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Chapter

Cesarean Delivery and Mental Health

Evangelia Antoniou, Eirini Orovou, Alexandros Papatrechas, Christiana Arampatzi and Panagiotis Eskitzis

Abstract

A delivery by cesarean can be a cause of development of mental illness, especially posttraumatic stress disorder or the profile of the disorder for a percentage of women. Despite the global increase in cesarean deliveries, there is a paucity of adequate research into posttraumatic stress disorder after cesarean delivery and at many times is associated with other mental disorders of the postpartum period. The purpose of this research is to identify if there is a link between the type of cesarean delivery and posttraumatic stress disorder among postpartum women. Our sample consisted of 162 women who underwent a cesarean section in a public University Hospital in Greece and consented to participate in the study. The results show a high prevalence of postpartum posttraumatic stress disorder (31.7%) and profile postpartum post-traumatic stress disorder (14.3%) in women after emergency cesarean delivery with additional risk factors of preterm delivery, inclusion in Neonatal Intensive Care Unit, lack of support from the partner, and lack of breastfeeding.

Keywords: cesarean delivery, emergency cesarean section, elective cesarean section, posttraumatic stress disorder, postpartum period, mental health

1. Introduction

Posttraumatic stress disorder (PTSD) is a psychiatric disorder that may occur to a person who has experienced or witnessed a traumatic event such as a natural disaster, a serious accident, sexual violence, threatened death or death, serious injury, or extreme repeated exposure to the workplace [1]. PTSD has been known by other names in the past, such as “shell shock” during the World War I and “combat fatigue” after World War II. PTSD can happen in all people of any nationality or culture and at any age [2]. However, the prevalence of PTSD is about 10–12% in women and 5–6% in men [3], and this shows how it is influenced by traumatic birth experiences, hormonal disorders, stressful life events, and domestic violence [4]. PTSD is diagnosed after a month of a traumatic event and characterized by four main types of symptoms: re-experiencing, avoidance, negative thoughts and feelings, and arousal [5].

On the other hand, partial or profile PTSD involves many PTSD symptoms but not all, since persons exposed to the traumatic event do not meet all PTSD criteria. This is PTSD profile, which has been shown to be associated with high rates of suicidal

ideation, alcoholism, absence in the working environment, and overconsumption of health services [6, 7].

1.1 Postpartum PTSD (P-PTSD)

For several years, the birth experience was considered by scientists as a positive experience for the woman. In recent years, however, research into birth trauma has increased interest, and it is now known that one out of three women had a stressful childbirth experience [8], while approximately 6% of women will develop acute PTSD and up to 16% clinically significant PTSD symptoms [9].

A traumatic birth experience can affect to a significant extend the woman herself and her family. Actually, P-PTSD may impair a mother-child bond and has an indirect adverse effect on the newborn's health. Also, P-PTSD or PTSD profile can overshadow the relationship with the partner and the desire to acquire another child in the future [10].

P-PTSD is the outcome of interaction between pre-labor, intrapartum, and postpartum vulnerability factors [11]. Various conditions seem to affect the development of this disorder, such as pregnancy pathology, complications during birth, emergency cesarean section, personal history of psychiatric disorders, fear of childbirth, and previous traumatic events in the mother's life [12–15]. Past traumatic life events may lead to a new PTSD after a traumatic birth experience. For explanation, the past traumas can be recalled and cause posttraumatic symptoms of an old PTSD [12, 13, 16].

Comorbidity of P-PTSD and depression is a very common phenomenon as evident in up to 70% of postpartum women endorsing P-PTSD [17]. Furthermore, suicidal ideation prevails in about 20% of women with P-PTSD [9], and for this reason, this postpartum mental disorder deserves more attention.

