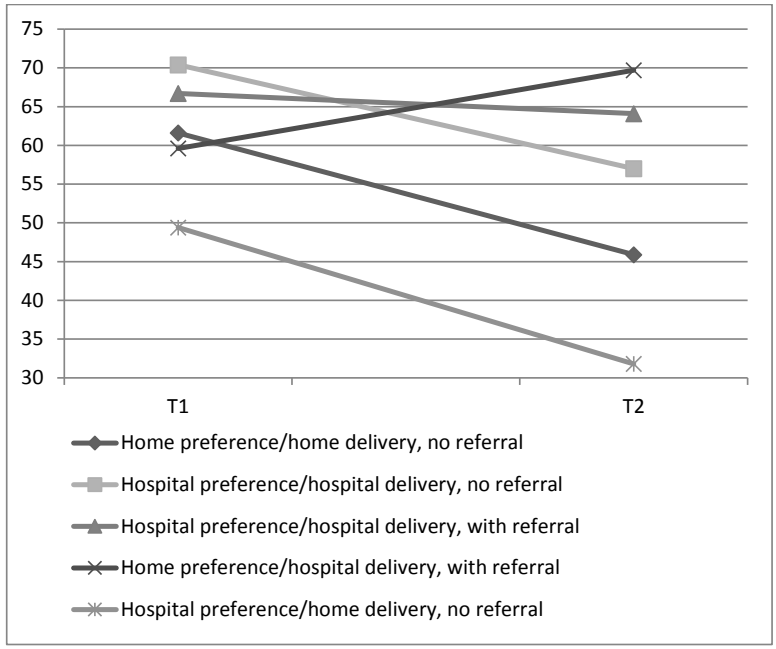

Fig. 2 Change of mean W-DEQ scores from 30 weeks pregnancy (T1) until six weeks postpartum (T2) for the five congruence/referral groups

In this sample of pregnant women judged to be at *low risk* at T1, 25 % in the group that originally preferred a home birth (Groups 1 and 4) were eventually referred to hospital and an obstetrician, whilst 55% of the women who preferred a hospital birth (Groups 2, 3 and 5) were referred to an obstetrician. This difference was significant ($\chi 2$ (1)= 9.6; p= .002).

DISCUSSION

Main findings and interpretation

At 30 weeks pregnant, women who preferred to give birth in a hospital did not differ from those who preferred to deliver at home in terms of FOC. However, the *strength* of preference was related to FOC. We found that women with a strong preference for place of birth, whether this was for a hospital or a home birth, had lower FOC than women with a weak preference. In other words, uncertainty, i.e. not having a clear preference for a place of birth, was positively related to FOC.

In general, making decisions is often difficult when one is uncertain on the consequences of one's choices; consequences which may be highly influenced by other, unpredictable events. People often experience conflict on how one uncertain factor trades off in favour of another(24). Examples of conflicting uncertain factors that may affect the choice for a particular place of birth are potential complications during labour, and not knowing how one will be able to deal with pain. Such uncertainty can cause doubt and undermine clarity of preference for the place of birth.

The reasons given for the preference for place of birth show that in both the home and the hospital preference group women had motivations related to anxiety. In the hospital group, women stated to be afraid of possible complications if they were to give birth at home. In the home group, women declared they feared "the unfamiliar hospital environment" and "the number of caregivers that will show up in a hospital".

Slovic *et al. (25)*emphasized the influence of affect guiding judgments and decisions. Affect represents the specific quality of goodness or badness of a stimulus, experienced as a feeling state, and occurs rapidly and automatically. A preference for home or hospital birth is therefore not only based on reason but also on affect. Home or hospital birth appears to have affective connotations (positive or negative) in most people, related to experiences of relatives and friends (5), one's own experience, information in the media (26) and what the most common opinion is in the society one lives in (27). This notion is supported by our results. Our study shows that the actual place of birth of near family members predicts a 3.8 times higher probability of that location being the preferred place of birth of the pregnant woman herself,

independently of whether she evaluated the deliveries of her mother or sisters positively or negatively. Being more familiar with home birth apparently makes it easier to choose for the home setting. During the past 10 years, home birth rates in the Netherlands have declined substantially from 31.9% in 2003 to 18.4 % in 2014 (28). The decreasing number of home births in the Netherlands will probably be a self-reinforcing effect. In the future, pregnant women will be less likely to feel supported by their family or society to give birth at home.

Unexpected complications during labour give rise to high levels of postpartum FOC (29). Low risk parous women who were referred to an obstetrician and had interventions during labour, reported particularly higher FOC postpartum than during pregnancy (18). The results of this study show that it was not the *actual* place of birth but the combination of referral to an obstetrician with *incongruence* of place of birth that bore a relation to post-partum fear. In the group of women who had, due to medical risk, undergone a compulsory move from home to hospital during labour, we found increased FOC several weeks postpartum. For those who preferred hospital birth from the outset, referral merely implied transition to another level of care and caregiver, but not a change of environment. In this group we found no change in FOC from pre- to postpartum. For those who prefer to give birth at home, referral means, besides a higher risk level, also incongruence of projected place of birth, as well as an unplanned transfer to hospital. These women, in addition to the unexpected extra displacement, have to quickly adjust their expectations from the natural birth in a homely environment to a generally more medicalised setting in a hospital. These factors al together possibly explain the higher pre- to postpartum change of FOC in especially this group.

Women who actually gave birth at their intended place of birth without being referred, showed a decrease of FOC postpartum, regardless of whether the birth was at home or in the hospital. Within this group, the women with a home birth showed the lowest postpartum FOC.
However, we found that women who started giving birth at the hospital had a higher probability of being referred to an obstetrician. This higher chance of referral or intervention for low risk hospital births compared to home births was consistent with other studies (30-33).

Strength and limitations
Our observational study of a prospective cohort gives for the first time insight in differences (in changes) in FOC between women preferring a home- versus hospital-birth. Our findings can be used for future power calculations in view of testing clinically meaningful differences of FOC between the groups as analysed in our study. The W-DEQ

was used to measure differences in fear scores, however not all participants were shown to be fearful of birth. In future research we recommend to determine preference for place of birth in women shown to be highly fearful of birth.
A possible shortcoming was that only half of the women eligible were approached for participation by the recruiting midwives, which could comprise a possible bias in interests. Comparing the women included in the study with those not included, showed no differences in mean age and ethnicity. However, the study sample overrepresented nulliparous women, referral to an obstetrician and birth at the hospital. We tried to prevent this bias by offering the midwives a training in presenting of the study to potential participants, but high work-load may have taken its toll here. Potentially, support from a 'practise nurse' for research aims, would have resulted in a higher inclusion percentage. Although our cohort stemmed from only one region in the Netherlands, we were able to systematically include women from both urban and rural areas, and from different midwifery practises, with a reasonable level of representativeness, supporting the between-group differences validity. Nevertheless, carefulness is recommended regarding generalising our conclusions to the Netherlands as a whole, as well as to other countries, as (levels of-) care for home and hospital birth may differ considerably, and cultural aspects may vary greatly, which influence women's approach particularly.

CONCLUSION

Our study shows that the common perception that FOC is linearly related to the choice for place of birth is not correct for this low risk cohort. Women in both preference groups (home and hospital) make up their mind in terms of negative and positive motivations. The negative motivations mentioned by the participants of our study show that women preferring home birth have other fears than women preferring hospital birth.
The choice for a particular place of birth is not just based on risk calculations, but also on reasoning in accordance with what occurs in the social environment. Having positive or negative connotations regarding home or hospital birth is greatly influenced by opinions and experiences of near family and friends. Uncertainty about 'the right' decision appears to lead to more FOC as well as the other way around. Once the decision is made, the woman still has to cope with the risks pertaining to that particular choice: in the case of a hospital birth in terms of a higher risk of interventions and referral to an obstetrician during labour and, in the case of a home birth, the transfer to another place (hospital) when being referred.
By far, most referrals from home to hospital are not acute (34), but (mentally) adjusting to an entirely unfamiliar environment and often different caregivers, aside from the medical complication, may cause more postpartum FOC. Because stronger FOC postpartum is

related to a higher risk of psychiatric problems (35, 36), special attention should be given to the psychological condition of these women, by means of evaluation of the birth process and being alert to anxiety or other stress symptoms after giving birth. In the Netherlands, nowadays there is a strong awareness of this vulnerable group, and both continuity and integration of care by all caregivers is implemented more and more. The results of our study again emphasize the importance of knowledge of how women's attitude and childbirth anxiety may influence their experience of the upcoming birth. This knowledge will improve the quality of obstetrical health care by possibly reducing unnecessary interventions, improvements in the (hospital) environment and communication between caregivers.

Details of Ethical Approval

The study was approved by the Medical Ethical Board of the LUMC (P05.065).

REFERENCE LIST

1. de Vries R. A pleasing birth, midwives and maternity care in the Netherlands. Philadelphia, US: Temple University Press; 2004.
2. de Jonge A, van der Goes BY, Ravelli ACJ, Amelink-Verburg MP, Mol BW, Nijhuis JG, et al. Perinatal mortality and morbidity in a nationwide cohort of 529 688 low-risk planned home and hospital births. Bjog-An International Journal of Obstetrics and Gynaecology. 2009;116(9):1177-84.
3. Brocklehurst P, Hardy P, Hollowell J, Linsell L, Macfarlane A, McCourt C, et al. Perinatal and maternal outcomes by planned place of birth for healthy women with low risk pregnancies: the Birthplace in England national prospective cohort study. British Medical Journal. 2011;343.
4. de Jonge A, Geerts CC, van der Goes BY, Mol BW, Buitendijk SE, Nijhuis JG. Perinatal mortality and morbidity up to 28 days after birth among 743 070 low-risk planned home and hospital births: a cohort study based on three merged national perinatal databases. Bjog-An International Journal of Obstetrics and Gynaecology. 2015;122(5):720-8.
5. Wiegers TA, Van der Zee J, Kerssens JJ, Keirse MJ. Home birth or short-stay hospital birth in a low risk population in The Netherlands. Soc Sci Med. 1998;46(11):1505-11.
6. Kleiverda G, Steen AM, Andersen I, Treffers PE, Everaerd W. PLACE OF DELIVERY IN THE NETHERLANDS - ACTUAL LOCATION OF CONFINEMENT. European Journal of Obstetrics Gynecology and Reproductive Biology. 1991;39(2):139-46.
7. ten Haken TV, Hendrix M, Nieuwenhuijze M, Bude L, de Vries R, Nijhuis J. Preferred place of birth: Characteristics and motives of low-risk nulliparous women in the Netherlands. Midwifery. 2012;28(5):609-18.
8. Pavlova M, Hendrix M, Nouwens E, Nijhuis J, van Merode G. The choice of obstetric care by low-risk pregnant women in the Netherlands: Implications for policy and management. Health Policy. 2009;93(1):27-34.
9. van Haaren-ten Haken T, Pavlova M, Hendrix M, Nieuwenhuijze M, de Vries R, Nijhuis J. Eliciting Preferences for Key Attributes of Intrapartum Care in The Netherlands. Birth-Issues in Perinatal Care. 2014;41(2):185-94.
10. Anthony S, Buitendijk SE, Offerhaus PM, Dommelen P, Pal-de Bruin KM. Maternal factors and the probability of a planned home birth. Bjog. 2005;112(6):748-53.
11. Abel S, Kearns RA. Birth places: a geographical perspective on planned home birth in New Zealand. Social science & medicine (1982). 1991;33(7):825-34.
12. Soderstrom B, Stewart PJ, Kaitell C, Chamberlain M. Interest in alternative birthplaces among women in Ottawa-Carleton. Cmaj. 1990;142(9):963-9.
13. Waldenstrom U, Nilsson CA. Characteristics of women choosing birth center care. Acta Obstet Gynecol Scand. 1993;72(3):181-8.
14. MacDorman MF, Menacker F, Declercq E. Trends and characteristics of home and other out-of-hospital births in the United States, 1990-2006. National vital statistics reports : from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System. 2010;58(11):1-14, 6.
15. Boucher D, Bennett C, McFarlin B, Freeze R. Staying Home to Give Birth: Why Women in the United States Choose Home Birth. Journal of Midwifery & Women's Health. 2009;54(2):119-26.
16. Hildingsson IM, Lindgren HE, Haglund B, Radestad IJ. Characteristics of women giving birth at home in Sweden: a national register study. Am J Obstet Gynecol. 2006;195(5):1366-72.

17. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.
18. Sluijs AM, Cleiren MPHD, Scherjon SA, Wijma K. No relationship between fear of childbirth and pregnancy-/delivery-outcome in a low-risk Dutch pregnancy cohort delivering at home or in hospital. Journal of Psychosomatic Obstetrics and Gynecology. 2012;33(3):99-105.
19. Soderquist J, Wijma B, Thorbert G, Wijma K. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. BJOG. 2009;116(5):672-80.
20. Areskog B, Uddenberg N, Kjessler B. Background factors in pregnant women with and without fear of childbirth. Journal of Psychosomatic Obstetrics & Gynecology. 1983;2(2):102-8.
21. Health insurance board (Ziekenfondsraad). Obstetric Manual (Verloskundig vademecum indicatielijst). Amstelveen, The Netherlands 1999.
22. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19(2):84-97.
23. National statistics office (Centraal Bureau voor de Statistiek). Various characteristics of birth (geboorte naar diverse kenmerken) 2008 .
24. Shafir E, Simonson, I., Tversky, A. Reason based choice. In: S.Lichtenstein PS, editor. The construction of preference. Cambridge: Cambridge University Press; 2006. p. 411-33.
25. Slovic P, Finucane, M.L., Peters, E., Macgregor, D.G. The affect heuristic. In: S.Lichtenstein PS, editor. The construction of preference. Cambridge: Cambridge University Press; 2006. p. 434-53.
26. Fleming SE, Vandermause R, Shaw M. First-time mothers preparing for birthing in an electronic world: internet and mobile phone technology. Journal of Reproductive and Infant Psychology. 2014;32(3):240-53.
27. Murray-Davis B, McNiven P, McDonald H, Malott A, Elarar L, Hutton E. Why home birth? A qualitative study exploring women's decision making about place of birth in two Canadian provinces. Midwifery. 2012;28(5):576-81.
28. National statistics office (Centraal Bureau voor de Statistiek). Place of birth, breastfeeding (Bevalling, lengte en gewicht bij geboorte, borstvoeding) 2014.
29. Ryding EL, Wijma K, Wijma B. Experiences of emergency cesarean section: A phenomenological study of 53 women. Birth. 1998;25(4):246-51.
30. Faucon C, Brillac T. Planned home versus planned hospital births: Adverse outcomes comparison by reviewing the international literature. Gynecologie Obstetrique & Fertilite. 2013;41(6):388-93.
31. Blix E, Huitfeldt AS, Oian P, Straume B, Kumle M. Outcomes of planned home births and planned hospital births in low-risk women in Norway between 1990 and 2007: A retrospective cohort study. Sexual & Reproductive Healthcare. 2012;3(4):147-53.
32. Maassen MS, Hendrix MJC, Van Vugt HC, Veersema S, Smits F, Nijhuis JG. Operative Deliveries in Low-Risk Pregnancies in The Netherlands: Primary versus Secondary Care. Birth-Issues in Perinatal Care. 2008;35(4):277-82.
33. van der Hulst LAM, van Teijlingen ER, Bonsel GJ, Eskes M, Bleker OP. Does a pregnant woman's intended place of birth influence her attitudes toward and occurrence of obstetric interventions? Birth-Issues in Perinatal Care. 2004;31(1):28-33.
34. Amelink-Verburg MP, Verloove-Vanhorick SP, Hakkenberg RMA, Veldhuijzen IME, Gravenhorst JB, Buitendijka SE. Evaluation of 280,000 cases in Dutch midwifery practices: a descriptive study. Bjog-An International Journal of Obstetrics and Gynaecology. 2008;115(5):570-8.

35. Fairbrother N, Woody SR. Fear of childbirth and obstetrical events as predictors of postnatal symptoms of depression and post-traumatic stress disorder. J Psychosom Obstet Gynaecol. 2007;28(4):239-42.
36. Stramrood CAI, Paarlberg KM, Huis In't Veld EMJ, Berger LWAR, Vingerhoets AJJM, Schultz WCMW, et al. Posttraumatic stress following childbirth in homelike- and hospital settings. Journal of Psychosomatic Obstetrics and Gynecology. 2011;32(2):88-97.

4

Pain relief during labour and fear of childbirth from pre-to postpartum in medium to high risk women: a secondary analysis of the RAVEL-study

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ABSTRACT

Background

Whether receiving pharmacological pain relief during labour actually decreases fear of childbirth is currently unknown. The objective of this study was to examine the relationship between pharmacological pain relief during labour and fear of childbirth evaluated before and retrospectively after childbirth in medium to high risk women.

Methods

A sub-analysis of data from a multicenter randomised controlled equivalence trial, which was conducted in 15 hospitals throughout the Netherlands. Women with intermediate to high risk for obstetric complications completed questionnaires during pregnancy and 6 weeks postpartum. The main outcomes were: request for pain relief during labour, the type of pain relief given (epidural analgesia or patient-controlled analgesia with remifentanil), and fear of childbirth.

Results

Questionnaires were completed by 911 women during pregnancy and 500 women postpartum. Severe fear of childbirth was a significant predictor for requesting pain relief (OddsRatio: 1.86 , 95% ConfidenceInterval 1.14-3.03, *p*=.01). In a hierarchical multiple regression analysis, after adjusting for obstetric and psychological variables, the association between receiving pain relief and postpartum fear of childbirth was not significant (partial correlation= .07, *p*=.15). Fear of childbirth antepartum was highly predictive of fear postpartum (partial correlation=.42, p<.001). Other predictors of postpartum W-DEQ score were having a CS (partial correlation =.28, p<.001) and a higher HADS anxiety score at T1 (partial correlation =.11, p<.01).

The type of pain relief administered during labour was not significantly correlated with fear postpartum.

Conclusions

Severe fear of childbirth was a predictor for requesting pain relief. In our study, prepartum fear of childbirth, but not pharmacological pain relief, was significantly related with postpartum fear of childbirth. Furthermore, the type of pain relief was not related to FOC postpartum.

BACKGROUND

Pain during labour is one of the most feared factors surrounding the childbirth process. In many high-income countries, providing pharmacological pain relief during labour is a widely accepted practice. However, in 2013, nearly two-thirds (62.6%) of all women gave birth without pharmacological pain relief in the Netherlands(1) The question therefore remains whether women who give birth without pharmacological pain relief actually experience less fear of childbirth (FOC).

Aside from fear of labour pain (2), other factors related to FOC include general anxiety, depression, suboptimal communication with the caregiver, being nulliparous, traumatic previous childbirth experience, lack of emotional support, and the perception of little control during labour (3-7). An average of 6-10% of all pregnant women experience severe FOC, which is defined as a FOC that is so strong that it impedes the woman's personal, social, and/or occupational life (8-10). FOC has a range of consequences, including an increased need for instrumental delivery or CS, prolonged labour, reduced pain tolerance, and request for elective Cesarean section (CS) (2, 11-13) Furthermore severe FOC is related to an increased risk of developing psychiatric problems, particularly depression(14, 15), post-traumatic stress disorder (16), and difficulty establishing mother-infant bonding (17). Several studies have shown that receiving pharmacological pain relief during labour does not necessarily enhance the childbirth experience, nor does it necessarily improve the mother's psychological or physical well-being (4, 18-20). However, additional research is needed in order to understand the relationship between the use of pain relief during childbirth and the woman's level of FOC pre- and postpartum.
The RAVEL (Remifentanil patient-controlled Analgesia Versus Epidural analgesia during Labour) trial compared two types of pharmacological pain relief administered during labour: epidural analgesia (EDA) and remifentanil (21). The results of the RAVEL trial showed that women randomised to remifentanil PCA and receiving analgesia were generally less satisfied with their pain relief compared to women who were randomised to EDA (22)

Here, we evaluated the relationship between pharmacological pain relief during labour and pre- and postpartum FOC using data collected during the RAVEL trial, addressing the following research questions:

1. Do women who request pain relief during labour experience different levels of FOC during pregnancy compared to women who do not request pain relief?
2. Is receiving pain relief during labour associated with FOC measured postpartum?
3. Is the type of pain relief associated with FOC measured postpartum?

METHODS

This study is a sub-analysis of data from the RAVEL trial; a multicenter randomised controlled equivalence trial conducted from May 30, 2011 through October 24, 2012 in 15 hospitals. The study was approved by the Central Committee on Research Involving Human Subjects, (trial number p10-240), and the respective Boards of Directors at all participating hospitals. The RAVEL trial has been registered in the clinical trial registry (NTR-2551). Women were eligible to participate if they were 18 years of age or older, healthy (or had a mild systemic disease). The exclusion criteria included hypersensitivity to the analgesic compounds used or contraindication against receiving EDA. The RAVEL trial included only women who were considered to have a medium to high risk of obstetric complications, as the study was performed in hospitals, and most low-risk pregnant women in the Netherlands are under the care of a community midwife .

Women were recruited to the study prior to the onset of active labour, preferably during one of the antenatal visits, sometimes at the labour ward before starting induction of labour. After providing written consent, each woman was randomized by computer to receive either EDA or remifentanil PCA should they request analgesia. The full design of the RAVEL trial has been published previously (21, 22).

