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ANXIETY DISORDERS (A PELISSOLO, SECTION EDITOR)

Fear and Anxiety Disorders Related to Childbirth: Epidemiological and Therapeutic Issues

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Abstract

Purpose of Review This paper seeks to identify the risk factors of fear of childbirth (FOC) and posttraumatic stress disorder (PTSD) related to birth and reviews the efficacy of their respective screening tools and therapeutic interventions.

Recent Findings Biofeedback, hypnosis, internet-based cognitive behavioral therapy, and antenatal education are promising treatments for FOC. Training midwives to address traumatic birth experiences could help in preventing PTSD. A shorter more pragmatic screening tool for FOC than the Wijma Delivery Expectancy/Experience Questionnaire (WDEQ) is needed. Women with PTSD attributed a mismatch between the expected mode of delivery (MOD) and the actual MOD as the cause of their trauma.

Summary A history of mental health disorders, lack of social support, previous negative birth experiences, and MOD are correlated to FOC and postpartum PTSD. Psycho-education and CBT-based treatments have been found to reduce levels of FOC and PTSD.

Keywords Fear of childbirth · Postpartum PTSD · Tokophobia · Pregnancy

Introduction

Pregnancy usually is a time of joy and positive anticipation; however, an estimated 14% of women experience elevated levels of fear of childbirth (FOC), also referred to as tokophobia [1]. Primary tokophobia is defined as FOC occurring before delivery and sometimes even before pregnancy, while secondary tokophobia is FOC that develops after having had a perceived negative birth experience [2]. Some elements of FOC that have been identified are fear of the unknown, fear of pain, fear of having an episiotomy, fear of having no control over the situation, fear of the mother for her baby's life, and fear of the mother's own capacity to give birth [3, 4]. Elevated levels of anxiety during pregnancy are associated with an inappropriate adjustment of the mother to her role as a parent, as well as to an increased incidence of biological, mental, behavioral, and health issues in the offspring [5, 6]. In addition, women with FOC are more likely to request cesarean sections (CS) or pain relief during labor, and they have more psychologically vulnerable profiles with a higher probability of experiencing postpartum depressive and anxious symptoms and seeking professional help [7–13]. As a result, FOC incurs extra costs on the healthcare system [14]. Furthermore, women with FOC are more likely to experience birth as a traumatic event and develop postpartum posttraumatic stress disorder (PTSD) [15, 16]. These consequences of FOC highlight the importance of early screening and interventions in order to minimize the psychological and economic toll it takes on pregnant women and the healthcare system.

This literature review assesses the screening tools available for diagnosing FOC and PTSD, investigates the risk factors of FOC and PTSD related to birth, and reviews the relevant therapeutic interventions.

Method

A search was conducted on PubMed with the search terms ((anxiety disorder) OR fear) AND ((pregnancy) OR (delivery) OR (childbirth)) for articles published between

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September 1, 2013 and September 30, 2018 in order to include studies published after the most recent literature review [17]. The screening of the titles and abstracts of 3244 articles yielded 380 studies which were selected based on their relevance to FOC, PTSD, or anxiety during pregnancy. After reading the full-text articles, 106 + 16 studies were retained, 16 of which were extracted from reference lists of reviewed articles. Due to redundant findings, the more recent articles were preferentially cited and 22 studies were not mentioned. Figure 1 describes the selection process in detail.

Screening Tools

FOC

A multitude of measurement tools designed to assess the severity of FOC are described in the literature. Richens et al. found that most studies on FOC assessment tools were conducted in high resource settings, with a majority coming from Scandinavian countries [18••]. This indicates a possible need for more culturally sensitive instruments as people from different parts of the globe could experience FOC differently.

There are two important challenges in the diagnosis of FOC. First and foremost, the lack of a universal definition for FOC is a serious obstacle for study replication. Furthermore, as is the case with many mental disorders FOC lies on a continuum, with the lower end of the spectrum entailing worry about childbirth, and the upper end of the spectrum entailing phobic levels of fear of childbirth. The issue is the absence of unanimity on cutoff scores to draw the distinction between those with mild, moderate, or severe FOC.

The most commonly used tool to assess FOC is the 33-item Wijma Delivery Expectancy/Experience Questionnaire (WDEQ) scored from 0 to 165 [18••, 19]. There are two versions WDEQ-A (FOC before birth) and WDEQ-B (FOC following birth) [20]. Different studies administered the WDEQ at different stages of pregnancy with contrasting cutoff scores that varied between 66, 85, and 100 according to studies that aimed to measure high/severe FOC [18••, 19]. Other authors adopted percentiles instead of cutoff scores with those scoring above the 90th percentile assessed as having severe FOC [13,

