

PTSD, risk factors, and expectations among women having a baby: A two-wave longitudinal study

CRISTINA MAGGIONI¹, DAVIDE MARGOLA², & FRANCESCA FILIPPI¹

¹2° Clinica Ostetrico-Ginecologica, University of Milan, Italy, and ²Faculty of Psychology, Catholic University of Milan, Italy

Abstract

Introduction. The aim of the study was to evaluate the incidence of chronic post-traumatic stress disorder (PTSD) after childbirth in relation to pre-partum variables (personality characteristics, anamnestic risk factors) and intra-partum obstetrical and neonatal variables. Since expectations before an event could modify the perceptions, reactions, and satisfaction afterward, the representations of the idealized delivery were carefully analyzed. Moreover, the real and desired help perception from physicians and family members were separately considered during pregnancy and after delivery in relation to PTSD.

Method. The study was carried out submitting a questionnaire to pregnant women twice: firstly when women were in their 38–42 gestational week (Time 1) and secondly after 3–6 months from childbirth (Time 2). 93 women were recruited at a University City Hospital in Milan, Italy. PTSD subscales, depression, and anxiety levels were also assessed.

Results. 2.4% of women had a complete PTSD, while 32.1% of them resulted in having one or two positive subscales of symptoms: 15.5% ($N=13$) had a positive intrusion subscale, 25.0% ($N=21$) had a positive arousal subscale, while only 3.6% ($N=3$) had a positive avoidance subscale. Pre-delivery depression influences PTSD, but only for the intrusion subscale. Pre-delivery physical risk factors are linked to PTSD on the avoidance subscale. At Time 2 depression and PTSD are often present simultaneously. Given the high percentage of healthy newborns, intra-partum obstetrical variables do not seem to influence PTSD. High trait anxiety distinctively coexists with a specific expected delivery and a 'deception' in desired and real support from professionals.

Conclusions. Childbirth is a risk condition for PTSD, depression during pregnancy influences the intrusion subscale, while having physical problems influences the arousal subscale. Expectations and support are modulated by the anxiety levels and they are not directly related to chronic PTSD.

Keywords: Post-traumatic stress disorder, risk factors, childbirth expectations, depression, anxiety, help perception

Introduction

Childbirth represents a natural and positive experience in a woman's life, but sometimes it's also a stressful event. Recent studies show that not only negative outcomes or severe pathologies influence mothers' perceptions and psychological distress, but also normal delivery could assume a catastrophic trait and lead to post-traumatic stress disorder (PTSD) symptoms [1–6].

As for DSM-IV, the definition of PTSD requires a traumatic event which involves actual or threatened death or serious injury of oneself or others that causes fear, helplessness or horror in the subject experiencing the traumatic event. Three distinct types of symptoms therefore occur, consisting of

re-experiencing of the event, avoidance of any reminders of the event, and hyper-arousal for at least a month [7].

The assumption whereby even a natural event such as delivery could lead to PTSD, with all its consequences on the woman's and the baby's well-being, requires further investigation. Nowadays, several studies prove the existence of postnatal PTSD after complicated deliveries [8–10] and also after uncomplicated deliveries [9–13,15].

The incidence of obstetric PTSD is reported to vary from 5.6% (of 499 women) [10] to 1.7% (of 1640 women) [11]. Other studies report different incidences: 3.5% in a sample of 289 women [9], 3.0% in a sample of 264 women [12] and 1.9% of 103 women [13].

In the literature different factors are described to contribute to this pathology such as expectations [8,11,12], pain [9,10,12,13] sense of control [9,12], and social support [10–13]. Determining factors for PTSD after delivery are pre-partum, intra-partum, and post-partum variables.

During pregnancy, women develop hopes and fears about childbirth, which can affect their postnatal well-being and how they will judge their labor and delivery experience. We should consider that expectations are influenced by women's life, their mother's and friend's experiences of childbirth, and by media.

The interpretation of natural delivery as a traumatic event is reported to be determined by dissatisfaction with childbirth. Satisfaction is a complex concept. Studies on satisfaction are based either on fulfilment or on discrepancy between what is expected or desired and what is received during childbirth [11].

