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Centro Universitário de Lisboa
Escola de Psicologia e Ciências da Vida
Mestrado em Psicologia Clínica e da Saúde

FACTORS ASSOCIATED WITH FEAR OF CHILDBIRTH DURING PREGNANCY

Dissertação defendida em provas públicas para a obtenção do grau de Mestre em Psicologia Clínica e da Saúde, orientada pelo Prof. Doutor Tiago Pinto.

Diogo Manuel Ribeiro Silva

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Centro Universitário de Lisboa
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Factors Associated with Fear of Childbirth during Pregnancy

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2024

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Resumo

O medo do parto apresenta uma prevalência de 14%, em mulheres grávidas. Este estudo teve como objetivo identificar fatores sociodemográficos, obstétricos e psicológicos associados ao medo do parto entre as mulheres grávidas portuguesas. Este estudo transversal incluiu 168 participantes recrutadas no Hospital de São João e na Maternidade Alfredo da Costa, em Portugal. Foram recolhidos dados sobre características demográficas e informações obstétricas. O estudo utilizou a Escala de Medo do Parto (FOBS) e a Escala de Depressão Pós-Parto de Edimburgo (EPDS) para avaliação de medo do parto e sintomas depressivos. O modelo de regressão foi estatisticamente significativo ($R^2 = .568$, $F(3,120) = 41.29$, $p < .001$). Sintomas depressivos ($\beta = .708$, $t = 10.353$, $p < .001$) e complicações do bebé durante a gravidez ($\beta = .135$, $t = 2.107$, $p = .037$) foram preditores significativos do FOC (Medo do Parto), ambos apresentando associações positivas. Este estudo destaca a relevância dos sintomas depressivos e das complicações na gravidez como preditores da dinâmica do FOC, quando considerado os restantes fatores estudados, numa análise de regressão múltipla hierárquica. Recomenda-se mais pesquisa e a aplicação dessas descobertas nas práticas de saúde para melhorar a saúde maternal e neonatal.

Palavras-chave: Medo do Parto, Gravidez, Parto, Saúde Mental Perinatal

Abstract

The fear of childbirth has a prevalence of 14% in pregnant women. This study aimed to identify sociodemographic, obstetric, and psychological factors associated with the fear of childbirth among Portuguese pregnant women. This cross-sectional study included 168 participants recruited from Hospital de São João and Maternidade Alfredo da Costa in Portugal. Data on demographic characteristics and obstetric information were collected. The study used the Fear of Birth Scale (FOBS) and the Edinburgh Postnatal Depression Scale (EPDS) to assess fear of childbirth and depressive symptoms. The regression model was statistically significant ($R^2 = .568$, $F(3,120) = 41.29$, $p < .001$). Depressive symptoms ($\beta = .708$, $t = 10.353$, $p < .001$) and fetal complications during pregnancy ($\beta = .135$, $t = 2.107$, $p = .037$) were significant predictors of FOBS, both showing positive associations. This study highlights the relevance of depressive symptoms and pregnancy complications as predictors of FOC (Fear of Childbirth) dynamics when considering other studied factors in a hierarchical multiple regression model. Further research is recommended, and these findings should be applied in healthcare practices to improve maternal and neonatal health.

Keywords: Fear of Childbirth, Pregnancy, Childbirth, Perinatal Mental Health.

Abbreviations

FOC – Fear of Childbirth

FOBS-Fear of Birth Scale

EPDS- Edinburgh Postnatal Depression Scale

PTSD - Post Traumatic Stress Disorder

SPSS - Statistical Package for Social Sciences

VIF-Variance Inflation Factors

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Theoretical framework

Childbirth

Pregnancy is a challenging period in women's life, associated with several biological, psychological, and social changes (Fischer et al., 2006; Loh et al., 2022; Rhudy & Meagher, 2000; Sword et al., 2021). There is variability in women's perceptions and expectations about (Bewley & Cockburn, 2002; Hosseini-Tabaghdehi et al., 2020; Koehn, 2002). Positive experiences of childbirth are associated with women's higher self-esteem, responsibility, self-sufficiency, quality of life, empowerment, and better mother-child relationship (Shahoei et al., 2014; Fonseca et al., 2022). However, negative experiences of childbirth can have a detrimental impact on women's physical and mental health (Nieminem et al., 2021).

The Fear of Childbirth

The Fear of Childbirth (FOC) is a complex emotional state and manifests as negative emotions related to the physical and mental stress associated with childbirth, involving biological, psychological, social, and cultural factors (Haines et al., 2011; Nilsson et al., 2010). It comprises several concerns regarding the childbirth event, including the fear of physical harm or death (Haines et al., 2011), fear of pain (Pereira et al., 2011; Haines et al., 2011), fear for the health and well-being of the newborn (Pereira et al., 2011; Haines et al., 2011), fear of low quality of maternal and newborn care (Lyberg & Severinsson, 2010), fear of loss of control and autonomy (Lyberg & Severinsson, 2010; Salomonsson et al., 2010; Haines et al., 2011), and fear of anesthesia (Pereira et al., 2011; Smorti et al., 2020). These fears can have a negative impact on the daily life of pregnant women. Therefore, it requires recognition and effective management to ensure the best possible pregnancy and childbirth experience for both the woman and her child (Haines et al., 2011; Nilsson et al., 2010).