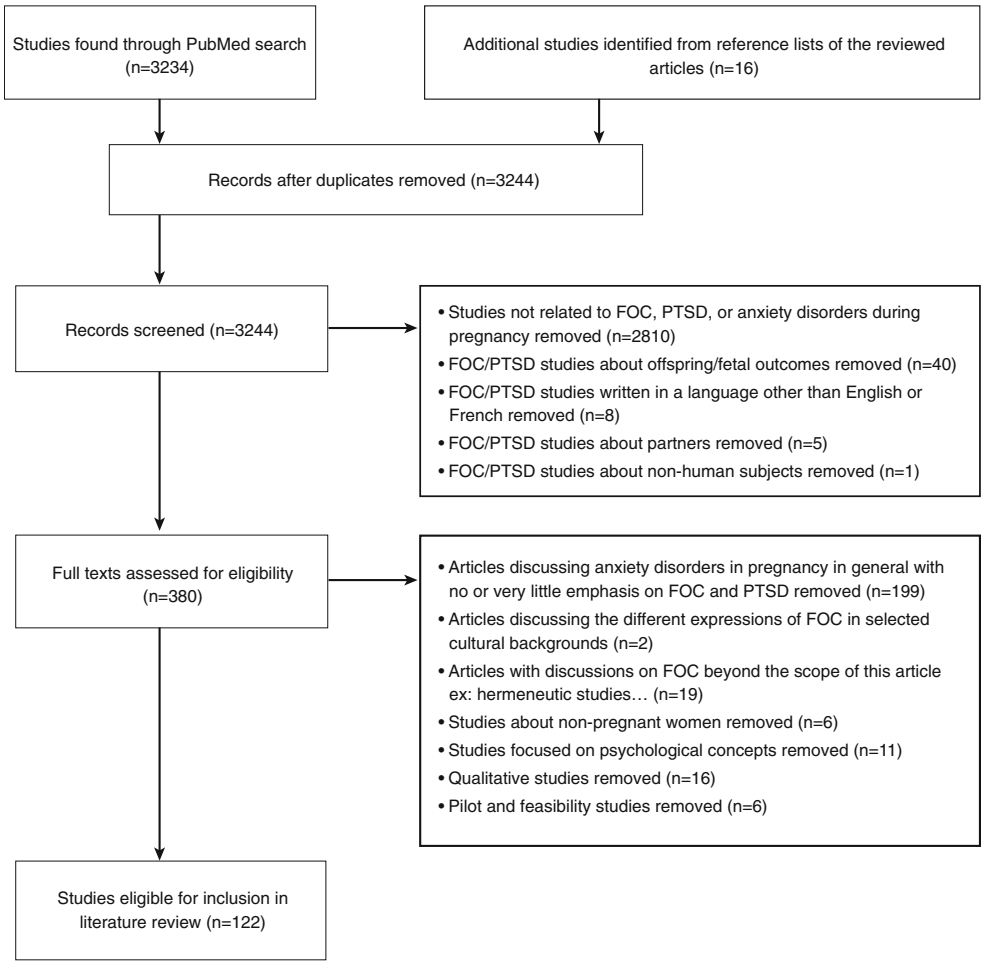

Fig. 1 Elimination process of studies and reviews identified through PubMed search

21, 22]. Although the 85 cutoff is the most used in international literature, Toohill et al. suggested the utilization of the 66 cutoff to avoid missing a subset of women in need of treatment [23•]. The authors also point out that women with scores above 85 should go through additional screening for other mental disorders as this subgroup were more likely to have previous mental health problems that seemed to be aggravated by FOC [23•]. This is in line with Molgora et al.'s finding that scores above the 90th percentile on the WDEQ are positively associated with clinical depression [13]. The WDEQ seems to be adequate at assessing FOC. However, it has mostly been used in research contexts rather than in clinical settings [18••].

Commonly utilized similar scales are the visual analogue scale (VAS) and the Fear of Birth Scale (FOBS). The former is a one-item scale from 1 to 10 measuring fear of birth, and the FOBS is an adapted two item version of the VAS measuring both fear and worry with a score range of 0 to 100 [24, 25]. With a cutoff score of 5, the VAS has been found to have high sensitivity of 97.8% and a specificity of 63.7% to identify women with WDEQ scores over 100 [24]. With a cutoff score of 54, the FOBS had a sensitivity of 89% and a specificity of 79% in identifying women with WDEQ scores over 85 [26•]. The FOBS might inflate the number of women diagnosed with FOC and result in higher prevalence estimates than the WDEQ; nevertheless, it is shorter, hence easier to use in clinical practice in order to identify women in need of further evaluation [1, 24, 25, 26•, 27•].

The Fear of Childbirth Questionnaire is another scale used to measure FOC, deemed as effective as face to face clinical interviews [18••, 28].

PTSD

Criterion A1 and A2 Validated PTSD screening tools are available with a plethora of research conducted on the relevant measurements. However, only few instruments have been designed specifically for postpartum PTSD such as the City Birth Trauma Scale or the expanded Posttraumatic Diagnostic Scale [29, 30].

One debatable issue in the diagnosis of birth-related PTSD is the removal of criterion A2 from the DSM-5. According to the DSM-IV criterion, A2 entails a subjective experience of intense fear, helplessness, or horror, whereas criterion A1 entails an actual physical threat to oneself or others.

One study found that questions from the City Birth Trauma Scale pertaining to criterion A1 were sufficient for diagnosis, and removing questions pertaining to criterion A2 did not substantially increase the number of women diagnosed with postpartum PTSD [29].