FOC and anxiety/depression were measured using the Wijma-Delivery Expectancy/ Experience Questionnaire (W-DEQ) and the Hospital Anxiety Depression Scale (HADS) questionnaire, which were completed by the women both during pregnancy (T1) and 6 weeks postpartum (T2).

Measures

Baseline characteristics: age, ethnicity, education, body mass index, gravidity, gestational age at time of birth and duration of labour.

Outcome variables: request for pain relief during labour (yes or no), type of pain relief administered (epidural or remifentanil PCA), and FOC.

Independent variables were obstetric variables with an association with FOC: parity, previous CS, previous vaginal instrumental delivery, multiple pregnancy, first trimester loss, maternal pre-existing disease (heart, vascular, hypertension, psychiatric, and/or pulmonary disease), medical indication (complications originated at pregnancy or birth), onset of labour (spontaneous vs. induced), duration of labour, mode of birth (vaginal vs. CS), postpartum hemorrhage, perineal injury (no lacerations vs. rupture/episiotomy), 5-minute Apgar score, major maternal complications (e.g., uterine rupture, eclampsia, amniotic fluid embolism, myocardial infarction, death, or other) and general anxiety and depression.

FOC was operationalised by the Wijma-Delivery Expectancy/Experience Questionnaire (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. (23, 24) 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 (24). Wijma et al. (23) 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).

The Hospital Anxiety Depression Scale (HADS) is a questionnaire containing a 7-item anxiety scale and a 7-item depression scale, both of which have scores ranging from 0 to 21. The HADS is designed to measure depression and/or anxiety disorders among patients in a non-psychiatric hospital or clinic and is considered a reliable and efficient questionnaire (25, 26).

Statistical analysis

Prior to analysis, the W-DEQ and HADS scores obtained at T1 and T2 were visually examined for outliers and for deviation from a normal distribution. Baseline characteristics between the women who completed the questionnaires and those who did not were compared using the chi-square test and Student's *t*-test (Table1).

To determine whether women who requested pain relief during labour had more FOC during pregnancy, we performed a binary logistic regression analysis with request for pain relief as the dependent variable. The W-DEQ scores were dichotomized into severe FOC (W-DEQ score ≥85) and low-to-moderate FOC (W-DEQ score ≤84). In the logistic regression, we adjusted for the following confounders: parity, multiple pregnancy, previous CS, previous vaginal instrumental delivery, first trimester loss, maternal pre-existing disease and medical indication.

The difference of the mean W-DEQ score at T2 for the use of pain relief (no analgesia, remifentanil PCA and epidural) was tested with ANOVA. Then a hierarchical multiple linear regression analyses was performed to study the relationship between the mean W-DEQ score at T2 (as the dependent variable) and pain relief (no or yes) or type of pain relief (remifentanil PCA or epidural) as the independent variable (block 1), with adjustment for obstetric variables (parity, onset of labour (induced or spontaneous), duration of active labour, mode of birth, 5-minute Apgar score, postpartum hemorrhage, perineal injury, and major maternal complications) (block 2) and psychological variables (mean W-DEQ and HADS scores at T1) (block 3). Data were analysed on an intention-to-treat (regarding the different analgetics) basis.

All statistical tests were two-tailed, and differences with a *p*-value <0.05 were considered statistically significant. All data were analyzed using SPSS version 20.0.0 (IBM Corp., Armonk, NY).

Table 1: Baseline characteristics of women who did or did not complete the questionnaires (T1)

	Questionnaires completed, n=911 (66%)	**Questionnaires not completed, n=482 (34%)**	**p-value**
Maternal age in years, mean (SD)	31.6 (5.1)	31.6 (4.8)	0.98
Body mass index, mean (SD)	24.7 (4.7)	25.2 (4.7)	0.1
Gestational age in weeks, mean (SD)	39.6 (1.5)	39.4 (1.6)	0.1
Duration of labor in minutes, median (IQR)	401 (244-609)	384 (209-614)	0.6
Gravidity, median (IQR)	2 (1-3)	2 (1-3)	0.5
Ethnicity			
Caucasian, n (%)	799(70.1)	107 (73.3)	0.4[a]
Education			
Higher education, n (%)	461 (52.9)	115 (57.8)	0.4[a]

[a]Pearson chi-square
IQR=interquartile range; SD=standard deviation

RESULTS

A total of 1414 pregnant women were included in the RAVEL trial. For our analyses, women were selected who completed the W-DEQ and HADS questionnaires. During pregnancy (T1), 911 out of 1414 women (65%) and postpartum (T2), 500 out of 1414 women (35%) completed the questionnaires (Figure 1). The W-DEQ and HADS scores contained no extreme outliers, skewness, or kurtosis.

The baseline characteristics of the participants (i.e., measured at T1) are summarised in Table 1. These were similar between women who did and did not complete the questionnaires during pregnancy. Pain relief was received during childbirth by significantly more nulliparous women (68%) than parous women (49%) (χ^2=32.7, p<0.001). Mean W-DEQ scores for nulli- and parous women at T1 and T2 according to type of pain relief are presented in Table 2.

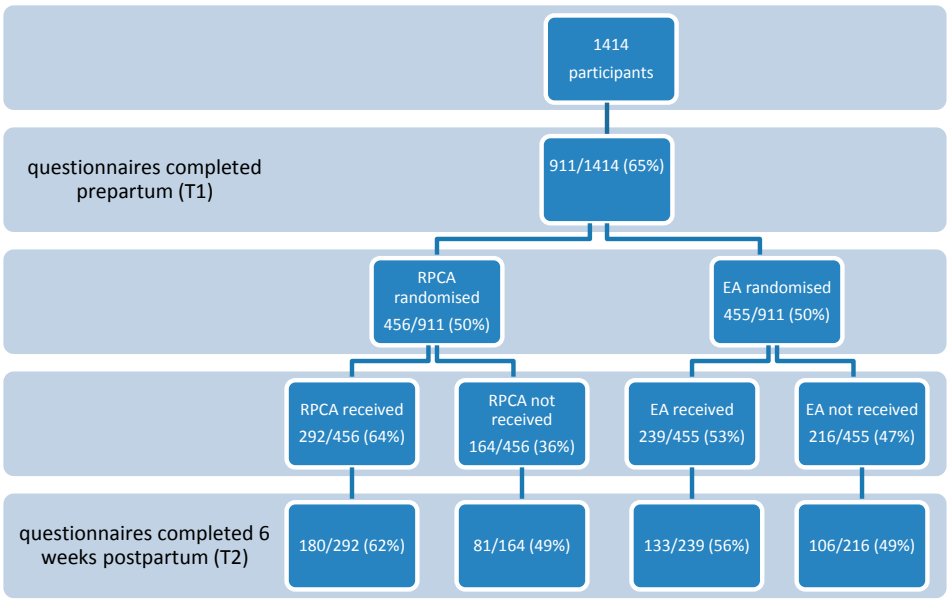

Figure 1: Flowchart of questionnaire responses in women who were allocated to receive remifentanil patient-controlled analgesia (RPCA) or epidural analgesia (EA), and who finally did or did not receive analgesia during labor.

Table 2: W-DEQ scores prepartum (T1) and postpartum (T2) for nulli- and parous women, according to type of pain relief

	W-DEQ T1 Mean (SD) n			**W-DEQ T2 Mean (SD) n**		
	nulliparous	***parous***	***Total***	***nulliparous***	***parous***	***Total***
No pain relief	60.6 (18.0) 132	60,8 (18.2) 228	60.7 (18.1) 360	49.1 (24.2) 68	51.2 (22.0) 119	50.4 (22.7) 187
Remifentanil PCA	62.7 (18.4) 151	68,3 (20.5) 125	65.2 (19.6) 276	60.9 (22.7) 96	60.0 (23.4) 84	60.5 (23.0) 180
Epidural analgesia	63.8 (16.4) 133	68.5 (18.8) 92	65.7 (17.5) 225	59.8 (21.5) 79	54.8 (24.9) 49	57.9 (22.9) 133
Total	62.4 (17.7) 416	64,5 (19.3) 445	63.5 (18.6) 861	57.2 (23.2) 243	54.8 (23.3) 252	56.0 (23.2) 495

Research question 1

Our logistic regression analysis (Table 3) revealed that having severe FOC was a significant predictor for requesting pain relief, just as being nulliparous, a previous CS and having a pre-existing disease(χ^2=58.81, df=7, p<.001).

Table 3: Logistic regression for variables predicting receiving pain relief (no/yes).

	No pain relief (n=380), n (%)	**With pain relief (n=531), n (%)**	**OR (95% CI)**	***p*-value**
Fear of childbirth				
low (W-DEQ <85)	330(92)	434(87)	1.86 (1.14-3.03)	0.01
high (W-DEQ ≥85)	30(8)	67(13)		
Parity				
Nulliparous	141(37)	299(56)	0.36 (0.26-0.51)	0.00
Parous	239(63)	232(44)		
Multiple pregnancy				
No	369(97)	507(96)	1.17 (0.54-2.54)	0.70
yes	11(3)	24(4)		
Previous Caesarean section				
No	329(87)	429(81)	2.82 (1.80-4.40)	0.00
Yes	49(13)	102(19)		
Previous vaginal instrumental delivery				
No	317(90)	497(94)	0.92 (0.53-1.60)	0.76
Yes	36(10)	33(6)		
Previous first trimester loss				
No	261(69)	358(67)	1.02 (0.75-1.40)	0.90
Yes	119(31)	173(33)		
Pre-existing maternal disease				
No	362(95)	486(90)	2.59 (1.44-4.62)	0.00
Yes	18(5)	57(10)		
Medical indication				
No	240(63)	320(59)	1.17 (0.86-1.58)	0.31
Yes	140(37)	223(41)		

Research question 2

ANOVA (n=495) showed higher postpartum W-DEQ scores for women receiving remifentanil PCA (n=180, mean=60.5) or EDA (n=128, mean=57.9) compared to women who gave birth without pain relief (n=187, mean=50.4) (F=9.5, df=2, *p*<0.001).

In the hierarchical multivariate regression analysis (see table 4), receiving pain relief (block 1) was associated with higher postpartum W-DEQ scores (partial correlation= .19, p<.001). However, after adjusting for obstetric variables (block 2) this association decreased (partial correlation=.13, p<.01) and after adjusting for the mean W-DEQ and mean HADS scores at T1(block 3), this association was no longer significant (partial correlation= .07, p=.15) (final model: F (12, 394)=21.8, p<.001, adjusted R^2=.38). W-DEQ score at T1 was a strong predictor of postpartum W-DEQ score (partial correlation=.42, p<.001). Thus, FOC during pregnancy appears to be an important mediator in the relationship between pain relief and FOC measured postpartum. Other predictors of postpartum W-DEQ score were having a CS (partial correlation =.28, p<.001) and a higher HADS anxiety score at T1 (partial correlation =.11, p<.01).

Table 4: Hierarchical multiple regression analysis for variables predicting W-DEQ score postpartum.

	Standardized coefficient Beta	t	Partial correlation Block 1	Partial correlation Block 1+ 2	Partial correlation Block 1+2+3
BLOCK 1: Pain relief					
Pain relief (no/yes)	.07	1.45	.19**	.13*	.07
BLOCK 2: Obstetric variables					
Parity (nulliparous/parous)	.02	.50		.06	.03
Onset of labour (spontaneous/induction)	-.03	-.72		-.07	-.04
Duration of active labour	.02	.38		-.02	.02
Mode of delivery (spontaneous vaginal/ VE, CS)	.26	5.87		.27**	.28**
Apgar score 5 min.	-.02	-.56		-.04	-.03
Postpartum haemorrhage	.05	1.12		.05	.06
Perineum (no laceration/rupture/ episiotomy)	.04	.86		.06	.04
Severe maternal complication (no/yes)	.04	.84		.04	.04
BLOCK 3: Psychological variables					
W-DEQ T1	.47	10.63			.42**
HADS anxiety	.14	2.80			.11*
HADS depression	-.01	-.28			-.01
Adjusted R^2			.03	.11	.38

Significance *p<.01, **p<.001

Research question 3

This hierarchical multivariate linear regression analysis included 329 women who received pain relief during labour and completed the questionnaires at T2 (i.e., postpartum). After entering type of pain relief (block 1) as well as the obstetric variables (block 2) and the psychologic variables (block 3), type of pain relief was not significantly related to W-DEQ scores postpartum.

DISCUSSION

Here, we report that women who experience severe FOC during pregnancy are more likely to request pain relief during labour, which is consistent with previous studies (3, 27). Intuitively, one might assume that receiving pharmacological pain relief during labour would reduce the level of fear experienced during childbirth. In our study, receiving pain relief during labour was related to higher levels of FOC measured postpartum. However, this effect was no longer significant after we adjusted for FOC during pregnancy, suggesting that FOC during pregnancy—rather than pharmacological pain relief—is correlated with postpartum FOC. The women who requested pain relief experienced higher FOC during pregnancy, which likely affected the way in which they experienced childbirth and would therefore predispose these women to a higher level of FOC postpartum. This notion is consistent with previous studies that found that women who experience more severe FOC during pregnancy also experience more fear both during and after childbirth (9, 28). The type of pain relief administered (EDA or remifentanil PCA) did not affect the level of FOC measured postpartum.

The RAVEL trial included only women with a medium to high risk of obstetric complications, which is both a strength and a limitation. On one hand, our sub-analyses were strengthened by including a homogeneous group of women with little difference between nulliparous and multiparous women. On the other hand, this subgroup does not necessarily represent the general Dutch population, in which approximately half of all pregnant women have a low risk of obstetric complications at the start of labour. A clear strength of this study is based on the fact that the RAVEL trial was a prospective study with a relatively large number of women with a high response rate (65%) with respect to completing the questionnaires during pregnancy. On the other hand, only 35% of the women completed the questionnaires after labour (T2).

In our cohort, 56% of all women received pharmacological pain relief during childbirth. This percentage is higher than reported for the Dutch population in 2010, in which 35% of all women who began labour under the care of an obstetrician or clinical midwife received pharmacological pain relief. The higher percentage in our study may have been due to a selection bias, given that women who are willing to be randomly assigned to receive a

particular type of analgesia during labour may be predisposed to requesting analgesia. Another possible limitation of this analysis is the randomised design of the RAVEL study. In daily practice, remifentanil PCA is administered preferably at the end of the first stage of labour, as it may not provide sufficient long-term analgesia due to a habituation effect (29). Therefore, EDA is generally indicated for women who request pain relief in the early stages of labour. However, in the RAVEL trial, women who were randomly assigned to receive remifentanil PCA, received it at the time they requested pain relief , irrespective of their stage during labour. It is therefore possible that some of the women who received remifentanil PCA did not receive adequate analgesia for a sufficiently long period, possibly leading to higher levels of FOC postpartum.

The finding that women with high FOC are more likely to request pain relief during childbirth can be explained—at least in part—by reduced pain tolerance in women who have FOC (13). One's ability to cope with or tolerate pain is related to one's expectations and cognitive appraisal of pain and giving birth (30, 31). An example of negative cognitive appraisal is having catastrophic thoughts, and women who have more catastrophic thoughts are more likely to request pharmacological pain relief during labour (32). Women with FOC must deal with negative expectations and generally unrealistic thoughts regarding the process of childbirth. Therefore, addressing these thoughts and fears can help women achieve more realistic expectations, thereby decreasing their FOC.

Other important factors that determine whether a woman can cope with labour pain include whether the woman has adequate support during childbirth and the woman's acceptance of pain, irrespective of whether she receives pain relief (30). In her review, Hodnett (18) reported that personal expectations, the level of support by caregivers, the quality of the caregiver-patient relationship, and the woman's involvement in the decision-making process are more important than pain and pain relief with respect to determining a woman's evaluation of her childbirth experience.

Our results provide important new information by showing that FOC measured postpartum depends more on FOC during pregnancy than on receiving pharmacological pain relief. By addressing the woman's FOC during pregnancy, the obstetric caregiver can increase the woman's feelings of support and control over the decision-making process. In addition, providing key information regarding the possibilities of both non-pharmacological and pharmacological forms of pain relief can strengthen the patient-caregiver relationship, ultimately improving the childbirth experience. Indeed, although every pregnant woman should be provided with an array of pain-management strategies, pharmacological pain relief should not be considered the default standard of care for relieving severe FOC.

CONCLUSION

We report that women who experience severe FOC during pregnancy are more likely to request pain relief during labour. Furthermore is antepartum FOC—rather than pharmacological pain relief—significantly correlated with (retrospective) FOC measured postpartum. No difference in postpartum FOC was found between the use of Remifentanil PCA and Epidural. Thus, in obstetric practice, addressing FOC during pregnancy is a key component in reducing fear during childbirth. Ideally, this should be performed in combination with providing the woman with options regarding pain relief.

Ethics approval and consent to participate

The RAVEL trial was approved by the Central Committee on Research Involving Human Subjects, the Medical Ethics Committee of Leiden University Medical Center (trial number p10-240), and the Boards of Directors of all participating hospitals. The trial has been registered in the clinical trial registry (NTR-2551). Prior to participation in the RAVEL study, women were asked to read and sign a consent form which informed them of the purpose of the study and they were told that that participation was voluntary.

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REFERENCES

1. Nederland. SPR. Perinatale Zorg in Nederland 2013 (Perinatal care in the Netherlands 2013). Utrecht: Stichting Perinatale Registratie Nederland. ; 2014.
2. Geissbuehler V, Eberhard J. Fear of childbirth during pregnancy: a study of more than 8000 pregnant women. J Psychosom Obstet Gynaecol. 2002;23(4):229-35.
3. Rouhe H, Salmela-Aro K, Halmesmaki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG. 2009;116(1):67-73.
4. Leap N, Sandall J, Buckland S, Huber U. Journey to Confidence: Women's Experiences of Pain in Labour and Relational Continuity of Care. Journal of Midwifery & Womens Health. 2010;55(3):234-42.
5. Hall WA, Hauck YL, Carty EM, Hutton EK, Fenwick J, Stoll K. Childbirth Fear, Anxiety, Fatigue, and Sleep Deprivation in Pregnant Women. Jognn-Journal of Obstetric Gynecologic and Neonatal Nursing. 2009;38(5):567-76.
6. Laursen M, Hedegaard M, Johansen C. Fear of childbirth: predictors and temporal changes among nulliparous women in the Danish National Birth Cohort. BJOG. 2008;115(3):354-60.
7. Areskog B, Uddenberg N, Kjessler B. Background factors in pregnant women with and without fear of childbirth. Journal of Psychosomatic Obstetrics & Gynecology. 1983;2(2):102-8.
8. Toohill J, Fenwick J, Gamble J, Creedy DK. Prevalence of childbirth fear in an Australian sample of pregnant women. Bmc Pregnancy and Childbirth. 2014;14.
9. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.
10. Kjrgaard H, Wijma K, Dykes AK, Alehagen S. Fear of childbirth in obstetrically low-risk nulliparous women in Sweden and Denmark. Journal of Reproductive and Infant Psychology. 2008;26(4):340-50.
11. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section--a cross-sectional study at various stages of pregnancy in Sweden. Acta Obstet Gynecol Scand. 2009;88(7):807-13.
12. Adams SS, Eberhard-Gran M, Eskild A. Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery. Bjog-An International Journal of Obstetrics and Gynaecology. 2012;119(10):1238-46.
13. Saisto T, Kaaja R, Ylikorkala O, Halmesmki E. Reduced pain tolerance during and after pregnancy in women suffering from fear of labor. Pain. 2001;93(2):123-7.
14. Fairbrother N, Woody SR. Fear of childbirth and obstetrical events as predictors of postnatal symptoms of depression and post-traumatic stress disorder. J Psychosom Obstet Gynaecol. 2007;28(4):239-42.
15. Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. General Hospital Psychiatry. 2004;26(4):289-95.
16. Soderquist J, Wijma B, Thorbert G, Wijma K. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. BJOG. 2009;116(5):672-80.
17. Areskog B, Uddenberg N, Kjessler B. Postnatal emotional balance in women with and without antenatal fear of childbirth. Journal of Psychosomatic Research. 1984;28(3):213-20.
18. Hodnett ED. Pain and women's satisfaction with the experience of childbirth: A systematic review. American Journal of Obstetrics and Gynecology. 2002;186(5):S160-S72.