The intensity of FOC can range from mild to severe, depending on the degree of distress involved (Demšar et al., 2018). Severe FOC can lead to tokophobia, a specific type of anxiety disorder that is linked to the cognitive interpretation of childbirth (Bandura, 1977; Bayrampour et al., 2016; Makara-Studzińska et al., 2022). Tokophobia is recognized as a phobic unspecified anxiety disorder by the International Classification of Diseases-11 (ICD; World Health Organization [WHO], 2019). Tokophobia has a worldwide prevalence ranging from 3.7% to 43%, with an average of 14% of pregnant women (Rouhe et al., 2015). The heterogeneity of the results between is postulated to stem from the lack of consensus in the definition of Tokophobia and the imprecise boundaries between the FOC and generalized anxiety (Hofberg

& Ward, 2003; Kacperczyk-Bartnik et al., 2019; Poggi et al., 2018). Therefore, a comprehensive approach to FOC that considers its multidimensional nature, and its potential severity is warranted (Poggi et al., 2018).

As a multidimensional and specific mental health problem, tokophobia can be classified into two types: primary and secondary tokophobia (Makara-Studzińska et al., 2022). According to the Diagnostic and Statistical Manual of Mental Disorders -5 (American Psychiatric Association [APA], 2013), primary tokophobia typically arises during adolescence or early adulthood and can be attributed to several factors, including indirect exposure to traumatic or stressful childbirth events, obtaining negative information about childbirth, experiencing situations of sexual abuse, and the generalization of other fears (Hofberg & Ward, 2003; Rondung et al., 2016). Secondary tokophobia is characterized by fear conditioning that arises as a result of a traumatic obstetric event. These events are typically associated with traumatic deliveries, but can also result from miscarriages, induced abortions, or stillbirths. In these cases, FOC may be linked to Post Traumatic Stress Disorder (PTSD; Hofberg & Ward, 2003; Rondung et al., 2016). FOC can have negative consequences for women's and newborn's health (Slade et al., 2019). The intense FOC can induce physiological changes in the maternal organism, such as an increase in blood pressure, prolonged active phase of cervical dilation, during pregnancy (Gallop et al., 2020). Higher FOC during pregnancy is also associated with an elevated risk of preeclampsia, premature birth, emergency cesarean section, instrumental vaginal delivery, lower fetal development, higher admission rates of newborns to intensive care units, low breastfeeding rates, and postpartum depression (Bahl et al., 2004; Kacperczyk-Bartnik et al., 2019; Ohman et al., 2004; Saisto & Halmesmäki, 2003).

Furthermore, FOC during pregnancy is associated with various concerns related to medical complications during pregnancy and delivery. These concerns encompass the fear of intolerable pain during labor and birth (Fisher et al., 2006; Geissbuehler et al., 2002; Lang et al., 2006; Melender, 2002; Saisto & Halmesmäki, 2003). Additionally, worries include not feeling physically prepared for childbirth (Eriksson et al., 2006), arriving too late for the maternity ward, fearing a lengthy labor, and experiencing panic during labor (Melender, 2002).

Moreover, there are concerns about not having the physical strength required for labor (Geissbuehler et al., 2002), being unable to breathe or push correctly during delivery (Eriksson et al., 2006; Melender et al., 2002), not cooperating with the medical team, and not being able to demonstrate competence (Eriksson et al., 2006; Sjögren & Thomassen, 1997). Additionally, there is the apprehension of losing control during labor or losing self-control (Eriksson et al.,

2006; Fisher et al., 2006; Geissbuehler et al., 2002), fearing a lack of support during childbirth (Melender et al., 2002). This includes concerns about not being treated empathetically, friendly, or respectfully by healthcare professionals, or being left isolated (Geissbuehler et al., 2002). All these factors contribute to feelings of powerlessness and helplessness (Fisher et al., 2006; Geissbuehler et al., 2002).

In addition, women are also afraid of labor interventions such as caesarean section (Fisher et al., 2006; Geissbuehler et al., 2002; Melender et al. 2002), episiotomy (Melender et al., 2002), or anesthesia (Geissbuehler et al., 2002), irreversible perineal ruptures (Eriksson et al., 2006), injuries to the mother and/or child (Eriksson et al., 2006; Geissbuehler et al., 2002; Melender et al. , 2002;) and fear that the baby (Melender et al., 2002) or the mother and baby may die (Eriksson et al, 2006; Sjögren & Thomassen, 1997). Women express fear of the unknown (Fisher et al., 2006) and a negative experience (Geissbuehler et al., 2002; Melender et al., 2002).

Sociodemographic factors of FOC

Several sociodemographic factors have been found to be associated with FOC, as demonstrated by recent research (Duman and Ertan, 2022; Ozcan et al., 2021; Tuncali et al., 2021). These studies shed light on the various aspects of FOC dynamics.

One noteworthy factor contributing to FOC, as suggested by Rouhe et al. (2009), is maternal age. This connection is linked to factors such as reduced physical resilience, increased concerns about postpartum care, and challenges in maternal adaptation. These findings support Gomes' (2008) observations about the impact of advanced maternal age in FOC. Another influential factor is educational attainment, as revealed by Striebich et al. (2018). Lower levels of education are associated with a higher risk of FOC, while higher educational achievements are linked to better cognitive abilities and knowledge that can help mitigate childbirth-related fears. This aligns with the insights of Oliveira and Machado (2022). The role of marital status, as elucidated by Striebich et al. (2018), also plays a significant role in FOC. Unmarried or non-cohabiting mothers are more susceptible to FOC due to a lack of partner support or external networks, as highlighted by Souto et al. (2022). Partner dissatisfaction, as described by Saisto et al. (2001), is another factor strongly linked to FOC. Similarly, Laursen et al. (2008) emphasize the importance of social support, with a lack of support networks correlating with higher levels of FOC.

