eCommons@AKU

Predictors of fear of childbirth and depressive symptoms among pregnant women: a cross-sectional survey in Pwani region, Tanzania

Agnes Fredrick Massae

Margareta Larsson

Sebalda Leshabari

Columba Mbekenga

Andrea Barnabas Pembe

See next page for additional authors

Authors

Agnes Fredrick Massae, Margareta Larsson, Sebalda Leshabari, Columba Mbekenga, Andrea Barnabas Pembe, and Agneta Skoog Svanberg

RESEARCH

Predictors of fear of childbirth and depressive symptoms among pregnant women: a cross-sectional survey in Pwani region, Tanzania

Agnes Fredrick Massae[1,2]*, Margareta Larsson[1], Sebalda Leshabari[2†^], Columba Mbekenga[3], Andrea Barnabas Pembe[4] and Agneta Skoog Svanberg[1]

Abstract

Background: Many women experience fear of childbirth (FoB) and depressive symptoms (DS) during pregnancy, but little is known about FoB among Tanzanian women. The current study aimed to assess the prevalence of FoB and DS among pregnant women and determine predictors of each and both, focusing on sociodemographic and obstetric predictors.

Methods: A cross-sectional study was conducted at six health facilities in two districts in Tanzania between 2018 and 2019. In total, 694 pregnant women with gestational age between 32 and 40 weeks and expecting vaginal delivery were consecutively recruited and assessed for FoB and DS. We collected data through interviews using 6 and 4-points Likert Scale of the Wijma Delivery Expectancy Questionnaire Version A and Edinburgh Postnatal Depression Scale, respectively. Women who scored ≥ 66 and ≥ 10 were categorised as having FoB and DS, respectively. We performed multivariable logistic regression to investigate the predictors of FoB and DS.

Results: The prevalence rates of FoB and DS among pregnant women were 15.1 and 17.7%, respectively. FoB and DS were more likely in women aged above 30 years [Adjusted Odds Ratio (AOR) 6.29, 95%CI 1.43–27.84] and in single mothers (AOR 2.57, 95%CI 1.14–5.78). Women with secondary education and above (AOR 0.22, 95%CI 0.05–0.99) and those who had given birth previously (AOR 0.27, 95% CI 0.09–0.87) were less likely to have FoB in combination with DS Women who had previous obstetric complications, and those who did not receive any social support from male partners in previous childbirth were more likely to have FoB and DS. FoB was strongly associated with DS (AOR 3.42, 95%CI 2.12–5.53). DS only was more common in women who had inadequate income (AOR 2.35, 95%CI 1.38–3.99) or had previously experienced a perineal tear (AOR 2.32, 95%CI 1.31–4.08).

Conclusions: Not having a formal education, having only primary education, being aged above 30 years, being single, being nulliparous, having experienced obstetric complications, and having a lack of social support from a male partner during previous pregnancy and childbirth were predictors of FoB and DS during pregnancy. FoB and DS were

*Correspondence: agnes.massae@kbh.uu.se
^Sebalda Leshabari is deceased.
[2] Department of Community Health Nursing, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania
Full list of author information is available at the end of the article

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 2 of 13

strongly associated with each other. It is vital to identify at-risk women early, to offer support during pregnancy and childbirth.

Keywords: Fear of childbirth, Depressive symptoms, Pregnancy, Childbirth, Prevalence, Predictors, Tanzania

Introduction

Pregnant women have predetermined childbirth expectations that could influence childbirth experience as they are approaching birth [1]. Childbirth experiences are multidimensional and unique to every woman, and can either be positive, negative, or a mixture of both. The experience can be influenced by individual factors such as: a woman's own emotions and the freedom to express these emotions in relation to childbirth [2]; perceptions of, and personal involvement during birth process, preferences of the mode of delivery whether vaginal or caeserean section (C/S) [2–4]; and one's own mental and physical health [5]. Other external related factors may involve and interaction with health care providers, support from a partner and/or relatives and lack of privacy during childbirth [2]. All of these features have a significant effect on the childbirth experience as some women can develop fear of having more children in the future [6–8].

Pregnancy as a transition period is accompanied by physical and emotional changes that can substantially affect the expectant mothers' well-being [9]. Pregnancy related health problems can be due to previous existing heath conditions, whilst other problems arise during and shortly after pregnancy [10]. Common conditions such as anaemia, urinary tract infection, hypertensive disorders of pregnancy, gestational diabetes, anterpartum hemorrhage and hyperemesis gravidarum have been widely studied during and post pregnancy [11, 12]. Furthermore, a review from WHO on prevalence and determinants of common perinatal mental disorders stated that women from low- and lower-middle-income countries are at an increased risk of reporting psychological disorders during pregnancy and after childbirth [13]. The common perinatal mental disorders such as mood disorders, particulary perinatal depression and anxiety disoders, have been studied, but gaps in the literature exist in low-middle income countries, including Tanzania [14, 15]. Fear of childbirth (FoB) for the upcoming birth described under specific phobia in anxiety related disorders has been far less studied in pregnant women as compared to general anxiety and depression [16–18]. There is an association between FoB, depressive symptoms (DS) and other anxiety related problems, [19] and in some women they comorbid [20].

The prevalence of antenatal FoB varies between countries. Worldwide, FoB ranges between 5 and 30% [21–23]

and DS affect 5–34% of women during pregnancy [24–26]. The rates in the Sub-Saharan African countries are reported to be 24.5% in Ethiopia [27], 22% Malawi [28] and 22.1% from Kenya [29]. However, the prevalence of DS is slightly lower among researched countries in Africa including rates from Malawi 19% [30], Ethiopia 19.9% [31], and Nigeria 24.5% [32]. In Tanzania, some studies have assessed DS during pregnancy, revealing high prevalence rates ranging from 11.5% in the Kilimanjaro region, northern Tanzania [33], to 33.8% in the Mwanza region [34]. Nevertheless, FoB and DS are not stable constructs, they vary depending on the pregnancy trimesters. In some women they may increase in late pregnancy/third trimester [35–37] or may be the same in early and late pregnancy [38, 39].

FoB and DS are due to various factors, which vary across countries. Quantitative studies across the world have shown that factors associated with FoB include sociodemographic factors such as young maternal age, lack of social support from male partners, relatives and friends, unemployment, financial constraints, and a history of abuse [40, 41]. Obstetric factors like nulliparity and adverse obstetric events, for example previous operative birth, may provoke childbirth fear [42–44]. Additionally, not being mentally and/or physically prepared for giving birth, an expectation of unendurable pain, a feeling of loss of control during labour and birth, and fear of death have been deemed to predict FoB [42, 43]. Inappropriate support from the birth team contributes to low childbirth confidence among women [43, 45].

In previous studies, DS were associated with unwanted pregnancy [46], young age/teenage pregnancy [37], low levels of education, unemployment, and low prestigious employment [46–48]. Inadequate social support (emotional, physical, and financial) and poor relationships with spouse/partner such as existing conflicts regarding sexual practices [34, 37, 46, 48], insufficient care, infidelity and polygamy, [34, 49] are other factors contributing towards development of DS among women.

FoB can be associated with pre-existing psychological problems like DS. An association between FoB and depression has been reported in a register study of 788,317 pregnant women in Finland, where depression was found to be the most potent risk factor for FoB among pregnant women, regardless of parity [50]. These results were similar to the findings from other studies performed around the world [51, 52].