19. Kannan S, Jamison RN, Datta S. Maternal satisfaction and pain control in women electing natural childbirth. Regional Anesthesia and Pain Medicine. 2001;26(5):468-72.
20. Lowe NK. The nature of labor pain. American Journal of Obstetrics and Gynecology. 2002;186(5):S16-S24.
21. Freeman LM, Bloemenkamp KWM, Franssen MTM, Papatsonis DNM, Hajenius PJ, van Huizen ME, et al. Remifentanil patient controlled analgesia versus epidural analgesia in labour. A multicentre randomized controlled trial. Bmc Pregnancy and Childbirth. 2012;12.
22. Freeman LM, Bloemenkamp KW, Franssen MT, Papatsonis DN, Hajenius PJ, Hollmann MW, et al. Patient controlled analgesia with remifentanil versus epidural analgesia in labour: randomised multicentre equivalence trial. Bmj-British Medical Journal. 2015;350.
23. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19(2):84-97.
24. Zar M. Diagnostic aspects of fear of childbirth. Linköping: Linköping University; 2001.
25. Snaith RP, Zigmond AS. The Hospital Anxiety and Depression Scale. British Medical Journal. 1986;292(6516):344-.
26. Spinhoven PH, Ormel J, Sloekers PPA, Kempen GIJM. A validation study of the Hospital Anxiety and Depression scale (HADS) in different groups of Dutch subjects. Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences. 1997;27(2):363-70.
27. Haines HM, Rubertsson C, Pallant JF, Hildingsson I. The influence of women's fear, attitudes and beliefs of childbirth on mode and experience of birth. Bmc Pregnancy and Childbirth. 2012;12.
28. Sluijs AM, Cleiren MPHD, Scherjon SA, Wijma K. No relationship between fear of childbirth and pregnancy-/delivery-outcome in a low-risk Dutch pregnancy cohort delivering at home or in hospital. Journal of Psychosomatic Obstetrics and Gynecology. 2012;33(3):99-105.
29. Douma MR, Verwey RA, Kam-Endtz CE, van der Linden PD, Stienstra R. Obstetric analgesia: a comparison of patient-controlled meperidine, remifentanil, and fentanyl in labour. British Journal of Anaesthesia. 2010;104(2):209-15.
30. Van der Gucht N, Lewis K. Women+¦s experiences of coping with pain during childbirth: A critical review of qualitative research. Midwifery. 2015;31(3):349-58.
31. Waldenstrom U, Bergman V, Vasell G. The complexity of labor pain: Experiences of 278 women. Journal of Psychosomatic Obstetrics and Gynecology. 1996;17(4):215-28.
32. Veringa I, Buitendijk S, de Miranda E, de Wolf S, Spinhoven P. Pain cognitions as predictors of the request for pain relief during the first stage of labor: a prospective study. Journal of Psychosomatic Obstetrics and Gynecology. 2011;32(3):119-25.

5

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 thirteen 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 Caesarean 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= .107, p<.05). Other significant predictors for high postpartum W-DEQ scores were high prepartum W-DEQ (partial r=.357) and HADS anxiety scores (partial r=.143) and the newborn in need of medical assistance (partial r=-.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.

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 judgements based on uncontrolled worrying, comprising negative automatic thoughts, play a central role in e.g. anxiety disorders.(2, 3)
By episodic foresight, i.e. the ability to both imagine future situations and organise 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 Caesarean 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 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 thirteen midwifery practices and four 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 analyse participants' obstetric files. The Medical Ethical Committee of the Leiden University Medical Centre approved the study (number P14.057).

T 1 Measures of main variables

FOC was operationalised by the Wijma-Delivery Expectancy/Experience Questionnaire (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 Caesarean 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.

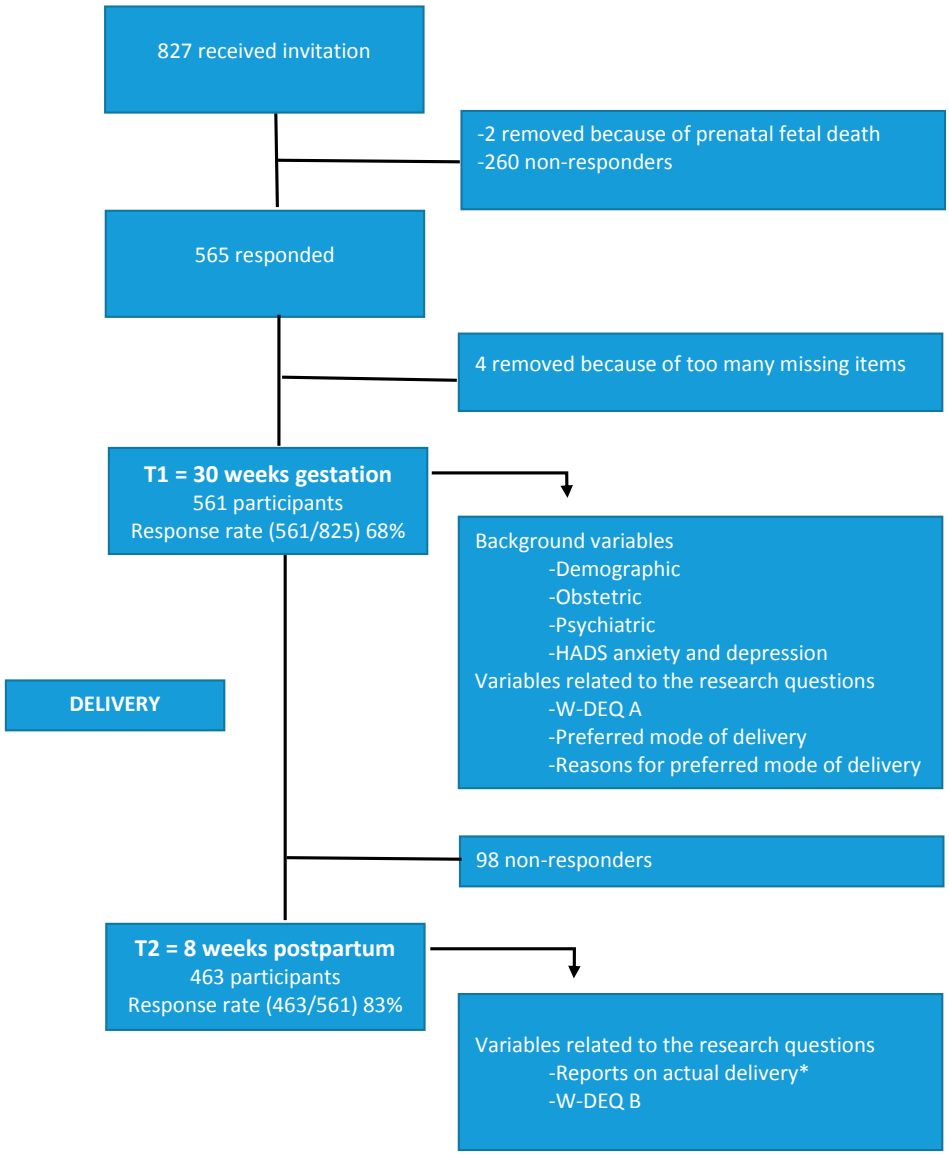

Figure 1 Flowchart and design of the study
* for this variable n= 492 as 29 reports could be added from medical files

Obstetric variables. Parity, mode (VD or CS) of previous deliveries, low risk/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 the present study for the HADS-A was 0.77 and for the HADS-D 0.72.

T 2 Measures

FOC was operationalised 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 maximise 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, afterwards 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 analysed using the software IBM SPSS Statistics 20. Statistical significance was defined as $p \leq 0.05$.

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 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 dichotomised for this analysis according to the cut off scores (W-DEQ <85/≥85, HADS anxiety <8/≥8).

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

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

	Preference Vaginal Delivery	Preference Caesarean Section
Age (n=561)		
≤25	40 (7%)	4 (6,9%)
26-35	415 (74%)	37 (63,8%)
≥36	106 (17.6%)	17 (29,3%)
Country of origin (n=561)		
The Netherlands	440 (87,5%)	49 (84,5%)
Other	63 (12,5%)	9 (15,5%)
Marital status (n=560)		
Married or cohabiting	493 (98,2%)	57 (98.3%)
Single mother	9 (1,8%)	1 (1.7%)
Education level completed (n=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 (n=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 (n=561)**		
Nulliparous	247 (49,1%)	17 (29,3%)
Parous	256 (50,9%)	41 (70,7%)
Previous Cesarean Section[a] (n=297) ***		
No	230 (89.8%)	11 (26.8%)
Yes	26 (10.2%)	30 (73.2%)
Low risk/high risk pregnancy[b] (n=561)***		
low risk	321 (63,8%)	16 (27,6%)
high risk	182 (36,2%)	42 (72,4%)
Fear of childbirth (n=548)***		
W-DEQ A < 85	449 (91.1)	41 (74.5)
W-DEQ A ≥ 85	44 (8.9)	14 (25.5)
General Anxiety (n=534)*		
HADS anxiety <8	417 (87.1%)	45 (81.8%)
HADS anxiety ≥8	62 (12.9%)	10 (18.2%)

Table 1: Continued

	Preference Vaginal Delivery	Preference Caesarean Section
Depression (n=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 (n=534)		
No	387 (80.8%)	46 (83,6%)
Yes	92 (19.2%)	9 (16.4%)

[a]Only for parous women. [b]Definitions. Low risk: taken care of by a community midwife at 30 wks of pregnancy; high risk: taken care of by an obstetrician/a clinical midwife at 30 weeks of pregnancy.
** p=.05, **p<.01, *** p<.001*

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 (ElCS) (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. As expected, W-DEQ scores decreased in most groups from T1 to T2 except for nulliparous women preferring a VD and having a CS.

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 were 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%

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 (see Table 1). The following (dichotomous) variables were evaluated as predictors: W-DEQ <85/≥85, parity, previous CS, low/high risk pregnancy and HADS anxiety <8/≥8. Results (Table 3) 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=. 36) of this model indicates a strong relationship.

Table 3: logistic regression for variables predicting preferred mode of delivery (VD or CS)

	B	S.E.	Wald	df	Exp(B)	95% C.I.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 risk /high risk pregnancy	0.56	0.40	1.99	1.0	0.16	0.8-3.8
Anxiety T1 (HADS anxiety ≥8)	-.03	0.44	0.00	1.0	0.95	0.4-2.3

(χ^2=100.7, df=5, p<.001, Nagelkerke R^2=.36)
****p<.001*; T1 = 30 weeks of gestation.

What is the relation between prepartum FOC and actual mode of delivery?
The same analysis as in Step 1 was performed to predict actual mode of delivery (χ^2=117.5, df=5, p<.001, Nagelkerke R^2=.35). Results show that severe FOC at T1 was a significant predictor for an actual CS (Exp (B) 2.3, B coeff .84, p=.049), also when adjusted for parity and obstetric history with previous CS, low/high risk pregnancy and HADS anxiety at T1.

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)**		**Severe FOC T1 (W-DEQ ≥85) n(%)**	**W-DEQ T2 (Total n=455#)**		**Severe FOC T2 (W-DEQ ≥85) n(%)**
	n	M/SD		n	M/SD	
VD →VD	386	59.9/18.2	30 (8%)	361	47.4/22.1	15(4%)
VD→CS	56	65.3/16.9	6 (11%)	49	64.6/28.7	7(15%)
CS→VD	21	79.5/21.4	6 (30%)	19	63.6/25.0	3(16%)
CS→CS	29	68.3/21.2	7 (24%)	26	57.6/24.6	3(12%)

#n drop outs=37

Note: PAC= Preferred Actual Congruence of mode of delivery, VD=vaginal delivery, CS=Cesarean Section, FOC=Fear of Childbirth, EmCS=Emergency CS, ElCS=Elective CS.

PAC Divided for parity/ previous mode of delivery	W-DEQ T1 (total n=492)			W-DEQ T2 (total n=455#)			W-DEQ T2 EmCS/ElCS			
	n	M	Min-max	n	M	Min-max	Em/ElCS	n	M	Min-max
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				
							EmCS	26	77.1	34-135
Nulliparous	40	66.0	26-105	35	68.0	15-135	ElCS	9	53.2	15-96
							EmCS	4	57	21-111
Parous previous VD	6	69.2	42-92	4	57	21-111	ElCS	0		
							EmCS	4	52.5	21-85
Parous previous CS	10	60.1	29-79	10	45.5	18-85	ElCS	6	40.8	18-66
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				
							EmCS	2	65	60-70
Nulliparous	6	85.3	50-112	6	65.3	42-104	ElCS	4	65.5	42-104
Parous previous VD	0			0						
							EmCS	2	52	45-59
Parous previous CS	23	63.9	39-110	20	55.3	17-108	ElCS	18	55.7	17-108

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 score (T1, T2) as within subjects time 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 (2nd block) and psychological variables (3rd 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, we evaluated the obstetric variables: parity, low/high risk pregnancy and condition of the newborn at 5 minutes. 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 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.

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=.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	.101	2.276	.224***	.113*	.107*
CS→ CS	.005	.114	.102*	.048	.005
CS→ VD	.035	.843	.139**	.129**	.040
BLOCK 2: Obstetric variables					
Condition of the newborn (good/needed medical assistance)	-.160	-3.611		-.182***	-.169***
Parity (nulliparous/parous)	-.055	-1.269		-.139**	-.060
Low risk /high risk pregnancy	.061	1.421		.104*	.067
BLOCK 3: Psychological variables					
W-DEQ T1	.362	8.065			.357***
HADS anxiety T1	.131	3.047			.143**
Mental health problems at T1 or in past (no/yes)	.082	2.020			.095*
Adjusted R^2			.06	.11	.28

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

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 prepartum 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.
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 condition 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 labour, 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 focussed 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 more 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 ElCS. 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→ElCS for a separate analysis.

CONCLUSION

Particularly at risk for severe FOC postpartum are 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.

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REFERENCES

1. Suddendorf TB, A;Miloyan, B;. Prospection and natural selection. Current Opinion in Behavioral Sciences. 2018;24:26-31.
2. Miloyan B, Bulley A, Suddendorf T. Anxiety: Here and Beyond. Emotion Review.0(0):1754073917738570.
3. Miloyan B, Pachana NA, Suddendorf T. The future is here: a review of foresight systems in anxiety and depression. Cognition & emotion. 2014;28(5):795-810.
4. Zar M, Wijma K, Wijma B. Relations between anxiety disorders and fear of childbirth during late pregnancy. Clinical Psychology & Psychotherapy. 2002;9(2):122-30.
5. Rouhe H, Salmela-Aro K, Gissler M, Halmesmaki E, Saisto T. Mental health problems common in women with fear of childbirth. Bjog-An International Journal of Obstetrics and Gynaecology. 2011;118(9):1104-11.
6. Wiklund I, Edman G, Andolf E. Cesarean section on maternal request: reasons for the request, self-estimated health, expectations, experience of birth and signs of depression among first-time mothers. Acta Obstetrica et Gynaecologica Scandinavica. 2007;86:451-6.
7. Wiklund I, Edman G, Ryding EL, Andolf E. Expectations on and experiences of childbirth in primiparae with caesarean section. 2007.
8. NationalInstituteforClinicalExcellence. Caesarean Section. London: National Collaborating Centre for Women's and Children's Health; 2004.
9. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section--a cross-sectional study at various stages of pregnancy in Sweden. Acta Obstet Gynecol Scand. 2009;88(7):807-13.
10. Ryding EL, Lukasse M, Kristjansdottir H, Steingrimsdottir T, Schei B. Pregnant women's preference for cesarean section and subsequent mode of birth - a six-country cohort study. Journal of Psychosomatic Obstetrics & Gynecology. 2016;37(3):75-83.
11. Tschudin S, Alder J, Hendriksen S, Bitzer J, Popp KA, Zanetti R, et al. Previous birth experience and birth anxiety: predictors of caesarean section on demand? Journal of Psychosomatic Obstetrics and Gynecology. 2009;30(3):175-80.
12. Perined. Perinatale Zorg in Nederland 2016 (Perinatal care in the Netherlands 2016). Utrecht: Perined, 2018.
13. gynecology) NDofoa. Richtlijn indicatiestelling sectio caesarea (guideline indication cesarean section) 2011 [updated 3/23/2011]. Available from: http://nvog-documenten.nl/index.php?pagina=/richtlijn/pagina.php&fSelectTG_62=75&fSelectedSub=62&fSelectedParent=75.
14. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19(2):84-97.
15. Zar M. Diagnostic aspects of fear of childbirth. Linköping: Linköping University; 2001.
16. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale - An updated literature review. Journal of Psychosomatic Research. 2002;52(2):69-77.
17. Sluijs AM, Cleiren MPHD, Scherjon SA, Wijma K. No relationship between fear of childbirth and pregnancy-/delivery-outcome in a low-risk Dutch pregnancy cohort delivering at home or in hospital. Journal of Psychosomatic Obstetrics and Gynecology. 2012;33(3):99-105.
18. Ryding EL, Wijma K, Wijma B. Experiences of emergency cesarean section: A phenomenological study of 53 women. Birth. 1998;25(4):246-51.

19. Lundgren I, Begley C, Gross MM, Bondas T. 'Groping through the fog': a metasynthesis of women's experiences on VBAC (Vaginal birth after Caesarean section). Bmc Pregnancy and Childbirth. 2012;12.
20. Barlow DH. Anxiety and its disorders. 2nd edition ed. New York: Guilford Press; 2004.
21. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.
22. Saisto T, Toivanen R, Salmela-Aro K, Halmesmaki E. Therapeutic group psychoeducation and relaxation in treating fear of childbirth. Acta Obstet Gynecol Scand. 2006;85(11):1315-9.
23. Saisto T, Halmesmaki E. Fear of childbirth can be treated, and cesarean section on maternal request avoided. Acta Obstet Gynecol Scand. 2007;86(9):1148-9.
24. Nieminen K, Andersson G, Wijma B, Ryding EL, Wijma K. Treatment of nulliparous women with severe fear of childbirth via the Internet: a feasibility study. Journal of psychosomatic obstetrics and gynaecology. 2016;37(2):37-43.
25. Klabbers GA, Wijma K, Paarlberg KM, Emons WHM, Vingerhoets A. Haptotherapy as a new intervention for treating fear of childbirth: a randomized controlled trial. Journal of psychosomatic obstetrics and gynaecology. 2017:1-10.

6

Is fear of childbirth related to the woman's preferred location for giving birth? A Dutch low risk cohort study

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ABSTRACT

Background

In the Netherlands, women with low-risk pregnancy are routinely given the option of home birth, providing a unique opportunity to study the relationship between fear of childbirth (FOC) and preference for childbirth location, as well as whether women experience higher FOC when the actual location differs from their preference.

Methods

In this prospective cohort study, 331 nulliparous and parous women completed a questionnaire at gestational week 30 (T1) and two months postpartum (T2). FOC was assessed using versions A (T1) and B (T2) of the Wijma Delivery Expectancy Questionnaire (W-DEQ).

Results

At T1, women who preferred home birth had significantly lower FOC compared to women who preferred a hospital birth (mean±SD W-DEQ scores: 55±19.8 and 64±18.3, respectively; $p<0.01$). 28% of women who responded at T2 gave birth at home. Congruence between the preferred and actual childbirth location was not predictive of FOC assessed at T2 when adjusted for obstetric and psychological variables. In an extended analysis we found that except for prepartum FOC the following variables also correlated with postpartum FOC: being referred due to complications, and poor neonatal condition.

Conclusions

Compared to women who prefer hospital birth, women who prefer home birth have lower prepartum and postpartum FOC. Giving birth at a location other than the preferred location does not appear to affect postpartum FOC. Whether giving birth at home or in the hospital, caregivers should pay extra attention to women with high FOC because they are vulnerable to postpartum FOC especially after a complicated birth and referral.

INTRODUCTION

In most Western countries, most pregnant women choose to give birth in a hospital, even in the case of a low-risk pregnancy. In contrast, in the Netherlands approximately half of all pregnant women, being low-risk, are given the option of choosing either home birth or a hospital birth under the care of a midwife (1). Although, of all births, the percentage of home births declined in the past decade from nearly 30% to approximately 13% (1), this rate is still relatively high compared to other Western countries, in which only 0.5-2.2% of births occur at home (2).
In the Netherlands, women with a low-risk pregnancy typically receive their pre- to postpartum care from a trained, licensed midwife. However, the woman can be referred to an obstetrician if the mother and/or child's risk profile changes, for example due to pregnancy-induced hypertension, prolonged labor, or postpartum hemorrhage. In addition, women who remain low-risk but request pain relief during labor are also referred to an obstetrician. Referral during a home birth involves handing over the responsibility from the midwife to an obstetrician and transport to the hospital.

The choice of a home birth is in most Western countries considered as unusual and 'alternative'. Those women are often well-educated, older (3-5), want to have control and continuity of care (6) and are less anxious about birth (4). In the Netherlands, when having low risk for complications, the option of home birth has been considered as normal for a long time, especially in rural regions. Here, home birth preference is related to the confidence of family and friends in home birth (7, 8), higher education (in highly urbanized areas) (9), the wish to remain in familiar surroundings at home and the need for personal autonomy (10). Factors associated with a preference for hospital delivery are the expected safety in the hospital, and the wish to minimize risks (11, 12).

The experiences of family and friends, and birth stories in social media can influence the woman's ideas about giving birth (7, 13, 14). The magnitude of that influence depends largely on the woman's trust in her own capabilities, as well as her general response to uncertain situations, which—in the case of anxiety—can reveal itself as fear of childbirth (FOC) in the peripartum period (15). Most women experience some degree of FOC, according to Wijma and Wijma (16). Severe FOC occurs when the delivery arouses fear to such a degree that it significantly impairs the woman's personal, social, relational, and/or professional life, as well as her willingness to become pregnant and/or her perceived competence to give birth. FOC is specifically related to labor and delivery, yet half of those with severe FOC also suffer from another kind of anxiety problem (16).

A woman with severe FOC may be unable to objectively process information regarding her upcoming childbirth, because in general anxiety-prone individuals are easily triggered by negative information (17), they may evaluate their situation in search of signs of danger, and may attempt to avoid anything related to the fear-inducing situation (18). For example, a woman may overestimate the risk of experiencing severe health problems either herself or by her child during birth or overestimate the risk of medical interventions in a hospital birth. Therefore FOC will likely play a role in the preferred location for giving birth. Witteveen et al. (19) reported 'more often pregnancy related anxiety in Dutch low risk women with planned hospital birth' compared to women with planned home birth, which concept roughly corresponds with FOC. However, in our study in 2005 (7) we did not find a difference in FOC between women preferring home or hospital birth. Moreover, we found increased FOC several weeks postpartum in the group of women who had, due to medical risk, undergone a compulsory move from home to hospital during labor. A woman who prefers home birth but ultimately gives birth in a hospital may have to deal with peripartum complications as well as giving birth in an environment that differs from her original preference, and this may exacerbate the level of FOC. However, the 2005 study was small and meanwhile in the Netherlands the home birth rate has rapidly declined.