Socioeconomic factors, as proposed by Räisänen et al. (2014), reveal a reciprocal association between socioeconomic status and FOC. Higher socioeconomic status is associated

with lower FOC, while unemployment, as discussed by Striebich et al. (2018), increases the likelihood of FOC.

Transcultural considerations, as highlighted by Ternström et al. (2015), add another dimension to the analysis of FOC. Giving birth in a foreign country is an additional factor that can increase vulnerability to FOC (Nativity). Additionally, ethnicity plays a role, with studies showing that women from minority ethnic backgrounds, such as Black, Hispanic, and Asian women, are at a higher risk of experiencing FOC compared to white women (Nguyen et al., 2022).

Obstetric factors of FOC

The association between parity, obstetric complications during pregnancy, fetal complications, and FOC during pregnancy, has gained substantial attention within the domain of maternal health (O'Connell et al., 2019). Parity has been a subject of significant investigation concerning FOC (Huang et al, 2021; Rouhe et al., 2009). For instance, Lyberg and Severinsson (2010) reported that primiparous women often exhibit more levels of FOC during pregnancy compared to multiparous women. Similarly, Massae et al. (2021) found that women with previous childbirth experiences tend to report lower levels of FOC in comparison to primiparous women. The impact of maternal complications during pregnancy on FOC represents a crucial aspect of this association (Veringa-Skiba et al., 2022). Recent studies have explored the influence of obstetric complications, such as gestational diabetes and hypertensive disorders, on the FOC (Ouyang et al., 2021). Gestational diabetes has been a focus of investigation in relation to FOC (Craig et al., 2020). Craig et al. (2020) conducted a recent case-control study that established a statistically significant association between gestational diabetes and FOC. Women with gestational diabetes were more likely to report significant FOC compared to those without this condition. Hypertensive disorders during pregnancy have been investigated in relation to FOC, as explored in a study by Sakurai et al. (2022). Their prospective study identified a noteworthy link between hypertensive disorders during pregnancy and heightened levels of FOC.

Complications related to the fetus, including prenatal diagnosis of fetal abnormalities or developmental issues, are another critical aspect of the association with FOC (Ali et al., 2022). In a recent study by Mirtabar et al. (2023), pregnant women who received prenatal diagnoses of fetal abnormalities exhibited significantly higher levels of FOC than those with uncomplicated pregnancies. Moreover, the uncertainty surrounding the fetal prognosis may exacerbate anxiety and FOC among these women (Hamzehgardeshi et al., 2021). Additional

research, such as the study by Hamzehgardeshi et al. (2021), has corroborated these findings, emphasizing the association between fetal complications during pregnancy and the experience of FOC.

Psychological factors of FOC

Several psychological factors have been associated with FOC such as general anxiety, neuroticism, vulnerability, depression, and low self-esteem (Räisänen et al., 2014; Ryding et al., 2007; Rondung et al., 2016; Saisto et al., 2001). History of mental problems before and/or during pregnancy is linked to higher levels of FOC (Rouhe et al., 2011; Zar et al., 2002). Pregnant women who have a history of sexual, emotional, or physical abuse in the past (Heimstad et al., 2006; Lukasse et al., 2010) and those who have experienced physical or sexual violence (Previous Trauma Experiences) (Schroll et al., 2011) reported higher levels of FOC.

It is worth noting that FOC has been observed in pregnant women who suffer from prenatal depression and is associated with the risk of sleep disturbances (Veringa et al., 2016; Rouhe et al., 2009).

In addition, a predictor of FOC that has been noted in the literature is the fear of a traumatic labor being repeated (Fisher et al., 2006; Souto et al., 2022; Nilsson & Lundgren, 2009; Nieminen et al., 2009). Negative experiences from previous deliveries, including pain, prolonged labor, and surgical interventions, can lead to an increase in FOC, particularly among multiparous women who have already undergone childbirth (Nilsson & Lundgren, 2009; Nieminen et al., 2009; Pereira et al., 2011).

Pertinence of the study of the Fear of Childbirth

The present study can provide new valuable information on the sociodemographic, obstetric, and psychological factors associated with FOC in pregnant women, assessing these factors in the same model and addressing possible interactions between them to explain variability in FOC during pregnancy. The early identification of pregnant women at risk of experiencing high levels of FOC holds paramount significance within the domain of obstetric care. This identification process serves as a foundational step towards the provision of specialized mental healthcare, aiming to effectively mitigate and alleviate FOC among this vulnerable population (Lundgren & Wijma, 2018).

By analyzing the factors that are associated with FOC in pregnant women, healthcare professionals and policymakers gain valuable insights into the complex dynamics of maternal psychological well-being during the perinatal period. This knowledge, grounded in empirical

research and informed by a robust evidence base, informs the development and refinement of health policies in obstetric care (Rouhe et al., 2019).

Objectives and Hypothesis

This study aimed to identify sociodemographic, obstetric, and psychological factors associated with FOC among pregnant women (Attachment I). Sociodemographic factors will include women's age, education, marital status, nativity, ethnicity, socioeconomic strata. We hypothesized that:

1a) Advanced maternal age, low educational level, not living with a partner, birth in foreign lands, low socioeconomic strata and ethnic minority women is associated with higher levels of FOC.

Obstetric factors include parity and medical complications for both mother and fetal.

2a) Women nulliparous, mother complications in pregnancy and fetal complications are associated with higher levels of FOC.

Psychological factors will include previous mental problems, previous traumas experience and current mental health problems (depressive symptoms).

3a) Women with a history of mental problems, previous trauma experience or depressive symptoms are associated with higher levels of FOC.

