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The relationship of childbirth experience with postpartum depression and anxiety: a cross-sectional study

Parivash Ahmadpour¹, Farnaz Faroughi² and Mojgan Mirghafourvand^{3,4,5*}

Abstract

Background The childbirth experience is a personal life event that is influenced by physiologic and mental-psychological processes. Due to the prevalence of psychiatric problems after childbirth, it is important to recognize the factors affecting women's emotional reactions. This study was conducted to define the relationship of childbirth experience with postpartum anxiety and depression.

Methods This cross-sectional study was conducted on 399 women from 1 to 4 months after their childbirth who were referred to health centers in Tabriz-Iran from January 2021 to September 2021. Socio-demographic and obstetric characteristics questionnaire, Childbirth Experience Questionnaire (CEQ 2.0), Edinburgh Postpartum Depression Scale (EPDS), and Postpartum Specific Anxiety Scale (PSAS) were used to collect the data. The general linear modeling was used along with adjustment of socio-demographic characteristics to determine the relationship between the childbirth experience with depression and anxiety.

Results The mean (SD) of the overall score for childbirth experience, anxiety, and depression were 2.9 (0.2) (score range: 1 to 4), 91.6 (4.8) (score range: 0 to 153), and 9.4 (0.7) (score range: 0 to 30), respectively. There was a significant inverse correlation between the overall score of childbirth experiences, the depression score ($r = -0.36$, $p < 0.001$), and the anxiety score ($r = -0.12$, $p = 0.028$) based on the Pearson correlation test. According to the general linear modeling and with adjustment of socio-demographic characteristics, with the increasing score of the childbirth experience, the depression score decreased ($B = -0.2$; 95%CI: -0.3 to -0.1). Moreover, the variable of control during pregnancy was a predictor for postpartum depression and anxiety, so in women with the control during pregnancy, the mean score of postpartum depression ($B = -1.8$; CI 95%: -3.0 to -0.5; $P = 0.004$) and anxiety ($B = -6.0$; CI 95%: -10.1 to -1.6; $P = 0.007$) was less.

Conclusion Based on the study results, postpartum depression and anxiety are related to childbirth experiences, therefore considering the effects of mothers' mental health on other aspects of a woman and her family's life, the core role of health care providers and policymakers in creating positive childbirth experiences is determined.

Keywords Childbirth experience, Depression, Anxiety

*Correspondence:

Mojgan Mirghafourvand
mirghafourvand@gmail.com

¹Midwifery Department, Faculty of Nursing and Midwifery, Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran

²Midwifery Department, Faculty of Nursing and Midwifery, Maragheh Branch, Islamic azad University, Maragheh, Iran

³Social Determinants of Health Research Center, Department of Midwifery, Faculty of Nursing & Midwifery, Tabriz University of Medical sciences, Tabriz, Iran

⁴Menopause Andropause Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

⁵Social Determinants of Health Research Center, Tabriz University of Medical sciences, Tabriz, Iran



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Background

Childbirth is an important and challenging life event, which affects many women annually. Birth events are stressful for most women and can include a wide spectrum of consequences and obstetric interventions [1]. After childbirth, women are vulnerable to postpartum psychiatric disorders, including depression, anxiety, and attachment disorders [2]. The experiences women achieve during the labor process are considered important childbirth consequences and these experiences will stay with them throughout their whole life [3].

Factors like the feeling of control and perceived control [4, 5], the extent of labor pain [6], caregiver's support during the childbirth process [7], perinatal analgesia [8, 9], level of awareness, type of labor [10], and the amount of pregnant mother's involvement in the decision-making process [6] influence women's childbirth experiences. Moreover, unplanned medical interventions during the labor, such as emergency cesarean, assisted vaginal delivery [11, 12], mid-pregnancy problems [13], fear of childbirth [14], long-term labor [15], and the need for neonatal intensive care [16] are related to women's dissatisfaction with childbirth. Different control and support aspects correlate with the childbirth experience, labor's perception as a trauma, and depression [17, 18].

