





# Determinants of Postpartum Post-traumatic Stress Disorder: A Cross-Sectional Study

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## Abstract

**Objectives:** Postpartum post-traumatic stress disorder (PTSD) is regarded as a life-threatening childbirth experience for mother or infant and may be accompanied with the risk of death or serious injury to the mother or her infant. Given the changes to diagnostic criteria of traumatic childbirth brought in with DSM-5 and considering the unfavorable outcomes of postpartum PTSD, this study was carried out to identify the determinants of postpartum PTSD.

**Materials and Methods:** This cross-sectional study was conducted in 2018 on 310 postpartum women who had experienced a traumatic childbirth, based on the DSM-5 criteria, and referred to Tabriz health centers for routine care 42-60 days after the delivery. Subjects were selected through convenience sampling. Research instruments were demographic, obstetric, and neonatal information questionnaire, Post-Traumatic Stress Checklist for DSM-5 Criteria (PCL-5), Mackey Childbirth Satisfaction Rating Scale, and Winefield and Tiggemann Social Support Questionnaire. The data were analyzed using SPSS version 25.0, and ANOVA, independent t-test, Pearson correlation coefficient test, Spearman correlation coefficient test, and multivariate linear regression were applied.

**Results:** The mean score ( $\pm$ standard deviation) of postpartum PTSD was 42.13 ( $\pm$ 11.72). The determinants of postpartum PTSD also included complications during pregnancy, type of delivery, concordance between desired and actual type of delivery, method of placenta removal, analgesia, sleeping and neonatal states, satisfaction with childbirth, and perceived support during and after childbirth.

**Conclusions:** Designing interventions to make childbirth more pleasant through provision of methods for a pain-free or pain-reduced childbirth, promotion of satisfaction with childbirth, and support during and after the childbirth seem to be essential for reducing postpartum PTSD.

**Keywords:** Post-traumatic stress disorder, Traumatic childbirth, Perceived support, Satisfaction with childbirth

## Introduction

Postpartum post-traumatic stress disorder (PTSD) is considered a life-threatening childbirth experience for mother or infant and may be accompanied with the risk of death or serious injury to the mother or her infant (1). The fifth version of The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) classifies post-traumatic stress as post-traumatic stress-related disorders that are comprised of four main signs of re-experiencing the event in mind (disturbing thoughts, nightmares, and flashbacks); avoiding the negative memories, thoughts, and feelings associated with the event; negative changes of the mood and cognition; and arousal and reactions such as restlessness, concentration and sleep problems, anger, and so forth (2).

The prevalence rate of postpartum PTSD varies from 1%-3% in most of the European countries including Britain, Germany, and Italy (3-5), 13% in France (6), 6% in Nigeria (7), 8%-9% in Canada and United States (8,9),

to 17%-39% in Iran (10,11).

Several consequences of postpartum PTSD include changes in mood and behavior, interference with mother's social functioning, negative impact on marital relations, and poor parental compliance (12).

Since complications linked to mental disorders impose direct and indirect costs on families and society, interventional measures should be taken for women prone to postpartum mental disorders in order to prevent the progress of the symptoms and complications. Considering the rather high prevalence rate of postpartum PTSD in Iran compared to other parts of the world and its unfavorable outcomes, this study was carried out to identify the PTSD-associated factors in order to provide adequate interventions for improving the mental health of childbearing women. Given the changes to the diagnostic criteria of traumatic childbirth from DSM-IV to DSM-V, the present study was conducted in accordance with the fifth edition of DSM.

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## Methods and Materials

This cross-sectional study was conducted from April to September 2018. The population under study included all of the postpartum women with a traumatic childbirth who had referred to Tabriz health centers 42-60 days after the delivery for the second postpartum care and had been examined for postpartum PTSD.

