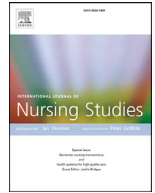




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A comparison of the Fear of Childbirth Scale with the Tilburg Pregnancy Distress Scale to identify childbirth-related fear in a sample of Dutch pregnant women: a diagnostic accuracy comparative cross-sectional study

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ABSTRACT

Background: Because of the considerable negative effects of women's childbirth-related anxiety, fear and worries, and the time constraints that midwives perceive to assess women's antenatal emotional wellbeing, it is important that midwives can identify women with a more severe fear of birth with an easy to administer, validated tool.

Objective: To investigate the ability of the two-item Fear of Childbirth Scale (FOBS) to discriminate between pregnant women with and without birth-related fear, compared with the 16-item Tilburg Pregnancy Distress Scale (TPDS).

Methods: A diagnostic accuracy comparative cross-sectional study was performed, comparing two screening tests. Sensitivity, specificity, positive and negative predictive values and accuracy and discriminant property of the FOBS were determined and compared with the TPDS and with the negative affect 11-items TPDS (TPDS-NA) subscale. The TPDS and TPDS-NA were treated as reference standard to establish the discriminative potential of the FOBS for the presence or absence of antenatal birth-related fear.

Participants: A sample of 396 Dutch women with uncomplicated pregnancies.

Results: When compared with the 16-items TPDS, the FOBS showed a higher specificity (95%) than sensitivity (70%) to detect fear of childbirth. The FOBS items had a good predictive ability for fear and worries about the forthcoming birth (79%) and a conclusive ability for negative case-finding (92%). The FOBS showed good accuracy (89%). The FOBS discriminated women who were or were not classified as being fearful according to the TPDS (AUC .86). When compared with the 11 items TPDS-NA subscale, the FOBS validity and accuracy decreased: sensitivity: 51%; specificity 92%; positive predictive ability 65%; negative predictive ability 88%; accuracy 83%; AUC .82.

Conclusion: When compared with the 16-items TPDS, the two-item FOBS shows to be an accurate tool for identifying the presence of antenatal birth-related fear in a sample of Dutch women with uncomplicated pregnancies.

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What is already known about the topic?

- Fear of childbirth is common in pregnancy and has detrimental mental health and obstetric effects for women.
- Midwives are the ideal healthcare professional to perform antenatal screening for fear of childbirth.

- Midwives need an easy to administer, validated tool to identify women with fear of childbirth.

What this paper adds

- This diagnostic accuracy comparative cross-sectional study shows that the two-item FOBS offers the opportunity in midwifery care to adequately identify pregnant women with fear of childbirth, instead of using measures that include manifold items such as the 16-items TPDS.

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1. Introduction

Antenatal pregnancy-related anxiety is a unique and a content-specific state anxiety differing from general trait anxiety (Huizink et al., 2004), being characterised by pregnancy-specific concerns and worries and fears about childbirth (Rondung et al., 2016; Brunton et al., 2019). Women may be worried about the health of their baby, the pain during labour, their future role as a mother, about their own appearance, and their changing relationship with their partner (Rondung et al., 2016). Antenatal fear specifically related to the event of childbirth, accounts for a large part of antenatal pregnancy-related anxiety in pregnant women (Klabbers et al., 2017). Although most pregnant women experience some feelings of fear of childbirth (Fenwick et al., 2009), there is also a group of pregnant women who develop severe feelings of childbirth-related fears, anxiety, and worries (Wijma & Wijma, 2016) - that is - tophobia. Tophobia has been described as an extreme fear or unreasoning dread of childbirth (Askoy et al., 2015). Factors associated with tophobia have been reported as anxious personality types, previous sexual abuse, past traumatic birth traumatic experience in health care, previous miscarriages, long duration of infertility, smoking, low social supports and poor partner relationships (O'Connell et al., 2015). In the Netherlands, 16% of healthy pregnant women reported heightened levels of pregnancy-related anxiety in the third trimester of pregnancy, including aspects of the labour and birth process (Fontein-Kuipers et al., 2016; Westerneng et al., 2017) and 14% reported elevated levels of fear of childbirth at 36 weeks' gestation (Klabbers et al., 2017). The estimated worldwide prevalence rate for childbirth-related fear has been reported as 14% with increased prevalence rates in recent years (O'Connell et al., 2017). Fear of childbirth can be distinguished in fear that predates pregnancy; fear that results from a previous birth; or as a symptom of antenatal depression (Klabbers et al., 2016). Childbirth-related fear can include fear of pain, fear of being incapable of giving birth, about the risk of injuries, complications and/ or mode of birth (Slade et al., 2019), fear of losing control and fear of interactions with healthcare professionals during labour, fear of becoming a parent and fear of death (Klabbers et al., 2016; Slade et al., 2019). Childbirth-related fear can lead to antenatal depression and general anxiety (Fontein-Kuipers et al., 2017), avoidance or delay of pregnancy (Klabbers et al., 2016), intrapartum pharmacological pain relief (Adams et al., 2012; Koelewijn et al., 2017), a longer duration of labour (Adams et al., 2012), a caesarean section as mode of birth (Adams et al., 2012; Ryding et al., 2015; Koelewijn et al., 2017) and/ or a self-reported negative birth experience (Nilsson et al., 2011). There are also several studies showing that pregnancy-specific anxiety (including fear of birth) is related to poor child outcomes and later child (neuro)behavioral problems, that is infant temperamental problems independent of maternal pre- and postnatal general anxiety (Henrichs et al., 2009; Van den Bergh et al., 2017). Women's antenatal childbirth-anxiety and fear can be so overwhelming that it overshadows pregnancy, and affects the woman's daily functioning (Lukasse et al., 2014). The above illustrates that the identification of women with severe fear of birth is important so that health professionals are able to provide supportive, appropriate and timely care and interventions, as alleviating severe anxiety and worries can assist these women in achieving an unafraid or less fearful pregnancy and birth and to reduce the risk to develop persistent anxiety or depression.

In the Netherlands, midwives are ideally placed to engage with pregnant women and to talk about their feelings, worries, concerns and fear of the upcoming birth (Fontein-Kuipers et al., 2014). Midwives have been identified as designated healthcare professionals to screen for the presence of impaired emotional wellbeing and

psychological assessments are recommended as part of routine antenatal care (NICE, 2014). Women have identified midwife-led counselling as empowering and have also perceived that it increases their confidence when facing birth (Larsson, 2017). In the United Kingdom (UK), the NHS long term plan (Centre for Mental Health, 2019) aims to increase access to evidence-based care for women with perinatal mental health concerns through maternity outreach clinics which integrate midwifery care and psychological services. It is important to find a tool to accurately identify women with severe fear of childbirth within the midwifery-led context - as until now screening for childbirth-related fear is not integrated in routine midwifery practice (Fontein-Kuipers et al., 2014). Midwives, however, perceive lack of time as a barrier to assess women's antenatal emotional wellbeing (Fontein-Kuipers et al., 2014; Evans et al., 2017). Midwives and childbearing women might benefit from a pragmatic, standardised, brief, accessible, easy to administer and appropriate tool to identify women with fear of childbirth (Fontein-Kuipers & Jomeen, 2019). An example of such a tool in midwifery antenatal care are the Whooley items, which have shown to adequately identify women with depression and trait-anxiety among a Dutch antenatal population but showed limited diagnostic accuracy for pregnancy and birth-related anxiety (Fontein-Kuipers & Jomeen, 2019).