Physical changes during pregnancy contribute to a woman's sense of pride in her own body and can be seen as very positive. However, these changes can also be perceived as threatening due to the uncontrollable process, which can lead to an increased sense of insecurity and fear related to childbirth. It has been shown that perceived insecurities during pregnancy and childbirth may adversely affect mothers' ability to adjust to the responsibilities of parenthood, and their postpartum experiences [19, 20]. However, it is suggested that prenatal control influences on birth satisfaction by increasing healthy expectations and increasing the congruence between expectations and experienced control [21].

A new mother undergoes fundamental physiologic and emotional changes after labor and also faces the new responsibility of caring for the newly born infant [22]. Therefore, the first postpartum months are important periods in women's lives, which can be associated with an important psychological disorder for women [23]. Depression and anxiety are common postpartum psychiatric disorders.

Postpartum depression is a general health problem and is seen in 10–15% of new mothers after childbirth [24]. Postpartum depression occurs as sleep disturbances, mood swings, changes in appetite, fear of hurting, serious concerns about the infant, too much sorrow and crying, feeling of doubt, difficulty in concentration, lack of interest in daily activities, death thoughts, and suicidal thoughts [25, 26]. Despair in the severe form of the

disease can be life-threatening and result in suicide [27] and is responsible for 20% of the postpartum mortality of mothers [28]. Also, cases of fear of hurting the child (36%), weak attachment to the infant (34%), and even in severe cases, child suicide have been reported [29, 30]. Different risk factors have been proposed as postpartum depression risk factors, including marital conflicts [31], lack of self-confidence [32], difficult socio-psychological conditions [33], negative life events in a year before childbirth, and negative labor experiences [34]. Studies show that a negative childbirth experience will be associated with a request for a cesarean [35], depression during the next pregnancy [36], and postpartum depression [34].

Postpartum anxiety is one of the most common psychiatric problems that occur more often than postpartum depression and if left untreated, it can increase the risk of postpartum depression. The prevalence of anxiety disorder is between 9.9 and 20% in the first year after childbirth [37]. Anxiety can affect maternal abilities by creating irrational fears and limiting the mother's activities. Also, studies show that maternal anxiety can prevent optimal mother-child interactions, inhibit the child's socio-cognitive development and affect the infant's nutritional outcomes and behaviors [37–39].

With increasing of postpartum psychological disorders, it is crucial to identify the effective factors on women's emotional reactions. It is imperative to gather more information about how to minimize postpartum psychological distress and how to maximize positive emotions among women in order to reduce the incidence of postpartum psychological disorders [40]. In studies examining the link between gynecological factors and pregnancy and childbirth problems and postpartum depression, contradictory findings have been reported [41, 42]. Families suffering from postpartum depression suffer serious health consequences [43]. In order to take appropriate therapeutic measures, it is essential to identify the underlying causes of postpartum psychiatric disorders and susceptible individuals. Prior to developing screening programs and designing evidence-based preventive programs, scientific documents about the disease's etiology and underlying factors need to be collected [44]. As a result, this study was designed to determine whether childbirth experiences are associated with anxiety and depression.

Methods

Study design, participants, and setting

This cross-sectional study was performed on 339 women from 1 to 4 months after their childbirth who were referred to health centers in Tabriz-Iran from January 2021 to September 2021.

Inclusion criteria included: having at least 18 years of age, residence in Tabriz, and women in 1 to 4 months

after delivery. Women with the following criteria were not included in the study: multiple pregnancies, preterm labor (less than 37 weeks of pregnancy), and having a history of depression or psychological health problems during pregnancy or before it based on the mother's statements.

In order to estimate the sample size in the present research, the formula for the estimation of a mean in a single population was employed. In the present study, the value of z with a 95% confidence level was 1.96, and the values of mean (SD) (mean score of childbirth experience) were 2.71 (0.73) based on the study of Ghanbari-Homayi et al. [45] and considering d (precision) equal to 0.05 around the mean, a sample size of 226 people was obtained. Due to the clustered nature of the sampling and regarding the design effect of 1.5, the final sample size was calculated to be 339.

