Abstract

Objectives: Severe fear of childbirth (FOC) has adverse consequences for mother and child. This study aimed to update the global prevalence of severe FOC in low-risk pregnant women.

Materials and Methods: Observational studies published in English were obtained through PubMed, Scopus, Science Direct, Wiley Online, and Google Scholar databases up to April 2020. After reviewing the title and introduction, the quality of the articles that had full text and met the inclusion criteria of the study was checked with the JBI checklist. Then, the final extracted data were entered into the STATA software. The overall prevalence of severe FOC and fear in subgroups were obtained using meta-analysis. Tests of publication bias and sensitivity analysis were also performed.

Results: Overall, 27 observational studies were included (26014 participants). The global prevalence of severe FOC was 16% (95% CI: 14%–19%). The subgroup analysis showed that after 2015, the prevalence of fear was higher than before (%18 versus %14). The results also showed a higher prevalence of fear in women with a diploma and lower compared to women with a university education (%19 versus %13), in single/divorced women compared to married/cohabitation women (%21 versus %15), in nulliparous women compared to multiparous women (%17 versus %14) and in women experiencing the second trimester of pregnancy compared to women in the third trimester of pregnancy (%23 versus %14).

Conclusions: The global prevalence of severe FOC was 16%. Diagnostic, preventive, therapeutic and follow-up strategies are needed to reduce fear in all countries.

Keywords: Fear of childbirth, Pregnancy, Prevalence, Meta-analysis

Introduction

Pregnancy and delivery procedures are physiological processes (1,2), but these procedures are so distressing for some women that generate fear of childbirth (FOC) (3). FOC is a multifaceted variable that encompasses a wide range of indicators from negative feelings about childbirth to fears such as fear of pain, fear of medical interventions, fear of loss of independence, fear of staff misconduct, fear of maternal and infant death, fear of injury, fear of body change, and fear of unemployment and poverty (3-12).

FOC varies from mild to severe (10). According to estimates obtained from previous studies, the prevalence of FOC is between 5 and 21% (13); however, about 10% of women fear is so severe that it leads to women dysfunction, negative birth consequences, unpleasant experiences of childbirth, desire for cesarean section, emergency cesarean section, or even avoidance of pregnancy (14-19). The cesarean section increases the risk of complications of anesthesia, embolism, adhesions, persistent pain, ectopic pregnancy, stillbirth, uterine rupture, infertility and hysterectomy in mother and urinary tract infections, obesity, asthma and diabetes type 1 in the child (20-22). Avoiding pregnancy can reduce the replacement rate (23).

Demographic and obstetrics factors have a major effect on the severity of FOC (24) but this effect is ambiguous in studies. The prevalence of fear is higher among women who are younger (25), low-educated (26-28), single/divorced (27,29), and unemployed (11,26). However, some studies have reported conflicting findings (28,30-32). Fear is more common in women who expect their first child (nulliparous women) (13,29,33,34). However, different result was reported based on Nieminen’s study indicating that women with childbirth experience (multiparous women) were more afraid (35). Although the prevalence of fear is generally believed to be higher in the third trimester, it has not been proven yet (24).

The discrepancies in the studies are due to differences in culture, financial worries, and available tools (24,36). It seems that in some scales, financial and cultural indicators of FOC have led to different results (37), which can be
The prevalence of severe FOC has increased since 2015, and FOC has negative consequences for mother and child. It also increases pregnancy avoidance. Since the number of studies investigating the prevalence of FOC has increased recently, performing the meta-analysis can have scientific and practical benefits. The prevalence of severe FOC has increased since 2015, but this prevalence varies according to education, marital status, parity, and trimester status.

Key Messages
- Severe Fear of Childbirth (FOC) has negative consequences for mother and child. It also increases pregnancy avoidance.
- Since the number of studies investigating the prevalence of FOC has increased recently, performing the meta-analysis can have scientific and practical benefits.
- The prevalence of severe FOC has increased since 2015, but this prevalence varies according to education, marital status, parity, and trimester status.

Avoided by using those scales that do not measure these indicators. One of these scales is the Wijma Childbirth Expectancy Scale (W-DEQ), which is one of the most widely used measures to measure the FOC. The W-DEQ contains questions about women's feelings and emotions about childbirth (38). Given that fear is an emotion (39), this scale is the best tool for measuring FOC. On the other hand, most researchers agree on increasing FOC in women (33,40,41), while some other researchers disagree with this assumption (42). Performing a meta-analysis on the overall prevalence of FOC removes the existing ambiguities and can help planners and researchers to use appropriate interventions to prevent or reduce this fear. A meta-analysis on the overall prevalence of FOC was conducted in 2016. Since then, several studies have been conducted to examine the prevalence of FOC. This makes the results of the recent meta-analysis obsolete. Therefore, this study was carried out to update the meta-analysis of the studies that measured the prevalence of severe FOC using W-DEQ-A.