The purpose of this study is to test the following two hypotheses in a larger sample:

1. Women who prefer a home birth have a lower degree of FOC during pregnancy than women who prefer a hospital birth.
2. Women who give birth at a location other than their preferred location experience a higher level of FOC than women who give birth at their preferred location.

METHODS

We included women who were in gestational week 30 of a singleton pregnancy and had a good command of the Dutch language. Using a web-based questionnaire, the total study sample consisted of 565 low and high-risk participants, with a response rate of 68% of the 825 women who received a request by e-mail. For the present study, we identified 331 women who were at low risk for pregnancy-related complications and were under the care of a licensed midwife (see Fig. 1). Women who had a high-risk pregnancy or previously had delivered via cesarean section (CS) were excluded.

Design The prospective cohort study included 13 midwife practices in the southwestern part of the Netherlands, including both urban and rural areas. Participants were recruited from July 2014 through May 2015. At gestational week 20, eligible candidates received an information letter, including a link to the study's website. At gestational week 30

(defined here as T1), the participants received an email with a link to the first set of online questionnaires. Two months postpartum (T2), all participants who completed the questionnaire at T1 were emailed with a link to the second set of questionnaires. As needed, up to five reminders were sent. Participants provided written informed consent for our researchers to analyze their obstetric files. The response rate at T2 was 83%. The study was approved by the Medical Ethics Committee of the Leiden University Medical Center (number P14.067).

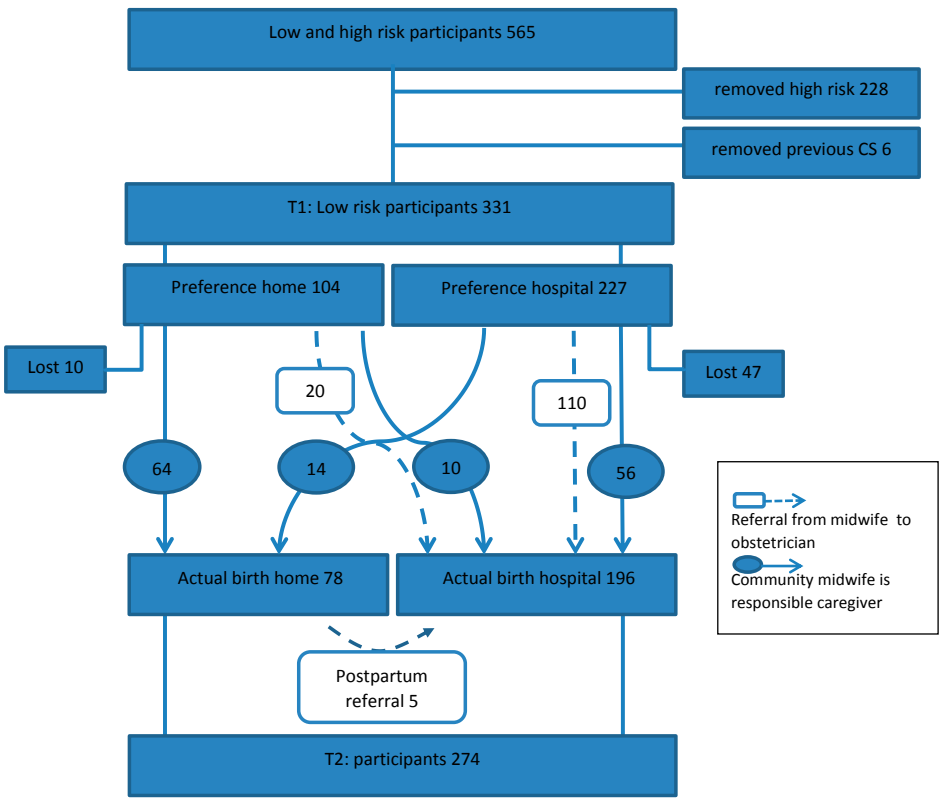

Figure 1. Flow chart showing the inclusion and exclusion of participants in the current study, the Netherlands, 2015-2016.

Measures

The following sociodemographic data were collected at T1: age, marital status, education level, employment status, and country of birth. At T1 and/or T2 self-reported obstetric data were collected: parity, referral (yes/no) and indication for referral, preferred and actual location for giving birth, transport during/after labor

(yes/no and means of transportation if relevant), method of labor onset (natural/induced), use of pain relief (yes/no), delivery mode (vaginal birth/CS), and neonatal condition.

Preferred place of birth was determined using the question "If you could choose, would you prefer a home birth or hospital birth?", followed by an open question designed to determine the reasons for this preference. We developed a "congruence" variable by combining preferred and actual place of birth, with four possible outcome groups: home-home, hospital-hospital (preferred location congruent with actual birth location), home-hospital and hospital-home (actual location incongruent with preferred location).

Referral was defined as handing over of the responsibility for the woman's obstetric care from the midwife to an obstetrician due to: i) complications during pregnancy, labor, delivery, or within 2 hours postpartum, ii) the woman's request of pharmacological pain relief.

Fear of childbirth (FOC) was measured at T1 (version A) and T2 (version B) of the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ), a 33-item self-assessment rating scale. The original Swedish version is well-validated (20, 21) and includes 33 statements regarding giving birth with answers to be rated on a scale of 0-5, yielding a final total score of 0 to 165. A higher W-DEQ score indicates a higher level of FOC. A score ≥85 indicates severe FOC, whereas a score <85 represents a continuum ranging from no FOC to manageable FOC (16). Wijma et al. previously reported that the internal reliability (Cronbach's alpha) of the W-DEQ is 0.93 and 0.94 for versions A and B, respectively, and the split-half reliability for both versions is >0.90 (20). Consistent with this high degree of reliability, in our study Cronbach's alpha was 0.90 and 0.92 for versions A and B, respectively. Mentions of FOC in the following text refer to W-DEQ scores.

FOC is a distinct psychological construct, separate from general anxiety (20). Therefore, at T1 we added the Hospital Anxiety and Depression Scale (HADS) to accentuate and statistically control for the difference between FOC, and general anxiety and depression. HADS is designed to detect depression and anxiety among patients in a non-psychiatric clinic (22) and includes two 7-item subscales (one for anxiety and one for depression), each with a total score ranging from 0 to 21. For each subscale, a score ≥11 is considered to represent clinically important signs of general anxiety or depression. In our study, Cronbach's alpha was 0.77 and 0.72 for the anxiety and depression subscales, respectively. A history of mental health problems (no/yes) was also asked for at T1.

Data analysis

For statistical analyses, we used IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, NY). Groups were compared using Pearson's chi-square test (for categorical variables) or the Student's t-test (for continuous variables). By scanning primary data for words and phrases most commonly used by respondents, the reasons for preference of home or hospital birth were evaluated.

In the following tests the W-DEQ score was used as a continuous variable. Differences in W-DEQ scores between T1 and T2 were tested using a repeated measures ANOVA. Predictors for the preferred place of giving birth were evaluated using a logistic regression analysis.

A hierarchical multiple regression analysis was performed to analyze potential predictor variables of postpartum FOC. The mean W-DEQ score (T2) was the dependent variable. We entered potential predictor variables of postpartum FOC in three consecutive stepwise blocks (Congruence groups, Obstetrical characteristics, and Psychological precondition) in order to observe a weight shift in the previously entered general predictor variables upon the addition of detailed personal predictors. This approach provides a more concise evaluation of the role of each variable from each domain. As referral to obstetrician-led care is required in order to induce labor, to deliver using obstetric instruments, and/or to provide pharmaceutical pain relief, we only used the variable "Referral" in the analysis. The home-home group was used as a reference group, as they had the lowest W-DEQ scores.

RESULTS

At T1, 31% of the participants (104/331) reported that they preferred home birth, while the remaining 69% preferred a hospital birth (Figure 1). At T2, 28% of those still remaining in the study (78/274) had given birth at home, while the remaining 72% (196/274) had given birth at hospital.

Some commonly cited reasons for preferring a home birth were that respondents: wanted a familiar and comfortable setting, found it easier to relax at home, had heard positive experiences from family or friends, wished to avoid the presence of numerous medical staff while giving birth, and had a general fear of hospitals. Some commonly cited reasons for preferring a hospital birth were that respondents: felt safer with the availability of medical equipment, specialists, and pharmacological pain relief, felt their home was an inconvenient place to give birth, and wished to avoid the need for transport during labor in the event of complications.

A significantly higher percentage of women preferring home birth were multiparous, worked part-time, and reported a history of mental problems than women preferring hospital birth (Table 1). In addition, the women preferring home birth had a lower degree of FOC, including a lower prevalence of severe FOC ($p<0.05$) and lower mean W-DEQ scores (Table 1).

Of the 274 women who completed the questionnaires at T2, a significantly higher percentage of women who preferred hospital birth were referred to an obstetrician (61%, 110/180) than women who preferred home birth (21%, 20/94) ($p<0.001$). In addition, five of the women who gave birth at home were subsequently referred to hospital due to postpartum complications, three had preferred home birth, and the other two hospital birth. The main reason cited for referral during labor was to augment labor. In addition, 50% of all women being referred also received pain relief.

At T1, 11% of the entire cohort had severe FOC, while at T2 only 6% reported having severe FOC. The HADS-anxiety and HADS-depression scores correlated significantly with the W-DEQ scores both at T1 ($r=0.31$ and $r=0.28$, respectively) and at T2 ($r=0.39$ and $r=0.33$, respectively).

Our results generally support our first hypothesis, as women preferring home birth had a significantly lower level of FOC at T1 than women preferring hospital birth, (Table 1).
A logistic regression analysis revealed similar results. After adjusting for parity, education, and a history of mental health problems, women with higher FOC were more likely to prefer a hospital birth (OR: 1.02, $n=316$, $p<0.001$).

In contrast, our findings do not support hypothesis 2. We found that when prepartum FOC was taken into account, the presumed effect of 'incongruence of preferred and actual place of birth' on postpartum measured FOC could not be demonstrated.
To reach this conclusion first FOC (mean W-DEQ scores) at T1 and T2 was examined for the four 'congruence' groups (Figure 2). FOC in each group was higher at T1 than at T2 ($p<0.001$). The only difference found between the four groups was that women in the home-home group had a lower degree of FOC at both T1 and T2 than women in the hospital-hospital group ($p<0.001$) (repeated measures ANOVA using Bonferroni post hoc correction).

Table 1. Chacteristics of pregnant women at 30 weeks of gestation (T1) preferring home or hospital birth, the Netherlands 2015-2016

	Preference home n=104 n(%) or Mean±SD	Preference hospital n=227 n(%) or Mean±SD
Age		
≤25	7 (6.7)	21 (9.3)
26-35	80 (77.0)	177 (78.0)
≥36	17 (16.3)	29 (12.7)
Educational level finished		
Elementary/high school	6 (6.0)	24 (10.6)
Vocational education (associates degree)	21 (20.0)	64 (28.2)
University (bachelor/master)	77 (74.0)	139 (61.2)
Country of origin		
Netherlands	95 (91.3)	198 (87.2)
Other	9 (8.7)	29 (12.8)
Work **		
Full time	31 (29.8)	105 (46.3)
Part time	60 (57.7)	74 (32.6)
Unemployed/other	13 (12.5)	48 (21.1)
Marital status		
Married/cohabiting	102 (99.0)	224 (99.0)
Single mother	1 (1.0)	3 (1.0)
Mental problems now or in past *		
No	78 (75.7)	183 (86.7)
Yes	25 (24.3)	28 (13.3)
Parity***		
Nulliparous	41 (39.8)	149 (66.2)
Multiparous	62 (60.2)	76 (33.8)
Severe FOC *		
W-DEQ<85	98 (94.0)	189 (86.0)
W-DEQ≥85	6 (6.0)	31 (14.0)
Mean W-DEQ score **	55 ±19.8	64 ±18.3
HADS anxiety score	5 ±3.4	5 ±2.8
HADS depression score	3 ±2.9	3 ±2.6

Numbers may not add to totals due to unknown responses.
**p<.05 **p<.01 ***p<.001*

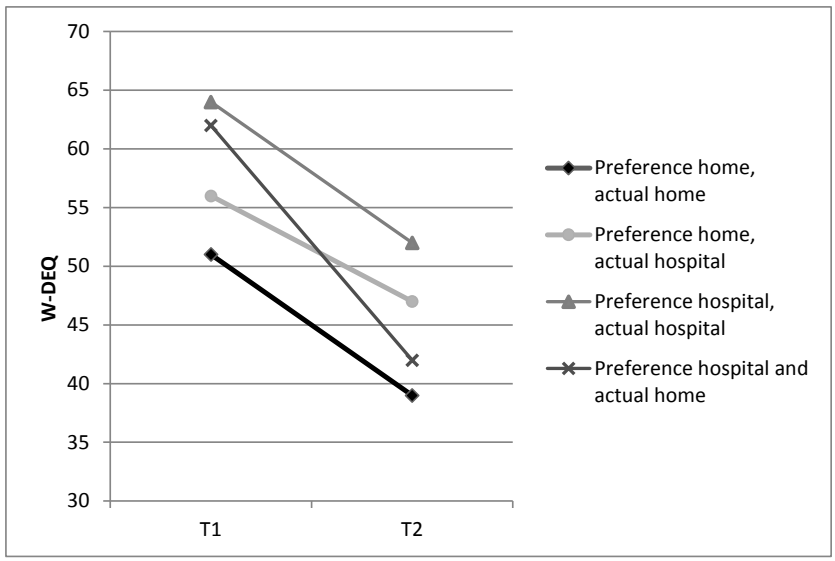

Figure 2. Mean W-DEQ scores in the indicated groups based on their initial preference at T1 and their actual place of giving birth (reported at T2), the Netherlands, 2015-2016.

The hierarchical multiple regression analysis (Table 2) also shows that the hospital→hospital group predicts higher postpartum FOC than the home→home group, while the two incongruent groups did not (block 1). However, after adding the obstetric variables to the model (block 2), the predictive role of preferred/actual place of birth is overtaken by obstetric predictors. The obstetric variables continue to have predictive value after adding psychological predictors (block 3). After including all variables, the model showed that the incongruence of preferred and actual place of birth did not predict postpartum FOC. However, a high degree of FOC at T1, high general anxiety at T1, a poor neonatal condition, and being referred to an obstetrician due to complications were related to higher postpartum FOC. This final model is statistically significant in predicting postpartum FOC ($p<0.001$, adjusted $R2=0.27$). This indicates that there are two major groups of women who are prone to postpartum FOC: those who have had medical complications concerning themselves or the baby, and those who already prepartum feared the delivery or had a more general anxiety.

In our final regression model, referral emerged as an important factor. Therefore, we examined the relationship between referral and both prepartum and postpartum FOC using a repeated measures ANOVA. We found that women who were referred to an obstetrician had a higher degree of FOC at T1 ($p<0.01$), a smaller decrease in FOC measured at T2 ($p<0.05$), and a higher degree of FOC measured at T2 ($p<0.01$) than women not referred (Figure 3). Overall, we found that among the women who were referred, FOC measured at T2 was generally similar for the women who preferred home birth and the women who preferred a hospital birth.

Table 2: Correlation (partial r) of preferred-actual place of birth with W-DEQ scores two months postpartum, controlling for obstetric and psychological variables, the Netherlands 2015-2016

	Standard coefficient Beta	t	Partial r Block 1	Partial r Block 1+2	Partial r Block 1+2+ 3
Block 1 Preferred-Actual place of giving birth					
Home-hospital	-.03	-.41	.09	-.01	-.03
Hospital-hospital	.02	.24	.22***	.06	.02
Hospital-home	-.03	-.52	.03	.005	-.03
Block 2 Obstetric variables					
Neonatal condition (needed help/ good)	-.18	-3.40		-.22***	-.21**
Referral from 30 wks pregnancy till 2 hours postpartum (no/yes)	.19	3.13		.21**	.19**
Parity (nulli/parous)	-.06	-1.10		-.14*	-.07
Block 3 Psychological variables					
W-DEQ T1	.30	5.00			.30***
HADS anxiety T1	.12	2.08			.13*
Adjusted R^2			.04	.17	.27

**p<.05 **p<.01 ***p<.001*

Focusing on the 23 women who initially preferred home birth but were referred to an obstetrician, we found that ten were referred during pregnancy, ten during labor (all transported with their own vehicle), and three were sent to hospital postpartum (of which two women were transported by ambulance). Among these 23 women, only two—both of whom were referred during pregnancy—had severe FOC measured at T2.

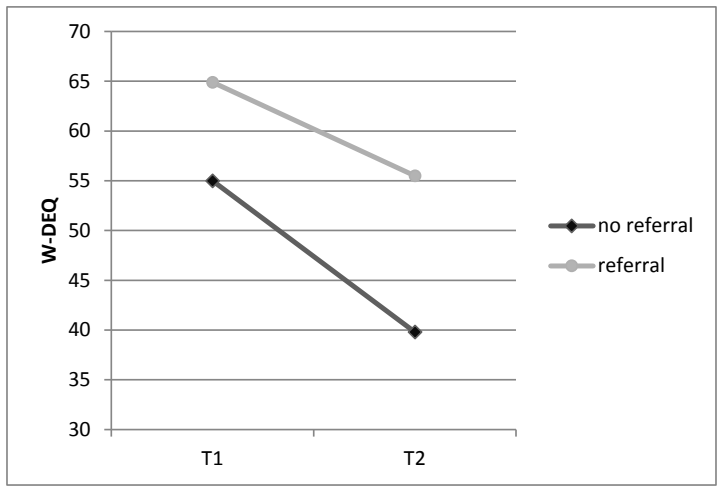

Figure 3. Mean W-DEQ scores at T1 and T2, in women who remained under the care of their midwife (no referral) and in women who were referred to an obstetrician during pregnancy, during labor, or within 2 hours of delivery, the Netherlands, 2015-2016.

DISCUSSION

In support of our first hypothesis, our data show that women who prefer a hospital birth generally have a higher degree of FOC than women who prefer a home birth, irrespective of parity.

Consistent with previous reports (23-29), we found that women who prefer a hospital birth have a higher likelihood of being referred to an obstetrician and receiving medical interventions than women preferring home birth. As this group has an overrepresentation of women with a high degree of FOC, you may presume that these women desire a secure environment for giving birth, feel less confident in their ability to give birth (30), and generally have a strong desire for pharmacological pain relief (31) , which all could be reasons for hospital birth preference. Importantly, the reasons for preferring a particular birth location and/or for referral to an obstetrician may be more complicated than meets the eye and could be motivated partly by psychological reasons(32).

The preference for birth location in women with severe FOC may be based on anxiety-inducing images instead of on rational considerations. This phenomenon of threat-related attentional bias has been well-documented in anxious individuals (33). Likewise, judgment of perceived risks is systematically biased in all women who have severe FOC, thereby causing an overestimation of the likelihood of critical—albeit rare—events

such as losing the child, and/or an underestimation of the risks associated with less critical—but relatively common—adverse events such as the need to deliver by CS (34). Anecdotal stories from family, friends, and social media, as well as information available via the Internet can reinforce these biases. The woman's emotions connected to a desired or undesired outcome (i.e., her intuitive evaluation) can lead to judgment bias regarding the risks (34, 35). These emotions can be particularly strong and persistent in women who are prone to fear and can guide not only the decision regarding where to give birth but also the interpretation of the childbirth experience.

Our results do not support our second hypothesis. Specifically, we found that giving birth at a location other than the woman's preferred location is not a predictor of a high level of FOC measured postpartum, after we adjusted for the variables "being referred" and "FOC during pregnancy".
Our prediction model shown in Table 2 revealed that a high level of postpartum FOC is associated with high prepartum FOC (consistent with previous studies (27, 36)), being referred to an obstetrician, and a poor neonatal condition. The latter two findings may be interpreted as signs of medical interventions and/or complications during labor, which have earlier been shown to increase the risk of postpartum FOC (37, 38).

Although FOC, general anxiety, and depression were interrelated in our study, FOC clearly appears as a separate predictive construct. In our analyses, prepartum FOC holds up as a clearly discernable psychological variable in its own right, constituting a significant predictor of postpartum FOC even when general anxiety and depression are controlled for.

We found that women who initially preferred home birth but were referred to an obstetrician (in pregnancy or during labour) did not have a higher level of postpartum FOC than women being referred who initially preferred a hospital birth. This finding may seem surprising, as women who prefer home birth, but are referred to the hospital may need to adjust to the concept of receiving medical care in a more clinical setting. However, the women who initially preferred a home birth generally had lower FOC, which is strongly correlated with a lower level of FOC measured both while giving birth and postpartum (36). Women with a lower level of FOC generally feel more confident in their ability to give birth (30) and may therefore be less focused on medical interventions such as pain relief. Rather, these women may focus more strongly on information that increases their confidence in giving birth, thereby helping them to reduce potential anxiety. Some of these women may also have been referred during pregnancy and have therefore had time to adjust to the change in location.