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 3 of 13

Fear of childbirth may have consequences in the lives of women and their babies. It affects emotional and psychological well being of women [20, 40]. During childbirth, it can lead to increased use of pharmacologic pain relief [20], prolonged labour [53], aggravated maternal and foetal distress [20], and increased obstetric interventions, like labour argumentation [54] and C/S on maternal request [6, 55]. Maternal DS can interfere with women's daily activities, mother-newborn bonding, early interruption of exclusive breastfeeding and/or discontinuation of breastfeeding and, for the infant, disruption of sleeping patterns and delays in cognitive development [56–58].

Tanzania is a multi-ethnic and multi-lingual country and has recently been upgraded into a middle-income country. There has been a significant socioeconomical transformation within its boarders following this economic scale up. This transformation may pose challenges to women of child bearing age, considering that financial difficulties are among the factors associated with FoB and other psychological problems. Moreover, the nature and scope of mental health issues among Tanzanian women may differ from women with western cultural backgrounds, norms perceptions and social structures and this would also affect classifications, diagnosis, and management of such illnesses. It is therefore essential to increase understanding of FoB and DS during pregnancy to enhance the chances of providing the right support to the mothers. To the best of our knowledge, studies in Tanzania on perinatal mental health are limited and no published studies have assessed FoB and its predictors among Tanzanian women, despite the advocacy on integrated mental health in maternal and child health services in the health system and proven long-lasting consequences of maternal FoB and/or DS. Studies on the prevalence of FoB and DS, their predictors, effects, and management, have been performed mainly in European countries, with a few from Asia [59] and Africa [27–29]. Hence, this study's primary objective was to determine the prevalence of FoB and DS among pregnant women at ≥32 weeks of gestation. The secondary objective was to investigate the predictors of FoB and DS, focusing on sociodemographic factors and previous obstetric experiences.

Methods

Study design

This study was accomodated in a longitudinal study. Pregnant women were recruited and interviewed during the antenatal period and followed up through childbirth and interviewed again during the postnatal period. The present study investigated prevalence and predictors of FoB and DS among pregnant women in Pwani region, Tanzania.

Study setting

We carried out the study in the Mkuranga and Kisarawe districts in the Pwani region, Tanzania. The country has seven geographical zones that are subdivided into 31 administrative regions. Pwani is one of the regions located in the Eastern zone with seven districts namely Mkuranga, Kisarawe, Bagamoyo, Kibaha, Mafia, Rufiji and Kibiti [60]. The Mkuranga district has 57 health facilities in total: 1 hospital, six health centres (2 governmental and four privately owned), 50 dispensaries (37 governmental and 13 privately owned). The Kisarawe district has a total of 40 health facilities, including 1 district hospital, 3 health centres, and 36 dispensaries (32 are governmental and four privately owned) [61]. In each district, one district hospital and two health centres, all of which were government-owned, were selected for the study. The selected health facilities had a volume of at least ten antenatal visits per day, and the district hospitals had facilities for childbirth by both vaginal delivery and C/S. In Tanzania, antenatal care is accessible in every public health care facility at no charge. A pregnant woman is recommended to make at least eight antenatal visits at these facilities prior to delivery; at these facilities where nurse-midwives are the primary care providers. In case of any complications identified when providing services, the nurse-midwife refers the woman to a specialist or higher-level health facility for further management.

Study participants and procedure

We recruited and interviewed a consecutive sample of pregnant women seeking antenatal services at selected health facilities from September 2018 to March 2019. The eligibility criteria were: being pregnant at least the 32nd week of gestation; speaking Kiswahili; being resident in the selected district; having had no previous C/S; anticipating vaginal birth; attending the relevant health facility for antenatal care. The sample size was computed by using two proportion formula in Epi Info 7 StatCal with a power of 80% and a significant level of 0.05 with two tails. A minimum sample of 616 women was expected to be enrolled in this study. Of the 1130 pregnant women approached, 702 were invited to the study, eight refused participation, and 694 provided survey data. Women who refused to participate did so due to lack of time, having other commitments after receiving antenatal care or that their male partners were waiting for them; some women felt unwilling to take part in the survey.

We trained six registered nurse-midwives who were not employed during data collection as research assistants (RAs) in the data collection tools, use of a visual scale, study participant recruitment, and data collection procedures, including ethical principles in data collection.

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 4 of 13

During the actual data collection, RAs recruited study participants, obtained informed consent, and performed data collection through face-to-face interviews in the selected antenatal clinics. We spent between 30 and 45 min per interview. Interviews were selected as the data collection method, to maintain data collection consistency, overcome the illiteracy challenge, and enhance comprehension of the questions and data collection scales. To decrease interview bias, participants could use a visual analogue scale to rate levels of fear for the Wijma Delivery and Expectation Questionnaire version A (W-DEQ-A). This reduced the risk of having different verbal explanations for response items from different research assistants. To enhance validity, all interviews were conducted in Kiswahili, and the quality of collected data was ensured by direct supervision of the first author and general guidance from all team members during the data collection.

Instruments and measures

The participants were interviewed regarding sociodemographic (age, education level, occupation, income and marital status) and obstetric characteristics (gravidity, parity, pregnancy status, and complications on previous pregnancy). Further, we interviewed participants on expectations of childbirth, using the W-DEQ-A [62] and DS using the Edinburgh Postnatal Depression Scale (EPDS) [63]. Questions on obstetrics and social support were asked in relation to the history of the most recent previous pregnancy and childbirth.

The W-DEQ-A is a 6-point Likert scale questionnaire with 33 items ranging from 0 (not at all) to 5 (extremely), yielding a minimum score of 0 and a maximum score of 165. The higher the score, the more intense the FoB. The items refer to cognitive and emotional expectations of the upcoming childbirth (e.g. responding to the question, "*What do you think you will feel during labour and delivery*" with embedded words indicating opposite extremes of the expectations (e.g. "*Extreme panic*" vs. "*No panic at all*" or "*Extreme hopelessness*" vs. "*No hopelessness at all*", "*Extreme self-confidence*" vs. "*No self-confidence at all*", "*Extreme trust vs. No trust at all*", "*Extreme pain vs. No pain at all*"). The cut-off points from the original tool areas follows: a score of ≤37 is considered a low level of fear, a score of 38–65 reflects a moderate level of fear, a score of 66–84 signifies a high level of fear, and a score of ≥85 indicates a severe level of fear [62, 64]. We defined high FoB as scoring ≥66 and low FoB as scoring < 66 [64, 65]. In this study no FoB will be referring to a low FoB and presence of FoB as a high FoB. The original W-DEQ-A has been reported to be a reliable questionnaire with a Cronbach's alpha of 0.93. The original English questionnaire version was translated into Kiswahili and reviewed by a team of native Kiswahili speakers and professionals in midwifery, obstetrics, behavioral science, psychology, and psychiatry. Further, a pilot study and validation process were carried out and found that the translated W-DEQ-A was a reliable tool, with a Cronbach's alpha of 0.83 (Massae, Larsson, Leshabari, Mbekenga, Pembe and Svanberg. Fear of childbirth: Validation of the Kiswahili version of Wijma delivery expectancy/experience questionnaire version A&B in Tanzania. Forthcoming).