Methods
This meta-analysis was conducted in accordance with the PRISMA guidelines for reporting systematic reviews and meta-analysis (43–45).

Search Strategy
Five electronic databases (PubMed, Google Scholar, Science Direct, Scopus, and Wiley online) were selected and searched for all published literature on the given topic up to 19 April 2020 using keywords “fear of birth”, “fear of childbirth”, “fear of labor”, “fear of pregnancy” and “tocophobia”.

Selection of Studies
Inclusion criteria: observational studies published in English using WDEQ-A to measure the prevalence of severe FOC in pregnant women at any age, and in each trimester of pregnancy. Exclusion criteria: Experimental/ quasi-experimental or review studies not providing full texts or not reporting sufficient data to calculate the prevalence of fear. Two researchers (First and third authors) reviewed the titles and abstracts of the studies based on inclusion and exclusion criteria. Then, they assessed the validity of the remaining articles. Finally, the following data including author, year of publication, country of study, study design, sample size, and prevalence were extracted from the full texts of the selected articles.

Instrument
The applied tool was the 33-item W-DEQ-A, which is a 6-point Likert-type scale. The scores ranged from 0 to 165. Scores of 85 and above were indicative of a severe FOC and were considered in this study (46).

Methodological Quality Assessment
Two researchers assessed the quality of the studies separately using the JBI Critical Appraisal Checklist for Analytical prevalence Studies published by the Joanna Briggs Institute (47), which comprises nine questions. The answer to each question is in one of four modes: yes, no, unclear, and not applicable. Scoring is 1 point for “yes”, and 0 point for “the rest of the answers”. We only included high-quality articles (score of ≥5 out of 9) in this review. If there was a dispute between two researchers on data extraction or qualitative evaluation of studies, the viewpoint of the third researcher was adopted.

Statistical Analysis
To estimate the pooled prevalence of severe FOC, a meta-analysis was conducted using STATA software (version 21) and the fixed or random-effects model. Cochran’s Q test and I² index were used to examine the heterogeneity of studies. We used a random-effect model for heterogeneity above 75% (48). The FOC at severe levels was described as the W-DEQ-A score of 85 points and above. Sensitivity analysis was performed to assess the role of each study on the overall prevalence of severe FOC.

Subgroup analyses were conducted based on the year of publication (up to 2015 vs. since 2015), education (diploma and less vs. university), marital status (married/cohabitation vs. single/divorced), parity (nulliparous women vs. multiparous women), and trimester of pregnancy (second trimester vs. third trimester). The publication bias was evaluated by Begg's test. A significance level of less than 0.05 revealed the publication bias (49).

Results
Through the initial search, a total of 1207 articles were detected, 628 of which were deleted due to being duplicate. After removing unrelated studies, 93 full-text articles were assessed for eligibility, where 27 studies met the eligibility criteria for meta-analysis (Figure 1). A total of 26014 women were included in the study (Minimum sample = 137, Maximum sample = 6870) (27,50). Summary characteristics of studies are shown in Table 1.

Publication Bias
According to Begg's test (P = 0.8), there was no publication bias.
Figure 1. The Flowchart on the Stages of Including the Studies in the Systematic Review and Meta-Analysis.