Nevertheless, most studies established that removing criterion A2 inflated the number of women diagnosed with PTSD and this would entail unnecessary increased stress on the maternal healthcare system [30, 31]. Furthermore, in the Posttraumatic Diagnostic Scale, keeping questions reflecting criterion A2 made the instrument more predictive of which women would continue to experience distressing symptoms after birth [30].

Other Relevant Issues in Postpartum PTSD Diagnosis Unlike other types of PTSD, not remembering details about the traumatic birth was not a relevant indicator of postpartum PTSD [29]. It might be that unlike other traumatic experiences, births are often discussed and enquired about, hence repeatedly exposing the mother to the memory of the trauma details [29].

Furthermore, when assessing postpartum PTSD for research purposes, controlling for pre-existing PTSD resulted in a substantial decrease of the prevalence rate from 4.7 to 2% [32••]. Results of studies which have not controlled for prior PTSD should therefore be interpreted with caution.

Risk Factors

FOC

Sociodemographics The literature is inconsistent with regard to how sociodemographic factors affect levels of FOC.

The literature reports conflicting results regarding the association between FOC and socioeconomic status (SES), with both low and high SES being correlated to a high level of FOC in different studies [33, 34, 35•]. This discrepancy could stem from the fact that women of different socioeconomic classes fear different elements of childbirth. For example, those with low SES fear birth due to concerns about the quality of healthcare they will receive, whereas those of high SES would worry more about the risks of labor [35•]. The latter could be partially explained by Räisänen et al.'s speculation that women with high SES are more likely to get pregnant at a later age (40+) and have higher risk pregnancies resulting in higher FOC scores [34].

With regard to education, some studies reported a positive association between elevated FOC scores and lower levels of education [36–38], while Størksen et al. found that highly educated women had higher FOC [39]. On one hand, a higher level of education increases the probability of seeking information about childbirth, making one more aware of the risks of labor and resulting in elevated FOC [39]. On the other hand, women with higher levels of education are more likely be followed up by the same midwife throughout their pregnancy [40] and continuity of care may be a protective factor of FOC [33].

Concerning employment, two studies found that employed women had higher FOC scores than their unemployed counterparts with work being an additional stressor, and working women being more likely to be nullliparous [8, 41].

In a study conducted in Turkey, those living in rural areas reported lower FOC scores than those living in Istanbul [42]. In Sweden, foreign-born women were more than twice as likely to have FOC than native Swedes [43]. Other surveys found no relation between geodemographic factors and FOC [44, 45].

Other reports found no relation between FOC and sociodemographic factors such as age, level of education, and occupation [13, 44, 46].

Social Support Women who are married, cohabiting, or have a partner have reduced FOC scores [33, 34]. In fact, most studies show that social support is negatively correlated to FOC [12, 33, 37, 39, 42, 47]. However, a study conducted in Malawi, a low-income country, failed to find an association between social support and FOC [38]. It is possible that mothers living in areas with a strong sense of community are in less need of direct support [25, 38].

Age of Mother, Parity, and Gestational Age Inconsistent associations of age and FOC were reported in different studies, with higher levels of fear related with a mother's younger age [35•, 37, 47], or on the contrary older age: over 30 [48] and 40 [34]. Fairbrother et al. found that younger women feared loss of sexual pleasure, attractiveness, and embarrassment [35•], whereas Räisänen et al. inferred that women over 40 would have higher risk pregnancies [34]. Hence, women from different age groups would have different reasons to develop FOC.

Surprisingly, young adolescents (13 to 16 years old) were found to have levels of FOC postpartum similar to older adolescents (17 to 19 years old) [49]. Though the difference was not significant, older adolescents were more fearful of birth [49]. The authors speculate this could be due to the fact that older adolescents were more likely to be multiparous, and hence more likely to have had previous negative birth experiences resulting in higher FOC scores [49].

In most studies, nulliparas were found to have higher levels of FOC [24, 35•, 39, 41, 43, 46, 50]. For multiparas, as number of births increased the FOC decreased [48, 50]. In contrast to the previous literature, a longitudinal study conducted in Finland between 1997 and 2010 found multiparous women to be twice as likely as nulliparous women to experience FOC [34]. This finding was attributed to previous negative birth experiences that resulted in FOC [34].

Two studies found no relationship between gestational age and FOC [33, 50]. However, Hildingsson et al. reported a decrease in FOC from mid to late pregnancy while Rouhe et al. reported that tokophobia increased as birth approached, with a general trend of an increase past 21 weeks of gestation [24, 44].

Planned Pregnancy and Preferred Mode of Birth Having a planned pregnancy was related to lower levels of FOC [33, 47]. Presumably, mothers with planned pregnancies are better able to mentally and emotionally prepare for the upcoming birth experience instilling a sense of control which would reduce the likelihood of FOC.

Mothers requesting cesarean sections, epidural analgesia, or those who were uncertain about their preferred mode of delivery (MOD) had elevated FOC [12, 36, 51].

In a literature review conducted by O'Donovan and O'Donovan, tokophobia was found to be the most common reason for requesting a CS [7]. The relationship between FOC and actually receiving a CS is weaker than that between FOC and preferring a CS [39]. This could be related to the appropriate referral of women with FOC to an anti-fear program [39].