The EPDS is a tool used to identify common perinatal mental disorders and has been used to screen women at risk of developing depression during pregnancy or/ and after childbirth [63]. The EPDS is a four-point Likert scale with 10 items ranging from 0 to 3. Participants rate each item based on how they have felt in the preceding seven days with items like: *I have been able to laugh and see the funny side of things* with responses "As much as I always could," "Not quite so much now", "Definitely not so much now", "Not at all". Other items were *I have looked forward with enjoyment to things, I have blamed myself unnecessarily when things went wrong, I have been anxious or worried for no good reason, I have felt scared or panicky for no very good reason, Things have been getting on top of me, I have been so unhappy that I have had difficulty sleeping, I have felt sad or miserable, I have been so unhappy that I have been crying, The thought of harming myself has occurred to me.* The lowest score that can be obtained on this scale is 0, while the highest is 30. The higher the score, the higher the risk of having DS. Scores ≥10 suggest the presence of DS, while scores ≥13 represent depressive illness of varying severity [63]. In this study, we defined DS as scoring ≥10 and no DS as scoring < 10 [17, 30, 66]. The internal consistency reliability of the original EPDS was excellent, with a Cronbach's alpha of 0.88. Our study had a Cronbach's alpha of 0.85. The EPDS has been translated into Kiswahili in Kenya and showed an acceptable Cronbach's alpha of 0.78 [25]. We adapted the EPDS from Kenya, translated by Green and colleagues [25], for data collection in Tanzania.

Data analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarise demographics, obstetric characteristics, and the prevalence rates of FoB and DS. A chi-squared test was performed to determine the associations between sociodemographic and obstetric variables and the prevalence rates of FoB and DS. Logistic regression was used to estimate the effects of sociodemographic and obstetric variables on the prevalence rates of FoB and DS after adjusting for potential confounders. Univariable analysis was conducted to assess the association between each sociodemographic and obstetric

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 5 of 13

variable and the presence of FoB and/or DS. All the variables with $p < 0.2$ in the univariable analysis were subjected to several multivariable logistic regression models using an ENTER approach where variables were entered into the models, one after another. Age, education, and parity were included in every model, since they had been shown to be confounders of FoB and DS predictors in previous studies. A *p*-value of < 0.05 was considered significant. Effect sizes were presented using odds ratios (ORs) with 95% confidence intervals (CIs). Multicolliniarity of independent variables was assessed using Variance Inflation Factor (VIF). Variables with VIF ≤ 5 were maintained for further analysis. The outcomes of interest were grouped as (1) FoB vs.no FoB and DS vs. no DS, (2) Neither FoB nor DS vs. FoB but no DS, DS but no FoB, and FoB in combination with DS.

Results

Description of the population

In total, 694 eligible pregnant women agreed to participate in this study. The response rate was 98.9%. Their age varied between 14 and 46 years, with a median age of 26 years and IQR of 11 and the majority (73.2%) were married and had primary education (61.8%). The majority were financially (59.1%) and socially (36.9%) supported by their male partners and had planned the pregnancy.

Prevalence of FoB and DS

The total scores for FoB ranged from 1 to 102, while those for DS were 0–27. The median scores with interquartile range (IQR) for FoB and DS were 48 (24.0) and 3 (7), respectively. The overall prevalence of FoB was 15.1% and that of DS was 17.7%. The results indicated that about 37 (5.3%) of the pregnant women had both FoB and DS, 68 (9.8%) had FoB but no DS, 86 (12.4%) had DS but no FoB, and 503 (72.5%) had neither FoB nor DS.

Scores for the item in the W-DEQ-A

Scores for each item in the W-DEQ-A are shown in Table 1 in descending order of prevalence. The most common fear reported by pregnant women was labour pain. The items for which most women scored low were longing for a child and childbirth being fun.

Association between demographic and obstetric variables and FoB and/or DS

Education level, marital status, sex of the baby, male partner social support, and experience of obstetric complications were significant variables associated with FoB ($p < 0.05$). DS and FoB were strongly associated

Table 1 Fear of childbirth scores by item

Item number	Items	Mean (Standard deviation)	Total scores per item
24	Painful	4.2 (0.9)	2918
25	Behave badly	3.1 (1.6)	2147
2	Frightful	2.8 (1.6)	1955
3	Lonely	2.8 (1.6)	1913
6	Afraid	2.7 (1.6)	1883
19	Panic	2.7 (1.5)	1884
26	Surrender control of the body	2.4 (1.7)	1651
12	Tense	2.5 (1.5)	1768
8	Weak	2.3 (1.5)	1616
31	Dangerous	2.1 (1.6)	1446
27	Lose control	1.8 (1.4)	1269
7	Deserted	1.7 (1.4)	1213
15	Abandoned	1.7 (1.5)	1198
11	Desolate	1.6 (1.4)	1114
1	Fantastic	1.5 (1.5)	1019
13	Glad	1.5 (1.4)	1077
20	Hopelessness	1.5 (1.6)	1066
18	Happy	0.9 (1.2)	603
17	Relaxed	0.8 (1.1)	549
32	Fantasy thatchild will die	0.8 (1.1)	551
4	Strong	0.7 (0.9)	478
9	Safe	0.7 (1.0)	480
10	Independent	0.7 (1.1)	507
14	Proud	0.7 (1.1)	458
16	Composed	0.7 (1.0)	506
33	Fantasy that child will be injured	0.7 (0.9)	453
5	Confident	0.6 (0.9)	399
29	Natural	0.5 (0.9)	365
30	Self-evident	0.5 (1.0)	344
22	Self confidence	0.4 (0.8)	289
23	Trust	0.4 (0.8)	274
21	Longing for a child	0.1 (0.5)	55
28	Funny	0.1 (0.5)	73
Total fear of childbirth score		**48.2 (16.3)**	**33,521**

($p < 0.001$). DS was associated with education level, marital status, income adequacy, previous perineal tear, and previous obstetric complication (Table 2).

Regression analysis of the predictors of FoB and DS

Tables 3 and 4 show different logistic regression models for both univariable and multivariable analyses of FoB and DS as outcomes. Experience of obstetric complications in a previous pregnancy and birth was the strongest predictor of FoB. Another strong predictor of FoB

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 6 of 13

Table 2 Associations of sociodemographic and obstetric variables with fear of childbirth and depressive symptoms