Differences between expectations and the actual experience can affect women's feelings and can produce adverse emotional outcomes such as disappointment, guilt, depression, and trauma [12–14].

But what do women really expect from delivery? Few studies have been exploring childbirth expectations [15,16]. Waldenström [17], in a prospective study on 1111 participants, showed that women with positive expectations of birth in early pregnancy had a more positive birth experience; in a prospective study on 825 subjects, women with lower expectations, which were then realized, had lower levels of satisfactions [18]. In a study of 100 pregnant women with fear of childbirth, 47% of nulliparous women were afraid of intolerable pain [19]. Unmet expectations about maintaining one's sense of control during labor have been associated with worse birth experience [20]. Women's expectations about birth resulted to be an important predictor of traumatic experience: in a prospective study [13] about pre-birth expectations and their influence on women's birth experiences, it emerged that women who expected more pain were the ones more likely to perceive the birth as traumatic, and that birth experiences proving to be more negative than expected were more likely to report childbirth as traumatic.

All these studies did not distinguish between expectations that are based on knowledge of what is available to women, and preferences that are based on individual's wishes [21]. Thus, in our study, women were free to express any feeling, image, desire they have about childbirth: even women who had a programmed c-section could describe the childbirth they would have preferred to have.

In addition to this, pain has been extensively reported as playing an important role both in women's expectations and satisfaction with the experience of childbirth [22–24]. Although the perception of pain has been associated with negative birth experience

[24] and trauma [17], the effect of pain relief on childbirth is still controversial and less evident [25]. Waldenstrom et al. [26] found both pain and pharmacological pain-relief related to a negative birth experience, suggesting that the request for epidural analgesia already identifies women who are more anxious and therefore receive more analgesia and have more negative birth experience than others, as previously assumed by Green [20].

On the other hand, higher positive expectations are also associated with greater perception of pain during birth and later dissatisfaction and greater PTSD incidence: this is because these women may be unprepared when something unexpected happens (e.g., operative delivery), but also because unmet pain expectations may make birth perceived as traumatic [13,19].

Howell [25], instead, used a randomized controlled trial and found no different effects, neither negative nor positive, of epidural analgesia on women's birth experience.

Intra-partum medical variables have all been associated with dissatisfaction: emergency c-section, induction, prolonged labor, instrumental vaginal delivery [13,24,27]. Some studies found no effect of medical intervention on satisfaction [28] or found an effect when favoring the intervention that was most likely to shorten labor [29].

Another intra-partum variable related to postnatal PTSD is the perception of control [5]. Several studies have revealed that the maintenance of control during labor and delivery is a common hope among women [23,26,30,31]. Thus not all studies give to 'control' the same meaning: sometimes they refer to 'external control' (control over what is done by others) [24,28,32], sometimes to 'internal control' (control of one's body and behavior) [22,33].

Expectations about labor control concerning involvement in decision making, being well informed, having all interventions and procedures explained and discussing analgesia are often expressed by pregnant women [22,26,27] and can influence birth satisfaction [22,25,34,35] and also lead to PTSD [5,36].

Some researchers have shown that loss of control was associated with negative experience of childbirth [22,24,25]; lack of control over body movements and decision-making didn't give women the sense of power in a situation where they could not be sure what to expect, consequently didn't help them cope with labor and, in postpartum, did not feel positively about the experience [28]. In other works, women experiencing limited choices and limited control on decisions during labor and delivery have been associated with adverse psychological outcomes, such as PTSD [5].

The need for support is also correlated with negative perception of delivery [24] and PTSD symptoms [5].

Green [20] revealed how unmet expectations for support was the most pervasive difficulty and included unfulfilled or missing offers of assistance, unmet expectations for social interaction, mismatched aid, or incompetence on the part of the potential care-giver.

Continuous support from partners and health professionals, in terms of providing support, encouragement, help, empathy, has been associated with childbirth satisfaction [38]. Midwife's support has been identified positively correlated with childbirth experience, while partner's support was not [24]. Perception of inadequate support or feeling hurt or neglected by medical staff has emerged to be strong predictors of disappointment with childbirth [34] and the onset of postnatal PTSD [37].