1.2 P-PTSD after cesarean delivery

The type of delivery and the P-PTSD was the subject of research by several researchers [10, 18, 19]. Regarding cesarean sections (CSs), however, there are studies that do not differentiate the outcome between emergency cesarean section (EMCS) and elective cesarean section (ELCS), and they finally consider that there is no connection between EMCS and PTSD [20–23]. On the other hand, there are many surveys that support a strong relationship between P-PTSD and EMCS in contrast to other kinds of delivery [16, 24–26]. So far, only two surveys investigate the correlation between EMCS and P-PTSD. A study published in 1997 was the first one showing that the majority of women experienced EMCS as a mental trauma [27], as well as a following article, that investigated the P-PTSD symptoms 3 months postpartum [27]. An explanation for this correlation is that the EMCS could be an unexpected outcome for some women who going through a difficult vaginal delivery were rushed into the operating room and underwent surgery with spinal/epidural anesthesia and in some cases, general anesthesia [28]. Furthermore, some studies also identified that past traumatic life events, low social support, poor coping skills, and psychiatric history are more determining factors for the development of P-PTSD [11, 13, 29].

1.3 P-PTSD after cesarean delivery in Greece

In Greece during 2019, there were about 85.000 [30], of which more than 50% were CS [31]. As a result, Greece occupies one of the greater positions worldwide [32].

Apart from Greece, other countries such as Turkey, Mexico, Chile, Korea, Poland, and Hungary have been in the top positions in the world [33], which shows that the mothers of these countries are more exposed to birth trauma and consequently, more likely to develop P-PTSD or other mental disorder of postpartum period. So far, no research has been carried out in Greek women on P-PTSD or PTSD Profile, while the data are limited to other medical disorders of the postpartum period, such as depression [34, 35]. Therefore, this is the first survey that investigates P-PTSD in Greek women and specifically in a group of women who are more exposed to birth trauma. The purpose of this investigation is first to study the frequency of P-PTSD between two groups of women (EMCS and ELCS) in the sixth week postpartum and secondly to determine the risk factors and their degree of contribution to the development of P-PTSD and PTSD Profile. After identifying the risk factors, it is expected to develop specialized midwifery interventions and treatment in women with P-PTSD. This survey should signal the start of further investigations in the P-PTSD in Greece.

2. Methods

This prospective cohort study took place from July to November 2019, at the obstetric Clinic of the University Hospital of Larisa in Greece. The survey was approved by the Ethics Commission of Hospital. Approval: 18838/08-05-2019. This study used a descriptive design to record the prevalence of P-PTSD and PTSD Profile 6 weeks after CS (Criterion F of PTSD, DSM-5) [36]. As well as the risk factors that may lead to the development of these disorders.

2.1 Study participants

All participants were postpartum women who underwent a CS and had a medical dossier in the specific hospital. From this study excluded all women with issues at a cognitive level, who do not speak Greek or those whose pregnancy was monitored in another hospital. Furthermore, the women who used psychotropic substances or drugs were excluded (Criterion H of PTSD, DSM-5) [36], as well as underage mothers.

2.2 Data and measures

The data were collected in two stages. The first stage was the second day after CS, and the second stage was the sixth week after childbirth. During the first stage that coincides with the recovery of the woman after cesarean delivery, so that they can answer the questions of the psychometric tools, we collected medical, sociodemographic, past traumatic life events, and the identification or not of the cesarean delivery being a traumatic event from the total sample of 160 women who met the criteria for participation. The specific period of time was selected in order to meet the Criterion F of DSM-5 of PTSD [36]. All measures were made By the National Center of PTSD staff according to the DSM-5 Criteria [5] translated and weighted into the Greek language by the investigator midwife.

2.2.1 Sociodemographic questionnaire

The research-made questionnaire includes items on medical (obstetric/neonatal), social, demographic, and mental characteristics of the postpartum women. It also

included information on the experience of the traumatic cesarean delivery or conditions associated with neonatal complications.

2.2.2 The life events checklist (LEC-5) of DSM-5

The LEC-5 is a self-report tool for screen previous traumatic events in a person's life. The measure evaluates exposure to 16 traumatic events known to result in trauma and one item evaluating any other event not captured in 16 items [37]. The LEC-5 is the only measure that the persons can define different exposure status of a traumatic event, while there is no score or rating [38].