Actual MOD A large study conducted in six European countries (Belgium, Iceland, Denmark, Estonia, Norway, and Sweden) found a dose-response relationship between FOC and both emergency CS and elective CS [52]. There was one study which did not find emergency CS to be related to FOC [53]. The authors suggest that women underreported their FOC due to fear of being stigmatized, hence affecting the results [53].

Handelzalts et al. reported that postpartum FOC levels were highest for women who underwent emergency CS, followed by those who had an instrumental vaginal birth (VB), and were lowest for those who had a natural VB [45]. Another study supporting this correlation between MOD and FOC noted that having had a previous VB was a protective factor for FOC [41].

Previous Negative Birth Women who experienced previous still births, early pregnancy terminations, miscarriages, assisted VBs, episiotomies, perineal tears, or had previous negative birthing experiences were more likely to report higher levels of FOC [8, 34, 35•, 37–39], suggesting that traumatic pregnancy and delivery experiences lead to secondary tokophobia [54••].

Mental and Physical Health of Mothers Anxiety, depression, pretraumatic stress symptoms during pregnancy, posttraumatic stress symptoms, a history of depression and anxiety, and multiple comorbid anxiety disorders (panic disorder, phobia not otherwise specified, specific phobia, OCD, PTSD, agoraphobia, social phobia, and GAD) were positively correlated to FOC [8, 12, 13, 33, 37, 39, 55–57]. Those with FOC were also more likely to have postpartum anxiety [58].

Mologora et al. investigated FOC as a continuous variable with the lower end of the spectrum representing the worries of any mother expecting a newborn and the higher end representing those with pathological levels of FOC [13]. They also then assessed FOC as a dichotomous variable, differentiating between severe FOC and FOC. Interestingly, they reported that depression only predicted severe FOC, and was not associated with lower FOC scores, as such the authors

recommend distinguishing between severe FOC and FOC [13]. This could indicate a clinical difference between those with moderate/high FOC versus those with severe FOC. Nevertheless, this issue is difficult to address as there is no consensus on specific cutoff scores to differentiate different levels of FOC.

Women with epilepsy had higher rates of FOC than those without epilepsy; however, after birth, FOC levels were similar in both groups [59]. Smokers and women with gestational diabetes were also found to have increased FOC [34].

Personality and Temperament Women with high anxiety sensitivity and both state and trait anxiety scored higher on FOC measures [37, 45, 46]. Furthermore, as reported by Handelzalts et al., women with personalities high on neuroticism and low on conscientiousness tend to be more prone to anxiety which in turn is correlated to higher FOC scores [45]. Their suggested model proposes that these personality traits are associated with prepartum FOC, and that combined with a negative subjective birth experience can ultimately lead to secondary tokophobia [45]. Another psychological concept related to FOC is spiritual intelligence (SI) which is one's ability to try and make sense of the world by looking at the bigger picture and attempting to understand the meaning of life [60]. Abdollahpour et al. found that those who did not have FOC had significantly higher SI scores [61]. Spirituality may therefore be a protective factor against FOC.

Table 1 Summary of important findings of risk factors for FOC

Author	Population	Type and aim of study	Significant findings
Räisänen et al. 2014	Mothers with singleton births in Finland 1997–2010 ($n = 788, 317$)	Observational study to identify the risk factors of FOC	• Multiparas are twice as likely to have FOC than nulliparas. • High SES, advanced maternal age, and depression were identified as FOC risk factors.
Størksen et al. 2015	Akershus Birth Cohort in Norway November 2008–April 2010 At 17 and 32 weeks of pregnancy ($n = 1789$)	Observational study to identify demographic and psychosocial characteristics related to FOC and their importance on CS request and delivery	• Previous negative birth experience, depression and anxiety symptoms, and poor social support were the factors significantly associated to FOC. • FOC is not related to CS delivery.
Fairbrother et al. 2018	Pregnant women from English speaking countries ($n = 643$)	Cross-sectional online survey study to identify demographic and reproductive variables correlated to FOC	• Previous traumatic birth experiences, young age, low income, low education, and nulliparity were found to be related to higher FOC scores.
Toohill et al. 2014	Women in Australia in their second trimester ($n = 1410$)	Cross-sectional descriptive study to investigate the association between demographic and obstetric factors of FOC	• Nulliparity, previous operative births, and being employed were related to FOC. • Previous vaginal birth was a protective factor.
O'Donavan and O'Donavan 2018	Women between 16 and 43 years old from studies published between January 2006 and June 2016	Systematic review of peer-reviewed qualitative studies to identify reasons behind elective CS.	• Most common reason for elective CS was tokophobia.
Lukasse et al. 2014	Pregnant women from Belgium, Iceland, Denmark, Estonia, Norway, and Sweden (BIDENS) ($n = 6870$)	Cross-sectional observational study to assess prevalence of severe FOC and the correlation between FOC and background variables.	• Obstetric complications were positively correlated to FOC • Dose-response relationship was found between FOC and emergency CS and elective CS • Having a planned pregnancy, and cohabiting or being married were correlated to lower FOC. • Posttraumatic stress and depression were associated with higher FOC.
Poggi et al. 2018	Pregnant women at 36 weeks of gestation ($n = 98$)	Cross-sectional survey study to assess associations between obstetric and psychopathological variables and intensity of FOC	• Anxiety and depression and pretraumatic stress symptoms are positively related to intensity of FOC, • Those who planned to have an epidural anesthesia or CS had higher FOC scores than those planning VB.