Sampling

Sampling was conducted after approving of this study by ethics committee of Tabriz University of Medical Sciences (Ethical code: IR.TBZMED.REC.1399.1109). Postpartum women referred to Tabriz health centers were the target population. There are 84 health centers in Tabriz. Cluster random sampling was used for sampling. We first randomly selected a quarter of the health centers ($n=21$) using www.random.org. Birth-giving women were distributed differently across health centers. Probability proportional to size sampling was used in the sampling process. Based on the number of women covered by each center, the researcher selected a sample of women 1 to 4 months after birth. The number of selected samples from each center was determined by the number of women covered by each center, and then they were randomly selected. In Appendix 1, you can find a table that shows the number of clusters, the number of eligible mothers in each cluster, and the number of chosen participants in each cluster.

After selecting eligible individuals, the researcher contacted them by phone. If they wished, they were invited to attend the health center on a specific day. Following the presentation, the study's objectives and methods were explained, and written informed consent was obtained if they wished to participate. We assured participants that their names, information, and results would remain confidential. The participants were interviewed face-to-face during this face-to-face session to complete socio-demographic and obstetric characteristics questionnaires, Childbirth Experience Questionnaires (CEQ2.0), Edinburgh Postpartum Depression Scales (EPDS), and Postpartum Specific Anxiety Scales in an Iranian population (PSAS-IR) in a relatively quiet environment.

Data collection tools

The data of this research were collected by socio-demographic and obstetrics characteristics questionnaire, CEQ 2.0, EPDS, and PSAS-IR.

Socio-demographic and obstetrics characteristics questionnaire.

This questionnaire included questions about age, spouse' age, the sufficiency of monthly income, living expenses, education of the woman and her spouse, occupation of the woman and her spouse, marital status, residence status, the mother's weight, and height. The obstetrics profile included questions about the number of pregnancies, the number of deliveries, the number of abortions, the history of infertility, attending or not attending pregnancy classes, controlling over pregnancy and pregnancy status in terms of wanted or not, type of childbirth, and neonate's admission at neonatal intensive care unit (NICU). Content and face validity were used to determine the validity of the questionnaire. The questionnaire was provided to the faculty members of the Schools of Nursing & Midwifery, and Medicine, and after collecting their comments, the instruments were modified based on the received feedback.

Childbirth experience questionnaire 2.0 (CEQ 2.0)

The first version of this tool contained 23 statements, but the revised questionnaire by the inventor contains 25 statements, including 3 extra items. This tool measures the childbirth experience of women. The questionnaire includes the following areas: personal capacity (sense of control, personal feelings about childbirth and labor pain), professional support (information and midwifery care), perceived safety (feeling of security and memories of childbirth), and participation (the woman's ability to change posture, movements, and pain relief during labor and delivery). Of 25 items in the questionnaire, 23 statements are completed as multiple-choice questions and 3 statements are completed in visual analog scale (VAS). The validity and reliability of this tool have been proven in the American female population. The answers are as strongly agree (score 1), often agree (score 2), often disagree (score 3), and strongly disagree (score 4). Questions answered on a visual scale will be converted to a score of 1 to 4: scores 0–40 (score 1), scores 41–60 (score 2), 61–80 (score 3), and 81–100 (Score 4). Sentences with negative concepts (experiencing severe pain, feeling tired, scared, and having bad memories) are scored negatively. The high mean scores in this tool mean a more positive experience of childbirth [46]. The validity and reliability of the Persian version of this questionnaire in the research environment of this study have been determined by Ghanbari-Homayi et al. and its Cronbach's alpha was 0.93 and the intra-correlation coefficient (ICC) was 0.97 [47].

Edinburgh Postpartum Depression Scale (EPDS).