Method

Participants

The sample comprised 168 pregnant women (see Table 1). The mean age of the sample was 33.15 years ($SD = 4.73$), with an age range from 20 to 44 years.

In the context of ethnicity, a statistical majority (96.0%) attested to self-identification within the rubric of the dominant ethnic demographic, juxtaposed with a fractional demographic stratum (4.0%) whose professed alignment resonated distinctly with a subaltern ethnic minority. In the domain of nativity, a substantial sample (80.1%) of participants proffered that they're native. In the domain of economic strata, a substantial subset (67.7%) of respondents avowed income levels with the national fiscal average. From the sampled cohort, it emerges that the contingent of women who pursued higher education constitutes 69%. Within the precincts of marital status, a preeminent majority (93.9%) affixed the presence of conjugal entwinements with a partner.

Wherein a preponderance of individuals (62.3%) is primiparous. Concurrently, a prominent demographic subset (56.3%) underscores the dearth of maternal complications during the gestational interval. Correspondingly, an appreciable majority of participants (85.6%) affirm the absence of perinatal complications.

The data reveals that most participants (70.4%) did not have any previous trauma experience. Also, the majority (79.0%) had no history of diagnosed mental health issues. On the EPDS (depressive symptoms), the score is average ($M=6.63$; $SD = 4.23$).

Table 1.

Sociodemographic and obstetric characteristics of study sample (n = 168).

Sociodemographic, obstetric, and psychological characteristics	n (%)
Age group, years ($M = 33.15 \pm SD = 4.73$)	
20–29	35 (21.6)
30–39	114 (68.7)
40–44	17 (9.7)
Education level, years	
≤ 12	51 (30.5)
> 12	116 (69.0)
Nativity ^a	
Yes	133 (80.1)
No	33 (19.9)
Ethnicity	
Ethnic majority	145 (96.0)
Ethnic minority	6 (4.0)
Socioeconomic Strata	
Below average	16 (9.8)
Average	111 (67.7)
Above average	37 (22.6)
Relation status	
With partner	154 (93.9)
Without partner	10 (6.1)
Parity ^b	
≥ 1	63 (37.7)
0	104 (62.3)
Mother complications in pregnancy ^c	
Yes	73 (43.7)
No	94 (56.3)
Fetal complications in pregnancy ^d	

Yes	24 (14.4)
No	143 (85.6)
Previous trauma experience ^e	
Yes	47 (29.6)
No	112 (70.4)
History of mental problems	
Yes	34 (21.0)
No	128 (79.0)

Note. Abbreviations: M, mean; SD, standard deviation.

^a Nativity means being born in Portugal.

^b Parity = 0 corresponds to nulliparous individuals (those without any previous births); parity = 1 refers to primiparous individuals (those with one previous birth); and parity > 1 indicates multiparous individuals (those with more than one previous birth).

^c Mother complications in pregnancy was codified as 'Yes' if the participant answered 'Yes' to at least one of the items concerning mother complications in pregnancy (regardless of type or severity of complication). A specific question was used, and four responses options were provided.

^d Fetal complications in pregnancy was codified as 'Yes' if the participant answered 'Yes' to at least one of the items concerning fetal complications in pregnancy (regardless of type or severity of complication). A specific question was used, and four responses options were provided.

^e Previous trauma experience was codified as 'Yes' if the participant answered 'Yes' to at least one of the items concerning previous trauma experience. A specific question was used, and ten responses options were provided, from illness to natural disasters.

Procedures

The sample of this cross-sectional study is drawn from a larger longitudinal study (Pinto et al., 2023), that takes part from an international study that involves 45 countries, with the main objective being to determine the prevalence of birth trauma and PTSD, determine differences in symptom presentation and determine the etiology of childbirth-related PTSD symptoms across countries and cultures.

The participants were recruited from Hospital de São João (Ethical Committee, Hospital de São João, Porto (CES CHUSJ: 279 / 2022) and Maternidade Alfredo da Costa, Lisboa (1317/2022). The project received a favorable opinion from the Commission on Ethics and Deontology in Scientific Research of the School of Psychology, Education, and Sports of Lusófona University (Ref. RC000121) and adheres to relevant data protection regulations and ethical guidelines. Informed consent is obtained from participants, and their right to withdraw from the study is ensured without any repercussions. Confidentiality and privacy were maintained using unique identification codes and secure storage of personal identifying information. Only the research team and authorized personnel have access to the collected data.

Participants must be aged 18 or over, have the ability to understand the Portuguese language (dimensions: reading and writing), reside in Portugal, be in the third trimester of pregnancy, that is, between 28 and 32 gestational weeks, and completed the FOBS.

Measures

Socio-Demographic, obstetric and psychological factors

A sociodemographic questionnaire serves as an encompassing instrument designed to collect information regarding participants' backgrounds and experiences. These variables include age verification, where participants confirm eligibility, a requisite procedure for accurate cohort inclusion. Additionally, pregnancy confirmation is attained through affirmative or negative responses.

Demographic characteristics are elicited, including participants' age and their ethnic or racial affiliation, contributing to the classification of groups. The participants' country of residence offers insights into migration patterns, and for those residing outside their birth country, the length of residence is elucidated in months. Contextualizing spatial environments, residential context characterizes living arrangements as city center, suburban, or rural. Educational trajectories are represented through education level, which encompasses tiers ranging from non-formal to higher education. Socioeconomic strata perception is

contextualized within country norms, offering socio-economic insights. Marital status is rigorously examined to shed light on participants' relationship statuses, encapsulating categories ranging from matrimonially affianced to widowed.