Various instruments to measure fear of childbirth do exist. Because the Dutch childbearing population has a specific attitude towards childbirth (de Vries et al., 2013), the 16-items Tilburg Pregnancy Distress Scale (TPDS) has been developed and validated in a Dutch pregnant population to capture the experience of childbirth-related fear of Dutch women (Pop et al., 2011; Boekhorst et al., 2019). Psychometric and discriminative properties of the TPDS have been reported in numerous studies which evaluated the TPDS as good in terms of test-retest reliability, internal consistency, construct and concurrent validity (Ertugrul et al., 2014; Çapı & Pasinlioglu, 2015; Evans et al., 2015; Boekhorst et al., 2019; Volpato et al., 2019). At the moment of the current study, the TPDS was the best available diagnostic tool in the Netherlands. As midwives are known to have limited time to administer measures with manifold items such as the TPDS (Fontein-Kuipers et al., 2014; Sanders et al., 2016; Higgins et al., 2018), there seems to be a need for a tool that is easy and quick to fill in. A feasible tool that is easy and fast to administer, is the Fear of Birth Scale (FOBS), a two-item visual analogue scale that is used to measure worry and fear among pregnant women in midwifery practice (Haines et al., 2015; Ternstrom et al., 2016; O'Connell et al., 2017). Before it can be considered or recommended to implement this tool in Dutch antenatal care, the FOBS needs to be validated for its utility. Various studies have highlighted the limited research investigating psychometric properties of pregnancy and birth-specific anxiety measures (Meades & Ayers, 2011; Alderdice et al., 2012; Morrell et al., 2013; Evans et al., 2015).

The TPDS was developed and validated among Dutch women and practitioners to create a scale primarily reflecting pregnant women's experiences of birth-related anxiety and fear (Pop et al., 2011). Although the TPDS is a Dutch developed scale tested within a Dutch childbearing population, the scale is also being used in the UK, Portugal, Brazil, Spain, Turkey and Indonesia (Boekhorst et al., 2019). So far, the FOBS has mainly been used in Sweden and Australia (Haines et al., 2012; Haines et al., 2015; Ternström et al., 2015; Hildingsson et al., 2018) and also concerns a measurement tool addressing birth-related fear from the woman's perspective - similar to the TPDS. The FOBS is being recognised to be a culturally transferrable tool (Haines et al., 2015). Considered from a multicultural perspective, it is of international interest to compare two scales that are used and validated in culturally different childbearing populations.

2. Aim

To investigate the ability of the two-item Fear of Childbirth Scale (FOBS) to discriminate between women with and without antenatal birth-related fear, compared with the 16-items Tilburg Pregnancy Distress Scale (TPDS).

3. Methodology

3.1. Design

We performed a diagnostic accuracy comparative cross-sectional study among a sample of Dutch low-risk pregnant women. In this design all participants are all exposed to the same studied test and reference test and the test results in all study subjects are compared with the reference standard (Knottnerus and Mursi, 2003). The data was collected using online self-completed questionnaires. The data were collected between 12 September and 29 November 2018, after the index test (FOBS) and reference standard (TPDS, TPDS-NA) were selected (Knottnerus and Mursi, 2003). We used the Limesurvey software to collect the data. A link to the survey and Quick Response (QR) code were distributed to the participants. The primary outcome variable was the presence or absence of childbirth-related fear and the secondary outcome variable was the presence or absence of negative affect. Reference standards and index test results were available to the researchers.

3.2. Sampling

We did not know in advance which women were experiencing childbirth-related fear but aimed to include participants clinically representative of a Dutch low-risk pregnant population but with similar clinical characteristics. We included women in the Netherlands who received midwife-led primary care. Women receiving this type of care are women with healthy uncomplicated/low risk pregnancies who do not require obstetric care. We included women with a good comprehension of the Dutch language, 18 years of age or older and during any trimester of pregnancy. Women receiving secondary or tertiary care were excluded because it can be expected that when antenatal complications are present or threaten to arise, those women are more susceptible for childbirth-related fear that is related to worries about the woman's and baby's health (McCoyd et al., 2019). We used a list-based sampling frame, consecutively recruiting pregnant women through the social media platforms such as websites and Facebook accounts of midwifery practices in the South-West region of the Netherlands, allowing snowballing. To minimise bias, the recruitment title was formulated as "What are your thoughts when you think about labour and birth?". The title purposively did not include words as 'anxiety', 'worries' or 'fear', to avoid over-representation of women with antenatal birth-related fear.

3.3. Ethics

This study is part of a (interregional) project conducted in the Netherlands and Flanders and the study protocol was reviewed and approved by the Ethics Committee Social and Human Sciences Antwerp (Reference number EA_SHW_17_40_03). According to Dutch legislation, additional ethical approval was not considered necessary (CCMO, 2002). The study was performed in accordance with the ethical standards of the 1964 Helsinki declaration and its later amendments and in accordance with the Higher Education-protocol Assurance Research (Vereniging Hogescholen, 2015). Participation was voluntary and informed consent was obtained before the questionnaire could be completed. Privacy and confidentiality were protected.

3.4. Measurement

3.4.1. Fear of Birth Scale (FOBS) – description of the scale

The FOBS is a two-item visual analogue scale, asking to rate feelings about the approaching birth with the question: "How do you feel right now about the approaching birth?" The degree of worry and of fear are assessed in two separate items. Both elements worry and fear are indicated on a 0 to 100 mm scale, with 'calm' to 'worried' and 'no fear' to 'strong fear' representing the anchors of the two scales (Haines et al., 2011) based on the Rouhe Visual Analogue Scale (VAS) (Rouhe et al., 2009). (See Box 1). The FOBS has been validated in primigravid and multigravid samples of Swedish and Australian populations (Haines et al., 2012; Haines et al., 2015; Ternström et al., 2015; Hildingsson et al., 2019).

3.4.2. Fear of Birth Scale (FOBS) – procedure for translation

A bilingual midwifery expert translated the two FOBS-items from English into Dutch. Back-translation was performed by a lay person, unfamiliar with the FOBS. No significant differences in meaning were found between the original English version and the back-translated version. Twelve pregnant women, randomly approached in the existing network of the first author, tested the items for (unambiguous) wording and comprehensibility. The women were encouraged to share their thoughts immediately after answering the two questions, similar to the thinking aloud technique used by Ternström and colleagues (2016). No changes were made.