In the present study, sample size was calculated using the following formula:

$$n = \frac{Z^2 \frac{1-\alpha}{2} \delta^2}{d^2}$$

Based on the study results of Mousavi et al (13) with  $m = 18.5$ ,  $SD = 8.3$ ,  $\alpha = 0.05$ , a confidence interval of 95%, and  $d = 0.925$ , the sample size was calculated to be 310. Multistage sampling was conducted in such a way that out of 78 health centers of Tabriz, around half or 39 centers were selected randomly using [www.random.org](http://www.random.org) website from which subjects were chosen by means of convenience sampling. Inclusion criteria were vaginal delivery or cesarean section (C-section) and traumatic childbirth according to DSM-5 [A] criteria (14). Childbirth would be traumatic if the answer to at least one of the following questions was positive: during labor or delivery, was your life or your baby's in danger?; and during labor or delivery, did you fear serious injury to yourself or your baby?

Women with illegitimate pregnancy, history of known mental illnesses, history of systemic or chronic illnesses or aggravating disorders during pregnancy and childbirth, and history of recent tragic accident such as death of first-degree relatives over the last 6 months were excluded from the study.

Subjects would be provided with information about the research goals and methods, as well as confidentiality of the data if they were interested, and written informed consent was obtained from those who were interested to participate. A total of 310 women responded to the following questionnaires 42-60 days after the delivery: demographic, obstetric, and neonatal information questionnaire, Post-Traumatic Stress Checklist for DSM-5 Criteria (PCL-5), Mackey Childbirth Satisfaction Rating Scale (MCSRS), and Winefield and Tiggemann Social Support Questionnaire. To avoid participant fatigue, some of the items such as neonatal weight, gestational age, and the like were responded by the researcher based on their files.

Demographic, obstetric, and neonatal information questionnaire asked for the following information: age, education level, employment status, income level, parity, pregnancy intention (wanted or unwanted), obstetric complications during pregnancy, delivery, and postpartum, type of delivery, concordance or discordance between desired and actual type of delivery, history of infertility or preterm childbirth, interval between the last two pregnancies, childbirth agent and location, birth weight and age, neonatal gender, concordance between

desired and actual infant's gender, type of neonatal nutrition, neonatal hospitalization, and infant's sleeping and crying statuses.

The postpartum PTSD score was calculated using the PCL5 checklist which is based on the PTSD criteria proposed in DSM-5. The checklist has 20 multiple-choice items scored from zero to four and its total score is ranged from zero to 80. Respondents may choose the answers they have felt over the past month. Scores between 0-20 indicate absence of PTSD, 21-40 mild PTSD, 41-60 moderate PTSD, and 61-80 suggest severe PTSD (15).

MCSRS is a 40-item scale of which 34 items measure six areas including satisfaction with self-performance, nurse's performance, accompanier's performance, physician's performance, neonatal state, and overall satisfaction with childbirth. The items are scored on a 5-point Likert scale from highly dissatisfied to highly satisfied with the scores varying from 34 to 170 (16). Cronbach's alpha of the localized version of MCSRS was calculated at 0.78 by Moudi et al and the stability was found to be 0.98 by calculating the ICC (17).

Winefield and Tiggemann Social Support Questionnaire consists of six items that are scored either zero or 1 based on negative or positive responses with the total score ranging from 0 to 6 (18). Cronbach's alpha of the localized version of this questionnaire was reported 0.80 by Sadr et al and the stability was found to be 0.95 through retest (19).

The data collected from the questionnaires were analyzed using SPSS version 25.0, and descriptive statistics including frequency, percentage, mean, and standard deviation, and analytical statistics including independent t-test, Pearson correlation coefficient test, Spearman correlation coefficient test, and one-way ANOVA were applied. To control the confounding variables and estimate the effect size of each independent variable (demographic and obstetric-neonatal information, satisfaction with childbirth, and perceived support) on the dependent variable (postpartum PTSD), those variables whose  $P$  value was less than 0.2 in the two-variable test were introduced into the backward multivariate linear regression model.