FOC fear of childbirth, *SES* socioeconomic status, *CS* cesarean section, *VB* vaginal birth

A summary of the important findings on the risk factors of FOC can be found in Table 1.

PTSD

Demographic Context and Social Support Lack of social support is one of the salient risk factors for developing postpartum PTSD [15, 27•, 54••, 62]. Women living with their nuclear family were less likely to have postpartum PTSD symptoms [63]. Urban living was also found to be a protective factor [63].

MOD and Mismatch Emergency CS was reported to be associated with a perceived traumatic birth [31, 64] while postpartum PTSD was predicted by operative birth in general as well as emergency CS [63, 65••]. However, Dikmen-Yildez et al. found no such association, possibly in relation to the less traumatic perception of CS in Turkey where the intervention is relatively common [15].

It is speculated that when expectations about the birth experience (i.e., level of pain or planned MOD) do not align with the actual experience, this sense of loss of control is what leads to PTSD rather than MOD itself [66, 67••]. This was especially prominent in women who requested a CS but delivered by VB [66]. It is therefore important to take into consideration women's birth preferences.

Preterm Birth Women who deliver preterm babies are at a higher risk of developing birth-related delayed PTSD, putatively being too preoccupied with the baby's health and not being able to process the trauma until later on [54••, 68]. Misund et al. noted that 52% of mothers who experienced preterm births developed posttraumatic stress reactions, highlighting the need for careful screening for PTSD in this particularly vulnerable group [69].

Mental Health Women with a history of psychological problems are at a higher risk of anticipating a traumatic birth and developing pretraumatic stress symptoms [70]. Antenatal depression and anxiety were found to be significant predictors of postpartum PTSD symptoms [15, 64, 65••].

Postpartum anxiety [58] and depression [16, 54••, 65••] are also positively associated with PTSD, with depression predicting as much as 47% of the variance in PTSD [16]. Furthermore, a review by Agius et al. found a 2–3% triple comorbidity rate of perinatal anxiety, depression, and PTSD [71]. Interestingly, PTSD symptoms' decrease 6 months after birth was not as pronounced as the decrease in depression and anxiety symptoms, indicating that PTSD is more chronic and resistant in postpartum women [72].

Perinatal psychoform and somatoform dissociation were also found to be significantly correlated to PTSD 3 months after birth [64].

One of the salient risk factors of postpartum PTSD is a history of traumatic life events such as childhood sexual abuse and intimate partner violence [32••, 73, 74]. Those who experience traumatic events after birth are also more likely to develop postpartum PTSD as the trauma could hinder recovery from a traumatic birth or aggravate already existing PTSD symptoms [54••].

It was observed that 5.8% of women who experienced a traumatic childbirth developed delayed PTSD with symptoms worsening 6 months after birth, emphasizing the need for continued attention for vulnerable women [54••].

Both primary and secondary tokophobia were found to be positively correlated to elevated PTSD symptomatology [15, 16, 62, 75].

Women with poor health or pregnancy complications were at a higher risk of developing PTSD [65••].

Personality and Temperament Srkalović Imširagić et al. found that the personality trait of neuroticism univariately predicted the development of PTSD after birth [63].

A summary of the important risk factors of PTSD can be found in Table 2.

Therapeutic Interventions

There were no studies found on the specific pharmacological treatments for FOC or postpartum PTSD. The studies discussing drug treatments were focused on generalized anxiety disorder or panic disorder during pregnancy. As these disorders are not specifically related to birth, their relevant drug treatments were found to be outside the scope of this paper and hence were not reviewed in the following.

FOC

According to a recent systematic review, FOC treatments should focus on addressing negative cognitions, enhancing self-efficacy, and addressing the fear of having no control over the birthing process as these seem to be the primary identified elements of FOC [76].

Cognitive Behavioral Therapy Internet-based cognitive behavioral therapy (ICBT) consists of self-help material that is accessible online, divided into modules with homework assignments designed to help women with FOC learn to recognize and cope with their emotions about the upcoming birth [77•]. Rondung et al. found that 1 year after birth, FOC scores were lower for women who received ICBT as opposed to those who received standard care entailing counseling by midwives, psychologists, and obstetricians as needed [77•]. Nevertheless, only 10% of

women completed all modules which could have affected the results. The latter finding also highlights low adherence rates as a distinct disadvantage of this treatment modality [77•].

A study conducted by Larsson et al. reported no difference in FOC between those undergoing ICBT versus those receiving standard care [78]. In addition, women in the standard care group reported higher satisfaction with their treatment than those in the ICBT group as they experienced face to face interactions with their midwives and as a result felt more supported [78].

Women attending a CBT-based educational program had a significant decrease in FOC scores and a more positive birth experience than those who received no intervention [79]. Albeit these promising results, a recent review by Stoll et al. found that short individual CBT sessions were more effective than group CBT sessions in reducing FOC [80].