2.2.3 Posttraumatic stress checklist (PCL-5) of DSM-V

The (PCL-5) is a self-report measure, authored by the National Center of PTSD according to the DSM-5, which was constructed to assess PTSD symptoms. In this study, the postpartum women answered via telephone to questions that corresponded to four groups of criteria (re-experiencing, avoidance, negative thoughts and feelings, arousal, and reactivity) [39]. The answers range by 0–4 and a score of 1 or more in items of re-experiencing and avoidance, and 2 or more in items of negative thoughts and feelings and arousal and reactivity, are considered as possible PTSD. If all the above criteria are met along with criterion A, the provisional diagnosis of PTSD is made. To diagnose the severity of the symptomatology, the score of the rating from all the answers can be used. A score ≥ 33 of PCL-5 can also considered as a possible PTSD [40–43]. The disorder is divided into two categories: (a) the provisional PTSD diagnosis and, (b) PTSD Profile (which includes some of its basic symptoms) [6, 7, 23]. The PCL-5 has very good psychometric properties and can be used to diagnose PTSD in many population groups [13, 44].

3. Results

Data from 160 postpartum women after EMCS and ELCS were analyzed. The sample characteristics according to the type of cesarean delivery are presented in **Table 1**. A percentage of 39.4% of women had an EMCS and 60.6% had an ELCS. Other demographic factors such as, age, nationality, family and financial status, and medical history are similar in the two groups of postpartum women. Women who underwent an ELCS were more likely to have a previous birth or a previous cesarean delivery and less likely to have a psychiatric history. Additionally, the median number of traumatic events that were recorded was greater in the group of women who had an EMCS.

3.1 Pregnancy and delivery characteristics

Pregnancy and delivery characteristics are shown in **Table 2**. In the EMCS group, a greater proportion of women had complications during pregnancy or required inclusion to the Neonatal Intensive Care Unit (NICU). Women with ELCS reported more support from their partners and had significantly lower proportions of reported traumatic birth experience. In addition, postpartum mothers with EMCS had a lower rate of breastfeeding (**Figure 1**) and expectations for their birth experience.

| | Total sample (N = 160) | Type of c-section | | P |
|--|---------------------------|---------------------------------|-------------------------------|---------------------|
| | | Emergency (N = 63; 39.4%) | Planned (N = 97; 60.6%) | |
| | N (%) | N (%) | N (%) | |
| Age, mean (SD) | 33.1 (5.9) | 32.7 (6.3) | 33.4 (5.6) | 0.506 [‡] |
| Married/engaged/in a relationship | 154 (96.3) | 62 (98.4) | 92 (94.8) | 0.404 ⁺⁺ |
| Educational level | | | | |
| Primary/middle/high school graduate | 81 (50.6) | 34 (54) | 47 (48.5) | 0.495 ⁺ |
| University alumni/MSc/PhD | 79 (49.4) | 29 (46) | 50 (51.5) | |
| Financial status | | | | |
| Low | 18 (11.3) | 9 (14.3) | 9 (9.3) | 0.185 ⁺⁺ |
| Middle | 134 (83.8) | 53 (84.1) | 81 (83.5) | |
| High | 8 (5.0) | 1 (1.6) | 7 (7.2) | |
| Nationality | | | | |
| Greek | 149 (93.1) | 57 (90.5) | 92 (94.8) | 0.344 ⁺⁺ |
| Other | 11 (6.9) | 6 (9.5) | 5 (5.2) | |
| Parity | | | | |
| 0 | 79 (49.4) | 46 (73) | 33 (34) | <0.001 ⁺ |
| 1 | 61 (38.1) | 13 (20.6) | 48 (49.5) | |
| >1 | 20 (12.5) | 4 (6.3) | 16 (16.5) | |
| Type of previous labor | | | | |
| Vaginal | 16 (19.8) | 8 (47.1) | 8 (12.5) | 0.010 ⁺⁺ |
| C-section | 62 (76.5) | 9 (52.9) | 53 (82.8) | |
| Both | 3 (3.7) | 0 (0.0) | 3 (4.7) | |
| Psychiatric history | 21 (13.1) | 8 (12.7) | 8 (8.2) | 0.337 ⁺ |
| Number of traumatic events, median (IQR) | 1 (0–2) | 2 (0–4) | 1 (0–3) | 0.012 ^{##} |
| Medical history | 54 (33.8) | 23 (36.5) | 31 (32) | 0.552 ⁺ |

⁺Pearson's chi-square test.
⁺⁺Fisher's exact test.
[‡]Student's t-test.
^{##}Mann-Whitney test.