Table 1. Characteristics of Included Studies on Sever FOC

<table>
<thead>
<tr>
<th>First Author (year)</th>
<th>Country</th>
<th>Study Design</th>
<th>Sample Size</th>
<th>Prevalence</th>
<th>Score of Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams (2012)</td>
<td>Norway</td>
<td>Cohort</td>
<td>2206</td>
<td>7.5%</td>
<td>8</td>
</tr>
<tr>
<td>Aksoy (2014)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>900</td>
<td>16.1%</td>
<td>9</td>
</tr>
<tr>
<td>Aksoy (2016)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>350</td>
<td>11.4%</td>
<td>6</td>
</tr>
<tr>
<td>Aligani (2019)</td>
<td>Iran</td>
<td>Cross-sectional</td>
<td>211</td>
<td>22.7%</td>
<td>7</td>
</tr>
<tr>
<td>Çapik (2018)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>301</td>
<td>6.6%</td>
<td>6</td>
</tr>
<tr>
<td>Çıtak Bilgin (2020)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>624</td>
<td>20.8%</td>
<td>8</td>
</tr>
<tr>
<td>Henriksen (2018)</td>
<td>Norway</td>
<td>Cohort</td>
<td>2145</td>
<td>12%</td>
<td>9</td>
</tr>
<tr>
<td>Jokić-Begić (2013)</td>
<td>Hungary</td>
<td>Cohort</td>
<td>200</td>
<td>11.5%</td>
<td>6</td>
</tr>
<tr>
<td>Klabbers (2018)</td>
<td>Netherlands</td>
<td>Cohort</td>
<td>484</td>
<td>27.6%</td>
<td>5</td>
</tr>
<tr>
<td>Korukcu (2010)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>660</td>
<td>0.9%</td>
<td>5</td>
</tr>
<tr>
<td>Korukcu (2018)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>309</td>
<td>19.1%</td>
<td>5</td>
</tr>
<tr>
<td>Lukasse (2014)</td>
<td>Six European countries</td>
<td>Cross-sectional</td>
<td>6870</td>
<td>11%</td>
<td>8</td>
</tr>
<tr>
<td>Mortazavi (2018)</td>
<td>Iran</td>
<td>Cross-sectional</td>
<td>522</td>
<td>19.6%</td>
<td>8</td>
</tr>
<tr>
<td>Nierinen (2009)</td>
<td>Sweden</td>
<td>Cross-sectional</td>
<td>1635</td>
<td>15.6%</td>
<td>9</td>
</tr>
<tr>
<td>O’Connell (2019)</td>
<td>Ireland</td>
<td>Cross-sectional</td>
<td>882</td>
<td>5.3%</td>
<td>8</td>
</tr>
<tr>
<td>Okumus (2017)</td>
<td>Turkey</td>
<td>Cross-sectional</td>
<td>253</td>
<td>54%</td>
<td>5</td>
</tr>
<tr>
<td>Onchonga (2020)</td>
<td>Kenya</td>
<td>Cross-sectional</td>
<td>376</td>
<td>8%</td>
<td>8</td>
</tr>
<tr>
<td>Phunyammale (2019)</td>
<td>Thailand</td>
<td>Cross-sectional</td>
<td>305</td>
<td>0.7%</td>
<td>9</td>
</tr>
<tr>
<td>Ryding (2008)</td>
<td>Sweden</td>
<td>Case-control</td>
<td>1981</td>
<td>10%</td>
<td>8</td>
</tr>
<tr>
<td>Salomonsson (2013)</td>
<td>Sweden</td>
<td>Cross-sectional</td>
<td>423</td>
<td>20.8%</td>
<td>5</td>
</tr>
<tr>
<td>Schroll (2011)</td>
<td>Denmark</td>
<td>Cohort</td>
<td>2618</td>
<td>8.7%</td>
<td>9</td>
</tr>
<tr>
<td>Sluijs (2019)</td>
<td>Netherlands</td>
<td>Cohort</td>
<td>331</td>
<td>11%</td>
<td>7</td>
</tr>
<tr>
<td>Tata (2019)</td>
<td>Iran</td>
<td>Cross-sectional</td>
<td>230</td>
<td>12.6%</td>
<td>7</td>
</tr>
<tr>
<td>Toohill (2014)</td>
<td>Australian</td>
<td>Cross-sectional</td>
<td>1386</td>
<td>4.8%</td>
<td>9</td>
</tr>
<tr>
<td>Wiklund (2007)</td>
<td>Sweden</td>
<td>Cohort</td>
<td>496</td>
<td>17%</td>
<td>7</td>
</tr>
<tr>
<td>Zar (2002)</td>
<td>Sweden</td>
<td></td>
<td>506</td>
<td>11%</td>
<td>8</td>
</tr>
</tbody>
</table>
Meta-analysis

The pooled prevalence of severe FOC in 27 final studies with a random-effects model was 16% (95% CI: 14%-19%); and F test result showed high heterogeneity (I² = 98.1%, P = 0.00) (Figure 2).

The results of the sensitivity analysis revealed – in the absence of each study, no substantial change in the overall prevalence of severe FOC. The range of change was between 15% (95% CI: 13–17%), with Korukcu et al (51), Okumus et al (52), and Mildren et al (50) excluded; and 17% (95% CI: 14–19%), with Toohill et al (24), O’Connell et al (13), and Phunyammalee et al (28) excluded.