## Results

The mean age of the participants was  $30.3 (\pm 6.2)$  and the mean score of postpartum PTSD was  $42.13 (\pm 11.72)$ . The prevalence of postpartum PTSD was 22.9% ( $n = 71$ ) in the present study. The two-variable test revealed that there was a significant relationship between postpartum PTSD and the following variables (Table 1): income level ( $P = 0.008$ ), parity ( $P = 0.004$ ), pregnancy intention ( $P = 0.002$ ), complications during pregnancy ( $P < 0.001$ ), type of delivery ( $P = 0.007$ ), analgesia ( $P = 0.01$ ), concordance between the desired and actual type of delivery ( $P < 0.001$ ), method of placenta removal ( $P = 0.002$ ), concordance between the desired and actual infant's gender ( $P < 0.001$ ), type of neonatal nutrition ( $P < 0.001$ ), neonatal status

**Table 1.** Demographic and Maternal-Neonatal Characteristics of the Study Population and its Relation With Postpartum PTSD

Variable	No. (%)	P-value	Variable	No. (%)	P-value
Age (y)*	30.3 (6.2)	0.85#	<b>Obstetric complications during pregnancy, delivery, and postpartum</b>		<0.001\$
<b>Employment status</b>		0.79\$	Yes	91 (29.3)	
Housewife	268 (86.4)		No	219 (70.6)	
Employed	42 (13.5)		<b>Pregnancy intention</b>		0.002\$
<b>Education level</b>		0.26†	Wanted	211 (68.0)	
Elementary/guidance school	108 (34.8)		Unwanted	99 (31.9)	
High school/diploma	168 (54.1)		<b>Episiotomy</b>		0.94\$
Academic	34 (10.9)		Yes	85 (27.4)	
<b>Income level</b>		0.008†	No	94 (30.3)	
Insufficient	79 (25.4)		<b>Analgesia</b>		0.01†
Relatively sufficient	169 (54.5)		General anesthesia (cesarean)	21 (6.7)	
Sufficient	62 (20)		Local anesthesia (cesarean )	110 (35.4)	
<b>Parity</b>		0.004\$	Physiologic childbirth	46 (14.8)	
Primipara	151 (48.7)		Pharmacological management of pain during vaginal childbirth	45 (14.5)	
Multipara	159 (51.2)		No analgesia	88 (28.3)	
			<b>Gestational age (weeks) *</b>	38.6 (2.36)	0.27#
<b>Interval of the last two pregnancies *</b>	3.63 (3.2)	0.5#	<b>Neonate's illness and hospitalization</b>		0.97\$
<b>Type of delivery</b>		0.007†	Yes	32 (10.3)	
Spontaneous vaginal delivery	179 (57.7)		No	278 (89.6)	
Instrumental vaginal delivery	3 (0.9)		<b>Neonatal gender</b>		0.46\$
Pre-planned C-section	61 (19.6)		Girl	143 (46.1)	
Emergency C-section	67 (21.6)		Boy	167 (53..8)	
<b>Concordance between the desired and actual type of delivery</b>		<0.001\$	<b>Concordance between the desired and actual infant's gender</b>		<0.001\$
Concordance	216 (69.6)		Yes	169 (54.4)	
Discordance	94 (30.3)		No	141 (0.4)	
<b>Childbirth agent</b>		0.22\$	<b>Infant's sleeping and crying statuses</b>		<0.001\$
Obstetrician	207 (66.7)		Sleeping disorders and restlessness of the infant and infant crying	87 (28.0)	
Midwife	103 (33.2)		Relaxed	223 (71.9)	
<b>Childbirth location</b>		0.17†	<b>Type of neonatal nutrition</b>		<0.001†
Private hospital	67 (21.6)		Breast milk	221 (71.2)	
Public hospital	179 (57.7)		Baby formula	78 (25.1)	
Social security hospital	64 (20.6)		Breast milk and baby formula	11 (3.5)	
<b>Satisfaction with childbirth *</b>	100 (34.1)	<0.001#	<b>Method of placenta removal</b>		0.002\$
<b>Perceived support during and after childbirth *</b>	3.74 (1.6)	<0.001#	Spontaneous	155 (50)	
<b>Birth weight (g) *</b>	3386 (928)	0.34#	Manual placenta removal	24 (7.7)	

\* Mean (SD); † Pearson correlation; ‡ ANOVA; § Independent samples t test.