Table 1.
 Sample characteristics in total and according to the type of cesarean delivery.

3.2 The prevalence of PTSD symptoms among postpartum women

The prevalence of PTSD with Profile PTSD was 14.3% in women with EMCS and 4.1% in women with ELCS, while the prevalence of PTSD in women with EMCS was 31.7% and 1% in women with ELCS (**Figure 2**).

| | Total sample (N = 160) | Type of CS | | P |
|--------------------------------|---------------------------|----------------------------|----------------------------|---------------------|
| | | EMCS (N = 63; 39.4%) | ELCS (N = 97; 60.6%) | |
| | N (%) | N (%) | N (%) | |
| Conception | | | | |
| Normal | 145 (90.6) | 58 (92.1) | 87 (89.7) | 0.615 ⁺ |
| IVF | 15 (9.4) | 5 (7.9) | 10 (10.3) | |
| Problems during pregnancy | 70 (43.8) | 35 (55.6) | 35 (36.1) | 0.015 ⁺ |
| Gestational week, mean (SD) | 37.7 (2.1) | 37.4 (3) | 38 (1.2) | 0.066 [‡] |
| Preterm labor | 133 (83.1) | 48 (76.2) | 85 (87.6) | 0.059 ⁺ |
| NICU | 30 (18.8) | 19 (30.2) | 11 (11.3) | 0.003 ⁺ |
| Support from spouse | 132 (82.5) | 46 (73) | 86 (88.7) | 0.011 ⁺ |
| Expectations | 89 (55.6) | 16 (25.4) | 73 (75.3) | <0.001 ⁺ |
| Traumatic c-section | 64 (40) | 45 (71.4) | 19 (19.6) | <0.001 ⁺ |
| Breastfeeding | 110 (68.8) | 36 (57.1) | 74 (76.3) | 0.011 ⁺ |

⁺Pearson's chi-square test.
[‡]Student's t-test.

Table 2.
Pregnancy and delivery characteristics.

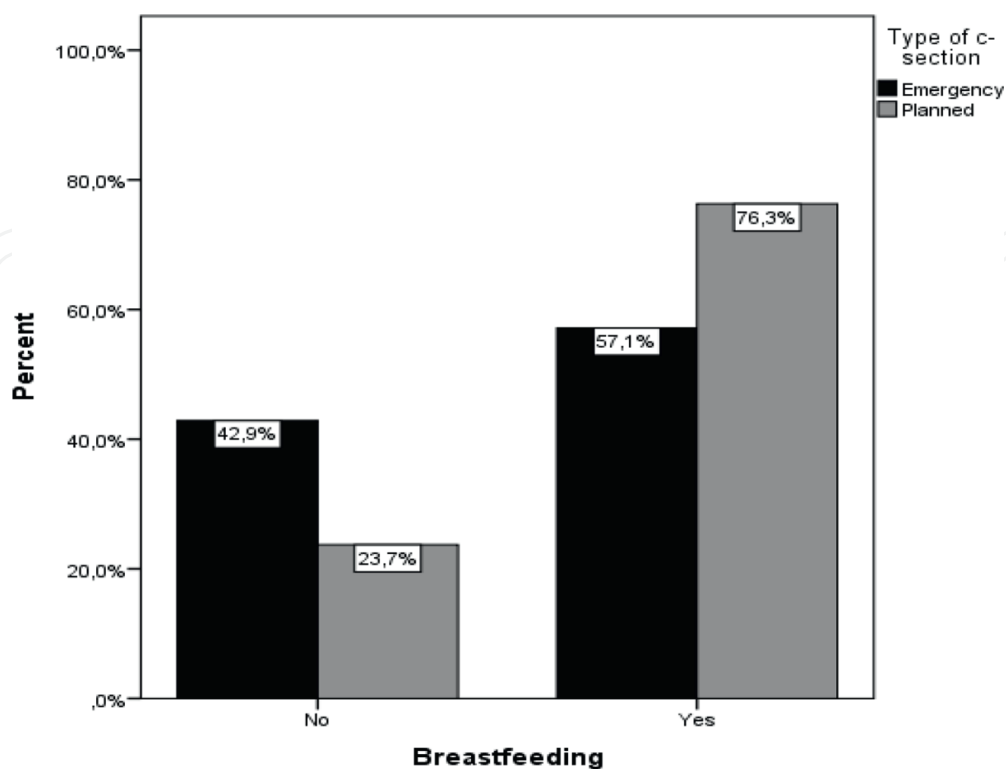


Figure 1.
Type of CS and rates of breastfeeding.