The nature of the current pregnancy is gleaned from response options like "Single baby," "Twins," "More than two babies," and "Prefer not to answer." To provide temporal context to the study observations, participants share their estimated due date. The incidence of pregnancy complications is revealed through responses encompassing minor complications, severe complications, no complications, and no answer while fetal complications are captured with the same responses such as pregnancy complications offering insight into the health challenges faced by fetals. Variables such as biological children examine the presence of biological children. The presence of non-biological children contributes to the understanding of family composition.

Participants' recounting of previous traumatic experiences spans a spectrum of responses, from illness to natural disasters. Psychological and mental health history is probed unraveling insights into diagnosis, current states, and professional assistance uptake. The current psychological treatment type is also included.

Collectively, these variables intertwine to weave a multi-dimensional narrative that encapsulates participants' pregnancy journeys, psychological well-being, past traumas, and socio-demographic profiles.

Fear of Birth Scale

The Fear of Birth Scale (FOBS, Original version: Hildingsson et al., 2017; Portuguese translation for research: Costa et al., 2022) was used to assess FOC. This is an analogous visual scale consisting of two items about feelings regarding the birth that is about to occur ("How do you feel right now about the approaching birth?"), quoting this in different semantic differentials, between "no fear" and "strong fear", and "calm" and "worried". The answer was revealed in two 10 cm lines, considering the two extremes of each semantic differential (Haines et al., 2011). The total FOBS score is calculated through the average of the two items, and ranges from 0 to 100, with higher scores indicating.

FOBS (Haines et al., 2015) has a high clinical utility and high accuracy (Richens et al., 2018). It is accepted and widely used in the research context (Ternstrom, 2015).

Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) is a widely recognized screening tool to assess the presence and severity of depression symptoms in the perinatal period with effectiveness in various clinical and research settings (Tendais et al., 2014). It consists of ten self-report items, on a likert scale from 0 to 3, indicating the presence and severity of the symptom.

Regarding construct validity, several studies have confirmed the EPDS's unidimensional structure, supporting its ability to primarily assess postnatal depression symptoms (Cooper, 2020; Santos et al., 2019). Confirmatory factor analyses have also demonstrated that the unifactorial model aligns well with the scale's underlying theoretical structure (Alves et al., 2018).

Regarding internal consistency, a key indicator of reliability, studies have reported satisfactory Cronbach's alpha coefficients for the Portuguese version of the EPDS, generally above .70 (Silva & Pereira, 2017; Carvalho et al., 2021). This suggests that the EPDS exhibits high internal consistency, with its items interrelated coherently, reflecting the nature of the construct being assessed (Eberhard-Gran et al., 2007; Gibson et al., 2009).

In terms of sensitivity and specificity, the EPDS has proven to be an efficient tool for identifying women with suspected postnatal depression. Studies have commonly adopted a cutoff point of a total score ≥ 10 to indicate the presence of significant postnatal depression symptoms, demonstrating good sensitivity and minimizing false positives (Santos et al., 2019; Pereira et al., 2020).

Another important indicator of reliability is the test-retest stability of the EPDS. Studies conducted by Silva and Pereira (2017) and Alves et al. (2018) have reported satisfactory intraclass correlation coefficients (ICC), reinforcing the scale's consistency over time.

Statistical analyses

Descriptive statistics were used to describe the study variables. Quantitative variables were described using mean and standard deviation.

To identify the associated factors for FOC, a multiple hierarchical analysis was performed, with the dependent variable FOBS and the independent variables indicated. The model was conducted into three hierarchical steps, each with a different set of independent variables. The first step included the sociodemographic factors: marital status, age, socioeconomic strata, nativity, ethnicity, and education level (sociodemographic factors). The

second step included the sociodemographic factors plus the obstetric factors: mother complications in pregnancy, fetal complications in pregnancy and parity. The third step included the sociodemographic and obstetric factors plus psychological factors: previous trauma experience, history of mental problems and current symptoms of depression (EPDS scores).

Missing data were handled using listwise deletion. The following statistics were reported for the regression model: coefficients, outliers, 95% confidence intervals for the coefficients, R-squared and change in R-squared. The significance level for the regression model was set at .05 for the entry criteria and .10 for the removal criteria. The Statistical Package for Social Sciences (SPSS; Inc, USA), version 28.0 software programme was used for all statistical analyses.

Results

Preliminary analyses

The assumptions were checked before performing a hierarchical multiple regression analysis. First and foremost, it is crucial to ascertain the presence of a linear association between the independent variables and the dependent variable. Through the inspection of scatterplots and visual analysis, it has been confirmed that the association between the variables are approximately linear, thus meeting this assumption. Additionally, an assessment of the independence of residuals, a critical assumption in regression analysis, has been conducted. Autocorrelation was examined through the Durbin-Watson test, revealing a value of 2.12, indicating the absence of serial dependence in the residuals. The normality of residuals was verified utilizing the Normal Probability Plot, which confirmed that the regression residuals followed a normal distribution. Furthermore, homoscedasticity was examined through Residuals vs. Independent Variables plots, revealing no discernible patterns, and indicating the constancy of residual variance. To address multicollinearity among the independent variables, Variance Inflation Factors (VIFs) were calculated, and they were both below the critical threshold of 5, demonstrating the absence of substantial multicollinearity (Field, 2017). The independence of errors was verified and confirmed through residual analysis, which did not reveal any patterns of autocorrelation. The presence of outliers and atypical values was meticulously examined through the table Standardized residuals, with no values identified as outliers. Finally, linearity in the independent variables was confirmed after analyzing

scatterplots, indicating that changes in the independent variables result in proportional changes in the dependent variable, FOBS.