In addition to the above-mentioned factors, the obstetric system itself also plays an important role. Most referrals to an obstetrician do not necessarily arise due to an acute situation (39) and that was the case also in our study. Moreover, in the obstetric system where this study took place, the midwife responsible for the home birth accompanied the woman to hospital whenever possible. Other researchers have discussed how particularly fearful women can benefit from such continuous, familiar support (40, 41).

Strengths and limitations

A strength of this study is its prospective design, which allowed us to follow women from gestational week 30 to 2 months postpartum. In addition, FOC was measured using the W-DEQ, an established and broadly validated instrument used in many countries.

In our cohort, both prepartum FOC and postpartum FOC were generally low, as we intentionally selected women with a low-risk pregnancy. Thus, the average level of FOC among our participants is not necessarily comparable to most studies regarding FOC. Nevertheless, the high percentage of women who preferred home birth and indeed gave birth at home provides empirical insight into a cultural setting in which home birth is considered the standard option rather than an alternative. Conversely, this may be seen as a limitation with respect to the generalizability of our results, as this situation does not necessarily apply to countries that have a much lower rate of home birth rates than the Netherlands. An innate limitation of the study's design is that causality cannot be directly inferred from the identified associations.

CONCLUSIONS

We found that women who prefer home birth have a lower level of FOC than women who prefer a hospital birth. Interestingly, we also found that women who initially prefer a hospital birth are more likely to be referred to an obstetrician. Finally, we found that a high level of prepartum FOC, being referred to an obstetrician, and a poor neonatal condition predict a high level of FOC measured postpartum, whereas giving birth at a location other than the preferred location does not appear to affect postpartum FOC. Women with high FOC might give birth at home as well as in the hospital, but caregivers should pay extra attention to them because they are vulnerable to postpartum FOC especially after a complicated birth requiring a referral.

Table 3, Supplemental information: Distribution of W-DEQ scores at T1 and T2 over the four congruence groups, subdivided according to parity and referral

Preferred/Actual location of giving birth	**W-DEQ T1**		**FOC T1 W-DEQ≥85**	**W-DEQ T2**	
	n (274)	M (SD)	n(%)	n (270)	M (SD)
Home/home	64	51.2 (16.6)	1 (1.6)	64	39.3 (18.8)
Home/hospital	30	56.9 (22.2)	3 (10)	29	46.6 (29.6)
Hospital/hospital	166	64.3 (18.1)	21 (12.7)	164	52.1 (23.8)
Hospital/home	14	58.9 (18.2)	1 (7.1)	13	40.7 (15.8)

*1.complication resolved, back to midwife before giving birth 2.postpartum hemorrhage
**1.manual placenta removal , 2.3th degree rupture, 3. and 4.complication resolved, back to midwife before giving birth
*** postpartum hemorrhage
****3th degree rupture

	FOC T2 W-DEQ≥85	Parity	referral	W-DEQ T1		W-DEQ T2	
	n(%)			N (271)	M min-max	N (267)	M min-max
	1(1.6)	nulli	no	22	58.1 20-89	22	42.8 12-84
			yes	2*	67.5 56-79	2	54.5 44-65
		parous	no	35	46.7 12-75	35	35.6 8-85
			yes	4**	44.8 37-52	4	44.3 26-52
	2 (6.9)	nulli	no	3	71.3 64-81	3	49.7 41-65
			yes	9	54.6 26-78	9	52.4 13-117
		parous	no	7	58.1 24-114	7	33.7 9-60
			yes	11	54.0 25-90	10	49.3 10-114
	12 (7.3)	nulli	no	29	66.9 46-99	29	45.3 14-117
			yes	86	68.5 30-112	84	59.5 11-131
		parous	no	26	48.7 24-101	26	36.5 10-83
			yes	23	64.9 24-104	23	52.9 23-86
	0	nulli	no	5	62.8 48-94	5	38.4 31-43
			yes	1***	77	1	22
		parous	no	7	50.1 27-72	6	47.5 25-82
			yes	1****	83	1	30

REFERENCES

1. Perined. Perinatal care in the Netherlands 2016 (Perinatale Zorg in Nederland 2016). Utrecht: Perined; 2018.
2. Zielinski R, Ackerson K, Kane Low L. Planned home birth: benefits, risks, and opportunities. International journal of women's health. 2015;7:361-77.
3. Boucher D, Bennett C, McFarlin B, Freeze R. Staying Home to Give Birth: Why Women in the United States Choose Home Birth. Journal of Midwifery & Women's Health. 2009;54(2):119-26.
4. Waldenstrom U, Nilsson CA. Characteristics of women choosing birth center care. Acta Obstet Gynecol Scand. 1993;72(3):181-8.
5. MacDorman MF, Menacker F, Declercq E. Trends and characteristics of home and other out-of-hospital births in the United States, 1990-2006. National vital statistics reports : from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System. 2010;58(11):1-14, 6.
6. Abel S, Kearns RA. Birth places: a geographical perspective on planned home birth in New Zealand. Social science & medicine (1982). 1991;33(7):825-34.
7. Sluijs A-M, Cleiren MPHD, Scherjon SA, Wijma K. Does fear of childbirth or family history affect whether pregnant Dutch women prefer a home- or hospital birth? Midwifery. 2015;31(12):1143-8.
8. Wiegers TA, Van der Zee J, Kerssens JJ, Keirse MJ. Home birth or short-stay hospital birth in a low risk population in The Netherlands. Soc Sci Med. 1998;46(11):1505-11.
9. Kleiverda G, Steen AM, Andersen I, Treffers PE, Everaerd W. PLACE OF DELIVERY IN THE NETHERLANDS - ACTUAL LOCATION OF CONFINEMENT. European Journal of Obstetrics Gynecology and Reproductive Biology. 1991;39(2):139-46.
10. ten Haken TV, Hendrix M, Nieuwenhuijze M, Bude L, de Vries R, Nijhuis J. Preferred place of birth: Characteristics and motives of low-risk nulliparous women in the Netherlands. Midwifery. 2012;28(5):609-18.
11. Pavlova M, Hendrix M, Nouwens E, Nijhuis J, van Merode G. The choice of obstetric care by low-risk pregnant women in the Netherlands: Implications for policy and management. Health Policy. 2009;93(1):27-34.
12. van Haaren-ten Haken T, Pavlova M, Hendrix M, Nieuwenhuijze M, de Vries R, Nijhuis J. Eliciting Preferences for Key Attributes of Intrapartum Care in The Netherlands. Birth-Issues in Perinatal Care. 2014;41(2):185-94.
13. Stoll K, Hall W, Janssen P, Carty E. Why are young Canadians afraid of birth? A survey study of childbirth fear and birth preferences among Canadian University students. Midwifery. 2014;30(2):220-6.
14. Luce A, Cash M, Hundley V, Cheyne H, van Teijlingen E, Angell C. "Is it realistic?" the portrayal of pregnancy and childbirth in the media. BMC Pregnancy and Childbirth. 2016;16(1):40.
15. Zar M, Wijma K, Wijma B. Relations between anxiety disorders and fear of childbirth during late pregnancy. Clinical Psychology & Psychotherapy. 2002;9(2):122-30.
16. Wijma K, Wijma B. A woman afraid to deliver: how to manage childbirth anxiety. In: Paarlberg KM, van de Wiel HBM, editors. Bio-psycho-social Obstetrics and Gynecology. Switzerland: Springer international publishing; 2017. p. 3-31.

17. Keough ME, Riccardi CJ, Timpano KR, Mitchell MA, Schmidt NB. Anxiety Symptomatology: The Association With Distress Tolerance and Anxiety Sensitivity. Behavior Therapy. 2010;41(4):567-74.
18. Ouimet AJ, Gawronski B, Dozois DJA. Cognitive vulnerability to anxiety: A review and an integrative model. Clinical Psychology Review. 2009;29(6):459-70.
19. Witteveen AB, De Cock P, Huizink AC, De Jonge A, Klomp T, Westerneng M, Geerts Pregnancy related anxiety and general anxious or depressed mood and the choice for birth setting: a secondary data-analysis of the DELIVER study. BMC Pregnancy and Childbirth. 2016;16(1):363.
20. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19(2):84-97.
21. Zar M. Diagnostic aspects of fear of childbirth. Linköping: Linköping University; 2001.
22. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale. An updated literature review. J Psychosom Res. 2002;52(2):69-77.
23. Geerts CC, Klomp T, Lagro-Janssen ALM, Twisk JWR, van Dillen J, de Jonge A. Birth setting, transfer and maternal sense of control: results from the DELIVER study. BMC Pregnancy and Childbirth. 2014;14.
24. van der Hulst LAM, van Teijlingen ER, Bonsel GJ, Eskes M, Bleker OP. Does a pregnant woman's intended place of birth influence her attitudes toward and occurrence of obstetric interventions? Birth-Issues in Perinatal Care. 2004;31(1):28-33.
25. Maassen MS, Hendrix MJC, Van Vugt HC, Veersema S, Smits F, Nijhuis JG. Operative Deliveries in Low-Risk Pregnancies in The Netherlands: Primary versus Secondary Care. Birth-Issues in Perinatal Care. 2008;35(4):277-82.
26. Blix E, Huitfeldt AS, Oian P, Straume B, Kumle M. Outcomes of planned home births and planned hospital births in low-risk women in Norway between 1990 and 2007: A retrospective cohort study. Sexual & Reproductive Healthcare. 2012;3(4):147-53.
27. Sluijs AM, Cleiren MPHD, Scherjon SA, Wijma K. No relationship between fear of childbirth and pregnancy-/delivery-outcome in a low-risk Dutch pregnancy cohort delivering at home or in hospital. Journal of Psychosomatic Obstetrics and Gynecology. 2012;33(3):99-105.
28. Faucon C, Brillac T. Planned home versus planned hospital births: Adverse outcomes comparison by reviewing the international literature. Gynecologie Obstetrique & Fertilite. 2013;41(6):388-93.
29. Hutton EK, Cappelletti A, Reitsma AH, Simioni J, Horne J, McGregor C, et al. Outcomes associated with planned place of birth among women with low-risk pregnancies. CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne. 2016;188(5):E80-90.
30. Salomonsson B, Gullberg MT, Alehagen S, Wijma K. Self-efficacy beliefs and fear of childbirth in nulliparous women. Journal of Psychosomatic Obstetrics & Gynecology. 2013;34(3):116-21.
31. Alehagen S, Wijma B, Lundberg U, Wijma K. Fear, pain and stress hormones during childbirth. J Psychosom Obstet Gynaecol. 2005;26(3):153-65.
32. Regan M. Women's perceptions of childbirth risk and place of birth. The Journal of clinical ethics. 2013;24(3):239-52.
33. Bar-Haim Y, Lamy D, Pergamin L, Bakermans-Kranenburg MJ, van IMH. Threat-related attentional bias in anxious and nonanxious individuals: a meta-analytic study. Psychological bulletin. 2007;133(1):1-24.
34. Kahneman D. THINKING, FAST AND SLOW. Penguin. 2011;129-136.

35. Slovic P, Finucane, M.L., Peters, E., Macgregor, D.G. The affect heuristic. In: S.Lichtenstein PS, editor. The construction of preference. Cambridge: Cambridge University Press; 2006. p. 434-53.
36. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.
37. Ayers S, Bond R, Bertullies S, Wijma K. The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. Psychological medicine. 2016;46(6):1121-34.
38. Stramrood CA, Wessel I, Doornbos B, Aarnoudse JG, van den Berg PP, Schultz WC, et al. Posttraumatic stress disorder following preeclampsia and PPROM: a prospective study with 15 months follow-up. Reproductive sciences (Thousand Oaks, Calif). 2011;18(7):645-53.
39. Amelink-Verburg MP, Verloove-Vanhorick SP, Hakkenberg RMA, Veldhuijzen IME, Gravenhorst JB, Buitendijka SE. Evaluation of 280,000 cases in Dutch midwifery practices: a descriptive study. Bjog-An International Journal of Obstetrics and Gynaecology. 2008;115(5):570-8.
40. Sydsjo G, Blomberg M, Palmquist S, Angerbjorn L, Bladh M, Josefsson A. Effects of continuous midwifery labour support for women with severe fear of childbirth. BMC Pregnancy and Childbirth. 2015;15.
41. de Jonge A, Stuijt R, Eijke I, Westerman MJ. Continuity of care: what matters to women when they are referred from primary to secondary care during labour? a qualitative interview study in the Netherlands. BMC Pregnancy and Childbirth. 2014;14.

7

General Discussion

INTRODUCTION

This thesis contributes to the knowledge of fear of childbirth (FOC) by providing new insights on preferences and decisions that women make regarding their place of giving birth, mode of giving birth and the use of pharmacological pain relief. Moreover, by measuring FOC both pre- and postpartum it was possible to study the relation of postpartum FOC with congruence of preferred and actual place of giving birth, preferred and actual mode of giving birth and pain relief. In addition, we compared results regarding prevalence of FOC and place of giving birth from the studies in 2005 and 2015.

For the interpretation of these results it is important to consider the obstetric circumstances in which they were collected and how these circumstances have changed in a decade. Table 1 shows numbers of the Dutch perinatal registration (PRN) from the years 2005 (1) and 2015 (2) for the general population (i.e. low and high risk combined).

Table 1. Obstetric changes in the Netherlands from 2005 to 2015 according to the Dutch Perinatal Register (PRN).

PRN percentages for all births in the Netherlands (general population)	2005	2015
Total number of births	**174.681**	**166.733**
Home birth	23,3%	13,0%
Birth in primary care/birth in secondary care	34/66%	29/71%
Induction and augmentation of labour	30,2%	41.4%
Planned CS	7,0%	8,2%
Emergency CS	8,1%	8,4%
Epidural (elective CS with epidural excluded)	7%	21,8%
Pain medication Remifentanil (elective CS with epidural excluded)	0%	12,5%

The most prominent changes in Dutch obstetrics from 2005 to 2015 (Table 1) are a decrease in home births, an increase in pain relief during labour and an increase in induction/augmentation of labour.

During these 10 years, perinatal mortality rates have been relatively high in the Netherlands compared to rates in other high-income Western countries (3, 4) and have been an important issue for professional discussions and media coverage. Several aspects (like preterm birth rates, smoking rates, age of first-time mothers, in-vitro fertilization rates, hypertension rates) have been considered as possible explanations for the relatively high rates. Likewise, an intensive discussion emerged whether a possible cause might be the Dutch obstetric system, with the division in primary and secondary care and high

home birth rates. As home births provoke strong emotions among professionals as well as among the general public, these debates most likely influenced the opinion of expectant mothers about where and how to give birth.
As one of the results of those discussions, in the Netherlands focus is since 2016 on a more integrated primary and secondary care, centred around the pregnant women, and with attention for continuity of care and a smooth referral if necessary (5).

DISCUSSION OF THE RESULTS

Prevalence of FOC

Research question 1. What is the prevalence of severe pre- and postpartum FOC in a low risk sample from 2005 and in a combined low and high-risk sample from 2015/2016?

Table 2. Mean W-DEQ scores and percentage of severe and phobic pre- and postpartum FOC per study

Samples	**N T1/T2**	**T1 W-DEQ mean**	**T1 Severe FOC W-DEQ ≥85**	**T1 Phobic FOC W-DEQ ≥100**	**T2 W-DEQ mean**	**T2 Severe FOC W-DEQ ≥85**	**T2 Phobic FOC W-DEQ ≥100**
2005 low risk (Chapter 2 and 3)	101/80	62.4	12.4%	0.9%	53.5	13.3%	6%
2015 low risk (Chapter 6)	324/274	61.3	11%	3%	47.8	5.6%	2.2%
2015 low and high risk (Chapter 5)	561/463	62	10%	2.6%	51	6%	2.9%
2012 RAVEL high risk (Chapter 4)	861/495	63.5	10.9%	2.1%	56	12.2%	4.2%

The mean W-DEQ scores and the rate of severe FOC in pregnancy are approximately the same in our study samples (Table 2). A possible explanation is that fear or anxiety involves foresight or expectations (16) which regards women in all samples in the same way. As we showed in Section 7.1, some striking changes took place in Dutch obstetric care from 2005 to 2015. An important difference is the greater availability and acceptance of pain relief during labour. Accordingly, expectations of giving birth must have changed too. Most likely, women adjust their expectations to the standard of obstetric care available for the moment.

In all studies in this thesis, mean W-DEQ scores decreased from T1 to T2, which is consistent with comparable studies (12, 13).
The prevalence of severe postpartum FOC in our studies is 5,6-13,3% (Table 2). The prevalence of severe postpartum FOC (6%) in the 2015 study is relatively low compared to what was found in the two other studies in this thesis. Only a few other studies have examined prevalence of postpartum FOC. A Danish study, performed in 2004 (14), had a prevalence of severe postpartum FOC of 12% in nulliparous women, and the Dutch study of Logtenberg et al. (15) from 2013 also showed a prevalence of 12% in a low-risk sample of nulliparous and parous women. This would indicate that results regarding prevalence of severe postpartum FOC of the 2005 and 2012 study were more alike those other studies than the results of the 2015 study.
Our low-risk samples of 2005 and 2015 were similar regarding proportions of nulliparous and parous women and came from the same region. In 2015 there was a greater use of pharmacological pain relief in the general population of the Netherlands (7% in 2005 and 34% in 2015, see Table 1), and this might be related to the lower prevalence of postpartum FOC we found in our 2015 study. However, we would then also expect a lower prevalence of postpartum FOC in the (medium high-risk) 2012 study as well as in the (low-risk) study of Logtenberg et al. in 2013, but this expectation could not be confirmed. Thus, we could not find an explanation for the differences we noticed in postpartum FOC. Yet, as sample characteristics differ considerably, a straight comparison is difficult. To be able to draw conclusions about differences between the studies, we should make a new analysis of both data samples and adjust for possible differences in background and obstetric variables.

The prevalence of severe FOC (W-DEQ ≥85) during pregnancy is in our studies 10-12,4% (Table 2), which is similar to the results from studies in other Western countries estimating the prevalence of severe FOC to 7-15% (6-11). In the Netherlands, the use of pharmacological pain relief is relatively low and home birth rates are relatively high compared to other high-income Western countries. Could this be a sign of a great faith in the normal birth process and therefore of low FOC in pregnancy? The prevalence of severe prepartum FOC in our low-risk samples and in our combined cohorts of low- and high-risk participants are in the midrange compared to those found in other high- income Western countries. And our mean prepartum W-DEQ scores are also in agreement with those in studies from Australia, Canada and several European countries (6, 17-19). Thus, the level of FOC in The Netherlands does not seem to be lower than in other high-income Western countries.

A possible explanation of this 'midrange' rate of severe FOC could be found in the predisposing intrinsic factors for developing anxiety problems as well as in the expectations of the obstetric circumstances. As described in the Introduction, a combination of

three vulnerability factors (generalised biological vulnerability, general psychological vulnerability and specific psychological vulnerability) are present in people developing an anxiety disorder (20). It is plausible that the presence of these factors does not systematically differ between people in different countries, implying that the intrinsic factors, determining the woman's preconditions to cope with her obstetric situation, would be generally similar over time and across countries.
Whether a pregnant woman feels capable to cope with childbirth in the obstetric situation of the country she lives in, is possibly not only dependent on intrinsic factors but also on expectations of what is normal in her own culture and the opinions of significant others, and on how the obstetric system supports and probably influences these expectations. Additionally, in my opinion, what is going on in the obstetric caregivers also plays an important role, such as their self-confidence as professionals, the degree of trust they offer the delivering woman and the fears they host.

Home/hospital birth

Research question 2a: In two low-risk samples (from 2005 and from 2015/2016) - is prepartum FOC associated to preference for home or hospital birth?

In the 2005 study (low-risk sample) (Chapter 3), prepartum FOC was not related to preference for home or hospital birth. In the 2015 study (low-risk sample) (Chapter 6) women with a hospital birth preference had higher prepartum FOC levels than those with a home birth preference.
Both the 2005 and the 2015 study comprised low-risk participants from the same region, but the percentage of women preferring home birth was higher in the 2005 study. In the 2005 study 61% preferred home birth compared to 31% in the 2015 study. Actual home birth rates in the 2005 and the 2015 study decreased from 52% to 28%. The nationwide (Dutch) home birth rate also decreased substantially: in those 10 years from 23 to 13% (Table 1).
Giving birth at home has become a less 'normal' option over the years and it is likely that the women who want to give birth at home emphasise the importance of a natural birth and want to avoid interventions. The lower rate of home birth preference in the 2015 study probably means that this preference group generally has become more selected, making the differences between women preferring home and hospital birth more pronounced. However, the absence of a difference in the 2005 study might also be related to the limited number of participants (n=101).

We found women with severe and phobic FOC (Chapters 3 and 6) both among those preferring a home birth and among those preferring to give birth at hospital. Women preferring a home birth were usually afraid of the hospital environment and of becoming the object of unnecessary interventions, whereas those preferring a hospital birth were more often afraid of complications that may occur at home or of labour pain.

Research question 2b. In the low-risk sample from 2005 - is the place of giving birth of mothers/sisters of the pregnant woman related to her own preferred place of giving birth?
We found in the 2005 study (Chapter 3) that the place where mothers and sisters have given birth is associated to the preferred place of birth by the pregnant women. This finding needs to be confirmed in larger samples, but if so, it indicates the importance of mothers and sisters as role models for the choices a pregnant woman makes, even in a time when the influence of media on people's ideas is considerable(21, 22). Additionally, as home birth rates decrease, women are less familiar with the phenomenon of home birth and may less often prefer a home birth for themselves.