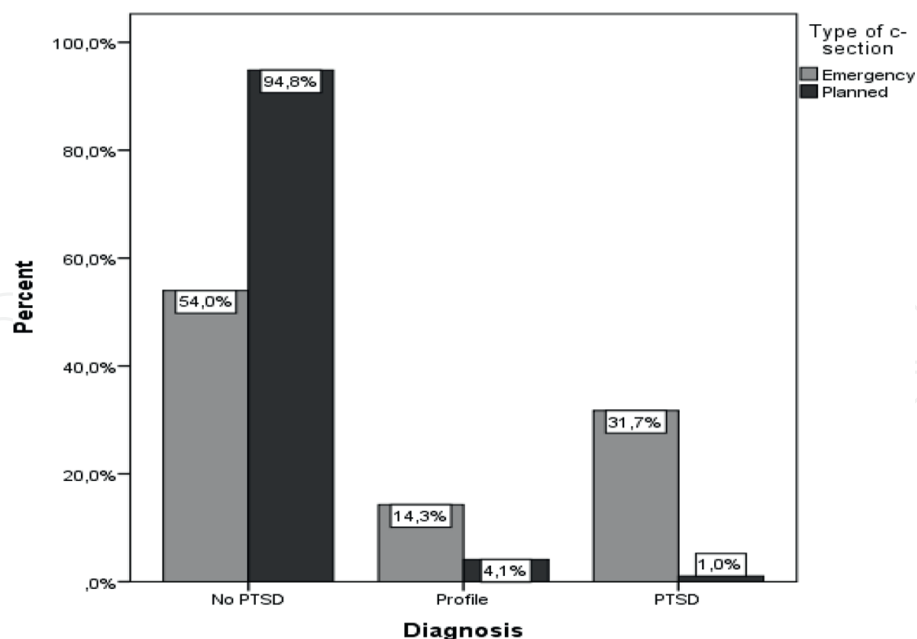


Figure 2.
 Proportions of women with PTSD according to type of cesarean delivery.

Table 3 shows an overview of PTSD profile and PTSD symptoms in women after EMCS and ELCS. Among the postpartum women, the prevalence of criterion A is 25.6% (ELCS = 7.2% and EMCS = 54%) and those who met the other four criteria of symptoms is between 19 and 26.3% (ELCS = 7.2–10.3% and EMCS = 36.4–52.5%). After cesarean delivery, a total of 13.1% of women after CS met the all PTSD criteria according to the DSM-5.

| | Total sample (N = 160) | Type of CS | | P |
|---------------------------------------|---------------------------|----------------------------|----------------------------|----------------------|
| | | EMCS (N = 63; 39.4%) | ELCS (N = 97; 60.6%) | |
| | N (%) | N (%) | N (%) | |
| Criterion A | 41 (25.6) | 34 (54) | 7 (7.2) | <0.001 ⁺ |
| Re-experiencing (B) | 42 (26.3) | 33 (52.4) | 9 (9.3) | <0.001 ⁺ |
| Avoidance (C) | 42 (26.3) | 32 (50.8) | 10 (10.3) | <0.001 ⁺ |
| Negative thoughts and feelings (D) | 43 (26.9) | 33 (52.4) | 10 (10.3) | <0.001 ⁺ |
| Arousal and reactivity (E) | 31 (19.4) | 23 (36.5) | 8 (8.2) | <0.001 ⁺ |
| Diagnosis | | | | |
| No PTSD | 126 (78.8) | 34 (54) | 92 (94.8) | <0.001 ⁺ |
| PTSD Profile | 13 (8.1) | 9 (14.3) | 4 (4.1) | |
| Provisional PTSD | 21 (13.1) | 20 (31.7) | 1 (1.0) | |
| PTSD score, median (IQR) | 2 (0–17) | 17 (2–32) | 0 (0–4) | <0.001 ^{##} |

⁺Pearson's chi-square test.
^{##}Mann-Whitney test.