Variables	Total	Fear of childbirth (W-DEQ-A)			Depressive symptoms (EPDS)		
		No fear (≤65)	Fear (≥ 66)	*P*-value	No Depessive symptoms (< 10)	Depressive symptoms (≥ 10)	*P*value
	n (%)	n (%)	n (%)		n (%)	n (%)	
Index pregnancy variables (*n* = 694)							
Age group				0.371			0.235
≤ 20 years	139 (100)	113 (81.3)	26 (18.7)		118 (84.9)	21 (15.1)	
21–30 years	358 (100)	305 (85.2)	53 (14.8)		286 (79.9)	72 (20.1)	
≥ 31 years	197 (100)	171 (86.8)	26 (13.2)		167 (84.8)	30 (15.2)	
Education level				0.121			0.056
No formal education	137 (100)	116 (84.7)	21 (15.3)		116 (84.7)	21 (15.3)	
Primary education	429 (100)	357 (83.2)	72 (16.8)		359 (83.7)	70 (16.3)	
Secondary and higher	128 (100)	116 (90.6)	12 (9.4)		96 (75.0)	32 (25.0)	
Occupation				0.446			0.687
Employed	490 (100)	419 (85.5)	71 (14.5)		405 (82.7)	85 (17.3)	
Not employed	204 (100)	170 (83.3)	34 (16.7)		166 (81.4)	38 (18.6)	
Marital status				**0.048**			**0.003**
Married	581(100)	500 (86.1)	81 (13.9)		489 (84.2)	92 (15.8)	
Single	113 (100)	89 (78.8)	24 (21.2)		82 (72.6)	31 (27.4)	
Income				0.286			**0.001**
Adequate	304 (100)	263 (86.5)	41 (13.5)		267 (87.8)	37 (12.2)	
Inadequate	390 (100)	326 (83.6)	64 (16.4)		304 (77.9)	86 (22.1)	
Gravidity				0.244			0.551
Primigravida	161 (100)	132 (82.0)	29 (18.0)		135 (23.6)	26 (21.1)	
Multigravida	533 (100)	457 (85.7)	76 (14.3)		436 (76.4)	97 (78.9)	
Parity				0.244			0.196
Nulliparous	347 (100)	289 (83.3)	58 (16.7)		279 (80.4)	68 (19.6)	
Parous	347 (100)	300 (86.5)	47 (13.5)		292 (84.1)	55 (15.9)	
Pregnancy status				0.693			0.165
Planned	471 (100)	398 (84.5)	73 (15.5)		381 (80.9)	90 (19.1)	
Unplanned	223 (100)	191 (85.7)	32 (14.3)		190 (85.2)	33 (14.8)	
DS during pregnancy				**< 0.001**			
No	571 (100)	503 (88.1)	68 (11.9)		NA		
Yes	123 (100)	86 (69.9)	37 (30.1)		NA		
FoB during pregnancy							**< 0.001**
No	589 (100)	NA			503 (85.4)	86 (14.6)	
Yes	105 (100)	NA			68 (64.8)	37 (35.2)	
Previous birth and pregnancy variables (*n* = 504)							
Social support from a male partner in previous childbirth				**0.043**			0.311
Yes	376 (100)	328 (87.2)	48 (12.8)		309 (82.2)	67 (17.8)	
No	128 (100)	103 (80.5)	25 (19.5)		100 (78.1)	28 (21.9)	
Previous perineal tear				0.228			**0.006**
Yes	130 (100)	107 (82.3)	23 (17.7)		95 (73.1)	35 (26.9)	
No	374 (100)	324 (86.6)	50 (13.4)		314 (84.0)	60 (16.0)	
Ever experienced obstetric complications				**0.007**			**< 0.001**
Yes	141 (100)	111 (78.7)	30 (21.3)		104 (73.8)	37 (26.2)	
No	363 (100)	320 (88.2)	43 (11.8)		305 (84.0)	53(16.0)	

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 7 of 13

Table 3 Demographic and obstetrics predictors of fear of childbirth and depressive symptoms

Variables	Fear of childbirth		Depressive symptoms	
	n = 105/694 (15.1%)		*n* = 123/694 (17.7%)	
	Unadjusted	Adjusted	Unadjusted	Adjusted
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age				
≤ 20 years	1	1	1	1
21–30 years	0.76 (0.45–1.27)	1.02 (0.55–1.89)	1.32 (0.76–2.29)	1.38 (0.70–2.69)
≥ 31 years	0.66 (0.37–1.19)	0.88 (0.38–2.03)	0.93 (0.49–1.73)	1.05 (0.44–2.53)
Education level				
No formal education	1	1	1	1
Primary education	1.11 (0.66–1.89)	0.94 (0.54–1.64)	1.08 (0.63–1.83)	0.90 (0.51–1.61)
Secondary education and above	**0.58 (0.27–0.99)***	**0.42 (0.18–0.94)***	1.84 (0.99–3.40)	1.49 (0.72–3.09)
Parity				
Nulliparous	1	1	1	1
Parous	0.78 (0.51–1.19)	0.78 (0.42–1.45)	0.77 (0.52–1.14)	0.79 (0.43–1.44)
Marital status				
Married	1	1	1	1
Single	**2.01 (1.33–3.02)***	1.56 (0.92–2.65)	**2.01 (1.33–3.02)***	**1.72 (1.01–2.91)***
Planned pregnancy				
No	1		1	
Yes	1.09 (0.69–1.72)	NA	1.36 (0.88–2.10)	NA
Income				
Adequate			1	1
Inadequate	1.26 (0.82–1.93)	NA	**2.04 (1.34–3.10)***	**2.39 (1.49–3.83)****
Social support from a male partner in a previous childbirth				
No	1	1	1	1
Yes	0.75 (0.49–1.14)	**0.49 (0.29–0.79)***	0.71 (0.48–1.04)	**0.61 (0.37–0.98)***
Ever experienced obstetric complications				
No	1	1	1	1
Yes	**1.72 (1.72–2.61)***	**2.03 (1.24–3.23)***	**2.33 (1.43–3.81)***	**1.76 (1.07–2.89)***
Previous perineal tear				
No	1		1	1
Yes	1.26 (0.76–2.09)	NA	**2.03 (1.26–3.25)***	1.21(0.72–2.01)
DS				
No	1		**NA**	NA
Yes	**3.18 (2.01–5.05)****	**3.42 (2.12–5.53)****	**NA**	NA
FoB				
No	NA	NA	1	1
Yes	NA	NA	**3.18 (2.01–5.05)****	**3.23 (2.01–5.35)****

NA Not applicable to that particular category and not entered into the multivariable model as the univariable pvalue was ≥0.200

**p* < 0.005, ***p* < 0.001

was having a low educational level and lack of support from a male partner in a previous childbirth. The strongest predictors of DS were being single, inadequate income, lack of social support from a male partner in a previous childbirth, having ever experienced obstetric complications, and have experienced a perineal tear before the index pregnancy (Table 3).

As shown in Table 4, the predictors of DS only, as compared with no FoB or DS were: lacking formal education; being unmarried; having inadequate income; having experienced a perineal tear in a previous delivery. The odds of having both FoB and DS as compared

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 8 of 13

Table 4 Predictors of having DS or FoB only or both

Variables	Predictors of having fear of childbirth only		Predictors of having depressive symptoms only		Predictors of having both fear of childbirth and depressive symptoms	
	n = 68/571 (11%)		*n* = 86/589 (14.6%)		*n* = 37/540 (6.9%)	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Age						
≤ 20 years	1	1	1	1	1	1
21–30 years	0.78 (0.42–1.43)	0.69 (0.33–1.42)	1.66 (0.87–3.17)	0.89 (0.41–1.94)	0.89 (0.38–2.13)	2.56 (0.95–6.89)
≥ 31 years	0.55 (0.26–1.14)	0.39 (0.15–1.04)	1.96 (0.46–2.03)	0.59 (0.22–1.62)	0.91 (0.35–2.33)	**6.29 (1.43–27.84)***
Education level						
No formal education	1	1	1	1	1	1
Primary education	1.04 (0.55–1.98)	1.32 (0.51–3.45)	0.99 (0.52–1.89)	**0.36 (0.16–0.81)***	1.25 (0.53–2.96)	0.95 (0.37–2.43)
Secondary and higher	0.75 (0.31–1.83)	1.33 (0.61–2.94)	**2.43 (1.21–4.87)***	**0.34 (0.19–0.63)***	0.50 (0.13–2.00)	**0.22 (0.05–0.99)***
Parity						
Nullipara	1	1	1	1	1	1
Multipara	0.84 (0.57–1.58)	1.42 (0.69–2.88)	0.91(0.57–1.43)	1.33 (0.68–2.60)	0.51 (0.26–1.03)	**0.27 (0.09–0.87)***
Income						
Adequate	1	1	1	1	1	1
Inadequate	1.13 (0.68–1.88)	NA	**2.06 (1.26–3.36)***	**2.35 (1.38–3.99)***	**2.11 (1.02–4.35)***	2.09 (0.97–4.52)
Marital status						
Married	1	1	1	1	1	1
Single	1.33 (0.68–2.59)	NA	**2.04 (1.27–3.29)***	**1.98 (1.18–3.32)***	2.97 (1.43–6.18)	**2.57 (1.14–5.78)***
Ever experienced obstetric complications						
No	1	1	1	1	1	1
Yes	1.15 (0.69–1.91)	NA	1.32 (0.84–2.09)	NA	**4.20 (1.88–9.37)***	**3.19(1.42–7.19)***
Planned pregnancy						
No	1	1	1	1	1	1
Yes	1.23 (0.71–2.13)	NA	1.58 (0.93–2.67)	NA	1.06 (0.52–2.17)	NA
Previous perineal tear						
No	1	1	1		1	1
Yes	1.49 (0.80–2.78)	NA	**2.42 (1.45–4.05)***	**2.32 (1.31–4.08)***	1.46 (0.64–3.31)	NA
Social support from a male partner						
No	1	1	1	1	1	1
Yes	1.52 (0.91–2.52)	NA	**1.59 (1.00–2.51)***	1.46 (0.87–2.45)	1.29 (0.66–2.52)	NA