Research question 2c. In two low-risk samples (from 2005 and from 2015/2016) - is pre- and/or postpartum FOC associated to medical problems or interventions (in the 2005 study) or to being referred from midwife-led care to obstetrician-led care (in the 2015 study)?
In the 2005 study severe prepartum FOC was not associated with medical problems or interventions. In both the 2005 and 2015 studies, being referred from midwifery-led care to obstetrician-led care was related to higher postpartum FOC. Additionally, severe prepartum FOC and a poor neonatal condition were related to severe postpartum FOC.
In the 2015 study prepartum FOC was related to a CS as mode of delivery. The 2005 study was probably too small, with only few actual CS's performed, to find such a relation.
The underlying reason for the referral from midwife to obstetrician, or the (expected) complication, may itself be related to postpartum anxiety. Several studies describe that complications like emergency CS (Chapter 4 and 5), neonatal asphyxia and severe postpartum haemorrhage are related to severe postpartum FOC, sometimes even to postpartum PTSD or -depression (29-32).

The referral rates from midwifery-led care to obstetrician-led care in both the 2005 and 2015 studies were lower in women with a home preference (24-25%) than in women with a hospital preference (55-62%). A higher referral rate for women with a hospital preference compared to women with a home preference is also found in other studies (23-27). In the Netherlands, the wish for pain relief is a common reason for referral during labour (28). When at hospital, the availability of pain relief and other interventions (augmentation with oxytocin, ventouse) probably explains at least parts of the higher referral rates.

Research question 2d. In two low-risk samples (from 2005 and from 2015/2016) - does incongruence of preferred and actual place of birth relate to postpartum FOC?
In the 2005 study, referral in women preferring a home birth, and actually giving birth in hospital, was associated with higher postpartum FOC (Chapter 3). It was not the *actual*

place of birth but the combination of referral to an obstetrician with *incongruence* of place of birth that bore a relation to post-partum fear. These women, in addition to the unexpected extra displacement, have to quickly adjust their expectations from the natural birth in a homely environment to a generally more medicalised setting in a hospital. On the other hand, in the 2015 study we could not confirm this finding; giving birth at a location other than the woman's preferred location was not a predictor of a high level of postpartum FOC, after we adjusted for the variables "being referred" and "FOC during pregnancy". The sample of the 2015 study was larger and the analysis more advanced, which makes the results somewhat more reliable. Furthermore, women who initially preferred a home birth but gave birth at hospital generally had a lower level of prepartum FOC. Such women often feel more confident in their ability to give birth and to deal with possible complications, which could prevent them from potential anxiety during and after childbirth.

Pain relief

In the Netherlands, in 2012, 17,6% of all women giving birth (planned CS's excluded) received epidural analgesia and another 14,5% had opioids (Remifentanil PCA or Pethidine) during labour (33). The Ravel trial (a randomised controlled trial) (34) studied the differences in satisfaction, side effects and costs between the two types of pain relief. The study was performed separately in both a medium high-risk cohort and a low-risk cohort (35). Chapter 4 describes FOC from pre- to postpartum in women participating in the medium high-risk cohort of the RAVEL trial.

Research question 3a. In a high-risk sample (from 2012) - is prepartum FOC associated to a request for pharmacological pain relief?

Our finding that women with severe prepartum FOC were more likely to request pain relief during childbirth, has also been found in several other studies (36-38) and can be explained - at least in part - by reduced pain tolerance in women who have a high level of FOC (39). According to Barlow's theory (20) about the development of an anxiety disorder (see Introduction), a general psychological vulnerability based on early life experiences can start a sense of uncontrollability expressed as an external locus of control. Those women are prone to find external solutions for their anxiety, which, in women with FOC anticipating giving birth, can present as requesting pain relief or even an elective CS.

Talking about fear of pain and providing pain relief are rewarding topics for both the woman with FOC and her caregiver. The woman can formulate a clear question about a topic that fits the frame of reference of the caregiver, it is easy to provide advanced forms of pain relief which are available around the clock, and thus the staff can feel reassured that the woman's request has been adequately met (40).

Next to prepartum FOC, expectations of childbirth and of pain, duration of labour and continuous support are related to the experienced labour pain (41-43). A woman asking for pain relief could actually have a hidden request for help to deal with her FOC.

Research question 3b. In a high-risk sample (from 2012) - do women who receive pain relief have lower FOC postpartum than women who do not?
Women receiving pain relief had higher FOC levels in pregnancy than women giving birth without pain relief. They also had higher FOC levels postpartum than women giving birth without pain relief. But when considering the mode of delivery and the level of prepartum FOC, receiving pain relief was not associated to postpartum FOC anymore, while a CS as mode of delivery and a high level of FOC in pregnancy were associated with high postpartum FOC. Receiving pain relief appeared neither to be an important predictor for high postpartum FOC, nor was it a guarantee for low postpartum levels.

Research question 3c. In a high-risk sample (from 2012) - is there a difference in postpartum FOC between women who receive Remifentanil PCA and women receiving epidural analgesia?
In our study sample, no difference in postpartum FOC was found between women receiving EDA and women receiving Remifentanil PCA. Logtenberg et al. (35) found that women receiving EDA had a higher chance of severe postpartum FOC than women giving birth without pain relief, whereas women receiving Remifentanil did not differ in postpartum FOC from women giving birth without pain relief. Both studies were from the Ravel trial. Our study contained medium high-risk pregnant women and Logtenberg et al. studied the low-risk group. In the analyses we adjusted for the same variables, only the analyses used were slightly different. In my opinion, the result of our study (no difference in postpartum FOC between women that received EDA and Remifentanil PCA) is more logic. EDA gives better pain relief, while Remifentil PCA gives less pain relief but also enhances feelings of control.
Probably the fact that women received pain relief when requested was already helpful, while the kind of pain relief was not important for the level of postpartum FOC. Other factors like the prepartum FOC level and the mode of delivery were more important predictors for postpartum FOC.

Maternal request for CS
Research question 4a. In a combined low- and high-risk sample (from 2015/2016) - what percentage of women prefers a CS as mode of delivery?
In Chapter 5 we describe that in our combined low- and high-risk cohort, 10% preferred a CS at 30 weeks' gestation; 6% in the nulliparous and 14% in the parous group. Studies in other Western countries have shown percentages varying from 2-12% (lowest for

nulliparous, highest for parous) (17, 44). Of women preferring a CS more than two-thirds had had a previous CS, which will be discussed in the following section. This percentage of previous CS in parous women with a CS preference was approximately the same as in the study of Nieminen et al. (17), and a little higher than in the six-country cohort of Ryding et al. (44).

Research question 4b. In a combined low- and high-risk sample (from 2015/2016) - is prepartum FOC associated to preferred and/or actual mode of delivery?
Similar to other researchers (17, 37, 44) we found that women with a preference for CS had higher FOC levels in pregnancy than women with a vaginal delivery (VD) preference, also when adjusted for parity, previous CS and low/high-risk pregnancy.
For women with severe or even phobic FOC, a CS is the ultimate avoidance of the, in their idea, forthcoming danger (or even disaster) of a VD. Like a request for pain relief, a request for CS can also be an expression of an external locus of control, i.e. that the woman thinks she cannot manage the situation by her own actions. According to Barlow (20), an external locus of control is one of the vulnerabilities for developing an anxiety disorder. Another vulnerability is a specific psychological event, such as having experienced sexual or physical abuse. Severe prepartum FOC is more often reported in women having experienced violence or sexual abuse in childhood than in women without being abused (14, 45). Both prepartum FOC and having experienced violence or sexual abuse have been shown to be related to a maternal request for CS (46, 47).

Of the parous women with CS preference, more than two-thirds had had a previous CS, and almost 80% of them actually had an elective CS. In the Netherlands, a previous CS gives women the possibility to choose a VD or a CS after having been counselled about the risks of both modes of delivery (48). It is often the combination of high FOC and a medical reason that results in an actual CS (44). In our study, women with a previous CS and high prepartum FOC often preferred and more often had an elective CS, compared to women with a previous CS and preferring VD, of which, actually, nobody had had severe FOC in pregnancy. The Dutch obstetric guidelines (49) recommend to first find out why a CS is requested, and, if necessary, to treat an existing prepartum FOC. According to the guidelines a CS on maternal request should be avoided because of the consequential risks in case of a future pregnancy (50-52). But a concurrent medical reason, together with severe FOC, facilitates the decision of an elective CS. For example, a woman with severe FOC, having a baby in breech position, will often not even consider a version to cephalic position but chooses a CS.

Research question 4c. In a combined low- and high-risk sample (from 2015/2016) - does incongruence of preferred and actual mode of delivery relate to postpartum FOC?

The results in our study show that several women with severe prepartum FOC and a CS preference, who had an elective CS, still had severe postpartum FOC. Women preferring a CS and having a VD also sometimes had severe FOC after giving birth. We did not find any difference in postpartum FOC between those two groups (CS-CS and CS-VD), but this absence of difference should be taken cautiously, due to the small number of CS in our sample. We did find that FOC during pregnancy is strongly associated with postpartum FOC, regardless of congruence between preferred and actual mode of delivery.

Granting a CS is no guarantee that FOC will decrease, although for some women a CS can help her to avoid an event that she has severe problems to handle mentally at that moment. An elective CS on maternal request in case of severe FOC is like offering someone with a phobia for flying to take the car; a strategy to avoid the problem, while not taking away the anxiety. The problem with this strategy is that a CS has medical risks. An (untreated) severe or phobic FOC in pregnant women is associated with a higher risk for postpartum psychiatric problems (53), is influencing bonding with the baby (54), and may even make women postpone or even avoid a future pregnancy. An elective CS for a woman with untreated severe or phobic prepartum FOC might be the best solution for the time being, but then in combination with treatment for her anxiety problem, pre- or postpartum.

Particularly at risk for severe postpartum FOC were the women preferring a VD but ending up with a CS. One explanation is the unexpected and probably alarming hassles the women in this group encountered. These women might not have had time enough to adjust their expectations to the actual situation. Additionally, in this group especially women with severe prepartum FOC might be expected to be at risk for high fear levels postpartum.

COMPREHENSIVE DISCUSSION

Vicious cycles of fear

Zar (12) showed that women with severe FOC during pregnancy are prone to have high fear scores immediately after giving birth and can experience severe FOC even several weeks postpartum. There appears to be a vicious cycle: a woman with FOC worries about her ability to cope with childbirth, the problems that could occur during delivery, and the health of herself and the baby. She is continuously vigilant for possible dangers, but because of her narrowed outlook, she often finds her suspicions confirmed. It is as if severely anxious persons cannot see the things that go well, but only focus on things they find threatening or difficult to deal with (attentional bias, see Section 7.7), and do not trust

that they are able to cope with those threatening situations. And when they look back on the birth giving event some weeks later, they can still experience severe postpartum FOC. In all three studies described in this thesis, the level of FOC postpartum was strongly related to the level of prepartum FOC, which can be described as a confirmation of the vicious cycle effect.

Fear and risk interpretation

In medicine in general, and also in obstetrics, risk evaluation is an important issue. Obstetricians as well as midwives normally follow protocols, and explain pros and cons of medical interventions to patients. Patients should give their consent for an intervention after having been informed.

However, the *rational* risk evaluation is difficult for the individual, because the interpretation of risk, or what this specific risk means for this specific individual, is dependent on many interconnected factors.

In anxious individuals, threat-related attentional bias (55) and judgement bias (56) can play a role in the interpretation of risk. The attentional system of anxious individuals is distinctively sensitive to and biased in favour of threat-related stimuli in the environment (55). This focus on danger easily causes an overestimation of risks. The woman's emotions connected to a desired or undesired outcome (i.e. her intuitive evaluation) can lead to judgment bias regarding the risks (56). These emotions can be particularly strong and persistent in women who are prone to fear, and can guide not only their decisions regarding where and how to give birth, but also their interpretations of the childbirth experience. In addition, according to the prospect theory of Kahneman and Tversky (57), individuals' perceptions of risk in general are systematically biased, causing an overestimation of critical but rare events. Thus, perceived risks can be presumed to be systematically biased in most women who have severe or phobic FOC, thereby causing an overestimation of the likelihood of critical, albeit rare, events such as losing the child, and/or an underestimation of the risks associated with less critical, but relatively common, adverse events such as a Caesarean section (58).

In daily practice, midwives and obstetricians are often confronted with a demand for interventions like induction of labour, pain relief or a CS. As shown in this thesis, in many women anxiety is probable to be an underlying origin of those requests. Because of the existing biases in risk interpretation in women with severe anxiety problems, information about rational risk evaluations of those interventions made by obstetric staff might not be effective and do not meet the underlying psychological needs. In relation to this, in 'Implications for practise' (section 7.6) we recommend that for those women preventive psychological treatment should be provided.

A specific group of women wanting to avoid interventions in childbirth choose home birth while having high-risk of complications during birth (e.g. twins or previous CS). Hollander et al. (59) interviewed such women and describes that the women's problem is not only fear of interventions, but even more so fear of the existing obstetric approach of childbirth, with its focus on avoiding a negative outcome, peer pressure and legal consequences. Likewise, Dahlen (60, 61) emphasises the possible consequences of fear in healthcare providers. The current obstetric system, with its focus on risk discourse and fear in care providers may also spread to pregnant women and increase their anxiety.

STRENGTHS, LIMITATIONS AND RECOMMENDATIONS FOR RESEARCH

The studies performed in 2005 and 2015 had high response rates. Especially the online approach of the 2015 study made it easy for women to participate and for the researcher to send reminders and collect the data. The difficulty was the necessity (a demand by the Ethical Board) of a handwritten consent for obtaining access to the medical files for the obstetric variables. We circumvented this problem in the end by using self-reported birth data. They proved reliable after a check with the available medical files.

The 2012 study was a secondary analysis of data from the RAVEL study. A limitation is that the design of the study (randomised controlled trial) was intended to compare two types of pain relief. In 2012, women without a request for pain relief also participated, which made our analyses possible. However, the main design of the RAVEL study was drafted for studying pain management, in which FOC originally was included as an accessory variable.

A strength of our three studies was the prospective longitudinal approach in all of them. In this way we were able to study the development of FOC from before to after childbirth. It would be interesting to do a longer follow-up, of several years, to find out how severe FOC actually does work out in women after birth in the long run, and to study how it affects their long-term mental well-being, the development of the child and the woman's wish for a future child. This would preferably be combined with investigating also post-traumatic stress symptoms.

In all our studies FOC was measured with the W-DEQ. The W-DEQ has been used worldwide and is one of the most common instruments for measuring FOC. Like recommended by Wijma et al. (67), a cut off score of ≥85 was used for severe FOC. Nevertheless, several

other researchers have used a cut off score of 66 (18, 68). In other studies, FOC was measured with other questionnaires than the W-DEQ (69, 70), or by means of a VAS (visual analogue scale) scale (71). This sometimes renders comparison of results difficult.

Although earlier in this chapter we compared the prevalence of severe FOC in the low-risk sample of the 2005 study with the low-risk sample of the 2015 study, we did not yet go as far as undertaking a complete re-analysis on a combined dataset. Future in depth comparisons from the original data sets, with case-matching adjustment for background and obstetric variables, may still reveal more detailed relationships.

An interesting topic for future research would be to explore fear in obstetric care providers and how such fear affects the information they provide about risks, the way they counsel, their use of interventions, and their referrals from midwifery-led care to obstetrician-led care. Furthermore, an interesting topic is the association between risk perception and FOC in pregnant women, and especially how this combination affects the decisions women make concerning ways of giving birth.

CONCLUSIONS

A consistent finding across all the three studies in this thesis is that the level of FOC in pregnancy is strongly related to and predictive of the level of postpartum FOC. We also find that women with severe FOC during pregnancy are prone to prefer a hospital birth, to have pharmacological pain relief during labour and to prefer an elective CS.
We did not find that congruence between preferred and actual *mode* of delivery was related to the level of postpartum FOC. Neither was congruence between preferred and actual *place* of birth related to the intensity of postpartum FOC. Instead, we found that predictors for high postpartum FOC were high levels of prepartum FOC, being referred from midwifery-led care to obstetrician-led care, emergency CS, and a poor condition of the new-born baby.

IMPLICATIONS FOR PRACTICE

From these findings we can formulate several implications for the approach in daily practice.
A general aim regarding FOC should be to prevent women to stay captured in the vicious cycle of having severe FOC in pregnancy, not feeling able to deal with the efforts of giving birth, having a negative interpretation of the birth, and still experiencing severe

FOC several weeks postpartum. Considering the results of our studies, we can argue that lowering FOC during pregnancy most likely would positively affect how the birth process will be experienced, which is something that may ultimately lower the risk for severe postpartum FOC. This might also decrease the risk of consequences like postpartum psychiatric problems (53), a negative influence on bonding with the baby (54), and/or postponing or even avoiding a future pregnancy.

Wijma and Wijma (40) offer comprehensive recommendations for the care of women with severe FOC, based on their extensive research and long clinical experience. Concurrently, based on concurrence of the existing literature, the results of the current investigation and my long working experience as a midwife, I would advocate specific guidance of women with severe FOC, in a collaborative effort of an obstetric caregiver with a psychotherapist educated in treating anxiety problems and experienced in guiding pregnant women.
The psychotherapist, in this case, may provide specialised psychotherapy for anxiety problems. The obstetric caregiver may assist by helping the woman to formulate her wishes for the birth situation, for example where to give birth and who is to attend the birth process, and can also provide information about pain relief and discuss possible interventions.

Generally, psychological treatment of anxiety or phobic problems takes time and in pregnancy that time is limited until a woman gives birth. Therefore, treatment efforts have to start in time, implying that screening for severe FOC should take place early in pregnancy.

With regard to place of delivery and referral, several aspects could make a difference in the way women experience their delivery.
First, when pregnant women with severe FOC are offered psychotherapy they are very likely to be better prepared to deal with the (mental and physical) efforts of giving birth, also in case complications occur and referral is needed.
Second, it is desirable that the midwife accompanies the woman during referral whenever possible, as particularly fearful women benefit from such continuous support (62, 63).
Third, the organization of the obstetric system can play an important role. Ensuring a smooth referral requires several key components, including: *i*) a system that allows home births; *ii*) a system in which referrals to an obstetrician are supported by established pathways; *iii*) protocols that are accepted by all parties: the woman, the midwife, and the obstetrician; and *iv*) a professional structure in which both midwives and obstetricians respect each other's expertise and contribution to the childbirth process.

We found that women with severe FOC more often request pharmacological pain relief. Nowadays, in high-income countries pain relief is available around the clock for every woman giving birth. In particular for women with severe FOC, it could be helpful to feel in control of the situation by means of pain relief. Yet, in daily practice we often see pain relief being used as a way to sooth women and play down anxiety, e.g. 'you need not to be afraid, because you can get pain relief'. However, our studies show that prepartum FOC is a more important factor than pain relief in predicting postpartum FOC. FOC is often not simply about fear of pain; often it involves fear of dying of the baby or dying yourself (64, 65). Offering pain relief is thus no sufficient intervention for handling many anxiety problems. For women with severe FOC additional psychotherapy is recommended.

In case of a maternal request for CS, it is recommended (49) to first examine the *reason* for the request as well as to assess the woman's FOC. A caregiver should bear in mind that the combined effect of a history of sexual or physical abuse and severe FOC is often seen in women requesting a CS (46).
Special guidance, in combination with psychological treatment, helps to decrease the level of anxiety and the woman gets time to adjust to the anticipated delivery. Her often unrealistic ideas and fears might thus change, offering her the mental space for a better preparation for giving birth. When women succeed to have a vaginal delivery, many feel empowered by the idea that they 'did give birth themselves' (66). In case psychological treatment is not accepted, not sufficient or, when it comes to it, no time is left for such treatment, an elective CS might be a solution.

For counsellors who inform women about interventions during childbirth, it is good to bear in mind that women with severe or phobic FOC in particular suffer from biased risk interpretation. Risk discourse has become standard in obstetric care, but for many fearful women such risk interpretation may be merely a confirmation of what they fear will happen. Additionally, their deeper needs may be overlooked - in this case to feel reassured, feel they can trust the obstetric caregivers, and that they become confident in trusting their own ability to give birth. Although in general, one has to be informed about advantages and disadvantages of interventions, women with severe FOC overestimate the risks, and most of all need attention to, and treatment for their anxiety, which tends to enlarge potential risks. In these women, rational risk evaluations may not solve but aggravate their anxiety problems.

In all postpartum care, it is important to discuss in retrospect how childbirth was experienced and to evaluate whether severe FOC is (still) present. It is also important to be knowledgeable about the symptomatology of post-traumatic stress and to be able to assess this and to refer to a psychologist if the magnitude of these symptoms

has not decreased within several weeks postpartum. Thus, even after childbirth, close collaboration between a psychotherapist and an obstetric caregiver is important for timely referral of those women who suffer from high postpartum FOC for treatment of their psychological problems.