Table 3.
 PTSD profile and PTSD symptoms in women after EMCS and ELCS.

Cesarean Section - Updated Data

| | | Diagnosis | Unadjusted OR (95% CI) | P | Adjusted OR (95% CI) | P | |
|---|--|---------------------|------------------------|----------------------|----------------------|----------------------|-------|
| | | No PTSD/ Profile | PTSD | | | | |
| | | N (%) | N (%) | | | | |
| Age | | 33.3 (5.7) | 32 (7.3) | 0.97 (0.90–1.04) | 0.380 | 0.89 (0.77–1.03) | 0.105 |
| Married/ engaged/in a relationship | No | 5 (83.3) | 1 (16.7) | 1.00 ⁺ | | 1.00 | |
| | Yes | 134 (87.0) | 20 (13.0) | 0.75 (0.08–6.72) | 0.794 | 0.53 (0.01–54.52) | 0.787 |
| Educational level | Primary/ middle/ high school graduate | 70 (86.4) | 11 (13.6) | 1.00 | | 1.00 | |
| | University alumni/ MSc/PhD | 69 (87.3) | 10 (12.7) | 0.92 (0.37–2.31) | 0.863 | 1.43 (0.33–6.13) | 0.630 |
| Financial status | Low | 14 (77.8) | 4 (22.2) | 1.00 | | 1.00 | |
| | Middle/ high | 125 (88.0) | 17 (12.0) | 0.48 (0.14–1.61) | 0.234 | 2.26 (0.16–32.05) | 0.548 |
| Nationality | Greek | 129 (86.6) | 20 (13.4) | 1.00 | | 1.00 | |
| | Other | 10 (90.9) | 1 (9.1) | 0.65 (0.08–5.31) | 0.684 | 0.16 (0.01–3.11) | 0.225 |
| Parity | 0 | 66 (83.5) | 13 (16.5) | 1.00 | | 1.00 | |
| | > = 1 | 73 (90.1) | 8 (9.9) | 0.56 (0.22–1.43) | 0.222 | 1.36 (0.11–16.79) | 0.810 |
| Previous CS | No | 79 (83.2) | 16 (16.8) | 1.00 | | 1.00 | |
| | Yes | 60 (92.3) | 5 (7.7) | 0.41 (0.14–1.19) | 0.100 | 0.9 (0.05–15.07) | 0.944 |
| Psychiatric history | No | 126 (90.6) | 13 (9.4) | 1.00 | | 1.00 | |
| | Yes | 13 (61.9) | 8 (38.1) | 5.96 (2.09–17.04) | 0.001 | 2.79 (0.55–14.17) | 0.216 |
| Number of traumatic events, median (IQR) | | 1 (0–3) | 3 (1–5) | 1.29 (1.06–1.57) | 0.013 | 1.34 (0.84–2.18) | 0.211 |
| Full-term labor | No | 18 (66.7) | 9 (33.3) | 1.00 | | 1.00 | |
| | Yes | 121 (91) | 12 (9) | 0.19 (0.07–0.54) | 0.001 | 0.34 (0.06–1.83) | 0.208 |