Simultaneously, it is not clear if the relationship between control and support can be interpreted as done by Walker et al. [38], where control means being able to have support when wanted and not have it when not wanted, or instead it is necessary to separate the two concepts. We should consider 'support' as the capacity of trusting medical staff, midwives, partners and/or other family members, thus differentiating this concept from the sense of control.

Perception of control and support, expectations and disappointment may also be influenced by personality characteristics. We know that depression is common in pregnancy as in the postnatal period affecting about 10% of women [39]. In fact, depression during pregnancy has been associated with a negative experience [24,40] and PTSD [5]. Also anxiety is reported to be related to dissatisfaction [24], but this relationship is less strong than depression [5], probably due to the smaller number of studies.

Previous works [4] sustain that expectations of fear about childbirth are connected to the beginning of stress symptoms, meaning that people who have high levels of fear before labor and delivery could be more vulnerable to stress symptoms and may develop postpartum emotional disorders.

Delivery experiences can cause negative expectations and fear in subsequent pregnancies [31]. Fear of childbirth due to a negative birth experience can cause women to avoid or postpone subsequent pregnancies, as well as an increased request for c-sections [41].

From a theoretical point of view, studying PTSD on women before delivery offers the possibility to study the personality risk factors [42,43], to test the expectations mismatching hypothesis [63,64], and the perception of support before the traumatic event [44]. This may also offer better understanding why PTSD develops in some but not all subjects [52,53].

Since the growing evidence for the protective role of social support, we add the variable of support in our study [45–47]. The personality structure [4,5] and the perceived support [48,51] may influence or buffer

or either increase women's reaction to the events three months later.

This work was designed as a prospective investigation testing women before delivery at the 39th gestational week and at 3–6 months postpartum. In particular, the present study investigates possible contributing factors of PTSD: before delivery (women's perception of and desire for support, medical factors during pregnancy, childbirth expectations, and women's depression) and at 3–6 months after childbirth (women's perception of and desire for support, women's depression, anxiety).

In sum, the aim of the present work is to identify factors that contributed to women's post-traumatic stress disorder in an unselected sample of women, considering obstetric, psychosocial variables, and childbirth expectations.

Method

Procedure

The research was conducted between February 2003 and June 2004 at Vittorio Buzzi Hospital, Milan, Italy. Pregnant women were recruited on the occasion of their term consultation at 38–42 weeks of gestation ($M = 39.94$, $SD = \pm 0.907$). The only inclusion criteria were an adequate knowledge of the Italian language in order to complete questionnaires, to have no psychiatric diagnosis in anamnesis, and to be over 18 years old. Written consent was gained from all the women before they answered the questionnaires.

The study was conducted in two stages. The first stage (Time 1) corresponds to the term consultation itself. In the second stage (Time 2) women were re-contacted at 3–6 months after childbirth: on this occasion, questionnaires were sent to women by mail with a reply-paid envelope. If questionnaires were not returned within two weeks, the researchers followed them up by telephone.

Participants

The two-wave longitudinal sample included 93 women. Participants were 33 years old on average ($SD = \pm 3.863$, range: 20–40). 64.4% of participants had no other child, 29.9% already had a child, while 5.7% had given birth twice.

At birth, all the babies were healthy: in fact, the mean Apgar score at minute 1 after delivery was 9.14 ($SD = \pm .486$); at minute 5 it was 9.89 ($SD = \pm .321$).

75.9% of participants had a vaginal delivery, 8% an instrumental delivery, while 16.1% had a c-section (for details on obstetric and delivery data, see Table I).

Furthermore, women were divided into two groups according to the number of pregnancy risk

Table I. Obstetric and delivery data.