3.4.3. 16-items Tilburg Pregnancy Distress Scale (TPDS)

The TPDS consists of 16 items and two subscales as it explores the negative affect (TPDS-NA) (11 items) related to the woman's pregnancy and birth and it explores the woman's perception of partner involvement (5 items TPDS-PI). The TPDS uses a 4-point rating scale generating a total score ranging from 0 to 48, with higher scores indicating increased birth-related anxiety and fear

How do you feel right now about the approaching birth?
Please mark with an X on the lines below.

Calm _____ Worried

No fear _____ Strong fear

Box 1. Fear Of Birth Scale

(Pop et al., 2011). In the Dutch validation study among 599 pregnant women, the TPDS showed good psychometric properties (Pop et al., 2011; Boekhorst et al. 2019).

3.5. Data Analysis

We calculated Cronbach's alpha to measure internal consistency of all 16 TPDS items and the results were considered as acceptable at $\alpha .8 > \alpha \geq .7$, good at $\alpha .9 > \alpha \geq .8$ and excellent at $\alpha \geq .9$ (Field, 2013). When fewer than 10% of the values for an item were missing, values were imputed with sample means. TPDS items 3, 5-7, 9-14 and 16 were reverse coded. We summed the scores of the 16 TPDS and the 11 TPDS-NA items. Based on the total TPDS scores > 17 , we identified pregnant women with high birth-related fear. Based on the TPDS-NA scores > 12 , we identified women who reported a heightened negative affect related to labour and birth, the postpartum and general health (Pop et al., 2011). The two-item FOBS values were averaged to give a total score ranging from 0 to 100, with high scores indicating higher levels of worry and fear about the forthcoming birth. We used a total FOBS score ≥ 60 as a cut-off point to identify women with high levels of worry and fear of childbirth (Hildingsson et al., 2018; Hildingsson et al., 2019). Pearson correlation coefficients were used to investigate the associations between scores on the continuous measure of the FOBS and the TPDS and TPDS-NA. According to Cohen (1988), $r < .3$ are considered small effects, $.3 > r < .5$ moderate effects, and $r > .5$ large effects. To measure differences between the scores of multiparous and nulliparous women, analysis of variance and Kruskal-Wallis tests were performed.

Scores above the cut-off values were recoded as a binary value of "high levels of birth-related fear" when above cut-off level and "low levels of fear" when below cut-off level. Levels above cut-off points were considered a positive test. We ascertained the rates of "true" and "false" positives and "true" and "false" negatives for the FOBS and TPDS. External validity was assessed using 2×2 contingency tables of weighted prevalences. We considered the FOBS items as case-finding questions to assess fear of childbirth. Here, the TPDS and TPDS-NA were treated as the reference standard against which the test was compared; using a positive response to the FOBS as the criterion for the presence of antenatal childbirth-related fear. We performed a primary analysis with the 16-items TPDS and a secondary analysis with the subscale TPDS-NA. As the overall TPDS scale includes items on both distress and the experience of partner involvement we intended to explore in what way the distress items alone (i.e. the TPDS-NA scale) can identify pregnancy-related anxiety.

We used the receiver operating characteristics (ROC) analysis to determine the accuracy of the FOBS, which are reported as area under the curve (AUC). We used Swets' criteria to assess the AUC (Swets, 1988). The AUC of .5 to .6 is defined as bad performance, .6 to .7 as poor performance, .7 to .8 as satisfactory performance, .8 to .9 as good performance, and .9 to 1.0 as excellent performance discriminant ability to correctly classify those with and without childbirth-related fears and worries (Swets, 1988). Statistical analyses were performed using SPSS 25.0 and the MedCalc Diagnostic test evaluation calculator (https://www.medcalc.org/calc/diagnostic_test.php). The validity outcomes based on both cut-off values were compared.

3.6. Sample size

Based on the sample mean and standard deviation from previous studies (Haines et al., 2012; Haines et al., 2015; Ternström et al., 2015; Ternström et al., 2016; Hildingsson et al., 2018; Hildingsson et al., 2019) with a 95 Confidence Interval (CI), we

required a minimum of 386 participants to collect data representative of the population.

4. Results

4.1. Characteristics participants

We collected demographic and personal characteristics of the participants in the same questionnaire, including information on: age, gestation, parity, relationship, ethnicity, occupation and education level. The participants in our study were aged between 19 and 45 years (Mean 30.3; ± 3.83), were predominantly of Dutch origin (97%), while 3% of the sample were not born in the Netherlands or had at least one parent been born in another Western or non-Western country. Most of the participants (65%) had received higher education, were predominantly employed (84%) and in a relationship (99%). The women in our study had a mean gestational age of 26 weeks (± 8.81 ; range 9 to 41 weeks), 39% of the participants were nulliparous and 61% were parous women, i.e. women who never have given birth and women who have given birth once or more respectively.

4.2. Birth-related fears and worries

We received 396 completed questionnaires (response rate 80%). The questionnaire was predominantly completed by women in the second and third trimester of pregnancy (92.6%) (See Table 1).

The mean total score of the TPDS was 12.54 (± 6.6 ; range 0 to 37). In both TPDS as well as FOBS, approximately 20% of the participants reported scores above cut-off levels. Visual interpretation of histograms and Q-Q plots showed that the TPDS scores were normally distributed. There were no missing values. Parous women had significant higher mean total TPDS scores and TPDS-NA subscale scores compared to nulliparous women ($p < .05$; $p < .01$, see also Table 1). The FOBS' scores showed no significant differences with regard to parity ($p < .28$). No significant differences were found between the scores above the TPDS, TPDS-NA or FOBS cut-off values of nulliparous and parous women ($p < .08$).

4.3. Internal consistency TPDS

The 16-item TPDS had an α coefficient of .80 and the TPDS-NA subscale had a α coefficient of .71, showing good and acceptable internal consistency (Field, 2013).

4.4. Concurrent validity

The two FOBS items were strongly correlated with a correlation coefficient of $r .68$ ($p < .001$). The FOBS and the TPDS were also strongly correlated with a correlation coefficient of $r .63$ ($p < .001$). The FOBS and the TPDS-NA were moderately negatively correlated with a correlation coefficient of $r -.46$ ($p < .001$).