The questionnaire is used to measure pregnancy and postpartum depression and was developed by Cox et al. in 1987. This tool consists of 10 multiple-choice questions, in which the choices have been organized from low to high (1, 2, 4) and in some from high to low (3, 5, 6, 7, 8, 9, 10). The options for each question are assigned a score from zero to three based on the intensity of the symptom and the score a person obtained from a total of ten questions can vary from zero to 30. Mothers who score above the 12 thresholds have varying degrees of depression. The validity of this scale was calculated to be equal to 0.78 using the simultaneous correlation coefficient of this scale and the Beck depression scale and the reliability of this scale was estimated equal to 0.75 by Cronbach's alpha method and Bisection method [48]. Montazeri et al. also reported a Cronbach's alpha of 0.77 for this questionnaire during pregnancy [49].

Postpartum Specific Anxiety Scale (PSAS).

This questionnaire designed by Fallon et al., Consists of 51 3-point Likert questions, including anxieties related to the mother's competence and attachment, anxieties related to the infant's safety and welfare, and anxieties about the practical care of the infant [50]. The validity and reliability of the Persian version of this questionnaire have been confirmed by Mirghafourvand et al. and Cronbach's alpha coefficient and ICC have been reported to be 0.93 and 0.92, respectively [51].

Data analysis

In order to analyze the data, SPSS statistical software (version 25) was used. Socio-demographic, obstetric, anxiety, depression, and childbirth experiences of the participants were described through descriptive statistics such as frequency, percentage, mean, and standard deviation. In order to determine whether quantitative data were normal, we used both visual inspection and Skewness and Kurtosis, which had a normal distribution. A Pearson correlation test was carried out to assess the relationship of anxiety and depression with childbirth experience. Independent t-test and one-way analysis of variance were performed to examine the relationship between socio-demographic and obstetrical characteristics and anxiety and depression variables. We then used general linear modeling to estimate the effect of the independent variables (socio-demographic and obstetrical characteristics as potential confounders, and childbirth experience) on the dependent variable (anxiety and depression). The cluster effect was controlled using R software on the dependent variables (anxiety and depression).

Results

A number of 521 women were studied. Of these, 399 women were eligible and 339 were included in the study with an 85% participation rate. The mean (SD) age of participants was 28.7 (6.0) years. Less than half of the women (45.7%) had secondary education and the majority (82.3%) were housewives. The mean (SD) age of the spouses was 33.9 (6.6) years and the majority of them (78.8%) had primary and secondary education. Moreover, about half of the spouses (54.6%) were self-employed. About half of the women (47.2%) reported that their monthly income was relatively sufficient for living expenses. More than half of the participants (60.5%) lived in their private homes. About one-third of women (35.7%) experienced their first pregnancy and the method of delivery was vaginal delivery in about half of the women (49.0%) (Table 1).

The mean (SD) of the total scores for childbirth experience, anxiety, and depression were 2.9 (0.2) (score range: 1 to 4), 91.6 (4.8) (score range: 0 to 30), and 9.4 (0.7) (score range: 0 to 153), respectively. According to the Pearson correlation test, there was a significant inverse correlation between the total score of childbirth experience and the score of depression ($r = -0.36$, $P < 0.001$) and anxiety ($r = -0.12$, $P = 0.028$) (Table 2). Less than a third of the women (28.0%) had depression with a score higher than 12.

Based on the results of bivariate tests (one-way ANOVA and independent t-test), there was a statistically significant relationship between the depression score with the variables of age ($P = 0.001$), age of the spouse ($P = 0.047$), age of marriage ($P = 0.023$), sufficiency of monthly income, for living expenses ($P = 0.001$), occupation ($P = 0.003$), abortion ($P = 0.005$) and control during pregnancy ($P = 0.001$). Also, there was a statistically significant relationship between the anxiety score with the variables of spouse education ($P = 0.038$) and control during pregnancy ($P = 0.004$). These variables were included in the general linear modeling together with the variable of childbirth experiences as an independent variable and the results of the adjusted general linear modeling showed that the variables of control during pregnancy, childbirth experience, and age had a statistically significant relationship with the depression ($P < 0.05$) so that with increasing the score of the childbirth experience, the mean score of depression decreased ($B = -0.2$; 95%CI: -0.278 to -0.143). In addition, postpartum depression was lower in women with control during pregnancy ($B = -1.8$; CI 95%: -3.0 to -0.5; $P = 0.004$) as well as the depression score increased with age too ($B = 0.05$, CI 95%: 0.2 to 0.4 $p = 0.013$). Besides, the variable of control during pregnancy had a statistically significant relationship with anxiety ($P < 0.05$), as the postpartum anxiety was less in