The range of FOBS scores spans from a minimum of 28.47 to a maximum of 100.00. The computed mean, a measure of central tendency, emerges at $M=39.94$ ($SD= 28.47$).

Analyses

The model including sociodemographic factors (Model 1) explained 4.7% ($R^2 = .047$) of the observed variance of FOC during pregnancy. Progressing to the model including sociodemographic factors and obstetric factors (Model 2) explained 12.1 % ($R^2 = .121$) of the variance within the dependent variable ensuing from the meticulous assimilation of these novel predictor variables. The F Change statistic for Model 2, a cornerstone in establishing the incremental value of introduced predictors, manifests as 1.892 ($F(4,123) = 2.601, p=.039$), with a significant increase of 7.4% to the explained variance, due to the adding of obstetric factors.

Transitioning to the model including sociodemographic factors, obstetric and psychological factors (Model 3) explained 56.8 % ($R^2=.568$). The analysis of variance consummates in a substantial F Change statistic, quantified at ($F(3,120) = 41.291, p<.001$). There was a substantial increase in the explained variance of 44.6%, indicative of a statistically significant improvement in the model's predictive power due to the adding of psychological factors.

The results indicated that the regression model is statistically significant and accounts for 56.8% of the variance, denoted as $R^2 = .568$, $F(3,120) = 41.29, p < .001$ (see Table 2).

The EPDS, with a $\beta = .708$, a $t = 10.353$, and a significance level of $p < .001$., as well as Fetal Complications in pregnancy, with a $\beta = .135$, a $t = 2.107$, and a significance level of $p = .037$, emerged as significant predictors of FOBS. Notably, both predictors exhibit positive associations, signifying those higher levels of EPDS (depressive symptoms) and Fetal Complications in pregnancy serve as predictors of elevated levels of FOBS

Table 2.

Sociodemographic, Obstetric, and Psychological factors associated with FOC of study sample (n = 168).

Model	Standardize d Coefficients β	t	Sig.	95,0% Confidence Interval for B		Statistics	
				Lower Bound	Upper Bound	R ²	Adjusted R ²
1 ^a			.403			.047	.002
Age	-.073	-.819	.414	-1.446	.599		
Nativity	-.195	-2.087	.039	-29.730	-.793		
Ethnicity	-.090	-.960	.339	-41.243	14.307		
Socioeconomic Strata	-.042	-.472	.638	-11.328	6.963		
Education	.101	1.120	.265	-4.982	17.984		
Marital Status	-.002	-.019	.985	-41.044	40.261		
2 ^b			.039			.121	.050
Age	-.091	-.992	.323	-1.582	.526		
Nativity	-.204	-2.187	.031	-30.433	-1.513		
Ethnicity	-.095	-1.039	.301	-41.537	12.936		
Socioeconomic Strata	-.051	-.582	.562	-11.583	6.320		
Education	.120	1.313	.192	-3.897	19.252		
Marital Status	.033	.377	.706	-32.671	48.068		
Parity	-.036	-.385	.701	-12.653	8.536		
Mother Complications	.103	1.156	.250	-4.198	15.982		
Fetal Complications	.248	2.830	.005	5.932	33.551		
3 ^c			.000			.568	.521
Age	-.037	-.549	.584	-.986	.558		
Nativity	-.119	-1.779	.078	-19.694	1.052		
Ethnicity	-.090	-1.365	.175	-33.008	6.063		
Socioeconomic Strata	.009	.151	.880	-5.924	6.901		
Education	.074	1.145	.254	-3.474	13.005		
Marital Status	.003	.056	.956	-28.096	29.727		
Parity	-.124	-1.876	.063	-14.769	.399		

Mother	-.044	-.665	.507	-9.941	4.940
Complications					
Fetal Complications	.135	2.107	.037	.648	20.869
Previous Trauma	.010	.155	.877	-7.542	8.822
Experience					
History of Mental	-.008	-.126	.900	-4.899	4.314
Problems					
EPDS	.708	10.353	.000	3.849	5.669

Note. Abbreviations: EPDS, Edinburgh Postnatal Depression Scale.

^a Model 1 includes only sociodemographic factors.

^b Model 2 includes sociodemographic and obstetric factors.

^c Model 3 includes sociodemographic, obstetric and psychological factors.

Discussion

This study has provided empirical evidence pertaining to the sociodemographic, obstetric, and psychological factors associated with antenatal FOC. It offers insights into the intricate interplay of these variables, contributing to our understanding of this complex phenomenon within the context of pregnancy.

In relation to Hypothesis 1a (Sociodemographic Variables), it postulated that sociodemographic factors such as age, education, marital status, nativity, socioeconomic strata, and ethnicity would exhibit a significant association with levels of FOC among pregnant women in Portugal. However, the results of the regression analysis did not substantiate this hypothesis. The regression coefficients for all sociodemographic variables did not attain statistical significance, revealing an absence of a direct association between these factors and FOBS. Thus, in accordance with the findings, sociodemographic characteristics did not emerge as statistically significant predictors of FOBS, indicating a disconnection between these factors and childbirth-related fear.

Research in the field of maternal health and psychology has challenged the wisdom that sociodemographic factors are linked to higher levels of FOC (Challacombe et al., 2021). These factors can be challenging to modify through healthcare interventions, yet their significance in influencing individuals' well-being necessitates consideration when planning targeted maternity care (Dencker et al., 2021).