Subgroup Analyses Based on Year of Publication

Fifteen studies estimated the prevalence of severe fear since 2015, and twelve studies estimated the prevalence of severe fear up to 2015. The pooled prevalence was 18% (95% CI: 13%-23%) and 14% (95% CI: 11%-17%) respectively. Heterogeneity of studies was significant (I² = 98.1%, P = 0.00) (Figure 3).

Subgroup Analyses Based on Education

Six studies assessed prevalence in single/divorced women and the pooled prevalence was 21% (95% CI 12%-30%). Six studies measured the prevalence of severe fear in married/cohabitation women and the pooled prevalence became 15% (95% CI: 11%-18%). Heterogeneity of the studies was significant (F = 95.4%, P = 0.00) (Figure 5).

Subgroup Analyses Based on Parity

Sixteen studies estimated the pooled prevalence of severe FOC in nulliparous women and thirteen studies estimated the prevalence of severe FOC in multiparous women. Using the random-effects model, the pooled prevalence was 17% (95% CI: 14%-20%) and 14% (95% CI: 11%-17%), respectively. The heterogeneity of the studies was high (F = 96.4%, P = 0.00) (Figure 6).

Subgroup Analyses Based on Marital Status

Four studies assessed prevalence in single/divorced women and the pooled prevalence was 21% (95% CI: 12%-30%). Six studies measured the prevalence of severe fear in married/cohabitation women and the pooled prevalence became 15% (95% CI: 11%-18%). Heterogeneity of the studies was significant (F = 95.4%, P = 0.00) (Figure 5).

Subgroup Analyses Based on Year of Publication

Sixteen studies estimated the pooled prevalence of severe FOC in nulliparous women and thirteen studies estimated the prevalence of severe FOC in multiparous women. Using the random-effects model, the pooled prevalence was 17% (95% CI: 14%-20%) and 14% (95% CI: 11%-17%), respectively. The heterogeneity of the studies was high (F = 96.4%, P = 0.00) (Figure 6).

Subgroup Analyses Based on Marital Status

Four studies assessed prevalence in single/divorced women and the pooled prevalence was 21% (95% CI: 12%-30%). Six studies measured the prevalence of severe fear in married/cohabitation women and the pooled prevalence became 15% (95% CI: 11%-18%). Heterogeneity of the studies was significant (F = 95.4%, P = 0.00) (Figure 5).

Subgroup Analyses Based on Education

Six studies assessed the prevalence of severe FOC based on education level. We divided the data related to education into two categories: diploma and less, and university level. The pooled prevalence of severe fear was 19% (95% CI: 16%-21%) and 13% (95% CI: 10%-16%) respectively. Heterogeneity of studies was high in both categories (I² = 91.8%, P = 0.00) (Figure 4).

Subgroup Analyses Based on Publication Date of the Studies

Using the random-effects model, the pooled prevalence of severe FOC up to 2015 was 17% (95% CI: 13%-23%) and 14% (95% CI: 11%-17%) respectively. The heterogeneity of the studies was significant (F = 98.1%, P = 0.00) (Figure 6).

Figure 2. Forest Plot of the Meta-Analysis for the Prevalence of Severe FOC for all Studies Included in the Meta-Analysis.

Figure 3. Forest Plot of the Meta-Analysis for the Prevalence of Severe FOC Based on Year of Publication of the Studies.

Figure 4. Forest Plot of the Meta-Analysis for the Prevalence of Severe FOC Based on the Education Level.
trimester (between 17 and 28 weeks of pregnancy) versus 14% (95% CI: 10%-18%) in 14 studies with data concerning the third trimester (over 28 weeks of pregnancy). Heterogeneity proved to be significant ($I^2 = 98.3\%$, $P = 0.0$). Seven studies were not included in the meta-analysis due to lack of clear classification (13,27,32,33,50,53) (Figure 7).

Discussion

Severe FOC is an important public health problem all over the world. Women with severe FOC don’t have sufficient ability and confidence to successfully adapt to labor and delivery, and are more likely to seek cesarean section (26,54). Increasing the rate of cesarean section not only has a financial burden but also harms the health of mother and child. Therefore, the global prevalence of severe FOC in pregnant women was examined.