4.5. Diagnostic accuracy of the FOBS

Agreement between the FOBS and TPDS were analysed using standard diagnostic performance measures: sensitivity (the proportion of true positives correctly identified by the test), specificity (the proportion of true negatives correctly identified by the test), likelihood ratio (shows how much more likely a woman is to get a positive test if she experiences fear of childbirth, compared with a woman without fear of childbirth), positive predictive value (the proportion of women with positive test results who are correctly identified) and negative predictive value (the proportion of women with negative test results who are correctly identified). The FOBS items showed a higher specificity than sensitivity: Thirty per cent

Table 1
Demographic and personal characteristics participants (n= 396)

	Mean (SD \pm) range	N (%)
Age in years	30.28 (\pm 3.83) 19-45	
Gestational age in weeks	26.3 (\pm 8.81) 9-41	
Trimester 1 (<13 weeks)		29 (7.4)
Trimester 2 (13-27 weeks)		174 (43.9)
Trimester 3 (\geq 28 weeks)		193 (48.7)
Nulliparous		156 (39.4)
Parous		240 (60.6)
Living with partner		392 (99)
Occupation		
Working (paid) job		333 (84.1)
Unpaid job		59 (14.9)
Student		4 (1)
Ethnicity*		
Dutch		383 (96.7)
Other Western country		8 (2)
Non-Western country		5 (1.3)
Education**		
Low level of education		42 (10.6)
Medium level of education		98 (24.7)
High level of education		256 (64.7)
TPDS total scores	12.54 (\pm 6.6) 0-37	
Nulliparous ^a	11.53 (\pm 5.87) 2-25 ²	
Parous ^b	13.2 (\pm 7) 0-37 ¹	
TPDS scores > 17		79 (19.9)
Nulliparous ^a		28 (17.9)
Parous ^b		51 (21.3)
TPDS-NA scores	9.52 (\pm 4.5) 3-30	
Nulliparous ^a	9.79 (\pm 3.8) 4-25 ²	
Parous ^b	9.37 (\pm 5) 3-30 ²	
TPDS-NA scores > 12		78 (19.7)
Nulliparous ^a		33 (21.2)
Multiparous ^b		45 (18.8)
FOBS		
<i>Calm (0) – worried (100)</i>	43.3 (\pm 29) 0-100	
Score \geq 60		83 (21)
<i>No fear (0) – strong fear (100)</i>	40.8 (\pm 27.8) 0-100	
Score \geq 60		86 (21.7)
FOBS total scores	42 (\pm 24.7) 0-100	
Score \geq 60		89 (22.5)
Nulliparous ^a	39.8 (\pm 23.1) 0-100	28 (17.9)
Parous ^b	43.5 (\pm 25.6) 0-100	61 (25.5)

* Dutch: Respondent born in the Netherlands and both parents born in the Netherlands; Other Western country: Respondent born in other Western country and/ or at least one parent born in other Western country; Non-Western country: Respondent born in non-Western country and/ or at least one parent born in non-Western country.

** Low: elementary, pre-vocational secondary education; Medium: vocational secondary education (preparing for higher education); High: secondary education preparing for Bachelor(-equivalent), Master(-equivalent), university.

¹ $p < .05$

² $p < .01$.

^a Nulliparous: women who never have given birth; Parous: women who have given birth once or more.

of women with birth-related fears and worries would go undetected when using the FOBS, while 5 per cent would be incorrectly identified as being worried and fearful. The likelihood ratios indicated that positive FOBS results showed strong evidence to identify women with worries and fears regarding the forthcoming birth. The positive predictive value showed a good predictive ability of the FOBS for antenatal birth-related fears and worries. The negative predictive value showed a rather conclusive ability for negative case-finding results. The FOBS showed good accuracy (Table 2). The discriminant validity of the FOBS is presented in Figs. 1 and 2. The ROC curves were plotted in function of the false positive rate and showed that the FOBS discriminated women who were or were not classified as being fearful or worried according to the TPDS. The area under the curve AUC .86 (Fig. 1), measured that the FOBS parameter distinguished between women the presence and absence of birth-related fear against the reference standard cases

Table 2
TPDS and TPDS NA as indicators for FOBS

Statistic	Value TPDS all items	Value TPDS NA
True positive (n)	62	49
False negative (n)	27	40
False positive (n)	17	26
True negative (n)	290	281
Sensitivity (95% CI)	69.66% (59.01 to 78.97)	55.06% (44.14 to 65.62)
Specificity (95% CI)	94.46% (91.28 to 96.74)	91.53% (87.84 to 94.39)
Positive Likelihood Ratio	12.58 (7.77 to 20.37)	6.50 (4.30 to 9.82)
Negative Likelihood Ratio	.32 (.23 to .44)	.49 (.39 to .62)
PPV (95% CI)	78.48% (69.25 to 85.52)	65.33% (55.50 to 74.01)
NPV (95% CI)	91.48% (88.68 to 93.64)	87.54% (84.77 to 89.86)
Accuracy	88.89% (85.37 to 91.81)	83.33% (79.29 to 86.87)

PPV = Positive predictive value; NPV = Negative predictive value

(TPDS), indicating high discriminant ability and thus good accuracy as a diagnostic test. We observed almost identical results when the TPDS-NA subscale was used as comparative measure, albeit that sensitivity reduced notably. In this case the sensitivity of the FOBS was 55% and the specificity was 92% (see Table 2 for more detail) and the AUC was .82 (Fig. 2).

5. Discussion

The scales of the FOBS were shown to be able to effectively and accurately in identifying women with and without birth related fear. These characteristics of the FOBS would make it possible to efficiently identify women needing more extensive evaluation of their antenatal mental functioning and also reduce the number of unnecessary subsequent extensive evaluations.

We used the TPDS as comparative measure with and without the partner support subscale (TPDS-PI) (Pop et al., 2011). Intuitively, the TPDS-NA subscale may be the one most closely related to the particular constructs of fear of childbirth. However, excluding the partner support subscale did not support this concept as overall sensitivity to childbirth-related fear was reduced, suggesting that the origins of antenatal birth-related fears and worries are known to be diverse and include social / partner support (Klabbers et al., 2016; Slade et al., 2019). Because of the significant correlations between the TPDS and FOBS in this study, it can be suggested that antenatal birth-related fear is rather contextual, not solely focused on the birth (Ternström et al., 2016). This suggests that self-reports of antenatal birth-related fear are influenced by other factors than only birth itself. Our exploration of the TPDS-NA subscale confirmed this thought.

In that respect, the TPDS items provide more insight in the origin or cause of women's fears and worries when compared to the FOBS. However, women have expressed that in particular disclosing details about their negative feelings towards the unborn child may cause discomfort (Evans et al., 2017). Otherwise, the FOBS showed good evidence to identify women who have antenatal extreme fears and worries about birth in a way that meets women's needs by using a cut-off point indicating referral without concern of being criticised or being stigmatised. Similar to the Whooley items, the FOBS scores can serve as a tool serving as a start for a dialogue about the woman's fears and worries (Ternström et al., 2016) and can lead to self-disclosure, which is known to be a positive coping strategy of pregnant women regarding their antenatal emotional wellbeing (Fontein-Kuipers et al., 2015). Women have identified that the use of anxiety and fear instruments helps to prompt an open discussion with their midwife and that midwives can help women to discuss their mental health concerns by providing a safe and supportive context and clearly communicating the purpose of screening tools (Evans et al., 2017). An earlier study