NA Not applicable – indicates that the univariable *p* value was ≥0.20 and that the variable was not entered into the multivariable model

*p < 0.005, **p < 0.001

with no FoB and no DS were higher in older, single, and/or nulliparous women, those with a low education level, and those who had experienced obstetric complications.

See Additional file 1.

Discussion

We aimed to determine the prevalence rates and predictors of FoB and DS among pregnant women attending antenatal clinics at selected public health facilities. We found that the prevalence rates of FoB and DS were in a similar range: 15.1 and 17.7%, respectively. Some women had both FoB and DS, some had FoB but no DS or DS but no FoB, and others had neither FoB nor DS. Predictors of FoB and DS were lack of formal education, age above 30 years, never having given birth, being single, having had obstetric complications in the past, and having experienced a lack of male social support at a previous childbirth. Predictors of FoB were not having a formal education, while DS was seen in women without formal education, with inadequate income, who were single, and/or who had experienced a tear/episiotomy in a previous childbirth. Another key finding was that FoB and DS were strongly associated.

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 9 of 13

The prevalence rates of FoB and DS among Tanzania pregnant women in our study are within global ranges when the same validated tools are used for analysis [24, 25, 28, 33, 34, 59, 67]. The similar results across the globe might indicate that most women fear labour pain, being alone, and losing control of their body during labour and childbirth. Tanzanian women, like other women worldwide, have positive expectations on health facility childbirth [68]. Most women who prefer health facility childbirth seek life-saving technology in case of obstetric complications. Some wish to have family members nearby to provide care and affection [69]. However, Tanzanian women's expectations may be hard to meet due to the high patient-health care provider ratio at most public health facilities [70]. This could contribute to the high prevalence rates of FoB and DS. Also, disrespectful and abusive treatment from health providers during childbirth has been reported in Tanzania. For instance, women report being neglected/ignored, receiving physical and verbal abuse [71], being shouted at, threatened, slapped/pinched, or being left alone and forced to deliver by themselves [72]. All of these events could cause FoB and DS.

Being above 30 years of age, not having a formal education or having primary education only, being single, being nulliparous, and having previous experience of obstetric complications were common among women with FoB in combination with DS. We found that older women were more fearful and had more DS than younger ones. The findings were in line with those of a study done in Norway, assessing childbirth experiences in first-time mothers of advanced age [73]. The reason could be that older women have heard of more complications, which might intensify fear ahead of childbirth. Another reason could be, older women have been exposed more to the childbirth process, and some might have gone through negative childbirth experience.

We found contradictory findings, showing that younger women/teenagers were more likely to develop DS and FoB than older women [41]. The discrepancy could be due to most teenagers being nulliparous with limited childbirth experience, which could manifest as DS and FoB. Health care providers should be attentive to all women and their differing childbirth expectations. FoB and DS were more likely in single women than married women. These findings were similar to those of previous studies [29, 32, 46].

Further, women who had never given birth previously had a higher risk of having both FoB and DS. This was in line with other studies, which reported that nulliparous women presented with FoB more often than multiparous women [6, 44]. However, we could not find any study

assessing predictors of FoB in combination with DS for comparison therefore further studies are needed.

Previous obstetric complications were strong predictors of both FoB and DS. Similar findings have been made in several other studies: a previous negative experience predicts FoB and DS in subsequent childbirth [6, 74, 75]. Negative birth experiences can lead to hesitance at becoming pregnant or giving birth in the future, resulting in delaying subsequent pregnancies or total avoidance of later pregnancies [22, 76]. This might impact on women's future reproductive lives, likely diminishing trust in the ability to give birth and trust in maternity services. Such mistrust might lead to women not seeking maternity services from health facilities or opting for a C/S rather than vaginal birth [77, 78]. It is crucial to raise nurse-midwives awareness on the possible causes of negative birth experiences and to discuss how to support these women during subsequent pregnancies and childbirths. Women who have negative experiences should be identified during antenatal care for psychological support during pregnancy and childbirth. The same applies for women at risk of experiencing obstetric complications. These women will need to be empowered through provision of antenatal education on what to expect throughout the perinatal period.

In this study, women who received social support from their male partners during previous childbirths were less likely to report FoB and DS. This is in line with previous studies which reported that male partner support during childbirth is essential in alleviating fear related to childbirth [41] and preventing DS [79]. This highlights the importance of partner companionhip before, during, and after childbirth in a country where a male companion is not yet allowed or standard procedure during health facility childbirth.

Our study showed that FoB and DS were strongly associated. DS during pregnancy predicted having FoB. These findings are in line with findings from most systematic reviews and published studies [76, 80].

Depressive disorders are an important health problem globally [81, 82]. Among the participating women, DS was more likely to occur in women without formal education, who were single, who had an inadequate income and/or who had experienced tearing and/or an episiotomy in a previous delivery. Our findings were in line with previous studies showing that single mothers [46, 83] and those with inadequate income [34, 46] had increased risks of DS. Further, several previous studies have found that less educated people are more likely to be depressed than more educated ones [46, 84]. There might be a pattern in how people of a similar educational background perceive the childbirth process, child upbringing, and associated resources.

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 10 of 13

Another explanation could be that the more educated people are, the more they seek information from different sources, which could prevent them from emotional distress, manifesting as DS. Our findings were also consistent with another study showing that perineal wounds due to either tearing or episiotomy were associated with DS [59].

Strengths and limitations

The study's major strength was the use of standardised, validated, and widely used tools for measuring FoB (W-DEQ-A) and DS (EPDS), increasing credibility. The use of a visual aid scale was an added advantage that ensured clarity when using the W-DEQ Likert scale in the W-DEQ tool. Further, the sample was large enough to determine the prevalence rates and predictors of the outcome variables. While many other similar studies have used self-administered tools, we used the interviewer-administered questionnaire technique, eliminating the hurdle for participants struggling to fill in responses on their own.