Based on this review, the global prevalence of severe FOC was 16%. The findings also showed that the prevalence of fear has increased since 2015 compared to the time period before this year. In a meta-analysis study conducted by O’Connell et al in 2016, the worldwide prevalence of tocophobia was 12% in studies to have used WDEQ-A. This difference is due to the fact that in O’Connell and colleagues’ review, included studies were related to developed countries, where the prevalence of fear is low; in the present review, however, both developed and developing countries were included in the meta-analysis, not ignoring the fact that developing countries have a different socio-economic, political and weaker health system. For example, in Turkey and Iran – two developing countries, issues including insufficient support from family and spouse, lack of decision making, lack of trust in staff due to a variety of health professionals within different disciplines, deficiency maternal care practices such as home visit (47,55), and lack of home birth are the most important reasons for high prevalence of FOC.

In subgroup analysis, moreover, the prevalence of fear was higher in women with a diploma and lower educational degrees compared to women with academic degrees. This is similar to the findings of nine previous studies (4,11,27,28,31,32,56-58) but different from the results of one previous study (55). Since providing information regarding pregnancy and birth is not commensurate with the level of education of women, those women with lower levels of education do not fully understand the information (59). On the other hand, higher education is associated with the use of more effective and adaptive coping strategies in the face of a problem, which can prevent aggravation of the problem (48).

The current study also found that single/divorced women were more likely to be afraid than those who were married/cohabitated. This finding was confirmed by the results from four studies (4,11,56,60). Single/divorced
women do not enjoy the support of their spouses. Research has shown that spouse and family support reduce FOC in pregnant women (52).

Subgroup analysis results indicated that the prevalence of fear was higher in Nulliparous women than in Multiparous women. Our findings were also confirmed by other studies (34,50). However, the values obtained from our review are close to the values derived in O’Connell and colleagues’ review; thus the prevalence in our study must be interpreted with caution because seven studies reported only general prevalence and did not calculate the prevalence in nulliparous and multiparous women separately. The prevalence of these studies ranged from 10% to 75%. The reason behind the more amount of fear among nulliparous women lies in the fact that the labor pain, birth support, and birth experience are still unknown (61). However, there are conflicting studies showing that the prevalence of fear was higher in multiparous women (11,35). One reason for this lay in the fact that the parous women had a negative experience of previous birth, and this might have increased the FOC (11).

Also, the prevalence in the second trimester of pregnancy was higher than in the third trimester of pregnancy. This result is different from the findings of four previous studies (27,31,33,62). In this context, it may be stated that the statistical population relating to most of the studies examining the prevalence of fear in the second trimester were nulliparous women who, according to the findings of this study, were more afraid than multiparous women.

However, FOC is not a new phenomenon and increasing prevalence of this fear indicates that various factors, including the lack of care for women delivered by staff, unfriendly relationships between women and staff, lack of involvement of women in decision-making processes, lack of support, as well as the scanty knowledge about the birth are responsible for it (52). To reduce the FOC, therefore, a complete package including identification of women with severe fear, interventions to reduce fear, prenatal support (social support, family support, spouse support, staff support, and informational support), and postpartum monitoring are required.

Strengths and Limitations

The greatest strength of this study was the inclusion of studies that had used the WDEQ-A. Since WDEQ-A is not a multifactorial scale, its results cannot be cumulative with scales that are multifactorial. Therefore, the overall prevalence obtained from the studies that used this scale is more valid (28). In this review, one study used the electronic version of WDEQ-A without validation (50). When data are collected online, the results may be biased due to the low internet literacy of some people. Finally, we did not have enough data to calculate the overall prevalence based on age and employment status.

Conclusions

This meta-analysis helped update the overall prevalence of severe FOC in pregnant women. The results showed an increase in the prevalence of fear compared to the first meta-analysis (63). Since many studies on the prevalence of fear have been widely conducted around the world in recent years, the present review can clearly show the current prevalence of global fear. The results of this study revealed an increase in prevalence of fear since 2015. Furthermore, the amount of fear was higher among women who had lower education or were single and nulliparous. These results being significant, therefore, can be used for proper health planning.

Authors’ Contribution

SHS, AK conceived of the presented idea. SHS did the literature search and, together with AK, selected the studies. SHS and RCH checked the quality of the studies. SHS and RCH performed the calculations and SHG confirmed them. SHS, AK, and RCH interpreted the data. SHS wrote the first draft of the paper. All the authors read the draft and provided critical feedback. All authors approved the final draft.

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Issues

This study was approved by the Shahroud university of medical sciences ethical committee (Code: IR.SHMU.REC.1398.098).

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