REFERENCES

1. Perinatal Registry the Netherlands (Stichting Perinatale Registratie Nederland). Perinatale zorg in Nederland 2005 (Perinatal care in the Netherlands 2005). Utrecht:Perined; 2008.
2. Perinatal Registry the Netherlands (Stichting Perinatale Registratie Nederland). Perinatale zorg in Nederland 2015 (perinatal care in the Netherlands 2015). Utrecht: Perined; 2016.
3. de Jonge A, Baron R, Westerneng M, Twisk J, Hutton EK. Perinatal mortality rate in the Netherlands compared to other European countries: a secondary analysis of Euro-PERISTAT data. Midwifery. 2013;29(8):1011-8.
4. de Jonge A, Geerts CC, van der Goes BY, Mol BW, Buitendijk SE, Nijhuis JG. Perinatal mortality and morbidity up to 28 days after birth among 743 070 low-risk planned home and hospital births: a cohort study based on three merged national perinatal databases. BJOG-An International Journal of Obstetrics and Gynaecology. 2015;122(5):720-8.
5. Expert groep zorgstandaard integrale geboortezorg Cpz. Zorgstandaard integrale geboortezorg (Standard for integrated birth care). Utrecht, the Netherlands: College perinatale zorg; 2016.
6. Lukasse M, Schei B, Ryding EL, Bidens Study G. Prevalence and associated factors of fear of childbirth in six European countries. Sexual & Reproductive Healthcare. 2014;5(3):99-106.
7. Ryding EL, Wijma K, Wijma B. Psychological impact of emergency Cesarean section in comparison with elective Cesarean section, instrumental and normal vaginal delivery. Journal of Psychosomatic Obstetrics and Gynecology. 1998;19(3):135-44.
8. Zar M, Wijma K, Wijma B. Relations between anxiety disorders and fear of childbirth during late pregnancy. Clinical Psychology & Psychotherapy. 2002;9(2):122-30.
9. Spice K, Jones SL, Hadjistavropoulos HD, Kowalyk K, Stewart SH. Prenatal fear of childbirth and anxiety sensitivity. J Psychosom Obstet Gynaecol. 2009;30(3):168-74.
10. Adams S, Eberhard-Gran M, Eskild A. Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery. BJOG. 2012;119.
11. Nilsson C, Hessman E, Sjoblom H, Dencker A, Jangsten E, Mollberg M, et al. Definitions, measurements and prevalence of fear of childbirth: a systematic review. BMC Pregnancy and Childbirth. 2018;18.
12. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scan J Behav Ther. 2001;30.
13. Alehagen S, Wijma B, Wijma K. Fear of childbirth before, during, and after childbirth. Acta Obstetricia et Gynecologica Scandinavica. 2006;85(1):56-62.
14. Schroll AM, Tabor A, Kjaergaard H. Physical and sexual lifetime violence: Prevalence and influence on fear of childbirth before, during and after delivery. Journal of Psychosomatic Obstetrics & Gynecology. 2011;32(1):19-26.
15. Logtenberg SLM, Verhoeven CJ, Rengerink KO, Sluijs AM, Freeman LM, Schellevis FG, et al. Pharmacological pain relief and fear of childbirth in low risk women; secondary analysis of the RAVEL study. BMC Pregnancy and Childbirth. 2018;18.
16. Miloyan B, Pachana NA, Suddendorf T. The future is here: a review of foresight systems in anxiety and depression. Cognition & emotion. 2014;28(5):795-810.
17. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section--a cross-sectional study at various stages of pregnancy in Sweden. Acta Obstet Gynecol Scand. 2009;88(7):807-13.

18. Hall WA, Hauck YL, Carty EM, Hutton EK, Fenwick J, Stoll K. Childbirth Fear, Anxiety, Fatigue, and Sleep Deprivation in Pregnant Women. Jognn-Journal of Obstetric Gynecologic and Neonatal Nursing. 2009;38(5):567-76.
19. Fenwick J, Gamble J, Nathan E, Bayes S, Hauck Y. Pre- and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women. J Clin Nurs. 2009;18(5):667-77.
20. Barlow DH. Anxiety and its disorders. 2nd edition ed. New York: Guilford Press; 2004.
21. Stoll K, Hall W. Vicarious birth experiences and childbirth fear: Does it matter how young Canadian women learn about birth. J Perinat Educ. 2013;22.
22. Luce A, Cash M, Hundley V, Cheyne H, van Teijlingen E, Angell C. "Is it realistic?" the portrayal of pregnancy and childbirth in the media. BMC Pregnancy and Childbirth. 2016;16(1):40.
23. Geerts CC, Klomp T, Lagro-Janssen ALM, Twisk JWR, van Dillen J, de Jonge A. Birth setting, transfer and maternal sense of control: results from the DELIVER study. BMC Pregnancy and Childbirth. 2014;14.
24. Maassen MS, Hendrix MJC, Van Vugt HC, Veersema S, Smits F, Nijhuis JG. Operative Deliveries in Low-Risk Pregnancies in The Netherlands: Primary versus Secondary Care. Birth-Issues in Perinatal Care. 2008;35(4):277-82.
25. Blix E, Huitfeldt AS, Oian P, Straume B, Kumle M. Outcomes of planned home births and planned hospital births in low-risk women in Norway between 1990 and 2007: A retrospective cohort study. Sexual & Reproductive Healthcare. 2012;3(4):147-53.
26. Faucon C, Brillac T. Planned home versus planned hospital births: Adverse outcomes comparison by reviewing the international literature. Gynecologie Obstetrique & Fertilite. 2013;41(6):388-93.
27. Hutton EK, Cappelletti A, Reitsma AH, Simioni J, Horne J, McGregor C, et al. Outcomes associated with planned place of birth among women with low-risk pregnancies. CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne. 2016;188(5):E80-90.
28. Offerhaus PM, de Jonge A, van der Pal-de Bruin K, Hukkelhoven CWPM, Scheepers PLH, Lagro-Janssen ALM. Change in primary midwife-led care in the Netherlands in 2000-2008: A descriptive study of caesarean sections and other interventions among 789,795 low risk births. Midwifery. 2014;30(5):560-6.
29. Soderquist J, Wijma B, Thorbert G, Wijma K. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. BJOG. 2009;116(5):672-80.
30. Stramrood CA, Wessel I, Doornbos B, Aarnoudse JG, van den Berg PP, Schultz WC, et al. Posttraumatic stress disorder following preeclampsia and PPROM: a prospective study with 15 months follow-up. Reproductive sciences (Thousand Oaks, Calif). 2011;18(7):645-53.
31. Garthus-Niegel S, von Soest T, Knoph C, Simonsen TB, Torgersen L, Eberhard-Gran M. The influence of women's preferences and actual mode of delivery on post-traumatic stress symptoms following childbirth: a population-based, longitudinal study. BMC Pregnancy and Childbirth. 2014;14.
32. Dikmen-Yildiz P, Ayers S, Phillips L. Longitudinal trajectories of post-traumatic stress disorder (PTSD) after birth and associated risk factors. Journal of Affective Disorders. 2018;229:377-85.
33. Perinatal Registry the Netherlands (Stichting Perinatale Registratie Nederland). Perinatale zorg in Nederland 2012 (Perinatal care in the Netherlands 2012). 2013.
34. Freeman LM, Bloemenkamp KW, Franssen MT, Papatsonis DN, Hajenius PJ, Hollmann MW, et al. Patient controlled analgesia with remifentanil versus epidural analgesia in labour: randomised multicentre equivalence trial. BMJ-British Medical Journal. 2015;350.

35. Logtenberg SLM, Verhoeven CJ, Rengerink KO, Sluijs AM, Freeman LM, Schellevis FG, et al. Pharmacological pain relief and fear of childbirth in low risk women; secondary analysis of the RAVEL study. BMC Pregnancy Childbirth. 2018;18(1):347.
36. Rouhe H, Salmela-Aro K, Halmesmaki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG. 2009;116.
37. Haines HM, Rubertsson C, Pallant JF, Hildingsson I. The influence of women's fear, attitudes and beliefs of childbirth on mode and experience of birth. BMC Pregnancy and Childbirth. 2012;12.
38. Alehagen S, Wijma B, Lundberg U, Wijma K. Fear, pain and stress hormones during childbirth. J Psychosom Obstet Gynaecol. 2005;26(3):153-65.
39. Saisto T, Kaaja R, Ylikorkala O, Halmesmki E. Reduced pain tolerance during and after pregnancy in women suffering from fear of labor. Pain. 2001;93(2):123-7.
40. Wijma K, Wijma B. A woman afraid to deliver: how to manage childbirth anxiety. In: Paarlberg KM, van de Wiel HBM, editors. Bio-psycho-social Obstetrics and Gynecology. Switzerland: Springer international publishing; 2017. p. 3-31.
41. McLachlan HL, Forster DA, Davey MA, Farrell T, Flood M, Shafiei T, et al. The effect of primary midwife-led care on women's experience of childbirth: results from the COSMOS randomised controlled trial. BJOG. 2016;123(3):465-74.
42. Van der Gucht N, Lewis K. Women's experiences of coping with pain during childbirth: A critical review of qualitative research. Midwifery. 2015;31(3):349-58.
43. Hodnett ED. Pain and women's satisfaction with the experience of childbirth: a systematic review. Am J Obstet Gynecol. 2002;186.
44. Ryding EL, Lukasse M, Kristjansdottir H, Steingrimsdottir T, Schei B. Pregnant women's preference for cesarean section and subsequent mode of birth - a six-country cohort study. Journal of Psychosomatic Obstetrics & Gynecology. 2016;37(3):75-83.
45. Lukasse M, Vangen S, Oian P, Kumle M, Ryding EL, Schei B, et al. Childhood Abuse and Fear of Childbirth-A Population-based Study. Birth-Issues in Perinatal Care. 2010;37(4):267-74.
46. Lukasse M, Vangen S, Oian P, Schei B. Fear of childbirth, women's preference for cesarean section and childhood abuse: a longitudinal study. Acta Obstetricia et Gynecologica Scandinavica. 2011;90(1):33-40.
47. Schei B, Lukasse M, Ryding EL, Campbell J, Karro H, Kristjansdottir H, et al. A History of Abuse and Operative Delivery - Results from a European Multi-Country Cohort Study. Plos One. 2014;9(1).
48. NVOG (Dutch organization for obstetrics and gynecology). Pregnancy and delivery after a previous Cesarean Section (zwangerschap en bevalling na een voorgaande sectio Caesarea) 2010 [Available from: https://www.nvog.nl/wp-content/uploads/2017/12/Zwangerschap-en-bevalling-na-een-voorgaande-sectio-caesarea-1.0-04-06-2010.pdf.
49. NVOG (Dutch organization for obstetrics and gynecology). Richtlijn indicatiestelling sectio caesarea (guideline indication cesarean section) 2011 [updated 3/23/2011. Available from: http://nvog-documenten.nl/index.php?pagina=/richtlijn/pagina.php&fSelectTG_62=75&fSelectedSub=62&fSelectedParent=75.
50. Schuitemaker N, vanRoosmalen J, Dekker G, vanDongen P, vanGeijn H, Gravenhorst B. Maternal mortality after cesarean section in The Netherlands. Acta Obstetricia et Gynecologica Scandinavica. 1997;76(4):332-4.

51. Souza JP, Gulmezoglu AM, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, et al. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. BMC Medicine. 2010;8.
52. Kamilya G, Seal SL, Mukherji J, Bhattacharyya SK, Hazra A. Maternal mortality and cesarean delivery: An analytical observational study. Journal of Obstetrics and Gynaecology Research. 2010;36(2):248-53.
53. Ayers S, Bond R, Bertullies S, Wijma K. The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. Psychological medicine. 2016;46(6):1121-34.
54. Areskog B, Uddenberg N, Kjessler B. Experience of delivery in women with and without antenatal fear of childbirth. Gynecol Obstet Invest. 1983;16(1):1-12.
55. Bar-Haim Y, Lamy D, Pergamin L, Bakermans-Kranenburg MJ, van IMH. Threat-related attentional bias in anxious and nonanxious individuals: a meta-analytic study. Psychological bulletin. 2007;133(1):1-24.
56. Slovic P, Finucane, M.L., Peters, E., Macgregor, D.G. The affect heuristic. In: S.Lichtenstein PS, editor. The construction of preference. Cambridge: Cambridge University Press; 2006. p. 434-53.
57. Kahneman D. Thinking fast and slow. New York: Farrar, Strauss and Giroux; 2011.
58. Regan M. Women's perceptions of childbirth risk and place of birth. The Journal of clinical ethics. 2013;24(3):239-52.
59. Hollander M, de Miranda E, van Dillen J, de Graaf I, Vandenbussche F, Holten L. Women's motivations for choosing a high risk birth setting against medical advice in the Netherlands: a qualitative analysis. BMC Pregnancy Childbirth. 2017;17(1):423.
60. Dahlen H. Undone by fear? Deluded by trust? Midwifery. 2010;26(2):156-62.
61. Dahlen HG. The politicisation of risk. Midwifery. 2016;38:6-8.
62. Wijma K, Wijma B, Zar M. Psychometrics aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynecol. 1998;19.
63. Toohill J, Fenwick J, Gamble J, Creedy DK. Prevalence of childbirth fear in an Australian sample of pregnant women. BMC Pregnancy and Childbirth. 2014;14.
64. Huizink AC, Delforterie MJ, Scheinin NM, Tolvanen M, Karlsson L, Karlsson H. Adaption of pregnancy anxiety questionnaire-revised for all pregnant women regardless of parity: PRAQ-R2. Archives of Womens Mental Health. 2016;19(1):125-32.
65. Fairbrother N, Thordarson DS, Stoll K. Fine tuning fear of childbirth: the relationship between Childbirth Fear Questionnaire subscales and demographic and reproductive variables. Journal of Reproductive and Infant Psychology. 2018;36(1):15-29.
66. Haines HM, Pallant JF, Fenwick J, Gamble J, Creedy DK, Toohill J, et al. Identifying women who are afraid of giving birth: A comparison of the fear of birth scale with the WDEQ-A in a large Australian cohort. Sexual & Reproductive Healthcare. 2015;6(4):204-10.
67. Sydsjo G, Blomberg M, Palmquist S, Angerbjorn L, Bladh M, Josefsson A. Effects of continuous midwifery labour support for women with severe fear of childbirth. BMC Pregnancy and Childbirth. 2015;15.
68. de Jonge A, Stuijt R, Eijke I, Westerman MJ. Continuity of care: what matters to women when they are referred from primary to secondary care during labour? a qualitative interview study in the Netherlands. BMC Pregnancy and Childbirth. 2014;14.

69. Preis H, Benyamini Y, Eberhard-Gran M, Garthus-Niegel S. Childbirth preferences and related fears - comparison between Norway and Israel. BMC Pregnancy Childbirth. 2018;18(1):362.
70. Sjogren B. Reasons for anxiety about childbirth in 100 pregnant women. J Psychosom Obstet Gynaecol. 1997;18(4):266-72.
71. Lundgren I, Begley C, Gross MM, Bondas T. 'Groping through the fog': a metasynthesis of women's experiences on VBAC (Vaginal birth after Caesarean section). BMC Pregnancy and Childbirth. 2012;12.

8

English summary

ENGLISH SUMMARY

The introduction **(Chapter 1)** provides information about the Dutch obstetric system, and a general explanation of the development of anxiety disorders and of fear of childbirth (FOC) pre- and postpartum. If a women experiences severe FOC, she is so afraid of giving birth that it considerably impairs her personal, social, relational and occupational life and/or her willingness to become pregnant and/or her competence to give birth. Internationally, fear of childbirth is most often assessed with the Wijma-Delivery Expectancy/Experience Questionnaire (W-DEQ), which is also used for the studies in this thesis.
Several issues associated with FOC (parity, self-efficacy, violence and abuse, other mental health problems, obstetric interventions, maternal request for CS) are discussed, to outline the interaction of FOC with obstetric and psychological factors.

Chapter 2 and **Chapter 3** report the results of a prospective cohort study of 105 healthy women with low-risk pregnancies, performed in 2005. FOC, as measured at 30 weeks pregnancy and 6 weeks postpartum, was analysed in relation to obstetric data.

The aim of the study in **Chapter 2** was to examine the association of FOC (during pregnancy and postpartum), general anxiety and depression with birth complications. We found that the birth giving process was not related to prepartum FOC. Likewise, we did not find any relationship between general anxiety and depression, and delivery characteristics. However, the prepartum level of FOC was predictive of the level of postpartum FOC, suggesting that prepartum FOC may influence the woman's postpartum interpretation of the birth experience. We also found a positive association of parity and medical interventions during childbirth with postpartum FOC.

Chapter 3 explored how FOC was related to preferred and actual place of delivery. Since the Netherlands has a long history of home birthing, we also examined how the place where a pregnant woman's mother or sisters gave birth was related to the participants' preferred place of delivery. The place of delivery of close family members predicted a higher chance (OR 3.8) that the participants would prefer the same place. The idea that prepartum FOC is related to the choice of place of delivery was not true for this low risk cohort. Women in both preference groups (home and hospital) made their decisions based on negative and positive motivations. However, strength of preference was related to postpartum FOC; women having a strong preference for the place of giving birth had lower prepartum FOC than women with a weak preference. In the group of women who due to medical risk had undergone a compulsory move from home to hospital during labour, FOC had increased several weeks postpartum in comparison to prepartum FOC.

An explanation for the higher postpartum FOC in this group could be that, next to dealing with the medical complications, these women found it difficult to mentally adjust to a different environment than that preferred.

The study described in **Chapter 4** analysed data from the RAVEL trial (2012), in order to examine the association between pharmacological pain relief during labour and pre- and postpartum FOC, in a sample of women with medium to high-risk pregnancies. Questionnaires were completed by 911 women during pregnancy and by 500 women postpartum. The results showed that severe prepartum FOC was a predictor for the request of pain relief. Furthermore, prepartum FOC, but not pharmacological pain relief, was significantly related with postpartum FOC. Other variables that were positively related to postpartum FOC were having had a CS and a higher prepartum HADS anxiety score. There was no significant correlation between FOC postpartum and the type of pain relief (Remifentanil PCA or Epidural analgesia) administered during labour.

Chapter 5 and **Chapter 6** show the results of a prospective longitudinal cohort study performed in 2015. In this study participants from midwifery practices and hospitals in the southwestern part of the Netherlands filled out questionnaires at 30 weeks' gestation (n=561) and two months postpartum (n=463).

The study described in **Chapter 5** aimed to investigate the relation between preferred/actual mode of delivery and pre- and postpartum FOC in a mixed sample of women with low- and high-risk pregnancies. Both severe prepartum FOC and a previous Caesarean section (CS) predicted preference for CS. Severe prepartum FOC also predicted actual CS. Women preferring a VD but ending up with a CS were at risk of severe FOC postpartum, while the same risk was not demonstrated for women who preferred a CS but had a VD. Prepartum FOC was found to be strongly associated with postpartum FOC, regardless of congruence between preferred and actual mode of delivery.

Chapter 6 concerns the relation between FOC and the woman's preference for where she will give birth. The study is about whether, in retrospect, a woman experiences a higher level of FOC when the actual birth location differed from her preferred location. In the study group of 331 women with a low-risk pregnancy, 31% preferred a home birth. Moreover, among the 274 participants who provided postpartum follow-up data, 28% gave birth at home. We found that women who preferred home birth had a lower level of FOC than women who preferred a hospital birth. Interestingly, we also found that women who initially preferred a hospital birth were more likely to be referred to obstetrician-led care. Finally, we found that a high level of prepartum FOC, being referred

to obstetrician-led care, and a poor condition of the new-born child predicted a high level of postpartum FOC, whereas giving birth at a location other than preferred was not related to postpartum FOC.

The discussion (**Chapter 7**) provides information about the obstetric circumstances in which the studies were performed. Some striking changes from 2005 to 2015 in obstetric care, e.g. the increase in the use of pharmacological pain relief and the decrease of home births, are described to facilitate the interpretation of the results of the studies. We compared the results of the 2005, 2012 and 2015 studies and related them to the results of relevant studies as performed in other high-income Western countries. The prevalence of severe prepartum FOC (W-DEQ sum score ≥85) in our studies was 10-12,4%, and of severe postpartum FOC 5,6-13,3%.
Although the obstetric circumstances have changed, the mean W-DEQ scores and the rates of severe prepartum FOC were similar in the three studies. However, the levels of postpartum FOC differed between the studies, and a new and proper analysis of the data is necessary to be able to compare the results of the 2005 and the 2015 study in a meaningful way.
Furthermore, we discuss the results regarding preferred/actual *place* and *mode* of birth and their relation with FOC, as well as the relation of FOC with the use of pharmacological pain relief. Consistent across all studies in this thesis is the general finding that the level of prepartum FOC is strongly related to and predictive of the level of postpartum FOC, which is a confirmation of the vicious cycle effect, as described by Zar et al. (1).
Additionally, the effect of anxiety on risk evaluation is discussed and explained with psychological theories. Because of the existing biases in risk interpretation in women with severe anxiety problems, information of rational risk evaluations of interventions, like a CS on maternal request, might neither reach the desired goals nor meet the fearful woman's primary psychological needs.