Using interviewers for data collection was a strength, but could also entail some limitations. If women adjusted their responses to please the interviewer, a social desirability bias might have occurred. This could lead to the prevalence rates of FoB and DS being slightly under estimated. Being a cross-sectional study could be a limitation in finding predictors since the variables were assessed only at one single time. Another limitation was that we did not know whether women in our study who were categorised as having FoB and DS had received any treatment. We were also unable to offer any support to women identified as having any problems. This is because the collected data were analysed and interpreted weeks later, meaning that women could not be referred for further management. Furthermore, the tools were only for screening purposes and therefore could not be used for clinical diagnosis. Our findings cannot be generalised to the first and second trimester of pregnancy, as data were collected during the third trimester. Comparisons with results from other studies may be impaired because of different data collection tools and cut-off points used to measure FoB and DS. However, we compared our findings with other studies that used only W-DEQ and EPDS tools to define FoB and DS [64] and DS [63], leaving out studies that used other tools to measure FoB and DS. W-DEQ-A might have been affected by being translated into Kiswahili, due to cultural diversity and differences in how women define and perceive childbirth in different countries. Furthermore, use of an adapted version of the EPDS validated in Kenya, where Kiswahili is also a national language, might be a limitation, as some words may have a different meaning when used in Tanzania.

Conclusions

Previous obstetric complications were the strongest predictor of FoB and DS, and FoB and DS were strongly associated with each other. Lack of social support from a male partner was also a predictor of FoB and DS. Not having a formal education was a predictor of FoB. Being single, having an inadequate income and having experienced a perineal tear were strong predictors of DS. Having FoB in combination with DS was more common in women aged above 30 years, without formal education, who were nulliparous and/or single. Understanding why some women are more prone to FoB and DS is vital in developing effective prevention and timely intervention to restore their mental health and psychological well-being throughout pregnancy, delivery, and after childbirth. This could, in turn, decrease mental suffering and negative consequences linked to FoB and DS.

Clinical implications from our results could be the possibilities for: a) proper screening of pregnant women for FoB and DS during the antenatal period; b) identifying and providing support to women at risk of developing mental illnesses and those who have experienced complications during previous pregnancies and childbirths.

Abbreviations
AOR: Adjusted odds ratio; CI: Confidence interval; DS: Depressive symptoms; EPDS: Edinburgh Postpartum Depression Scale; FoB: Fear of childbirth; IQR: Interquartile range; RAs: Research assistants; W-DEQ-A: Wijma Delivery Expectancy/Experience Questionnaire-A.

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12884-021-04169-7.

Additional file 1.

Methodological consideration
All methods were carried out in accordance with relevant guidelines and regulations.

Authors' contributions
AFM, ASS, ML, ABP, SL, and CM designed the study and selected the appropriate measurement tools. With inputs from all co-authors, AFM developed the

Massae *et al. BMC Pregnancy Childbirth*   (2021) 21:704

Page 11 of 13

study protocol, piloted the tools, trained the research assistants, supervised the data collection, and carried out data entry. AFM, ML, and ABP analysed the data. AFM developed the draft manuscript, and all authors contributed equally to refining the manuscript. All authors have read and approved the submitted manuscript.

Declarations

Ethics approval and consent to participate
Written permission was granted by Wijma, the author of W-DEQ-A, to use the tool in data collection in this study. Ethical clearance was sought from the Senate Research and Publication Committee of the Muhimbili University of Health and Allied Scienceswith reference number 2018-03-09/AEC/Vol.XII/91. Permission to carry out the study was granted by the Regional Administrative Secretary in the Pwani region, Tanzania. We obtained written informed consent from the women who agreed to participate in the study. The study participants who were under 18 years of age were considered as emancipated minors and allowed to sign the consent form in the absence of their parents/guardians [85].

Consent for publication
Not applicable.

Competing interests
The authors declare they have no competing interests.

Author details
[1]Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden. [2]Department of Community Health Nursing, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania. [3]School of Nursing and Midwifery, The Aga Khan University, Dar es Salaam, Tanzania. [4]Department of Obstetrics and Gynaecology, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania.

References
1. Hauck Y, Fenwick J, Downie J, Butt J. The influence of childbirth expectations on Western Australian women's perceptions of their birth experience. Midwifery. 2007;23:235–47.
2. Aktaş S, Aydın R. The analysis of negative birth experiences of mothers: a qualitative study. J Reprod Infant Psychol. 2019;37:176–92. https://doi.org/10.1080/02646838.2018.1540863.
3. Smarandache A, Kim THM, Bohr Y, Tamim H. Predictors of a negative labour and birth experience based on a national survey of Canadian women. BMC Pregnancy Childbirth. 2016;16:1–9. https://doi.org/10.1186/s12884-016-0903-2.
4. Bertucci V, Boffo M, Mannarini S, Serena A, Saccardi C, Cosmi E, et al. Assessing the perception of the childbirth experience in Italian women: a contribution to the adaptation of the childbirth perception questionnaire. Midwifery. 2012;28:265–74. https://doi.org/10.1016/j.midw.2011.02.009.
5. Havizari S, Ghanbari-Homaie S, Eyvazzadeh O, Mirghafourvand M. Childbirth experience, maternal functioning and mental health: how are they related? J Reprod Infant Psychol. 2021;00:1–13. https://doi.org/10.1080/02646838.2021.1913488.
6. Nilsson C, Lundgren I, Karlström A, Hildingsson I. Self reported fear of childbirth and its association with women's birth experience and mode of delivery: a longitudinal population-based study. Women Birth. 2012;25(3):114–21.
7. Serçekuş P, Vardar O, Özkan S. Fear of childbirth among pregnant women and their partners in Turkey. Sex Reprod Healthc. 2020;24:100501.
8. Wassif OM, Abdo AS, Elawady MA, Elmaksoud AEA, Eldesouky RS. Assessment of postpartum depression and anxiety among females attending primary health care facilities in Qaliubeya governorate, Egypt. J Environ Public Health. 2019;2019:3691752.
9. Moya J, Phillips L, Sanford J, Wooton M, Gregg A, Schuda L. A review of physiological and behavioral changes during pregnancy and lactation: potential exposure factors and data gaps. J Expo Sci Environ Epidemiol. 2014;24:449–58.
10. World Health Organization (WHO). Managing complications in pregnancy and childbirth. 2017.
11. CDC. Pregnancy complications: Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion; 2020. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-complications.html#During20%Pregnancy
12. Braunthal S, Brateanu A. Hypertension in pregnancy: pathophysiology and treatment. SAGE Open Med. 2019;7:205031211984370.
13. Fisher J, de Mello MC, Patel V, Rahman A, Tran T, Holton S, et al. Prevalence and determinants of common perinatal mental disorders in women in low-and lower-middle-income countries: a systematic review. Bull World Health Organ. 2012;90:139–49.
14. Howard LM, Khalifeh H. Perinatal mental health: a review of progress and challenges. World Psychiatry. 2020;19:313–27.
15. Paschetta E, Berrisford G, Coccia F, Whitmore J, Wood AG, Pretlove S, et al. Perinatal psychiatric disorders: an overview. Am J Obstet Gynecol. 2014;210. https://doi.org/10.1016/j.ajog.2013.10.009.
16. Mahenge B, Stöckl H, Likindikoki S, Kaaya S, Mbwambo J. The prevalence of mental health morbidity and its associated factors among women attending a prenatal clinic in Tanzania. Int J Gynecol Obstet. 2015;130:261–5.
17. Ngocho JS, Watt MH, Minja L, Knettel BA, Mmbaga BT, Williams P, et al. Depression and anxiety among pregnant women living with HIV in Kilimanjaro region, Tanzania. PLoS One. 2019;14:1–15. https://doi.org/10.1371/journal.pone.0224515.
18. Calderani E, Giardinelli L, Scannerini S, Arcabasso S, Compagno E, Petraglia F, et al. Tocophobia in the DSM-5 era: outcomes of a new cut-off analysis of the Wijma delivery expectancy/experience questionnaire based on clinical presentation. J Psychosom Res. 2019;116(November):37–43.
19. Storksen HT, Eberhard-Gran M, Garthus-Niegel S, Eskild A. Fear of childbirth; the relation to anxiety and depression. Acta Obstet Gynecol Scand. 2012;91:237–42.
20. Rouhe H, Salmela-Aro K, Gissler M, Halmesmäki E, Saisto T. Mental health problems common in women with fear of childbirth. BJOG. 2011;118:1104–11.
21. Ryding EL, Lukasse M, Parys ASV, Wangel A-M, Karro H, Kristjansdottir H, et al. Fear of childbirth and risk of cesarean delivery: a cohort study in six European countries. Birth. 2015;42:48–55. https://doi.org/10.1111/birt.12147.
22. Hildingsson I, Haines H, Karlström A, Nystedt A. Presence and process of fear of birth during pregnancy—findings from a longitudinal cohort study. Women Birth. 2017;30(5):e242–7.
23. Nilsson C, Hessman E, Sjöblom H, Dencker A, Jangsten E, Mollberg M, et al. Definitions, measurements and prevalence of fear of childbirth: a systematic review; 2018. p. 1–15.
24. Underwood L, Waldie K, D'Souza S, Peterson ER, Morton S. A review of longitudinal studies on antenatal and postnatal depression. Arch Womens Ment Health. 2016;19:711–20.
25. Green EP, Tuli H, Kwobah E, Menya D, Chesire I, Schmidt C. Developing and validating a perinatal depression screening tool in Kenya blending Western criteria with local idioms: a mixed methods study. J Affect Disord. 2018;228(February 2017):49–59. https://doi.org/10.1016/j.jad.2017.11.027.
26. Woody CA, Ferrari AJ, Siskind DJ, Whiteford HA, Harris MG. A systematic review and meta-regression of the prevalence and incidence of perinatal