<i>Obstetric data</i>	
Hyperemesis during pregnancy	41.9% (yes)
Alteration of rhythms during pregnancy	52.8% (yes)
Reported complications during pregnancy	87.8% (yes)
Hospitalization during pregnancy	10.8% (yes)
Miscarriages	23.0% (yes)
Attendance at birth class	43.7% (no)
<i>Delivery data</i>	
Time between check in and delivery (hrs)	71.3% (less than 24 hrs)
	26.4% (24 << 48 hrs)
	2.3% (more than 48 hrs)
Analgesia	54.0% (yes)
Type of delivery	75.9% (vaginal delivery)
	8.0% (instrumental delivery)
	16.1% (c-section)

factors (range: 0–6): hyperemesis, alteration of biological rhythms, women’s reported complications and hospitalization during pregnancy, previous miscarriages, and attendance at a childbirth training class. 53.1% of women had one or two risk factors only, while the remaining 46.9% had more than two risk factors. The women of this second subgroup were considered to be at higher risk.

Measures

At Time 1 women’s perception and desire of support, childbirth expectations, and women’s depression scores were collected; at Time 2 women were re-tested for depression and perception/desire of support, plus anxiety and PTSD.

The *Beck Depression Inventory* (BDI) [49] is a self-administered 21-item self-report scale. Scores above 10 indicate a diagnosis of light depression, while scores over 30 are indicative of severe depression. This scale has already been used and validated in pregnant women [50]. This test has been administered at both Times 1 and 2.

The *State Trait Anxiety Inventory* (STAI) [51,52] was used to measure trait and state anxiety. This scale has been used in various pregnancy and childbirth-related studies [3,6,12] and evaluates state anxiety, considered as a transitory state, and trait anxiety, which depicts a relatively steady personality trait. The STAI is a 40-item scale, 20 items for each type of anxiety, rated on a four-point Likert scale. Cut-off scores of 49 for state anxiety and 46 for trait anxiety have been used. This test was administered at Time 2 only.

The *Post-Traumatic Stress Disorder Questionnaire* (PTSD-Q) assesses the presence of PTSD symptoms after delivery. This 17-item self-administered scale was developed by Czarnocka and Slade [5] on the

basis of Watson’s ‘PTSD-Interview Scale’ (PTSD-I) [53] and it investigates the three subscales of PTSD symptoms (intrusion, avoidance and hyper-arousal) according to DSM-IV criteria. PTSD-I showed a 92% concurrence with a diagnostic categorization system based on DSM and its psychometric properties were adequate in terms of test–retest reliability and internal consistency [60].

In PTSD-Q, each item is evaluated on a seven-point Likert scale, from ‘not at all’ to ‘always’, and the answer equal to 4 (‘commonly’) or above is considered clinically significant. To make a diagnosis of post-traumatic stress disorder, at least one intrusion item, three avoidance items and two hyper-arousal items are needed. If a woman presents only one subscale of symptoms, she is classified as ‘partial PTSD’. This test has been used at Time 2.

Moreover, both at Times 1 and 2, the perception of received and desired support from medical staff and family members was measured with the 15-item *Real and Desired Help Scale* [54]. The questionnaire is self-administered and each of the 30 items, 15 for the received help and 15 for the desired help, corresponding to a specific person, is evaluated through a five-point Likert scale.

Finally, at Time 1 only women were asked to describe the childbirth they would have liked to go through. The descriptions have been analyzed with the content analysis technique [55] and *expectations* have been subsequently divided into four categories (‘quick labor’, ‘quick and pain-free labor’, ‘controlled labor’, ‘supported labor’).

Results

The mean value of depression scores at Time 1 was 6.24, while at Time 2 it was 5.92. The levels of anxiety revealed mean scores of 45.23 for state anxiety and 43.91 for trait anxiety. Concerning PTSD, 27 women resulted in having one or two positive subscales of symptoms (32.1%), while 2.4% had a complete PTSD. Analyzing each PTSD subscale, 15.5% ($N=13$) had a positive intrusion subscale, 25.0% ($N=21$) had a positive arousal subscale, while only 3.6% ($N=3$) had a positive avoidance subscale. Table II displays percentages of those subjects with clinically relevant depression at Times 1 and 2 and anxiety symptoms at Time 2 with the different dimensions of PTSD (global and partial).

In terms of expectations, 31.42% of subjects hoped for a quick and manageable pain during labor (‘quick and pain-free labor’), while 25.71% wanted a natural labor expressing the need to rely on significant others (‘supported labor’). A natural labor was also expected by a further 20.02% of participants, but these women wanted to maintain control over the event autonomously without the help of significant others

(‘controlled labor’); finally, 22.85% wished for a quick labor only, that is the fastest possible (‘quick labor’).