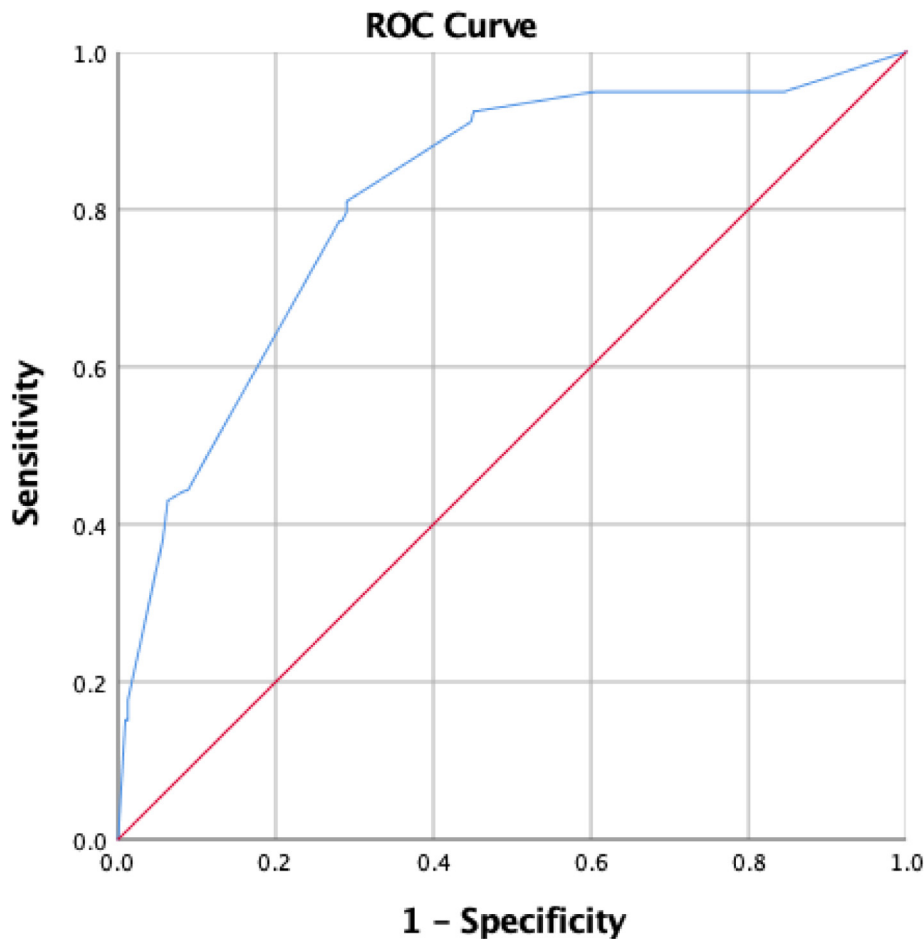


Fig. 1. ROC FOBS compared to TPDS

showed the need in Dutch antenatal services for a standardised, brief, easy to administer tool to identify women with fear of child-birth, in addition to the Whooley items (Fontein-Kuipers & Jomeen, 2019). Our study has shown that the FOBS would be an appropriate tool to fulfil this purpose. Additionally, our results suggest that the identification of women with fear of birth using the FOBS offers the opportunity for women identified to receive additional support from their midwife.

Addressing feelings and emotions concerning pregnancy or the forthcoming labour and birth reflects the midwife's unique supportive role in primary antenatal care. However, to facilitate an adequate discussion of women's emotional wellbeing, an effective and supportive relationship between the woman and the midwife needs to be promoted. This will help women to feel confident to openly and honestly discuss their feelings and be supported to, to access further professional services. Continuity of carer can build such a relationship pattern between women and midwives and promote women's emotional wellbeing (Sandall et al., 2016). To aid the discussion, midwives benefit from training and knowledge of the FOBS, from understanding the importance of discussing birth-related fear and fear, the skills to sensitively address the topic and from knowledge of referral and support services. Undergraduate and post-graduate teaching programmes for midwives should include an awareness of antenatal birth-related fear as well as training in using the effective use of the FOBS. Hence, communication between the woman and the midwife should not be replaced by screening or case-finding tools.

Discussing and preparing for labour and birth usually takes place in the third trimester of pregnancy (NICE, 2008). The representation of women with a mean gestational age of 26 weeks of our participants highlights that women think about labour and birth before the third trimester. This interpretation is likely to be more applicable to parous women (Huizink et al., 2016). An earlier study showed that 16% of pregnant women self-reported pregnancy and birth-related anxiety during the first trimester of pregnancy (Fontein-Kuipers & Jomeen, 2019). This emphasises that it is of merit for women to discuss their birth-related fear and worries sooner rather than later during pregnancy.

5.1. Methodological strengths and limitations

This is the first study to offer clinically meaningful information on the use of the FOBS among low-risk pregnant women in Dutch midwifery care. The strengths of this study included the use of an adequately powered sample of low-risk pregnant women in midwifery care and of validated questionnaires designed to measure pregnancy and birth-related fear. Our study also had potential limitations that need to be discussed.

First, the self-selective nature of our study population might have led to sampling bias. It is likely that women with insufficient proficiency of the Dutch (written) language or who feel ashamed or embarrassed about their emotions, as birth is socially regarded as a happy event, did not respond to the call for this study. We primarily used (social)media-recruitment where participants