Massae *et al. BMC Pregnancy Childbirth*　　(2021) 21:704

Page 12 of 13

depression. J Affect Disord. 2017;219(May):86–92. https://doi.org/10.1016/j.jad.2017.05.003.

27. Gelaw T, Ketema TG, Beyene K, Gurara MK, Ukke GG. Fear of childbirth among pregnant women attending antenatal care in Arba Minch town, southern Ethiopia: a cross-sectional study. BMC Pregnancy Childbirth. 2020;20:1–7.

28. Khwepeya M, Lee GT, Chen S, Kuo S. Childbirth fear and related factors among pregnant and postpartum women in Malawi; 2018. p. 1–10.

29. Onchonga D, MoghaddamHosseini V, Keraka M, Várnagy Á. Prevalence of fear of childbirth in a sample of gravida women in Kenya. Sex Reprod Healthc. 2020;24(January):100510. https://doi.org/10.1016/j.srhc.2020.100510.

30. Chorwe-Sungani G, Chipps J. A cross-sectional study of depression among women attending antenatal clinics in Blantyre district, Malawi. S Afr J Psychiatry. 2018;24:1–6.

31. Dibaba Y, Fantahun M, Hindin MJ. The association of unwanted pregnancy and social support with depressive symptoms in pregnancy: evidence from rural southwestern Ethiopia. BMC Pregnancy Childbirth. 2013;13:1–8.

32. Thompson O, Ajayi I. Prevalence of antenatal depression and associated risk factors among pregnant women attending antenatal clinics in Abeokuta North Local Government Area, Nigeria; 2016. https://doi.org/10.1155/2016/4518979.

33. Manongi R, Rogathi J, Sigalla G, Mushi D, Rasch V, Gammeltoft T, et al. The association between intimate partner violence and signs of depression during pregnancy in Kilimanjaro Region, Northern Tanzania. 2017.

34. Rwakarema M, Premji SS, Nyanza EC, Riziki P, Palacios-Derflingher L. Antenatal depression is associated with pregnancy-related anxiety, partner relations, and wealth in women in northern Tanzania: a cross-sectional study. BMC Womens Health. 2015;15:1–10.

35. O'Connell MA, Leahy-Warren P, Khashan AS, Kenny LC, O'Neill SM. Worldwide prevalence of tocophobia in pregnant women: systematic review and meta-analysis. Acta Obstet Gynecol Scand. 2017;96:907–20.

36. Phoosuwan N, Eriksson L, Lundberg PC. Antenatal depressive symptoms during late pregnancy among women in a north-eastern province of Thailand: prevalence and associated factors. Asian J Psychiatr. 2018;36(June):102–7. https://doi.org/10.1016/j.ajp.2018.06.012.

37. Zeng Y, Cui Y, Li J. Prevalence and predictors of antenatal depressive symptoms among Chinese women in their third trimester: a cross-sectional survey. BMC Psychiatry. 2015;15(1):1–7.

38. Phunyammalee M, Buayaem T, Boriboonhirunsarn D. Fear of childbirth and associated factors among low-risk pregnant women. J Obstet Gynaecol (Lahore). 2019;0:1–5. https://doi.org/10.1080/01443615.2019.1584885.

39. Sunnqvist C. Depressive symptoms during pregnancy and postpartum in women and use of antidepressant treatment – a longitudinal cohort study; 2019. p. 109–17.

40. Fenwick J, Gamble J, Creedy JK, Buist DK, Ryding AL. Psycho-social predictors of childbirth fear in pregnant women: an Australian study. Open J Obstet Gynecol. 2014;4:531–43. https://doi.org/10.4236/ojog.2014.49075.

41. Gao LL, Liu XJ, Fu BL, Xie W. Predictors of childbirth fear among pregnant Chinese women: a cross-sectional questionnaire survey. Midwifery. 2015;31:865–70.

42. Rouhe H, Salmela-Aro K, Halmesmäki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. BJOG. 2009;116:67–73.

43. Nilsson C, Lundgren I. Women's lived experience of fear of childbirth. Midwifery. 2007;25:e1–9.

44. Toohill J, Fenwick J, Gamble J, Creedy DK. Prevalence of childbirth fear in an Australian sample of pregnant women. BMC Pregnancy Childbirth. 2014;14:1–10.

45. Spice K, Jones SL, Hadjistavropoulos HD, Kowalyk K, Stewart SH. Prenatal fear of childbirth and anxiety sensitivity. J Psychosom Obstet Gynecol. 2009;30:168–74.

46. Lancaster CA, Gold KJ, Flynn HA, Yoo H, Marcus SM, Davis MM. Risk factors for depressive symptoms during pregnancy: a systematic review. Am J Obstet Gynecol. 2010;202:5–14.

47. Goyal D, Gay C, Lee KA. How much does low socioeconomic status increase the risk of prenatal and postpartum depressive symptoms in first time mothers? Womens Health Issues. 2010;20:96–104.

48. Kroll-Desrosiers AR, Crawford SL, Moore Simas TA, Clark MA, Bastian LA, Mattocks KM. Rates and correlates of depression symptoms in a sample

49. Taherifard P, Delpisheh A, Shirali R, Afkhamzadeh A, Veisani Y. Socioeconomic, psychiatric and materiality determinants and risk of postpartum depression in border city of Ilam, Western Iran. Depress Res Treat. 2013;2013:e1–7.

50. Räisänen S, Lehto SM, Nielsen HS, Gissler M, Kramer MR, Heinonen S. Fear of childbirth in nulliparous and multiparous women: a population-based analysis of all singleton births in Finland in 1997-2010. BJOG. 2014;121:965–70.