Correlations were tested among the continuous research variables and along Times 1 and 2 (i.e., depression, anxiety, PTSD, real and desired help both from medical staff and family members). Significant correlations emerged between depression at Times 1 and 2 ($r=0.513$, $p < 0.001$), state anxiety and trait anxiety at Time 2 ($r=0.839$, $p < 0.001$), PTSD and depression at Time 1 ($r=0.331$, $p=0.005$) and Time 2 ($r=0.444$, $p < 0.001$). In addition, the various forms of help (real/desired; from medical staff/from family members; at Time 1/at Time 2) were revealed to be associated at different levels (see Table III).

Subsequent analyses were implemented in order to evaluate which PTSD dimensions (global PTSD and/or each PTSD subscale), risk factors, and expectations were able to discriminate the research participants and the research variables.

Table II. PTSD, depression, and state/trait anxiety: A comparison (percentages).

Depression (Time 1) > 10	% of subjects
PTSD (global)	8.3
Intrusion	33.3
Avoidance	8.3
Hyper-arousal	33.3
Depression (Time 2) > 10	
PTSD (global)	10.0%
Intrusion	20.0%
Avoidance	10.0%
Hyper-arousal	40.0%
State Anxiety (Time 2) > 49	
PTSD (global)	5.3
Intrusion	15.8
Avoidance	5.3
Hyper-arousal	31.6
Trait Anxiety (Time 2) > 46	
PTSD (global)	4.5
Intrusion	22.7
Avoidance	4.5
Hyper-arousal	27.3

Firstly, univariate ANOVAs using Student–Newman–Keuls post hoc test revealed that women who have a fully symptomatic PTSD also have higher depression levels both at Times 1 and 2: fully PTSD women have a mean depression score of 13.50 at Time 1, compared to the mean score of 7.68 for the women having one positive PTSD subscale only, 4.50 for the women having two positive PTSD subscales, and 5.53 for the women with no PTSD ($F(3,64) = 4.23$, $p = 0.009$). The mean score of fully PTSD women at Time 2 was 16, compared to the score between 7.09 and 8.00 for the women partially symptomatic and 4.93 for the women with no PTSD ($F(3,80) = 7.88$, $p < 0.001$). Note also that mean depression scores of traumatized women are above the cut-off value of 10 at both Times 1 and 2, which means that women with global PTSD are also clinically depressed.

Each PTSD subscale was then analyzed separately using the *t*-test. The analyses revealed a significant difference among mean values of depression in the group of women with a positive intrusion subscale (9.60; $DS = \pm 4.86$) and the group without intrusive symptoms (5.78; $DS = \pm 3.52$) at Time 1 ($t(66) = -2.991$, $p = 0.004$). The same test was significant also at Time 2: women with intrusive symptoms had a mean depression score of 8 ($DS = \pm 5.45$) versus 5.55 ($DS = \pm 3.62$) for the group with no intrusive symptomatology ($t(82) = -2.060$, $p = 0.043$).

Analyzing the avoidance subscale, a significant difference emerged only at Time 2: women who have a positive avoidance subscale have a mean depression score of 12.33 ($DS = \pm 8.74$) versus 5.69 ($DS = \pm 3.64$) for the group without avoidance symptoms ($t(82) = -2.936$, $p = 0.004$). Note that the mean score of depression in the first group is over the cut-off value: women who have avoidance symptoms at 3–6 months postpartum are contemporarily depressed.

The *t*-test for the arousal subscale revealed a mean depression score of 8.67 ($DS = \pm 4.29$) in the group with arousal symptoms at Time 2, significantly different from the mean score of 5.02 ($DS = \pm 3.51$)

Table III. Pearson correlations among the components of real and desired help.