We propose several **Implications for practice.** A general aim regarding FOC should be to prevent women to stay captured in the vicious cycle of having severe FOC in pregnancy, not feeling able to deal with the efforts of giving birth, having a negative interpretation of the birth when the event is going on, and still experiencing severe FOC several weeks postpartum. Screening for severe FOC should take place early during pregnancy. Offering pain relief is not sufficient for women with severe FOC, and psychotherapy in addition to prepartum obstetric care is recommended. In order to prevent women with prepartum FOC from severe postpartum FOC we suggest a combination of continuity of care and an obstetric system that supports the women's own choice for place of birth and ensures a smooth referral in case of complications. In case of a maternal request for a CS from a woman with severe FOC, a close collaboration between the obstetric caregiver and

a psychotherapist is advised to lower the woman's FOC, improve decision making and prepare her for the delivery in the best way that is possible. However, an elective CS might be a solution in case psychological treatment is not accepted, not sufficient or when in the end no time is left for such treatment.
Finally, suggestions for **future research** are made.

Final Conclusions

The general finding, consistent across all studies in this thesis, is that the level of FOC in pregnancy is strongly related to, and predictive of the level of postpartum FOC. We also find that women with severe FOC during pregnancy are prone to preferring a hospital birth, having pharmacological pain relief during labour and requesting an elective CS.
We did not find that congruence between one's own preference (during pregnancy) and the actual delivery situation was related to the degree of postpartum FOC. This was true for both the prepartum preferred place and preferred mode of giving birth. Instead, we found that predictors for high postpartum FOC were: being referred from midwifery-led care to obstetrician-led care, emergency CS, and a poor condition of the new-born. To prevent women from staying captured in a vicious cycle of pre- and postpartum FOC, we advise a close collaboration between the obstetric caregiver and a psychotherapist during the process of guiding those women through pregnancy and childbirth. In this way, attention can be given to the woman's psychological needs, which can be supported and complemented with obstetric care.

REFERENCE

1. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.

9

Nederlandse samenvatting

NEDERLANDSE SAMENVATTING

De inleiding (hoofdstuk 1) geeft informatie over het Nederlandse obstetrische systeem en uitleg over de ontwikkeling van angststoornissen in zijn algemeenheid en specifiek van angst voor bevalling. Een vrouw met ernstige angst voor de bevalling is zo bang om te bevallen dat dit haar persoonlijke, sociale, relationele en beroepsleven en/of haar bereidheid om zwanger te worden en/of haar bekwaamheid om te bevallen aanzienlijk schaadt.
Internationaal wordt angst voor de bevalling (FOC) meestal gemeten met de Wijma-Delivery Expectancy / Experience Questionnaire (W-DEQ), die ook werd gebruikt voor de studies in dit proefschrift. In de inleiding wordt uitgebreid de samenhang van verschillende obstetrische en psychologische factoren (pariteit, zelfvertrouwen, geweld of misbruik, obstetrische interventies, andere psychische problematiek, vraag om primaire sectio) met angst voor de bevalling beschreven.

Hoofdstuk 2 en hoofdstuk 3 beschrijven de resultaten van een prospectieve cohortstudie van 105 gezonde vrouwen met een laag-risico zwangerschap, uitgevoerd in 2005. FOC, gemeten bij 30 weken zwangerschap en 6 weken postpartum, werd gerelateerd aan obstetrische variabelen.

Het doel van de studie in **hoofdstuk 2** was om de samenhang van FOC voor en na de bevalling met obstetrische complicaties te onderzoeken. Het verloop van de bevalling en eventuele complicaties bleken niet gerelateerd aan prepartum FOC. Wel bleek dat het niveau van FOC tijdens de zwangerschap voorspellend was voor het niveau van FOC na de bevalling, wat suggereert dat angst voor de bevalling de geboorte-ervaring van de vrouw kan beïnvloeden. We vonden een positieve associatie tussen zowel pariteit als medische interventies tijdens de bevalling en postpartum FOC.

In **hoofdstuk 3** wordt beschreven wat de relatie is van FOC en de gewenste en daadwerkelijke plaats van de bevalling. Omdat Nederland een lange geschiedenis van thuisbevallingen heeft, hebben we ook onderzocht of de plaats waar de moeder of zussen van een zwangere vrouw zijn bevallen, verband hield met de voorkeursplaats van de deelnemers. De plaats waar de naaste familieleden waren bevallen, voorspelde een hogere kans (OR 3.8) dat de deelnemers de voorkeur zouden geven aan dezelfde plaats. Anders dan dat we dachten, was in dit cohort van laag-risico zwangeren prepartum FOC niet gerelateerd aan de voorkeur voor een thuis of ziekenhuisbevalling. Vrouwen in beide voorkeursgroepen (thuis en in het ziekenhuis) namen hun beslissingen op basis van negatieve en positieve motivaties. Echter, de sterkte van de voorkeur was wel gerelateerd aan prepartum FOC; vrouwen met een sterke voorkeur voor een bevalling thuis of in het ziekenhuis, hadden een lagere prepartum FOC dan vrouwen met een zwakke voorkeur.

In de groep vrouwen die vanwege een medisch risico tijdens de bevalling moesten verplaatsen van thuis naar ziekenhuis, was FOC enkele weken na de bevalling gemiddeld toegenomen. Een verklaring voor het hogere postpartum FOC in deze groep zou kunnen zijn dat deze vrouwen, naast het omgaan met de medische complicaties, het moeilijk vonden om zich mentaal aan te passen aan een andere omgeving dan de gewenste plaats.

De studie beschreven in **hoofdstuk 4** analyseerde gegevens uit de RAVEL-studie (2012) om de associatie tussen medicamenteuze pijnstilling tijdens de bevalling en pre- en postpartum FOC te onderzoeken in een steekproef van vrouwen met medium- tot hoog-risico zwangerschappen. Vragenlijsten werden ingevuld door 911 vrouwen tijdens de zwangerschap en door 500 vrouwen na de bevalling. De resultaten lieten zien dat ernstige FOC een voorspeller was voor een verzoek om pijnstilling. Bovendien was prepartum FOC, maar niet medicamenteuze pijnstilling, significant gerelateerd aan postpartum FOC. Andere variabelen die positief gerelateerd waren aan postpartum FOC waren een keizersnede en een hogere prepartum HADS-angstscore. Er was geen significante correlatie tussen FOC postpartum en het type pijnstilling (Remifentanil PCA of epidurale analgesie) dat was toegediend tijdens de bevalling.

Hoofdstuk 5 en hoofdstuk 6 tonen de resultaten van een prospectieve longitudinale cohortstudie uitgevoerd in 2015. In deze studie vulden deelnemers van verloskundige praktijken en ziekenhuizen in Zuidwest-Nederland vragenlijsten in bij 30 weken zwangerschap (n = 561) en twee maanden na de bevalling (n = 463).

De studie beschreven in **hoofdstuk 5** was gericht op het onderzoeken van de relatie tussen de gewenste en werkelijke manier van bevallen (keizersnede of vaginaal) en pre- en postpartum angst voor de bevalling in een gemengde steekproef van vrouwen met een laag en hoog risico zwangerschap. Zowel ernstige prepartum angst voor de bevalling als een eerdere keizersnede voorspelden een voorkeur voor een keizersnede. Ernstige prepartum angst voor de bevalling was ook gerelateerd aan het uiteindelijk per keizersnede bevallen. Vrouwen die de voorkeur gaven aan een vaginale baring maar uiteindelijk een keizersnede kregen, liepen risico op ernstige angst postpartum, terwijl hetzelfde risico niet werd aangetoond voor vrouwen die de voorkeur gaven aan een keizersnede, maar een vaginale baring hadden. Prepartum angst voor de bevalling bleek sterk geassocieerd te zijn met postpartum angst voor de bevalling, onafhankelijk van het overeenkomen van de gewenste en uiteindelijke manier van bevallen.

Hoofdstuk 6 gaat over de relatie tussen FOC en de voorkeur van de vrouw voor waar ze zal bevallen, thuis of in het ziekenhuis. Onderzocht wordt of een vrouw achteraf een hoger niveau van angst voor de bevalling ervaart wanneer de plaats van haar bevalling

anders was dan haar voorkeurslocatie. In de studiegroep van 331 vrouwen met een laag risico zwangerschap, gaf 31% de voorkeur aan een thuisbevalling. Uiteindelijk beviel 28% thuis van de 274 deelnemers die postpartum-follow-upgegevens verstrekten. We vonden dat vrouwen die de voorkeur gaven aan een thuisbevalling een lager niveau van angst voor de bevalling hadden dan vrouwen die de voorkeur gaven aan een ziekenhuisbevalling. Opvallend was dat vrouwen die aanvankelijk de voorkeur gaven aan een ziekenhuisbevalling vaker werden verwezen naar een gynaecoloog/tweedelijns zorg. Tot slot vonden we dat postpartum angst voor de bevalling voorspeld werd door zowel een hoog niveau van prepartum-angst voor de bevalling, als een verwijzing naar de tweedelijn, en een slechte neonatale conditie, terwijl op een andere locatie dan gewenst bevallen niet gerelateerd was aan postpartum FOC.

De discussie (hoofdstuk 7) geeft informatie over de obstetrische omstandigheden waarin de onderzoeken werden uitgevoerd. Enkele opvallende veranderingen van 2005 tot 2015 in de verloskundige zorg, waaronder de toename van het gebruik van medicamenteuze pijnstilling en de afname van thuisbevallingen, worden beschreven om de interpretatie van de resultaten van de onderzoeken te vergemakkelijken. We vergeleken de resultaten van de onderzoeken van 2005, 2012 en 2015 en relateerden deze aan de resultaten van relevante onderzoeken zoals uitgevoerd in andere Westerse landen met een hoog inkomen. De prevalentie van ernstige prepartum FOC (W-DEQ somscore ≥ 85) in onze studies was 10-12,4% en van ernstige postpartum FOC 5,6-13,3%.
Hoewel de obstetrische omstandigheden zijn veranderd, waren de gemiddelde W-DEQ-scores en de percentages van ernstige prepartum-FOC vergelijkbaar in de drie onderzoeken. De niveaus van postpartum-FOC verschilden echter tussen de onderzoeken; een nieuwe en juiste analyse van de gegevens is nodig om de resultaten van het onderzoek van 2005 en 2015 te kunnen vergelijken.
Verder bespreken we de resultaten met betrekking tot de voorkeurs- en werkelijke plaats en modus van bevallen en hun relatie met FOC, evenals de relatie van FOC met het gebruik van medicamenteuze pijnstilling. Consistent in alle studies in dit proefschrift is de algemene bevinding dat het niveau van prepartum FOC sterk gerelateerd is aan en voorspellend is voor het niveau van postpartum FOC, wat een bevestiging is van het vicieuze cirkeleffect, zoals beschreven door Zar et al. (1).
Daarnaast wordt het effect van angst op risicoperceptie besproken en toegelicht met psychologische theorieën. Vanwege 'biases' in risicoperceptie bij vrouwen met ernstige angstproblemen, kan informatie over rationele risicobeoordelingen van interventies, zoals een CS op verzoek van de moeder, mogelijk niet het gewenste doel bereiken en niet voldoen aan de primaire psychologische behoeften van de angstige vrouw.

Op grond van de bevindingen van de studies van dit proefschrift, de bestaande literatuur

en praktijkervaring worden verschillende **aanbevelingen voor de praktijk** gegeven. Een algemene doelstelling met betrekking tot FOC is te voorkomen dat vrouwen gevangen blijven in de vicieuze cirkel van ernstige FOC tijdens de zwangerschap, zich niet in staat voelen om met de inspanning van een bevalling om te gaan, een negatieve interpretatie geven aan het geboorteproces, en enkele weken na de bevalling een nog steeds bestaande ernstige FOC. Screening op ernstige FOC moet vroeg tijdens de zwangerschap plaatsvinden om op tijd te kunnen beginnen met psychische begeleiding. Het aanbieden van medicamenteuze pijnstilling is niet voldoende voor vrouwen met ernstige FOC, en psychotherapie wordt aanbevolen als aanvulling op verloskundige zorg tijdens de zwangerschap. Een combinatie van continuïteit van zorg en een verloskundig systeem dat de eigen keuze van de vrouw voor de plaats van de bevalling ondersteunt en zorgt voor een vlotte verwijzing in geval van complicaties, kan behulpzaam zijn om te voorkomen dat vrouwen met prepartum FOC uiteindelijk na de bevalling nog steeds ernstige FOC hebben. In het geval van een verzoek voor een keizersnede door een vrouw met ernstige FOC, wordt een nauwe samenwerking tussen de verloskundige zorgverlener en een psychotherapeut aanbevolen om de FOC van de vrouw te verlagen, de besluitvorming te verbeteren en haar zo goed mogelijk voor te bereiden op de bevalling. Een electieve keizersnede kan echter een oplossing zijn indien een psychologische behandeling niet wordt geaccepteerd, niet voldoende is of er uiteindelijk geen tijd meer is voor een dergelijke behandeling.
Ten slotte worden suggesties voor toekomstig onderzoek gedaan waaronder een follow up studie om de lange termijn gevolgen van ernstige FOC te onderzoeken voor zowel moeder als kind en een nieuwe analyse van de laag risico groepen van de studies in 2005 en 2015 met behulp van een gecombineerde database om gefundeerde uitspraken over verschillen tussen de beide onderzoeksgroepen te kunnen doen. Ook zou onderzoek naar de risico perceptie van angstige zwangeren en naar angst bij zorgverleners aan te bevelen zijn.

Conclusies

Consistent in alle studies in dit proefschrift is de algemene bevinding dat het niveau van FOC tijdens de zwangerschap sterk gerelateerd is aan, en voorspellend is voor, het niveau van postpartum FOC. De resultaten uit onze studies laten zien dat vrouwen met ernstige FOC tijdens de zwangerschap vaker een voorkeur hebben voor een ziekenhuisbevalling, vaker medicamenteuze pijnstilling tijdens de bevalling krijgen, vaker een voorkeur voor electieve keizersnede hebben en ook vaker per keizersnede bevallen (zowel gepland als spoed).
We vonden dat het overeenkomen van de eigen voorkeur (tijdens de zwangerschap) en de feitelijke bevallingssituatie niet gerelateerd was aan de mate van postpartum FOC. Dit gold voor zowel de voorkeursplaats als de voorkeursmodus van bevallen. In

plaats daarvan ontdekten we dat voorspellers voor hoge postpartum-FOC waren: een verwijzing vanuit eerstelijns naar tweedelijns zorg, een spoed keizersnede en een slechte conditie van de pasgeborene. Om te voorkomen dat vrouwen in een vicieuze cirkel blijven van pre- tot postpartum FOC, adviseren we een nauwe samenwerking tussen de verloskundige zorgverlener en een psychotherapeut bij het begeleiden van deze vrouwen tijdens zwangerschap en bevalling. Op deze manier kan aandacht gegeven worden aan psychologische behoeften, ondersteund en aangevuld met verloskundige zorg.

REFERENCE

1. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scandinavian Journal of Behaviour Therapy. 2001;30(2):75-84.

ABBREVIATIONS

ANOVA	Analysis of Variance
CBT	Cognitive Behaviour Therapy
CI	Confidence Interval
CS	Caesarean section
CFQ	Childbirth Fear Questionnaire
DSM-5	Diagnostic and statistical manual of mental disorders, 5th edition
EDA	Epidural analgesia
ElCS	Elective Caesarean section
EmCS	Emergency Caesarean section
EMDR	Eye-movement desensitization and reprocessing
FOBS	Fear of birth scale
FOC	Fear of childbirth
HADS	Hospital Anxiety and Depression Scale
HELLP	Hemolyses, elevated liver enzyms, low platelets
ICBT	Internet Cognitive Behavioural Therapy
IQR	Inter Quartile Range
OR	Odds Ratio
PAC	Preference-Actual mode of delivery-Congruence
PCA	Principal component analysis
PRAQ-R2	Pregnancy Anxiety Questionnaire-Revised 2
PRN	Dutch Perinatal Register
PTSD	Post-traumatic Stress Disorder
RAVEL	Remifentanil patient controlled Analgesia Versus Epidural analgesia study
RCT	Randomized controlled trial
RPCA	Remifentanil patient controlled Analgesia
SD	Standard deviation
SFOC	Severe fear of childbirth
VD	Vaginal Delivery
VE	Vacuum Extraction
VIL	Verloskundige Indicatie Lijst
W-DEQ	Wijma Delivery Expectancy/Experience Questionnaire
W-DEQ A	Wijma Delivery Expectancy/Experience Questionnaire antepartum version
W-DEQ B	Wijma Delivery Expectancy/Experience Questionnaire postpartum version

PUBLICATIONS

In this thesis

Sluijs A., Cleiren M.P.H.D, Scherjon S.A., Wijma K., *No relationship between fear of childbirth and pregnancy-/delivery-outcome in a low-risk Dutch pregnancy cohort delivering at home or in hospital*. Journal of Psychosomatic Obstetrics and Gynecology, 2012; 33(3):99-105

Sluijs A., Cleiren M.P.H.D, Scherjon S.A., Wijma K., *Do fear of childbirth or family history affect whether pregnant Dutch women prefer a home- or hospital birth?* Midwifery, 2015; 31(12):1143-1148

Anne-Marie Sluijs, Johanna M. Middeldorp, Sanga H. Hassanzai, Saskia le Cessie, Jan M.M. van Lith, Liv M. Freeman: *Pain relief during labour and fear of childbirth from pre- to postpartum in medium to high risk women: a secondary analysis of the RAVEL-study*, submitted

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

Sluijs A-M., Cleiren M.P.H.D., van Lith J.M.M., Wijma B., Wijma K., *Is fear of childbirth related to the woman's preferred location for giving birth? A Dutch low-risk cohort study.* Birth. 2019;00:1-9. https ://doi.org/10.1111/birt.12456

Other publications

D. Dweik, **A.M. Sluijs**. *What is underneath the caesarean request?* Acta Obstet Gynecol Scand 2015; 94: 1153–1155.

Sluijs AM. *Tocofobie*. In: Lambregtse-van den Berg M, Kamp Iv, Wennink H, editors. Handboek psychiatrie en zwangerschap, 105-111. de Tijdstroom, 2015.

Koelewijn JM, **Sluijs AM**, Vrijkotte TGM . *Possible relationship between general and pregnancy-related anxiety during the first half of pregnancy and the birth process: A prospective cohort study.* BMJ Open2017;7:e013413. doi:10.1136/bmjopen-2016-013413

Logtenberg SLM, Verhoeven CJM, Oude Rengerink K, **Sluijs A**, Freeman LM, Schellevis FG, Mol BW. *Pharmacological pain relief and fear of childbirth in low risk women; secondary analysis of the RAVEL study.* BMC pregnancy and childbirth (2018), 18(1) DOI: 10.1186/s12884-018-1986-8 https://doi.org/10.1186/s12884-018-1986-8

Nadine E. de Vries , Claire A.I. Stramrood, Lynn M. Sligter, **Anne-Marie Sluijs,** Maria G. van Pampus. *Midwives' practices and knowledge about fear of childbirth and postpartum posttraumatic stress disorder*. Women and Birth 2018 https://doi.org/10.1016/j.wombi.2018.11.014

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CURRICULUM VITAE

Anne-Marie Sluijs werd geboren op 26 juli 1973 in Bussum als tweede van vijf dochters. Na de afronding van het atheneum aan Christelijk college 'Stad en Lande' in 1991, ging ze naar de 'kweekschool voor vroedvrouwen' in Amsterdam. In de zomer van 1994 voltooide Anne-Marie de opleiding, legde ze officieel de eed af en werd verloskundige.

Van 1994-1998 werkte Anne-Marie als eerstelijns verloskundige in verschillende verloskundigen praktijken in en rond Den Haag en Amsterdam. Daarna vertrok ze zeven maanden (1997-1998) naar Nepal om vrijwilligerswerk te doen als verloskundige in het Dhulikel-ziekenhuis. Na haar terugkeer in Nederland werkte Anne-Marie opnieuw als zelfstandig verloskundige en begon haar studie psychologie aan de Universiteit Leiden (1998). In 1999 werkte ze korte tijd in het UMC Utrecht, waarna ze vanaf juni 1999 als klinisch verloskundige in het LUMC ging werken.

Ondertussen vervolgde Anne-Marie haar (deeltijd) studie psychologie en studeerde in 2008 af in de Medische en Gezondheidspsychologie. Tijdens deze periode groeide haar interesse in de combinatie van psychologie en verloskunde en voor haar masterscriptie voerde ze haar eerste studie uit naar angst voor de bevalling. In 2013 ontving Anne-Marie van de KNOV (Koninklijke Nederlandse Organisatie voor Verloskundigen) een promotiebeurs. In combinatie met de steun van het LUMC en onder leiding van prof. Jan van Lith (LUMC), prof. Klaas Wijma en prof. Barbro Wijma (Linkoping University, Sweden), en dr. Marc Cleiren (universiteit Leiden) als (co)promotoren, kon ze haar onderzoek naar angst voor de bevalling voortzetten, wat resulteerde in dit proefschrift.

Tijdens haar promotie bleef Anne-Marie werken als klinisch verloskundige met als aandachtsgebied zwangerschap en psychiatrie, en was betrokken bij onderwijs en bij de organisatie van de poli- en het MDO psychiatrie en zwangerschap. Ze is actief bestuurslid van de Nederlandse werkgroep psychosociale obstetrie en gynaecologie (WPOG) en van de werkgroep psychiatrie en zwangerschap in het LUMC. Anne-Marie woont in Leiden met haar man Han Smit en hun drie zonen Silvester (2003), Siebren (2006) en Leander (2008).

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Een proefschrift schrijven doe je niet alleen, velen hebben bijgedragen in de vorm van inspiratie, motivatie, kennis, organisatie en het delen van ervaringen.

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