Individual Counseling and Group Therapy Women with severe FOC receiving individualized counseling based on both antenatal psycho-education and CBT were more likely to opt for VB than those not receiving such counseling [81].

Primiparous women receiving individual counseling based on Gamble and Creedy's counseling model that draws on CBT had reduced FOC scores [82–84]. This type of intervention focused on attitudes towards childbirth, communication, developing plans to manage negative events, and expressing and managing emotions during pregnancy.

One study conducted in Sweden found that women receiving counseling from midwives, obstetricians, psychologists,

Table 2 Summary of important findings of risk factors for postpartum PTSD

Author	Population	Type and aim of study	Significant findings
Dikmen-Yildiz et al. 2018	Women over 18 between 26 and 35 weeks of gestation ($n = 226$)	Longitudinal descriptive study to identify the predictors and trajectories of postpartum PTSD.	• Four trajectories identified: delayed PTSD, resilient, recovered, and chronic PTSD. • Antenatal depression and anxiety symptoms, preterm birth, receiving professional help, FOC, and experiencing additional trauma were associated with different trajectories of PTSD.
Ayers et al. 2016	Women over 18 years of age, over 1 month postpartum from studies published before March 2015 ($n = 21,429$)	Meta-analysis on vulnerability and risk factors of birth-related PTSD.	• Poor health and complications during pregnancy, depression, history of PTSD were identified as vulnerability factors. • Lack of social support, having a CS or assisted VB, and dissociation during birth were risk factors of birth-related PTSD.
Dikmen-Yildiz et al. 2017	Women over 18 years old recruited in Turkey between May 2014 and June 2015 ($n = 950$)	Prospective longitudinal study to investigate the antenatal and postpartum factors associated with birth-related posttraumatic stress symptoms at 4–6 weeks postpartum and 6 months postpartum	• Posttraumatic stress symptoms 6 months postpartum were associated with anxiety, posttraumatic stress during pregnancy, birth complications, satisfaction with health professionals, secondary FOC, depression after birth, and social support after birth. • Depression and anxiety were found to be highly comorbid with birth-related PTSD.
Garthus-Niegel et al. 2014	Women in Norway from Akershus Birth Cohort expecting to give birth between 2009 and 2010 ($n = 1700$)	Longitudinal survey study to investigate whether a mismatch between preferred and actual MOD is related to postpartum PTSD.	• Women who preferred CS but had VB had higher posttraumatic stress scores than those who preferred VB and had VB. • Matching a woman's preferred MOD to actual MOD should be an important consideration among maternal healthcare providers.
Çapik and Durmaz 2018	Women in their third trimester with previous VBs, not with high-risk pregnancies and with no history of psychiatric disorders ($n = 301$)	Cross-sectional study to investigate the correlation between FOC and postpartum depression with postpartum PTSD	• FOC and postpartum depression were found to be significantly correlated to birth-related PTSD.
Geller and Stasko 2017	Women with PTSD during the perinatal period	Literature review to investigate the effect of traumatic experiences before conception on PTSD during the perinatal period.	• Pre-existing PTSD is not often controlled for when assessing postpartum PTSD. In doing so, rates drop from 4.7 to 2%. • Depression, anxiety, history of mental disorders, history of sexual trauma, childhood sexual abuse, and intimate partner violence were correlated to perinatal PTSD.

PTSD posttraumatic stress disorder, *FOC* fear of childbirth, *CS* cesarean section, *VB* vaginal birth, *MOD* mode of delivery

Table 3 Summary of therapeutic interventions for FOC

Author	Population	Type and aim of study	Significant findings
Rondung et al. 2018	Women reporting significant levels of FOC ($n = 258$)	Non blinded multicenter RCT to investigate effects of ICBT administered through 8 modules. Treatment was focused on helping women recognize and cope with their emotions and thoughts.	• Only 10% of participants finished more than 4 modules, indicating low adherence for ICBT. • 1 year postpartum those in the ICBT had reduced FOC scores compared to controls.
Stoll et al. 2018	Seven studies extracted from a search through PubMed and Mendeley	Narrative summary investigating the efficacy of nonpharmacological interventions for women with pregnancy specific anxiety or FOC.	• Short individual psychotherapeutic interventions delivered by midwives or obstetricians trained in CBT were successful in reducing high levels FOC, whereas group interventions were not. • Childbirth education sessions, Hatha yoga, and prenatal education sessions were successful in reducing different levels of FOC.
Toohill et al. 2014	Women recruited between May 2012 and June 2013 who reported high FOC ($n = 339$).	Multisite RCT called BELIEF (Birth Emotions: Looking to Improve Expectant Fear) trial. Two armed nonblinded parallel design. Intervention was telephone psycho-education sessions delivered by a midwife.	• Women in the intervention group had reduced FOC and increased self-efficacy compared to controls.
Haapio et al. 2017	Finnish speaking nulliparous women 18–40 years of age with normal ultrasound results ($n = 659$)	RCT investigating the efficacy of 2 h midwife-led intervention introducing mothers to the delivery room and basic information about the delivery process in reducing FOC.	• Those in the intervention group had lower FOC than those in the control group.
Lukasse et al. 2014	Pregnant women from Belgium, Iceland, Denmark, Estonia, Norway, and Sweden (BIDENS) ($n = 6870$)	Cross-sectional observational study to assess prevalence of severe FOC and the correlation between FOC and background variables.	• Women from Belgium had the lowest FOC scores as they have excellent continuity of care which serves as a protective factor of FOC. Continuity of care may hence serve as a preventative intervention.
Moghaddam Hosseini et al. 2017	Databases searched for studies up to September 2017, 10 studies were included ($n = 3984$)	Literature review and meta-analysis of studies including RCTs and quasi-randomized trials to assess the efficacy of educational interventions (2 studies) or hypnosis-based interventions (8 studies).	• Though both self-hypnosis and education sessions were found to be effective interventions for FOC, educational sessions were almost twice as effective.
Narita et al. 2018	Pregnant women with low-risk pregnancies. ($n = 97$)	Non-randomized longitudinal experimental trial, those in the intervention group received biofeedback about their resting heart rate variability.	• Those with high FOC scores benefitted from biofeedback, making it a promising treatment option.