Table 1 Socio-demographic characteristics of the participants (n = 339)

characteristics of Socio-demographic	Mean (SD)	Relationship with Depression		Relationship with Anxiety	
		R	P-Value	r	P-Value
Age (Year)	28.7 (6.0)	0.12	0.000	-0.04	0.418
Spouse age (Year)	33.9 (6.6)	0.11	0.047	-0.05	0.349
Married age (Year)	20.9 (5.4)	0.12	0.023	-0.07	0.190
Body mass index (kg/m ²)	25.6 (4.8)	-0.06	0.238	-0.04	0.470
Gestational age (Week)	38.6 (1.0)	0.02	0.755	0.03	0.617
	Number (Percent)	Mean (SD)	P-Value	Mean (SD)	P-Value
Sufficiency of income for living expenses			0.001		0.903
Completely sufficient	101 (29.8)	9.1 (5.7)		92.3 (20.5)	
Somewhat sufficient	160 (47.2)	8.6 (5.9)		91.1 (19.2)	
Insufficient	78 (23.0)	11.6 (6.5)		91.7 (20.8)	
Home status			0.117		0.062
Private house	205 (60.5)	9.0 (5.6)		91.3 (19.5)	
Corporate home	112 (23.0)	9.0 (6.4)		90.3 (18.4)	
Living in a relatives' house	22 (6.5)	11.5 (8.1)		101.1 (28.3)	
Education			0.103		0.601
Primary school	131 (38.6)	8.4 (5.8)		92.0 (20.6)	
Secondary school	155 (45.7)	9.8 (6.4)		91.7 (20.1)	
High school	40 (11.8)	11.2 (5.8)		92.5 (19.2)	
Diploma	12 (3.5)	10.1 (5.0)		82.4 (13.6)	
University	1 (0.3)	11 (0.0)		97.0 (0.0)	
Spouse education			0.657		0.119
Primary school	135 (39.8)	9.3 (6.1)		93.2 (20.6)	
Secondary school	132 (38.9)	9.9 (6.3)		91.7 (19.4)	
High school	55 (16.2)	8.9 (5.8)		86.1 (19.4)	
Diploma	17 (5.0)	8.7 (4.9)		96.1 (18.3)	
Job			0.003		0.820
Housewife	279 (82.3)	8.9 (5.9)		91.6 (19.8)	
Working at home	57 (16.8)	12.1 (6.6)		90.9 (21.0)	
Working abroad	3 (0.9)	23.0 (2.8)		99.0 (2.8)	
Spouse employment			0.488		0.159
Unemployed	12 (3.5)	8.3 (5.9)		82.3 (22.1)	
Employee	49 (14.5)	8.5 (4.9)		90.2 (20.5)	
Manual worker	93 (27.4)	9.3 (6.1)		89.9 (18.5)	
Self-employment	185 (54.6)	9.9 (6.4)		93.5 (20.3)	
Gravid			0.172		0.296
1	121 (35.7)	8.6 (5.9)		89.3 (18.7)	
2	118 (34.8)	9.9 (6.3)		92.8 (19.8)	
≥ 3	100 (29.5)	9.8 (6.0)		92.9 (21.4)	
Abortion			0.005		0.425
Yes	236 (69.6)	8.8 (5.7)		91.0 (19.2)	
No	103 (30.4)	10.8 (6.6)		92.9 (21.6)	
Control during pregnancy			0.001		0.004
No	175 (51.6)	10.8 (6.3)		89.8 (4.4)	
Yes	164 (48.4)	8.1 (5.5)		86.2 (4.0)	
Prenatal education			0.476		0.107
No	305 (90.0)	9.5 (6.1)		86.4 (20.8)	
Yes	34 (10.0)	8.7 (6.3)		92.2 (19.8)	
Mode of Delivery			0.247		0.247
Normal Vaginal delivery (NVD)	166 (49.0)	9.0 (6.2)		90.8 (20.7)	
Elective Cesarean Section	118 (34.8)	10.1 (5.6)		93.9 (17.9)	
Emergency Cesarean Section	55 (16.2)	9.8 (6.7)		89.5 (21.7)	
Neonatal NICU admission			0.252		0.260
No	283 (83.5)	9.6 (6.3)		94.4 (18.2)	
Yes	56 (16.5)	5.6 (5.0)		91.1 (20.3)	