( $P<0.001$ ), satisfaction with the childbirth ( $P<0.001$ ), and perceived support during and after childbirth ( $P<0.001$ ).

Having the variables with  $P<0.2$  introduced into the multivariate linear regression model, the determinants of postpartum PTSD were identified as follows: complications during pregnancy, delivery and postpartum ( $P=0.012$ ), type of delivery ( $P<0.001$ ), concordance between the desired and actual type of delivery ( $P=0.013$ ), method of placenta removal ( $P=0.001$ ), analgesia ( $P=0.007$ ), neonatal status ( $P=0.001$ ), satisfaction with the childbirth ( $P=0.001$ ), and perceived support during and after childbirth ( $P<0.001$ ). These variables could explain 46% of the variance (Table 2).

## Discussion

According to the results of the present study, the prevalence

of postpartum PTSD was 22.9%. While the prevalence rates of postpartum PTSD, according to previous editions of DSM, were 1%-13% in European countries (3,6), 8%-9% in Canada and the United States (8,9), and 17%-39% in different cities of Iran (10,11).

Complications during pregnancy, and delivery and postpartum were the determinants of postpartum PTSD. Consistent with the present study, Adewuya et al reported history of hospitalization due to pregnancy complications as one of the important factors of developing postpartum PTSD (7). Maggioni et al argued that the incidence of pregnancy complications could contribute to the development of postpartum PTSD through stress about fetal health and pregnancy outcomes (4). In line with the present study, Modarres et al and Shaban et al also stated that pregnancy and postpartum complications were linked

**Table 2.** Predictors of Postpartum PTSD Based on Multivariate Linear Regression Model

Variable	$\beta$ (CI 95%)*	P Value <sup>a</sup>
<b>Complications during pregnancy, delivery, and postpartum (reference: no complications)</b>		0.012
Exposure to complications during pregnancy, delivery, and postpartum	0.13 (0.05-0.66)	
<b>Type of delivery (reference: vaginal)</b>		<0.001
Emergency C-section	0.25(0.07-0.88)	
Pre-planned C-section	-0.22 (-0.16--0.44)	
<b>Concordance between the desired and actual type of delivery (reference: concordance)</b>		0.013
Discordance	0.14 (0.07-0.90)	
<b>Method of placenta removal (reference: spontaneous)</b>		0.001
Manual placenta removal	0.17(0.01-0.35)	
<b>Analgesia (reference: use of analgesia)</b>		0.007
No analgesia	0.15(0.11-0.18)	
<b>sleeping and neonatal states (reference: relaxed)</b>		0.001
Sleeping disorders and restlessness of the infant and infant crying	0.20(0.19-0.27)	
<b>Satisfaction with childbirth</b>		0.001
<b>Perceived support during and after childbirth</b>		<0.001
	-0.20(-0.19--0.27)	

Note: Adjusted R<sup>2</sup>: 0.46; <sup>a</sup> Multivariate linear regression.

to the incidence of postpartum PTSD (20,21). Vizeh et al found a relationship of pregnancy complications, and not postpartum complications, with postpartum PTSD (10).

Satisfaction with the childbirth was another predictor of postpartum PTSD. Similarly, a significant relationship was reported in the literature between pregnancy experiences and postpartum PTSD (22,23). Dekel et al reported the negative mental experience of childbirth as the most important predictor of postpartum PTSD (24). In line with previous studies (15,25), a significant relationship was also found between manual placenta removal and postpartum PTSD which is possibly because of the relationship between method of placenta removal and childbirth experiences. Use of analgesics was yet another predictor of postpartum PTSD in the current study, which is consistent with the results of Adewuya et al and Gamble et al (7,26), and it is likely related to the association between analgesia and childbirth experiences.