While some earlier studies, such as those by Rouhe et al. (2009) and Räisänen et al. (2014), found a significant association between older maternal age and increased FOC, more contemporary investigations have shed light on the nuanced nature of this association. For instance, the impact of age on FOC varies across studies; some did not discern any association (Hall et al., 2009; Ternström et al., 2015), while others indicated an elevated risk for younger women (Eriksson et al., 2005; Laursen et al., 2008) and older women (Rouhe et al., 2009). In contrast to the conclusions drawn by Räisänen et al. (2014) and Striebich et al. (2018), the study's findings did not align with the proposed reciprocal association between socioeconomic status and FOC. A plausible explanation for the absence of a consistent age and socioeconomic strata related predictors of FOC lies in the intricate and multifaceted nature of FOC itself (Iliska et al., 2021). FOC represents a complex construct intricately intertwined with numerous

psychosocial, cultural, and individual determinants (Slade et al., 2019). These multifarious factors may overshadow the influence of age and socioeconomic strata, rendering it arduous to isolate as a primary predictive factor.

From one perspective, a stable marital status (Lukasse et al., 2014; Souto et al., 2022) and a partnership appear to function as protective factors against the development of FOC (Poikkeus et al., 2006). These factors are seemingly associated with the observed trend in which a deficiency of social support increases the susceptibility to FOC (Elvander et al., 2013; Hall et al., 2009). Conversely, it is worth noting that two studies did not yield supportive evidence for any discernible association between marital status and FOC (Hall et al., 2012; Ternström et al., 2015).

Educational attainment represents another critical sociodemographic facet frequently linked to pregnancy and maternal well-being (Striebich et al., 2018). In the present study, however, education did not emerge as a significant predictor of FOC, the same results as Laurssen et al. (2008) and Elvander et al. (2013) aligning with the notion supported by Ryding et al. (2015) that complicates the establishment of conclusive determinations regarding the impact of education on FOC. A plausible interpretation for the lack of consistency in this association is the influence of complex mediating and moderating variables. Education may be indirectly related to FOC through factors such as access to information and social support. (Kaboré et al., 2019)

Additionally, being an ethnic minority, as previously emphasized, represents a supplementary layer of vulnerability to FOC (Nguyen et al., 2022; Ternström et al., 2015). Nonetheless, the results of the present study do not corroborate these data; yet, they are supported by Hall et al. (2009) who further elucidate that they didn't have any association. These inconsistencies may plausibly originate from variations in cultural contexts, cultural perspectives, and disparities in healthcare delivery systems, particularly within heterogeneous healthcare environments (Dencker et al., 2021).

In Model 1, nativity may indeed emerge as a significant predictor of FOC. For instance, individuals born outside their host country may face unique challenges related to cultural differences and social support networks, which can contribute to increased FOC (Ternström et al., 2015). However, when considering a more comprehensive multivariate model (Model 3)

that incorporates obstetric and psychological variables, the significance of nativity may diminish. Obstetric factors, such as fetal complications in pregnancy (Ali et al., 2022; Hamzehgardeshi et al., 2021), and psychological variables like depressive symptoms, may play a more dominant role in shaping FOC (Räsänen et al., 2014; Saisto et al., 2001). This shift in significance underscores the complexity of factors contributing to FOC (Grogans et al., 2023). It suggests that nativity's influence may be mediated or confounded by a broader set of variables in the biopsychosocial framework. Therefore, understanding FOC comprehensively requires a multivariate approach that considers sociodemographic, obstetric, and psychological factors (Zhou et al., 2021).

Concerning Hypothesis 2a (Obstetric Variables), the premise was that obstetric variables, such as parity and pregnancy complications of mother and fetal, would have a significant association with levels of FOC. The results of the regression analysis partially confirmed this hypothesis. It was observed that complications during the pregnancy of the fetal emerged as a statistically significant predictor of FOBS. Therefore, based on the data, it is possible to assert that obstetric complications of the fetal may be associated with higher levels of FOC, partially corroborating Hypothesis 2a.

According to the study results, there is no significant association between parity and FOC, contrary to the notions put forth by Rouhe et al. (2009), Lyberg and Severinsson (2010) and Massae et al. (2021). Primiparous and multiparous women appear to exhibit essentially distinct sources of fear, yet they demonstrate similar levels of fear (Hofberg & Brockington, 2000; Klabbers et al., 2016). For multiparous women, a prior negative birth experience emerges as a primary factor contributing to FOC (Størksen et al., 2013), whereas nulliparous women express fear due to negative birth narratives conveyed by others, alarming information, or mood-related issues (Hofberg & Ward, 2003; Melender, 2002).

In accordance with the findings of the current study, a significant association between maternal medical complications during pregnancy and FOC was not discerned. These results do not align with prior research that has established a direct link between maternal medical complications and FOC (Craig et al., 2020; Ouyang et al., 2021; Veringa-Skiba et al., 2022). One plausible interpretation of these results is the significance of social support. Social support may play a pivotal role in mitigating FOC. Women who receive support from friends, family, and healthcare professionals may be less inclined to develop FOC (Kim et al., 2014).

Based on the results of the current study, there was an association identified between fetal complications and FOC, during pregnancy. These findings are in line with previous research that has also reported a connection between fetal medical complications and FOC (Ali et al., 2022; Hamzehgardeshi et al., 2021; Mirtabar et al., 2023). An interpretation for this observed association can be attributed to the heightened anxiety and apprehension that commonly manifest among pregnant women when confronted with complications in the health status of their unborn child (Priya et al., 2018). The perceived jeopardy to the fetal 's well-being can serve as a catalyst for the exacerbation of fears pertaining to the childbirth process, consequently culminating in elevated levels of FOC (Rúger-Navarrete et al., 2023). Consequently, it is judicious to deduce that the presence of fetal medical complications may indeed constitute a contributory factor to the genesis and exacerbation of FOC, a deduction that aligns with the substantiating evidence provided by the referenced studies (Westphal et al., 2016).