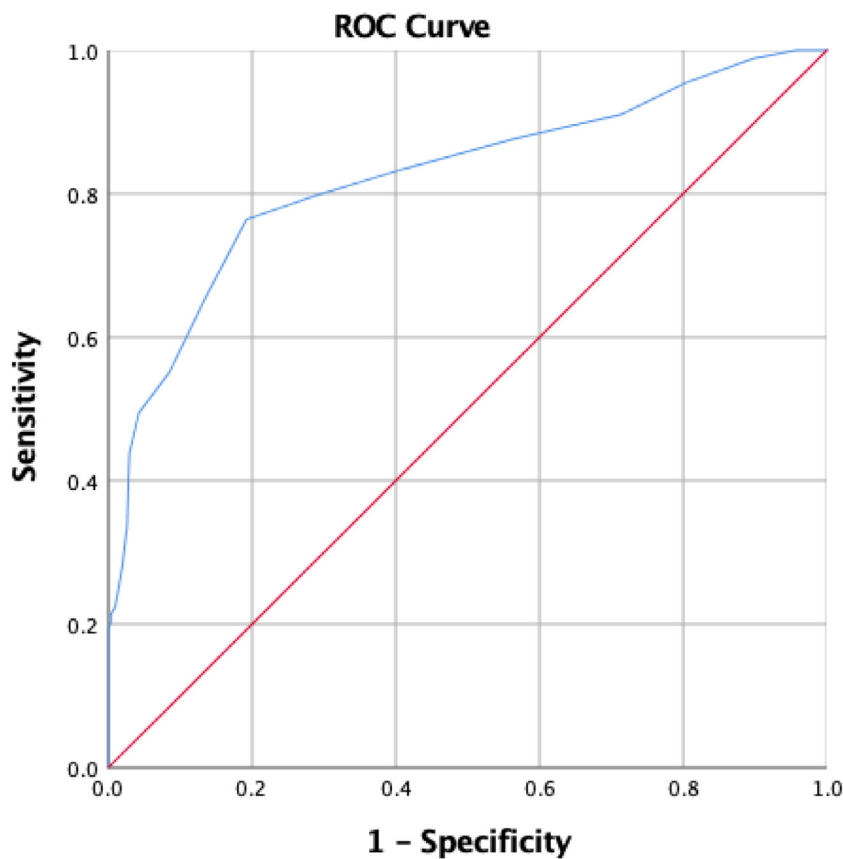


Fig. 2. ROC FOBS compared to TPDS NA

entered the study through self-referral rather than being systematically identified through referral from healthcare professionals. Self-selected samples are not necessarily a limitation, especially if the psychometric measures are specifically designed around self-reporting (Paulhus & Vazire, 2011). Additionally, because of the cross-sectional design of the study, post-test probabilities were unknown *a priori* sample selection bias can be ignored (Knottnerus and Mursi, 2003). Nevertheless, our sample was not fully representative of the Dutch low-risk pregnant population as our sample included fewer women with non-Dutch backgrounds and more women with high levels of education when compared to the general Dutch childbearing population (Statistics Netherlands, 2016; Perined, 2019). Limited representation can be caused by our sampling strategy through social media platforms. Future research should apply population-based systematic recruitment strategies to include diverse groups of pregnant women in a representative manner, e.g. other ethnicities or women with low educational levels, to replicate the accuracy of the FOBS among those groups.

Second, the sample included more parous than nulliparous women. This is similar to previous studies in this area of study (Pop et al., 2011; Ternström et al., 2015; Hildingsson et al., 2018; Hildingsson et al., 2019). Moreover, the distribution of parity in the current sample is similar to that of the Dutch childbearing population (Perined, 2019). As the predictive value of the FOBS is based on post-test probability, it can be affected by the prevalence of birth-related fear causing a measurement error. However, both our TPDS and FOBS mean scores were similar compared with mid and late pregnancy scores from previous studies (Haines et al., 2012; Ertugrul et al., 2014; Çapık & Pasinlioglu, 2015; Haines et al., 2015; Ternström et al., 2015; Ternström et al., 2016; Hildingsson et al., 2018; Hildingsson et al., 2019; Volpato et al., 2019).

The inclusion of more parous women can be explained by the self-selective nature of the study, assuming parous women to have different expectations of birth compared to nulliparous women (Toohill et al., 2014). There might have been women with negative or traumatic birth experiences among the parous women in our sample or women who experience high levels of parenting stress, influencing their levels of fear. These women might have responded in disproportionate numbers to recruitment posts. However, not all the scores in our study showed to be significantly higher in parous women. On the one hand, nulliparous women tend to score higher on questions related to specific anxiety of giving birth (Huizink et al., 2016) due to low self-efficacy expectancy (Huizink et al., 2016). On the other hand, general higher mean scores have been observed in parous women with a history of an emergency caesarean section or among women with negative previous birth experiences (Rouhe et al., 2009; O'Connell et al., 2015; Haines et al., 2015). As we did not assess the main underlying reasons contributing to fear of childbirth, nor did we assess the participants' previous birth experiences, we do not know if or to what extent this has influenced our findings. Assessment of previous mode of birth among parous women might be recommended for future studies when measuring birth-related fear. Third, our study population did not include high-risk pregnant women so it remains unclear whether the FOBS would be an appropriate measure to use in antenatal women with complicated pregnancies requiring obstetric-led care. Further studies with case mix are warranted because interpretation of our study results is limited to a homogenous population of low-risk Western well-educated pregnant women – as different sensitivities and specificities can be obtained in different groups or more diverse populations (Van Stralen et al., 2009).

Four, a methodological limitation of our study concerns internal validity lacking comparison with diagnostic interviews. This would offer a richer understanding of the utility and specific meaning of the FOBS items in midwifery practice.

5.2. Conclusion

The FOBS shows good evidence as an appropriate tool for the identification of women with more severe antenatal fear and worries about birth in a sample of Dutch women with uncomplicated pregnancies. Comparing the FOBS with the TPDS, including and excluding the TPDS-PI scale, shows that the FOBS is able to represent women's more contextual negative thoughts and emotions regarding pregnancy, the postpartum, general health and perceived partner involvement. The use of routine psychosocial assessment such as the FOBS may offer an opportunity to prompt an open discussion around women's concerns and worries about labour and birth with their midwife, during any antenatal point in time, and by this facilitate additional support to women displaying these fears. Hence, the use of the FOBS in midwifery practice benefits if effective education is provided to (student)midwives. The FOBS embodies the opportunity to meet the needs of pregnant women and of midwives. Future research among more heterogenous pregnant women, including women with non-Dutch backgrounds, women with a low education level, nulliparous and high-risk pregnant women, as well as collecting data on previous birth experiences and the use of diagnostic interviews is recommended.

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Ethical Approval

The study protocol was reviewed and approved by the Ethics Committee Social and Human Sciences Antwerp (Reference number EA_SHW_17_40_03).

Conflict of Interest

None.

CRediT authorship contribution statement

Jacoba Kuipers: Conceptualization, Methodology, Formal analysis, Data curation, Writing - original draft, Supervision, Writing - review & editing. **Jens Henrichs:** Conceptualization, Methodology, Writing - review & editing. **Kerry Evans:** Validation, Writing - review & editing.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.ijnurstu.2020.103615](https://doi.org/10.1016/j.ijnurstu.2020.103615).

References

Adams, S.S., Eberhard-Gran, M., Eskild, A., 2012. Fear of child-birth and duration of labour: A study of 2206 women with intended vaginal delivery. *BJOG: An International Journal of Obstetrics and Gynaecology* 119, 1238–1246.