51. Lukasse M, Schei B, Lena E, Study B. Prevalence and associated factors of fear of childbirth in six European countries. Sex Reprod Healthc. 2014;5:99–106. https://doi.org/10.1016/j.srhc.2014.06.007.

52. Laursen M, Hedegaard M, Johansen C. Fear of childbirth: predictors and temporal changes among nulliparous women in the Danish National Birth Cohort. Obstet Anesth Dig. 2009;29:64–5.

53. Adams SS, Eberhard-gran M, Eskild A. Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery; 2012. p. 15–8.

54. Sydsjo G, Sydsjo A, Gunnervik C, Bladh M, Josefsson A. Obstetric outcome for women who received individualized treatment for fear of childbirth during pregnancy. Acta Obstet Gynecol Scand. 2012;91:44–9.

55. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section--a cross-sectional study at various stages of pregnancy in Sweden. Acta Obstet Gynecol Scand. 2009;88:807–13.

56. Slomian J, Honvo G, Emonts P, Reginster JY, Bruyère O. Consequences of maternal postpartum depression: a systematic review of maternal and infant outcomes. Womens Health. 2019;15:1745506519844044.

57. Holm-larsen CE, Madsen FK, Rogathi JJ, Manongi R, Mushi D, Meyrowitsch DW. Postpartum depression and child growth in Tanzania: a cohort study; 2018. p. 590–8.

58. Madeghe BA, Kimani VN, Vander Stoep A, Nicodimos S, Kumar M. Postpartum depression and infant feeding practices in a low income urban settlement in Nairobi-Kenya. BMC Res Notes. 2016;9:506–14.

59. Jha P, Larsson M, Christensson K, Svanberg AS. Fear of childbirth and depressive symptoms among postnatal women : a cross-sectional survey from Chhattisgarh, India. Women Birth. 2018;31:e122–33. https://doi.org/10.1016/j.wombi.2017.07.003.

60. The United Republic of Tanzania President's Office Regional Administration and Local Government. 2020. https://www.tamisemi.go.tz/en.

61. The United Republic of Tanzania, Ministry of Health Community Development Gender Elderly and Children: Tanzania National Health Facility Registry Portal. 2020. http://hfrportal.moh.go.tz/index.php?r=facilities/homeAdvancedSearch.

62. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth. J Psychosom Obstet Gynaecol. 1998;19:84–97.

63. Cox JL, Sagovsky JMHR. Detection of postnatal depression development of the 10-item Edinburgh Postnatal Depression Scale; 1987. p. 782–6.

64. Zar M, Wijma K, Wijma B. Pre- and postpartum fear of childbirth in nulliparous and parous women. Scand J Behav Ther. 2001;30:75–84.

65. Hall WA, Hauck YL, Carty EM, Hutton EK, Fenwick J, Stoll K. Childbirth fear, anxiety, fatigue, and sleep deprivation in pregnant women. J Obstet Gynecol Neonatal Nurs. 2009;38:567–76.

66. Umuziga MP, Adejumo O, Hynie M. A cross-sectional study of the prevalence and factors associated with symptoms of perinatal depression and anxiety in Rwanda. BMC Pregnancy Childbirth. 2020;20:1–10.

67. Klabbers GA. Severe fear of childbirth: its features, assesment, prevalence, determinants, consequences and possible treatments. Psychol Top. 2016;25:107–27.

68. Taheri M, Takian A, Taghizadeh Z, Jafari N, Sarafraz N. Creating a positive perception of childbirth experience: systematic review and meta-analysis of prenatal and intrapartum interventions. Reprod Health. 2018;15:1–13.

69. Shimpuku Y, Patil CL, Norr KF, Hill PD, Shimpuku Y, Patil CL, et al. Women's perceptions of childbirth experience at a hospital in rural Tanzania. Health Care Women Int. 2013;34:461–81.

70. United Republic of Tanzania. Ministry of Health and Social Welfare. Human resource for health and social welfare strategic plan 2014–2019. Dar es Salaam; 2014.

71. Mselle LT, Moland KM, Mvungi A, Evjen-Olsen B, Kohi TW. Why give birth in health facility? Users' and providers' accounts of poor quality of birth

care in Tanzania at comprehensive community based rehabilitation in Tanzania and Temeke hospitals in Dar es Salaam, and Mpwapwa district in Dodoma region. 2008. http://www.biomedcentral.com/1472-6963/13/174.

72. Kruk ME, Kujawski S, Mbaruku G, Ramsey K, Moyo W, Freedman LP. Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey. Health Policy Plan. 2018;33:e26–33.

73. Aasheim V, Waldenström U, Rasmussen S, Schytt E. Experience of childbirth in first-time mothers of advanced age - a Norwegian population-based study. BMC Pregnancy Childbirth. 2013;13:53.

74. Størksen HT, Garthus-Niegel S, Vangen S, Eberhard-Gran M. The impact of previous birth experiences on maternal fear of childbirth. Acta Obstet Gynecol Scand. 2013;92:318–24.

75. Henriksen L, Grimsrud E, Schei B, Lukasse M. Factors related to a negative birth experience – a mixed methods study. Midwifery. 2017;51(January):33–9. https://doi.org/10.1016/j.midw.2017.05.004.

76. Dencker A, Nilsson C, Begley C, Jangsten E, Mollberg M, Patel H, et al. Causes and outcomes in studies of fear of childbirth: a systematic review. Women Birth. 2019;32:99–111. https://doi.org/10.1016/J.WOMBI.2018.07.004.

77. Størksen HT, Garthus-Niegel S, Adams SS, Vangen S, Eberhard-Gran M. Fear of childbirth and elective caesarean section: a population-based study. BMC Pregnancy Childbirth. 2015;15:1–10. https://doi.org/10.1186/s12884-015-0655-4.

78. Nilsson C, Bondas T, Lundgren I. Previous birth experience in women with intense fear of childbirth. J Obstet Gynecol Neonatal Nurs. 2010;39:298–309.

79. Phoosuwan N, Manasatchakun P, Eriksson L, Lundberg PC. Life situation and support during pregnancy among Thai expectant mothers with depressive symptoms and their partners: a qualitative study. BMC Pregnancy Childbirth. 2020;20:1–10.

80. Dørheim SK, Bjorvatn B, Eberhard-Gran M. Can insomnia in pregnancy predict postpartum depression? A longitudinal, population-based study. PLoS One. 2014;9(4):e94674.

81. Liu Q, He H, Yang J, Feng X, Zhao F, Lyu J. Changes in the global burden of depression from 1990 to 2017: findings from the global burden of disease study. J Psychiatr Res. 2020;126(August):134–40.

82. WHO. Depression and other common mental disorders: global health estimates. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO

83. Shakeel N, Eberhard-Gran M, Sletner L, Slinning K, Martinsen EW, Holme I, et al. A prospective cohort study of depression in pregnancy, prevalence and risk factors in a multi-ethnic population. BMC Pregnancy Childbirth. 2015;15:1–11.

84. Hein A, Rauh C, Engel A, Häberle L, Dammer U, Voigt F, et al. Socioeconomic status and depression during and after pregnancy in the Franconian Maternal Health Evaluation Studies (FRAMES). Arch Gynecol Obstet. 2014;289:755–63.

85. Council for International Organizations of Medical Sciences (CIOMS) and World Health Organisation. International ethical guidelines for health-related research involving humans. 4th ed. Geneva; 2016. http://www.sciencedirect.com/science/article/B6VC6-45F5X02-9C/2/e44bc37a6e392634b1cf436105978f01

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.