The results revealed an association between FOBS and psychological variables. Specifically, current symptoms of depression emerged as a significant predictor of FOBS.

These results align with prior research that has also established a robust connection between depressive symptoms and heightened FOC levels (Räsänen et al., 2014; Saisto et al., 2001). An interpretation for this association revolves around the intricate interplay of mental health and emotional well-being during pregnancy (Davis & Narayan, 2020). Depressive symptoms can contribute to heightened anxiety and emotional distress, both of which are recognized as integral components of FOC (Remes et al., 2021). The emotional turmoil experienced by expectant mothers with depressive symptoms may exacerbate their fears and apprehensions related to childbirth, ultimately resulting in elevated FOC levels (Hildingsson et al., 2021). Hence, it is reasonable to infer that the presence of depressive symptoms may serve as a significant contributing factor to the development and intensification of FOC (Li et al., 2009).

In line with the results obtained from the present study, a conspicuous dearth of a substantial linkage between a preexisting history of mental health disorders, previous trauma experiences and the FOC emergence of was analyzed. These outcomes are not in consonance with the extant scholarly body of literature, which has encountered complexities in substantiating a robust and consistent correlation between antecedent mental health conditions,

previous trauma experiences and elevated FOC levels (Heimstad et al., 2006; Lukasse et al., 2010; Rouhe et al., 2011; Schroll et al., 2011; Zar et al., 2002). One plausible explanation for the nonexistence of this association resides in the possibility of the presence of effective coping mechanisms, accessible mental health support, and adept management of pre-existing mental health conditions and previous trauma experience may serve to ameliorate the potential impact of such historical diagnoses on FOC (Kohrt et al., 2020).

Implications for practice and research

The findings add to prior evidence by elucidating the salience of depressive symptoms and fetal complications during pregnancy as possible factors for FOC (Räsänen et al., 2014; Rúger-Navarrete et al., 2023; Saisto et al., 2001). It is important healthcare professionals, particularly those engaged in midwifery care, to recognize the existence of these possible predictive elements to identify pregnant women with severe FOC. This cognizance may necessitate a reconsideration of the approach and content of interventions within the purview of midwifery care. By identifying pregnant women with severe FOC, healthcare professionals can assist pregnant women in formulating coping strategies to ameliorate their fears, thereby fostering a more positive and empowering childbirth experience to assume key roles in promoting quality reproductive health for both present and forthcoming generations.

The complexity of FOC etiology underscores the imperative for both midwives and mental healthcare professionals to engage in collaborative endeavors, as the challenges associated with screening and support are inherently collective issues. FOC remains under-recognized as a healthcare concern, often overlooked in the assessment of pregnant women (Souto et al., 2022). The findings from this study contribute to the extant literature in the field of perinatal mental health.

Strengths and Limitations

Data collection protocols are diligently followed, guaranteeing the precision and reliability of the gathered data. This commitment to data quality enhances the credibility of the study's findings, underscoring its trustworthiness (Tijani et al., 2021). The study's sampling strategy warrants recognition, as it draws upon a substantial dataset collected from major healthcare institutions across the country. These hospitals represent diverse patient populations, enhancing the generalizability of the study's findings (He et al., 2020).

The study's commitment to methodological rigor is further exemplified by the utilization of well-validated assessment instruments ((Eberhard-Gran et al., 2007; Gibson et al., 2009; Haines et al., 2015). Furthermore, the study's results exhibit a noteworthy consistency with prior research in the field. This alignment with existing studies underscores the reliability and validity of the study's findings, strengthening their overall credibility (Dai et al., 2020).

One notable limitation is related to the setting where data collection occurred. The study collected data in hospital outpatient settings. Hospitals have a clinical atmosphere that could impact how participants perceive and respond to questions. This might lead to response bias, where participants' answers are influenced by the clinical environment (Syyrilä et al., 2023).

Moreover, an interpretational challenge was encountered concerning the FOBS during the study. Expectant mothers reported difficulties in interpreting and comprehending certain aspects of this scale. This interpretational challenge could potentially introduce variability and measurement error into the data, impacting the accuracy of participants' responses (Gopal et al., 2021). Furthermore, it is incumbent to acknowledge that the use of self-report measures, which is a common methodology in studies of this nature, may inherently possess limitations. Self-reported scores may not consistently reflect individuals' genuine emotional states or cognitive processes (Dang et al., 2020).

Conclusion

The findings of this study hold paramount significance as they contribute to a deeper understanding of the underlying dynamics of FOC because the analysis includes a model incorporating sociodemographic, obstetric, and psychological factors. Particularly noteworthy is the positive association observed between predictors, signifying that higher levels of depressive symptoms and pregnancy-related fetal complications serve as predictive factors for elevated FOC levels. These discoveries offer valuable insights that may represent a significant methodological advancement for FOC prevention practices, catering to international as well as interdisciplinary audiences.

It is imperative to acknowledge that, while these results may provide novel perspectives, further investigation into the predictive factors of FOC is highly recommended for the future. This field is intricate and continually evolving, and continued exploration can provide a more comprehensive and in-depth understanding.

Furthermore, considering these novel findings, it becomes crucial to contemplate a reevaluation of perinatal care provided to women, with the aim of minimizing the FOC. This more informed approach has the potential to significantly contribute to the mental and emotional well-being of pregnant individuals, ultimately enhancing their birthing experiences and, consequently, positively impacting maternal and neonatal health.

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Attachments

Attachment I

Conceptual Model