- Alderdice, F., Lynn, F., Lobel, M., 2012. A review and psychometric evaluation of pregnancy-specific stress measures. *Journal of Psychosomatic Obstetrics and Gynaecology* 33, 62–77.
- Askoy, A., Ozkan, H., Gundogdu, G., 2015. Fear of childbirth in women with normal pregnancy evolution. *Clinical and Experimental Obstetrics & Gynecology* XLII, 179–183.
- Boekhorst, M., Beerhuizen, A., Van Son, M., Bergink, V., Pop, V., 2019. Psychometric aspects of the Tilburg Pregnancy Distress Scale: data from the HAPPY study. *Archives of Women's Mental Health*. <https://doi.org/10.1007/s00737-019-00974-4>.
- Brunton, R., Dryer, R., Saliba, A., Kohlhoff, J., 2019. The initial development of the Pregnancy-related Anxiety Scale. *Women and Birth* 32, e118–e130.
- Çapik, A., Pasiñoglu, T., 2015. Validity and reliability study of the Tilburg Pregnancy Distress Scale into Turkish. *Psychiatric and Mental Health Nursing* 22, 260–269.
- CCMO, 2002. Manual for the review of medical research involving human subjects. Central Committee on Research Involving Human Subjects, The Hague, Netherlands.
- Centre for Mental Health, 2019. The NHS long term plan. What does it mean for mental health?. Centre for Mental Health, London.
- Cohen, J., 1988. *Statistical power analysis for the behavioral sciences*, 2nd ed. Lawrence Erlbaum, New Jersey.
- De Vries, R., Nieuwenhuijze, M., Buitendijk, S., the members of Midwifery Science Work Group, 2013. What does it take to have a strong and independent profession of midwifery? Lessons learned from the Netherlands. *Midwifery* 29, 1122–1128. <https://dx.doi.org/10.1016/j.midw.2013.07.007>.
- Ertugrul, M., Okumus, H., Tokat, M., 2014. Psychometric evaluation of the Tilburg Pregnancy Distress Scale – Turkish Version (TPDS-T). *Journal of Transcultural Nursing* 26. <https://doi.org/10.1177/1043659614531795>.
- Evans, K., Spiby, H., Morrell, C., 2015. A psychometric systematic review of self-report instruments to identify anxiety in pregnancy. *Journal of Advanced Nursing* 71, 1986–2001.
- Evans, K., Morrell, D.J., Spiby, H., 2017. Women's views on anxiety in pregnancy and the use of anxiety instruments: a qualitative study. *Journal of Reproductive and Infant Psychology* 35. <https://doi.org/10.1080/02646838.2016.1245413>.
- Fenwick, J., Gamble, J., Nathan, E., Bayes, S., Hauck, Y., 2009. Pre- and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women. *Journal of Clinical Nursing* 18, 667–677. <https://doi.org/10.1111/j.13652702.2008.02568.x>.
- Field, A., 2013. *Discovering statistics using IBM SPSS statistics*, 4th Ed Sage Publications Ltd, London.
- Fontein-Kuipers, Y., Budé, L., Ausems, M., de Vries, R., Nieuwenhuijze, M., 2014. Dutch midwives' behavioural intentions of antenatal management of maternal distress and factors influencing these intentions: an exploratory survey. *Midwifery* 30, 234–241. <https://doi.org/10.1016/j.midw.2013.06.010>.
- Fontein-Kuipers, Y., Ausems, M., van Limbeek, E., Budé, L., de Vries, R., Nieuwenhuijze, M., 2015. Factors influencing maternal distress among Dutch women with a healthy pregnancy. *Women and Birth* 28, e36–e42. <https://doi.org/10.1016/j.wombi.2015.02.002>.
- Fontein-Kuipers, Y., Ausems, M., de Vries, R., Nieuwenhuijze, M., 2016. The effect of Wazzup Mama?! An antenatal intervention to prevent or reduce maternal distress in pregnancy. *Archives of Women's Mental Health*. <https://doi.org/10.1007/s00737-016-0614-8>.
- Fontein-Kuipers, Y., van Limbeek, E., Ausems, M., de Vries, R., Nieuwenhuijze, M., 2017. Responding to maternal distress: from needs assessment to effective intervention. *International Journal of Public Health* 62 (4), 441–452.
- Fontein-Kuipers, Y., Jomeen, J., 2019. Validity and accuracy of the Whooley questions to identify maternal distress in Dutch pregnant women. *The Journal of Mental Health Training, Education and Practice* 14, 33–45. <https://doi.org/10.1108/JMHT-06-2018-0034>.
- Haines, H., Pallant, J.F., Karlstrom, A., Hildingsson, I., 2011. Crosscultural comparison of levels of childbirth-related fear in an Australian and Swedish sample. *Midwifery* 27, 560–567.
- Haines, H., Rubertsson, C., Pallant, J., Hildingsson, I., 2012. Women's attitudes and beliefs of childbirth and association with birth preference: a comparison of a Swedish and an Australian and Swedish sample in mid-pregnancy. *Midwifery* 28, 850–856.
- Haines, H., Pallant, J.F., Fenwick, J., Gamble, J., Creedy, D., Toohill, J., Hildingsson, I., 2015. Identifying women are afraid of giving birth: a comparison of the fear of birth scale with the WDEQ A in a large Australian cohort. *Sex Reprod Healthc* 6, 204–210.
- Henrichs, J., Schenk, J., Schmidt, H., Velders, F., Hofman, A., Jaddoe, V., Verhulst, F., Tiemeler, H., 2009. Maternal pre- and postnatal anxiety and infant temperament. The generation R study. *Infant and Child Development* 18, 556–572. <https://doi.org/10.1002/icd.639>.
- Higgins, A., Downes, C., Monohan, M., Gill, A., Lamb, S., Carroll, M., 2018. Barriers to midwives and nurses addressing mental health issues with women during the perinatal period: The Mind Mothers study. *Journal of Clinical Nursing* 27, 1872–1883. <https://doi.org/10.1111/jocn.14252>.
- Hildingsson, I., Rubertsson, C., Karlström, A., Haines, H., 2018. Exploring the Fear of Birth Scale in a mixed population of women of childbearing age—a Swedish pilot study. *Women and Birth* 31, 407–413. <https://doi.org/10.1016/j.wombi.2017.12.005>.
- Hildingsson, I., Karlström, A., Rubertsson, C., Haines, H., 2019. Women with fear of childbirth might benefit from having a known midwife during labour. *Women and Birth* 32, 58–63. <https://doi.org/10.1016/j.wombi.2018.04.014>.