FOC fear of childbirth, *RCT* randomized controlled trial, *ICBT* internet-based cognitive behavioral therapy, *CBT* cognitive behavioral therapy

social workers, or psychiatrists had FOC scores 1 year after birth five times higher than those who did not receive counseling [85]. Major limitations of this study include its observational design, the screening for FOC with one question answered on a four-point Likert scale, and the questionable indications for referral as some women with severe FOC were not referred to counseling, and some women without FOC were referred [85].

Group therapy sessions focused on mentalization and the mind-body connection is a viable treatment option. When administered by psychologists trained in group therapy and pregnancy issues, it was found to be effective in reducing FOC and negative emotions about birth [86].

Educational Interventions The randomized controlled study "BELIEF" (Birth Emotions and Looking to Improve Expectant Fear) investigated the efficacy of a telephone psycho-education intervention given by midwives to women with high FOC [82]. This intervention is based on Gamble and Creedy's counseling model for distressed women postpartum [84]. The treatment was successful in decreasing FOC before birth, reducing CS rates, as well as increasing a preference for VB after birth for future pregnancies [87].

A cost analysis of the trial revealed that women with high FOC receiving the intervention incurred less costs on the healthcare system during pregnancy than those receiving care as usual since the former were more likely to opt for VB [88].

Furthermore, the intervention incurred no extra costs on the healthcare system in the postpartum period [89].

Childbirth education sessions designed to provide pregnant women with information about labor and birth, familiarizing women with the delivery room, and breathing techniques were found to decrease FOC significantly [90–94], with no effect on CS rates [90].

Women who engaged in role play as part of antenatal education sessions had more reduced FOC scores than those who attended antenatal education lectures [95].

Group psycho-education focused on mindfulness and relaxation for severe FOC patients led by a specialized psychologist resulted in reduced postpartum FOC scores, depressive symptoms, and a less negative birth experience overall [22].

Continuity and Type of Care In a large study across six European countries, women in Belgium scored lowest on FOC [33]. The authors speculated that this could be due to the continuity of care as pregnant women in Belgium are

Table 4 Summary for therapeutic intervention for birth-related posttraumatic stress

Author	Population	Type and aim of study	Significant findings
Niemen et al. 2016	Swedish-speaking women with self-reported birth-related PTSD symptoms who had given birth over 3 months prior to recruitment ($n = 56$)	RCT aimed to assess the efficacy of ICBT comprised of 8 modules with limited therapist contact, those in the control group were on the waiting list for the treatment (i.e., they received the treatment later on).	• ICBT showed promise as women receiving immediate treatment had reduced PTSD and depressive symptoms. • Women who had a delay in treatment had lower adherence rates than those in the intervention group. This could be due to lack of motivation, indicating that early intervention is important.
Fenwick et al. 2015	Pregnant women in the second trimester recruited between May 2012 and June 2013 participating in the BELIEF trial ($n = 184$).	Further analysis on BELIEF RCT outcomes to investigate the efficacy of midwife-led telephone psycho-education sessions on improving obstetric outcomes and maternal mental health 6 weeks postpartum	• No difference between intervention and control group concerning obstetric outcomes such as use of pharmacological analgesia or induction of labor. • Those receiving the intervention were less likely to report distressing flashbacks which could be a symptom of posttraumatic stress. The intervention therefore benefits postpartum maternal health.
Baxter et al. 2013	20 papers including surveys, RCTs, qualitative studies, and literature reviews	Meta ethnography approach to assess efficacy of postnatal debriefing	• Though women generally positively rated their debriefing experience as it validated their birthing experience, no consensus can be drawn on its efficacy in reducing psychological morbidity.
Borg Cunen et al. 2013	14 articles (6 studies and 8 reviews)	Literature review to assess the efficacy of midwife-led interventions on posttraumatic stress	• No conclusions can be drawn on the efficacy of evidence-based midwife-led interventions on posttraumatic stress related to birth, despite women appreciating discussing the birth with their midwives and having their experience validated. • Midwives had varying levels of training to address traumatic births, with some evidence pointing towards the importance of proper training in order to observe positive results.
Hollander et al. 2017	Women over 18 recruited in March 2016 with self-reported traumatic birth experiences that occurred after 2005 ($n = 2192$)	Retrospective survey study to assess women's traumatic birth experiences and identify areas for prevention and maternal mental healthcare improvement.	• Women believe that support and communication from their healthcare providers was key to improving their experience • Those attending hypnobirthing classes reported that their trauma stemmed from the expectation that the birth experience would be smoother and less painful than it actually was.