| | | Diagnosis | Unadjusted OR (95% CI) | P | Adjusted OR (95% CI) | P | |
|-------------------------|-----------|---------------------|------------------------------|----------------------------|----------------------------|----------------------------|--------|
| | | No PTSD/ Profile | PTSD | | | | |
| | | N (%) | N (%) | | | | |
| Type of CS | Planned | 96 (99.0) | 1 (1.0) | 1.00 | | 1.00 | |
| | Emergency | 43 (68.3) | 20 (31.7) | 44.65 (5.80– 343.50) | <0.001 | 46.55 (6.00– 360.81) | <0.001 |
| NICU | No | 121 (93.1) | 9 (6.9) | 1.00 | | 1.00 | |
| | Yes | 18 (60.0) | 12 (40) | 8.96 (3.31– 24.27) | <0.001 | 9.00 (3.31– 24.49) | <0.001 |
| Support from partner | No | 20 (71.4) | 8 (28.6) | 1.00 | | 1.00 | |
| | Yes | 119 (90.2) | 13 (9.8) | 0.27 (0.10– 0.74) | 0.011 | 0.27 (0.10– 0.74) | 0.011 |
| Expectations | No | 50 (70.4) | 21 (29.6) | | | | |
| | Yes | 89 (100.0) | 0 (0.0) | – ⁺⁺ | – | – | – |
| Traumatic CS | No | 96 (100.0) | 0 (0.0) | | | | |
| | Yes | 43 (67.2) | 21 (32.8) | – ⁺⁺ | – | – | – |
| Breastfeeding | No | 34 (68.0) | 16 (32.0) | 1.00 | | 1.00 | |
| | Yes | 105 (95.5) | 5 (4.5) | 0.10 (0.03– 0.30) | <0.001 | 0.08 (0.02– 0.25) | <0.001 |

^{*}Pearson's chi-square test.
⁺⁺Fisher's exact test.

Table 4.
 Risk factors for PTSD after cesarean delivery.

3.3 Risk factors for PTSD after cesarean delivery

According to the univariate regression analyses with dependent variable as the presence of postpartum PTSD (**Table 4**) presented a positive association between psychiatric history, inclusion in NICU, EMCS, and number of past traumatic events with the likelihood of PTSD diagnosis. Women, who breastfed, those with full-term labor, and those who reported having support from their partner, had lower likelihood of having postpartum PTSD. In **Table 4**, multiple analyses reveal that the type of cesarean delivery is independently linked with postpartum PTSD after cesarean delivery.

4. Discussion

The aim of this survey was to identify perinatal and predisposing factors during cesarean delivery that help the development of PTSD or PTSD Profile in postpartum

period, in order to realize appropriate preventive interventions in perinatal care. Our findings show that 40% of mothers reported their cesarean delivery as a traumatic event, while the Criterion A met by a quarter of all deliveries. Moreover, we found that postpartum PTSD was associated with preterm birth, inclusion in NICU, lack of breastfeeding, EMCS, and lack of support from a partner.

Several previous studies were considered the emergency cesarean delivery as a major risk factor for postpartum mental illness, such as depression [45–47] and PTSD [27, 48]. For example, the Schwab et al. study shows that all women who had been diagnosed with postpartum PTSD had undergone an EMCS [16]. The systematic review of Benton et al. found an association between EMCS and psychological outcomes in mothers with particular postpartum PTSD [49]. In addition, the Modaress et al. study found high levels of PTSD in women who underwent an EMCS in contrast to ELCS and those with vaginal delivery [50]. Furthermore, the findings of Ryding et al. investigation for PTSD reaction in women who underwent an EMCS showed that 1/3 of the sample suffered from serious PTSD reactions [48]. On the contrary, the study by Lopez et al. found no association between PTSD and a kind of CS, but with anesthesia complications [23]. Also, a systematic review of Futura et al. found a relationship with preeclampsia, rather than the type of CS [51].

However, the present study found that 13.1% of the population met the DSM-5 criteria for postpartum PTSD (31.7% after EMCS and 1% after ELCS), while 8.1% of women were suffering from Profile PTSD according to DSM-5 (**Table 3**). A possible explanation for the high difference in prevalence among two groups of mothers is due to the emergency surgery. Since, emergency surgery is unexpected more often with the pathology of gestation [50, 52], and can be a midwifery predictor of the development of postpartum PTSD [8, 27]. Therefore, the increase in EMCS increase PTSD, while an important reason for this phenomenon might be that the induction of labor takes place before the 41st week of gestation [53, 54].

An observation must be made regarding ours and other research findings. This survey is the first to investigate the evolvement of PTSD Profile and PTSD in postpartum women after EMCS or ELCS. In addition, it is one of the few articles where they used all the diagnostic criteria for PTSD postpartum, according to the DSM-5 (**Table 3**) [13], and this increases the sensitivity of the PCL-5 compared with common investigations in the past. So far, the fifth version of the PCL has not been in used in Greece yet. This is the first survey that used the PCL-5 in the Greek population and especially in postpartum women.