Table 2 Childbirth experience, depression and anxiety status and the relationships of childbirth experience with depression and anxiety (n = 339)

Variable	Mean (SD) *	Obtained score range	Obtainable score range	Relationship with Childbirth experience	
				r	p ^s
Anxiety	91.6 (4.8)	60 to 150	0 to 153	-0.12	0.028
Depression	9.4 (0.7)	0 to 27	0 to 30	-0.36	<0.001
Childbirth experience	2.9 (0.2)	1.64 to 3.68	1 to 4	-	-

* Mean (Standard Deviation (

Table 3 Predictors of depression based on general linear modeling (n = 339)

Variable	Childbirth experience	
	B (95% CI*)	P
Childbirth experience	-0.2 (-0.3 to -0.1)	<0.001
Age (Year)	0.2 (0.05 to 0.4)	0.013
Spouse Age (Year)	-0.4 (-0.2 to 0.1)	0.552
Married Age (Year)	-0.1 (-0.2 to 0.05)	0.175
Control during pregnancy (Reference: No)		
Yes	-1.8 (-3.0 to -0.6)	0.004
Sufficiency of income for living expenses (Reference: Completely sufficient)		
Insufficient	-1.2 (-3.0 to 0.5)	0.162
Somewhat sufficient	-1.1 (-2.8 to 0.5)	0.187
Job (Reference: Working abroad)		
Housewife	3.2 (-3.2 to 9.5)	0.325
Working at home	5.0 (-1.4 to 11.4)	0.125
Abortion (Reference: Yes)		
No	-1.12 (-2.4 to 0.2)	0.093

* 95% Confidence Interval

Table 4 Predictors of anxiety based on general linear modeling (n = 339)

Variable	Childbirth experience	
	B (95% CI*)	P
Control during pregnancy (Reference: No)		
Yes	-6.0 (-10.1 to -1.6)	0.007
Spouse education (Reference: Diploma)		
Primary school	-1.2 (-11.3 to 8.8)	0.811
Secondary school	-2.5 (-12.5 to 7.6)	0.631
High school	-8.6 (-19.4 to 2.2)	0.120

* 95% Confidence Interval

women with control during pregnancy (B=-6.0; 95%CI: -10.1 to -1.6; P=0.007) (Tables 3 and 4).

Discussion

The results of the present study showed that there was a significant inverse correlation between the overall score of the childbirth experience with depression, and anxiety so with increasing the score of the childbirth

experience, the score of postpartum depression and anxiety decreases. Moreover, the variables of the childbirth experience, control during pregnancy, and age were predictors of postpartum depression and the control during pregnancy variable was a predictor of maternal anxiety.

The prevalence of depression in the present study was estimated to be 28.0%. In a systematic review in 2013, the pooled prevalence of PPD in Iran was 25.3% [52]. In another systematic review, the prevalence of depression was 17% with the highest prevalence (26%) in the Middle-East and the lowest prevalence (8%) in the Europe [53]. Iran is located in the Middle-East region and the reported prevalence in both mentioned systematic reviews is almost similar to our study.

The childbirth experience was one of the predictors of depression in the present study. In line with the results of the present study, a study conducted by Bell et al. in the United Kingdom to determine the relationship between depression and labor factors, the type of labor (physiologic delivery without intervention against difficult labor), and childbirth experiences. The results of the study showed that the symptoms of postpartum depression were related to the type of delivery, immediate postpartum complications, and the mother's perception of the recent childbirth experience. Also, a more negative perception of the recent childbirth experience was associated with severe anxiety symptoms [54]. In a study conducted by Astbury et al. [55] which was aimed at determining the possible causes of postpartum depression, the results showed that negative labor experience and lack of participation in decision-making during labor were significantly associated with depression.