PTSD posttraumatic stress disorder, *ICBT* internet-based cognitive behavioral therapy, *RCT* randomized controlled trial

followed up by the same obstetrician throughout pregnancy and this type of support has been shown to be a protective factor against FOC [33]. Women who preferred receiving care from an obstetrician instead of a midwife had significantly higher FOC scores [96]. This preference could be related to a higher risk pregnancy, or an inclination to medicalized birth, which are both positively associated with FOC.

Alternative Treatments A recent systematic review reported that self-hypnosis training reduced FOC scores; however, in comparison, educational interventions were found to reduce FOC scores twice as much [97•].

In a study conducted by Narita et al., heart rate variability biofeedback was successful in reducing FOC [98•]. Further studies should explore the efficacy of this type of treatment. Haptotherapy for FOC is designed to help increase a woman's confidence in her ability to deliver by VB. This intervention has been shown to be a more effective treatment for postpartum FOC and PTSD than psycho-education administered via the internet [99].

One study found that women attending exercise classes experienced a reduction in FOC scores, whereas those attending typical antenatal education classes did not [100]. Hatha yoga was also found to decrease FOC in low-risk nulliparous women [101].

A summary of the therapeutic interventions for FOC can be found in Table 3.

PTSD

CBT

Trauma-focused ICBT with elements of exposure therapy successfully reduced PTSD scores following childbirth [102]. Trauma-focused CBT also alleviated posttraumatic stress symptoms of mothers with preterm babies in the neonatal intensive care unit (NICU) especially those with elevated NICU-related stress levels [103].

Education

Gökçe et al. noted that antenatal education with role play reduced the severity of PTSD symptoms in nulliparous women [93].

An analysis of the secondary outcomes of the BELIEF study found that women in the intervention group reported fewer distressing flashbacks of the birth at 6 weeks postpartum. This indicates that such psycho-education interventions before birth could help in making the birth less traumatic [87], while another study reported that group psycho-education failed to improve postpartum PTSD symptoms [22].

Debriefing

A Cochrane review of debriefing interventions following childbirth revealed that it was not an effective intervention for preventing PTSD symptoms [104]. Women however did value having their experience validated by being able to discuss the birth with their midwife and having their questions or concerns addressed [105].

Midwives

A review by Borg-Cunen et al. highlighted conflicting evidence on midwife-led interventions on PTSD, namely postpartum debriefing or counseling [106]. A putative explanation being that midwives are not always properly trained to address birth-related trauma and fear [105, 107•]. Studies of midwives who received special training to address perinatal psychological issues showed promising results [108, 109].

Hypnosis

Women who attended hypnobirthing classes reported that the discrepancy between what they expected from the birth and their actual birthing experience was a cause of trauma [27•]. It is possible that the classes led them to expect a smoother and less painful delivery, resulting in a mismatch between expectations and reality [27•]. A summary of the therapeutic interventions for PTSD can be found in Table 4.

Conclusion

FOC is a serious maternal mental health hurdle with ongoing lack of clear recommendations regarding the appropriate assessment tools and timing, albeit research interest in the topic.

The literature calls for a shorter and more clinically pragmatic tool than the WDEQ to increase compliance and efficiently identify women in need of further assessment. While the FOBS has potential, it does lead to an overdiagnosis of FOC. Nevertheless, it can be used for initial screening and if results are positive, the woman can be referred for further assessment with more sensitive tools such as the WDEQ or a clinical evaluation to assess the need for specialized care. It is also necessary for women with high levels of FOC to be screened for any other underlying mental disorders.

Different treatments for FOC have shown disparate levels of efficacy. There are promising findings regarding biofeedback, psycho-education, hypnotherapy, haptotherapy, and CBT-focused interventions. Of note, the BELIEF trial showed that brief psycho-education by telephone may be an appropriate treatment as it was both cost effective and efficient.

Concerning PTSD, recognizing the risk factors is important as prevention is the best intervention. Screening women for

FOC, previous trauma, and depression might help in identifying those women at higher risk of developing PTSD. Clinicians should be aware that postpartum PTSD might manifest slightly differently from other types of PTSD. Furthermore, in assessing postpartum PTSD, it might be of added benefit to use instruments that include questions that reflect criterion A2, despite its exclusion from the DSM-5.

In fine, training midwives to address traumatic births and FOC is an important step in improving maternal mental health care. After all, FOC and postpartum PTSD can be debilitating for expectant women during a time that should otherwise be joyous. Learning how to recognize and treat these disorders should be among the primary concerns of maternal health professionals.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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- •• Of major importance

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