- Huizink, A., Mulder, E., Robles De Medina, P., Visser, G., Buitelaar, J., 2004. Is pregnancy anxiety a distinctive syndrome? *Early Hum Dev* 79, 81–91.
- Huizink, A., Delforterie, M., Scheinin, N., Tolvanen, M., Karlsson, L., Karlsson, H., 2016. Adaption of pregnancy anxiety questionnaire-revised for all pregnant women regardless of parity: PRAQ-R2. *Archives of Womens Mental Health* 19, 125–132. <https://doi.org/10.1007/s00737-015-0531-2>.
- Klabbers, G.A., van den Heuvel, M.M.A., van Bakel, H.J.A., Vingerhoets, A.J.J.M., 2016. Severe fear of childbirth: Its features, assessment, prevalence, determinants, consequences and possible treatments. *Psychological Topics* 25, 107–127.
- Klabbers, G.A., Wijma, K., Paarlberg, K.M., Emons, W.H.M., Vingerhoets, A.J.J.M., 2017. Haptotherapy as a new intervention for treating fear of childbirth: a randomized controlled trial. *Journal of Psychosomatic Obstetrics and Gynaecology*. <https://doi.org/10.1080/0167482X.2017.1398230>.
- Knottnerus, J., Muris, J., 2003. Assessment of the accuracy of diagnostic tests: the cross-sectional study. *Journal of Clinical Epidemiology* 56, 1118–1128. doi:10.1016/s0895-4356(03)00206-3.
- Koelwijn, J., Sluijs, A., Vrijkotte, T., 2017. Possible relationship between general and pregnancy-related anxiety during the first half of pregnancy and the birth process: a prospective cohort study. *BMJ Open* 7, e13413. <https://doi.org/10.1136/bmjopen-2016-013413>.
- Larsson, B., 2017. Treatment for childbirth fear with a focus on midwife-led counselling. A national overview, women's birth preferences and experiences of counselling (Doctoral dissertation). Acta Universitatis Upsaliensis, Uppsala, Sweden.
- Lukasse, M., Schei, B., Ryding, A., Bidens Study Group, 2014. Prevalence and associated factors of fear of childbirth in six European countries. *Sexual Reproductive Healthcare* 5, 99–106. <https://doi.org/10.1016/j.srhc.2014.06.007>.
- McCoyd, J., Curran, L., Munch, S., 2019. They say, "If you don't relax... You're going to make something bad happen": Women's emotion management during medically high-risk pregnancy. *Psychology of Women Quarterly* 1–13. <https://doi.org/10.1177/0361684319883199>.
- Meades, R., Ayers, S., 2011. Anxiety measures validated in perinatal populations: A systematic review. *Journal of Affective Disorders* 133, 1–15.
- Morrell, C., Cantrell, A., Evans, K., Carrick-Sen, D., 2013. A review of instruments to measure health-related quality of life and well-being among pregnant women. *Journal of Reproductive and Infant Psychology* 31 (5), 512–530.
- NICE, 2014. Antenatal and postnatal mental health: clinical management and service guidance. Clinical Guideline [CG192] (Last updated: April 2018). National Institute for Health and Care Excellence, London.
- NICE, 2008. Antenatal care for uncomplicated pregnancies. Clinical Guideline [CG62] (Last updated: February 2019), 12, London.
- O'Connell, M., Leahy-Warren, P., Khashan, A., Kenny, L., O'Neill, S., 2017. Worldwide prevalence of tokophobia in pregnant women: systematic review and meta-analysis. *Acta Obstetrica et Gynecologica Scandinavica*. <https://doi.org/10.1111/aogs.13138>.
- Nilsson, C., Lundgren, I., Karlstrom, A., Hildingsson, I., 2011. Self reported fear of childbirth and its association with women's birth experience and mode of delivery: A longitudinal population-based study. *Women and Birth: Journal of the Australian College of Midwives* 25, 114–121. doi:10.1016/j.wombi.2011.06.001.
- O'Connell, M., Leahy-Warren, P., Khashan, A., Kenny, L., 2015. Tocophobia – the new hysteria? *Obstetrics, Gynecology & Reproductive Medicine* 25, 175–177. <https://doi.org/10.1016/j.ogrm.2015.03.002>.
- Paulhus, D., Vazire, S., 2011. The self-report method. In: Robins, R.W., Fraley, R.C., Krueger, R.F. (Eds.), *Handbook of research methods in personality psychology*, 3rd Ed., The Guilford Press, New York, NY, USA.
- Perined, 2019. Perinatal care in the Netherlands 2018. Annual perinatal figures. Perined, Utrecht, Netherlands.
- Pop, V. J., Pommer, A. M., Pop-Purceleanu, M., Wijnen, H. A., Bergink, V., Pouwer, F., 2011. Development of the Tilburg Pregnancy Distress Scale: the TPDS. *BMC Pregnancy and Childbirth*. <https://doi.org/10.1186/1471-2393-11-80>.
- Rondung, E., Thomtén, J., Sundin, Ö., 2016. Psychological perspectives on fear of childbirth. *Journal of anxiety disorders* 44, 80–91. <https://doi.org/10.1016/j.janxdis.2016.10.007>.
- Rouhe, H., Salmela-Aro, K., Halmesmaki, E., Saisto, T., 2009. Fear of childbirth according to parity, gestational age, and obstetric history. *BJOG* 116, 67–73.
- Ryding, E.L., Lukasse, M., Parys, A.S., Wangel, A.M., Karro, H., Kristjansdottir, H., Group., Bidens, 2015. Fear of childbirth and risk of cesarean delivery: A cohort study in six European countries. *Birth* 42, 48–55. <http://dx.doi.org/10.1111/birt.12147>.
- Sandall, J., Soltani, H., Gates, S., Shennan, A., Devane, D., 2016. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database of systematic Reviews*. <https://doi.org/10.1002/14651858.CD004667.pub5>.
- Sanders, J., Hunter, B., Warren, L., 2016. A wall of information? Exploring the public health component of maternity care in England. *Midwifery* 34, 253–260.
- Slade, P., Balling, K., Sheen, K., Houghton, G., 2019. Establishing a valid construct of fear of childbirth: findings from in-depth interviews with women and midwives. *BMC Pregnancy & Childbirth* 19. <https://doi.org/10.1186/s12884-019-2241-7>.
- Statistics Netherlands, 2016. Trends in the Netherlands. Centraal Bureau voor de Statistiek, The Hague, Netherlands.
- Swets, J.A., 1988. Measuring the accuracy of diagnostic systems. *Science* 240, 1285–1293. <https://doi.org/10.1126/science.3287615>.
- Ternström, E., Hildingsson, I., Haines, H., Rubertsson, C., 2015. Higher prevalence of childbirth related fear in foreign born pregnant women—findings from a community sample in Sweden. *Midwifery* 31, 445–450.
- Ternstrom, E., Hildingsson, I., Haines, H., Rubertsson, C., 2016. Pregnant women's thoughts when assessing fear of birth on the Fear of Birth Scale. *Women and Birth* 29, e44–e49.
- Toohill, J., Fenwick, J., Gamble, J., Creedy, D.K., 2014. Prevalence of childbirth fear in an Australian sample of pregnant women. *BMC Pregnancy and Childbirth* 14. <https://doi.org/10.1186/1471-2393-14-275>.
- Van den Bergh, B., van den Heuvel, M., Lathi, M., Braeken, M., de Rooij, S., Entringer, S., Hoyer, D., Roseboom, T., Räikkönen, K., King, S., Schwab, M., 2017. Prenatal development origins of behavior and mental health: The influence of maternal stress in pregnancy. *Neuroscience & Biobehavioral Reviews*. <http://dx.doi.org/doi:10.1016/j.neubiorev.2017.07.003>
- Van Stralen, K., Stel, V., Reitsma, J., Dekker, F., Zoccali, C., Jager, K., 2009. Diagnostic methods I: sensitivity, specificity, and other measures of accuracy. *Kidney International* 75, 2157–2163.
- Vereniging Hogescholen, 2015. Brancheprotocol Kwaliteitszorg Onderzoek (BKO) 2016-2020. Kwaliteitszorgstelsel Praktijkgericht Onderzoek Hogescholen. Vereniging Hogescholen, The Hague.
- Volpato, L., Siqueira, D., Dias Nunes, R., Filho, J., Traebert, J., 2019. Transcultural adaptation and validation of the Tilburg Pregnancy Distress Scale (TPDS) in the Brazilian cultural context. *Midwifery* 75, 97–102.
- Westerneng, M., Witteveen, A., Warmelink, C., Spelten, E., Honig, A., de Cock, P., 2017. Pregnancy-specific anxiety and its association with background characteristics and health-related behaviors in a low-risk population. *Comp Psychiatry* 75, 6–13. <https://www.ncbi.nlm.nih.gov/pubmed/28279817>.
- Wijma, K., Wijma, B., 2016. A woman afraid to deliver - how to manage childbirth anxiety. In: Paarlberg, K.M., van de Wiel, K.M. (Eds.), *Biopsychosocial obstetrics and gynaecology* H. B. M. Springer, Berlin.