Furthermore, type of delivery was another predictor of postpartum PTSD surveyed in the present study. Women with emergency C-section had experienced more severe postpartum PTSD than those with pre-planned C-section and spontaneous vaginal delivery; this can also be accounted for the relationship between childbirth experiences and postpartum PTSD. Likewise, Modarres et al found a significant relationship between the type of delivery and postpartum PTSD (20). A significant relationship was also found by Maggioni et al between emergency C-section and instrumental vaginal delivery and postpartum PTSD (4). Rowlands and Redshaw reported the highest rate of postpartum PTSD in forceps delivery (27). However, Adams et al did not find any relationship between the type of delivery and mental complications (28). These differences might be associated with varied prevalence of different delivery types and differences in quality of deliveries in different countries.

There were only three cases of instrumental delivery in our study.

Another predictor of postpartum PTSD was discordance between the desired and actual type of delivery which is consistent with the findings of Garthus-Niegel et al (29).

Perceived support during and after the childbirth was also a predictor of postpartum PTSD. Social support plays a remarkable role in lowering the postpartum stress and other mental problems (30). Many studies have shown that mother's adaptive behavior is related to her perception of positive supports such that having a good relationship with husband, relatives, and friends can help acquire the maternal role (31). Hollander et al argued that the emotional-physical support from the caregiver team during labor and delivery led to a declined postpartum PTSD (23), and Simpson and Catling reported low-quality interactions of childbirth caregivers as an important risk factor for traumatic childbirth (22). Abedian et al and Mokhtari et al also concluded that little social support during and after childbirth could contribute to postpartum PTSD (32,33). Yet, no significant relationship has been reported in other studies between perceived social support and postpartum PTSD (5,7,21). This might be attributed to the difference in the research populations and in perception of the notion 'social support'.

Sleeping disorders and restlessness of the infant was another predictor of postpartum PTSD. Previous studies have also reported a significant relationship between the two variables (34). As an example, Shaban et al found that infant crying and problems in taking care of the infant contribute to the incidence of postpartum PTSD (21). A significant relationship was also reported between infant crying and postpartum depression (35,36). In general, mothers who have problems in dealing with infant crying may experience more postpartum anxiety. The stress from taking care of the infant and sleep deprivation can

exacerbate the mothers' mood swings (37).

No significant relationship was found in the present study between parity and postpartum PTSD, as consistent with the results of Söderquist et al (5), while Cigoli et al found that primiparity was related to the development of postpartum PTSD (38). Vizeh et al, nonetheless, showed that higher parity could lead to lower incidence of postpartum PTSD (10).

The present study could not find a relationship between the interval of the last two pregnancies and postpartum PTSD, but Modarres et al and Kendall-Tackett reported a significant relationship between the two variables (20,39).

Moreover, no significant relationship was found between neonatal gender and postpartum PTSD. Given the dominant culture of preference for male children in South and East Asia, this finding may be an indication of cultural development in accepting the infant's gender regardless of past traditional views among Iranian women and families.

One strong point of the present study was the application of standard questionnaires. Utilization of DSM-V and adequate sample size were other strong points of the study. One limitation this study suffered from was the cross-sectional design which is unable to explore cause-effect relations. Therefore, designing prospective studies are recommended in the future. In addition, because of the wide range of factors associated with postpartum PTSD, it was not possible to study pregnancy and childbirth-related factors such as domestic violence, marital satisfaction, and history of sexual abuse.

### Implications for Practice

The results of this study suggest that in order to reduce postpartum PTSD, it is necessary to design interventions that would make childbirth more pleasant. Providing methods for a pain-free and pain-reduced childbirth, improving satisfaction with the childbirth, and providing support during and after the childbirth could be some examples.

### Conflict of Interests

Authors have no conflict of interests.

### Ethical Issues

The Ethics Committee of Tabriz University of Medical Sciences approved the study (TBZMED.REC.1395.547).

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