The findings of our study indicated that a preterm labor is associated with PTSD. From the survey participants, only 76.2% women after EMCS and 87.6% after ELCS had a full-term labor, and 1/3 of women who met the diagnostic criteria for PTSD or PTSD Profile had given birth prematurely. Only a few studies in the past have reported that a preterm delivery was a risk factor for PPTSD and other postpartum mental health disorders [55–57], and our study agrees with them. One hypothesis is that prematurity is related to emergency situations, neonatal complications, and inclusion in the NICU. Therefore, the risk of losing an infants' life is real (the adapted for the present research criterion A) and the cause of the development of postpartum mental health trauma.

In addition, another very important risk factor related to the previous one for the development of postpartum PTSD is the inclusion of the neonate in the NICU. It seems that the separation of the mother from the infant due to the admission to NICU is associated with a birth of a preterm neonate, pathology of gestation, and EMCS as well. It is already known that the postpartum distress after the admission of the neonate in the NICU consists of a complication of depressive, anxiety, and PTSD symptoms and is linked negatively with maternal-infant attachment [56, 58]. In our

findings, inclusion in the NICU is related to 11.3% of ELCS and 30.2% of EMCS and includes preterm and full-term neonates.

For a large percentage of women, breastfeeding is an extension of the birth experience, and it has been proven that it can reduce the birth trauma. In some cases, breastfeeding after a traumatic childbirth experience can be disappointing due to traumatic reminders of childbirth. All these feelings, as a part of avoidance symptoms of PTSD (Criterion C) [36], can lead to a lack of initiation or premature termination of breastfeeding [59]. In this survey, the lack of breastfeeding played an important role in the development of the birth trauma caused to the woman by the cesarean delivery, with rates of 95% in the first 24 h breastfeeding mothers without PTSD and 4.5% in breastfeeding mothers with PTSD. Therefore, breastfeeding is a relief by increasing the mental resistance of mothers exposed to birth trauma. These results are similar with the Hoff et al. study, which investigates that the lack of breastfeeding affects the development of the mother-child attachment and contributes to the intensity of the distress of the mother and developing postpartum PTSD [60]. Actually, in the Maureen et al. study, breastfeeding mothers had a lower perceived stress, lower depression and anger, and reported more positive life events than from postnatal PTSD [61–63].

Unfortunately, in Greece, there are few psychoeducation supporting services for women exposed to birth trauma. Among the few perinatal centers, Fainareti [64] is the first public perinatal center, which provides psychoeducation to mothers and couples. Due to this great lack of perinatal centers, support from a partner or spouse is one of the main factors protecting from postnatal PTSD.

5. Conclusions

The present research evaluated vulnerability postpartum risk factors in Greek mothers who had an EMCS or ELCS in a University Hospital. Birth trauma experience was predictive with the PCL-5 for cesarean deliveries. The measure revised to reflect the new diagnostic demands and now is one of the few validated tools for PTSD. Mothers in this survey who met all the diagnostic criteria (re-experiencing, avoidance, negative thoughts and feelings, arousal, and reactivity) of DSM-5 may have a provisional diagnosis of postpartum PTSD or PTSD Profile. Direct exposure and witnesses to birth trauma were predictive with the adapted Criterion A for postpartum women after cesarean delivery. From this study, it has emerged that the major risk factors developing postpartum PTSD are: inclusion in the NICU, preterm birth, EMCS, a lack of breastfeeding, and a lack of support from a partner. Perinatal health professionals who are in contact with women during pregnancy or postpartum should inform them in order to reduce the above risk factors. However, more research needs to be conducted with the aim of identifying more risk factors and reducing the rates of PTSD OR PTSD Profile, especially in countries similar to Greece with high percentages of CS. Finally, it should be understood by healthcare providers and health policymakers that the postpartum mental disorders are only a part of short-term and long-term negative effects of cesarean deliveries worldwide.

Acknowledgements

The authors would like to thank The Laboratory of Midwifery Care during Antenatal and Post natal period—Breastfeeding—L.M.C.A.P. – BF. of the University of West Attica.

Funding

From The Special Account for Research Grants, University of West Attica, Greece.

Conflict of interest

The authors declare no conflict of interest.

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