In the present study, depression was less in women who had control during pregnancy. Control issues during pregnancy and childbirth show themselves in three ways, including prenatal monitoring of fetal health during pregnancy, delivery and childbirth control, and the actual experienced control during delivery [56]. Pregnant women who have high control during pregnancy are more likely to attend childbirth classes and reduce their smoking, caffeine, and drug abuse. High internal control in pregnancy may help in better childbirth outcomes and higher satisfaction from the labor [57]. Research shows that high experiences of control during labor and birth increase birth satisfaction and reduce the incidence of postpartum depression. Lack of control is associated with unpleasant experiences of childbirth, postpartum depression, and post-traumatic stress disorder (PTSD) symptoms [17, 38].

A lower level of anxiety was observed in women who had control over their pregnancy in the present study. Studies have shown that anxiety disorders are more prevalent than depression in the postpartum period, with 16% of women suffering from anxiety disorders such as panic

disorder, phobia, acute adaptation disorder, or postpartum depression. There is also a tendency for anxiety disorders to be associated with depression [58]. It is essential to control physical and emotional reactions to stress according to psychiatric theories of stress responses, depression, and PTSD. As a result of low levels of control [both internal and external] during an extremely stressful health event, depression can result, and an uncertain sense of control can lead to anxiety [59].

The information obtained from this study can be effective in improving the quality of services provided to pregnant mothers. Given the impact of postpartum anxiety and depression on family and community health, it is expected that by identifying the underlying causes of these health problems, an important step can be taken to improve maternal health. With the support and control of mothers in childbirth, we may be able to create more positive labor experiences for them [44]. The results of the present study provide an opportunity to look specifically at the impact of childbirth experiences that may be important for clinical interventions and policymaking.

One of the limitations of this study is due to its cross-sectional nature, as the relationships shown between the childbirth experience, depression, and anxiety, and some socio-demographic characteristics do not accurately indicate a causal relationship. In addition, the present study was conducted under COVID-19 pandemic conditions. These conditions negatively affect the psyche of humans, notably mothers in the postpartum period [60]. This study has the advantage of using standard tools. There is another strength to this study, which is its random sampling, which makes the study findings generalizable. However, the multicultural context of Iran will influence the human psyche [61], so similar studies need to be conducted in other provinces.

Conclusion

According to the results of the study, childbirth experience and control during pregnancy are predictive factors of postpartum depression, and control during pregnancy is a predictive factor of postpartum anxiety. Due to the impact of the mother's mental health on other aspects of a woman and her family's life, by better caring for mothers during childbirth and creating positive childbirth experiences, women can be better prepared to face the challenges of the postpartum period, and this identifies the core role of midwives, midwifery trainers, and health care policymakers in helping to create positive childbirth experiences according to the mothers' psychological needs.

Abbreviations

CEQ 2.0	Childbirth Experience Questionnaire
EPDS	Postpartum Depression Scale
PSAS-IR	Anxiety Scale in an Iranian population

NICU	neonatal intensive care unit
VAS	visual analogue scale
ICC	intra-correlation coefficient
SD	standard deviation
ANOVA	Analysis of variance
COVID-19	coronavirus disease of 2019

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40359-023-01105-6>.

Supplementary Material 1

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Authors' contributions

PA was involved in Study Design, search in databases, Writing – original draft, Conceptualization, Methodology, Data collection. Writing – review & editing. FF involved in Writing – original draft, Conceptualization, Methodology, Data collection. MM involved in Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. All authors read and approved the final manuscript.

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Data Availability

The datasets generated and/or analysed during the current study are not publicly available due to limitations of ethical approval involving the patient data and anonymity but are available from the corresponding author on reasonable request.

Competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics approval and consent to participate

Ethical approval was obtained by the local ethics committee of Tabriz University of Medical Sciences (Ethical code: IR.TBZMED.REC.1399.1109). The informed written consent was obtained from all participants. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

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