Variables		1	2	3	4	5	6	7	8
1 Real help from medical staff	T1	–	0.50**	0.47**	0.37*	0.33*	0.13	0.49**	0.22
2 Desired help from medical staff	T1		–	0.40*	0.57***	0.26	0.28	0.33*	0.29
3 Real help from family members	T1			–	0.70***	0.32*	0.33**	0.64***	0.36**
4 Desired help from family members	T1				–	0.14	0.22	0.45***	0.44***
5 Real help from medical staff	T2					–	0.62***	0.26*	0.14
6 Desired help from medical staff	T2						–	0.27*	0.31**
7 Real help from family members	T2							–	0.56***
8 Desired help from family members	T2								–

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

in the non-symptomatic group ($t(82) = -3.900$, $p < 0.001$). No significant differences were found considering Time 1.

Considering PTSD and risk factors, the difference of the mean scores through the t-test revealed that women at higher risk (number of risk factors greater than two) have a higher score on the arousal scale compared to low-risk women ($t(81) = -3.290$, $p = 0.002$) as well as higher global PTSD scores ($t(82) = 2.001$, $p = 0.05$). On the contrary, high-risk women were not more depressed or more anxious than those subjects with less than two risk factors, nor did they perceive help from their family and from the medical staff differently.

Finally, expectations about the delivery were thoroughly analyzed. In order to avoid personal interpretation, women's descriptions of their ideal delivery were coded by two independent researchers with an overlapping of concordance above 97%. Using univariate ANOVAs, it emerged that there was a significant effect between groups for trait anxiety only ($F(5,70) = 5.04$, $p = 0.003$). Subsequent Student–Newman–Keuls post hoc test revealed that women who expected a 'quick labor' had a higher mean trait anxiety score (55.38) than women with other types of childbirth expectations. This score is above the cut-off level for STAI-T. That is, women hoping that their labor is quick are more anxious in terms of personality traits. Furthermore, they already have one child in most cases ($\chi^2(6) = 12.80$, $p < 0.05$).

Studying the single expectations in conjunction with real/desired help, no significant effects emerged when considering the help from family members. We obtain different results when we look at the help from medical staff (that is, the gynecologist and midwife).

In particular, matched pairs t-test revealed that mean scores of *real help from medical staff* among those women who expected a 'quick labor' were 3.6 at Time 1 and 1.9 at Time 2 ($t(5) = 4.152$, $p = 0.009$); for those who wanted a 'quick and pain-free labor' mean scores were 3.56 at Time 1 and 2.4 at Time 2 ($t(7) = 2.553$, $p = 0.038$); for a 'controlled labor' mean scores were 3.6 at Time 1 and 2.6 at Time 2 ($t(6) = 3.041$; $p = 0.023$). Thus, perception of perceived help from medical staff decreased over time for most women ($t(37) = 6.081$, $p < 0.001$), especially for those who wanted a quick labor.

Globally, mean scores of *desired help from medical staff* were also significantly different, with a mean score of 4.0 at Time 1 and 2.78 at Time 2 ($t(39) = 6.012$, $p < 0.001$). Considering single expectations and through the implementation of matched pairs t-test, this significant difference is such for three out of the four types of expectations: those who wish a quick labor ($t(4) = 5.477$, $p = 0.005$), a controlled labor ($t(6) = 2.828$, $p = 0.030$), and a supported labor ($t(7) = 2.667$, $p = 0.032$).

Discussion

The results of this study showed that the incidence of chronically PTSD tested 3–6 months after delivery is 2.4%, while an additional 32.1% of subjects are partially symptomatic. These results are comparable to others reports [2,4,8], although others authors reported higher levels of PTSD [3]. However, since the time from the event represents an important variable and PTSD incidence decreases over time, it is possible that studies performed at the 6th week have a higher incidence (see, for example, Czarnocka and Slade [3%] [5]; Creedy [5.6%] [3]). Differences may also be given by the particular data collection (questionnaires by postal mail versus phone interviews). We also excluded patients who reported psychiatric problems recruiting only women at term and rejecting de facto all subjects with high risk pregnancy or pregnancy complications who delivered earlier. Furthermore, our population tends to be representative of the hospital clients, that is middle-high social class, married or with a stable partner, white and well educated. Finally, we should also note that at the test time all babies were healthy. Reactions after the birth of a healthy baby may also be a methodological problem since women tend to rationalize the obstetrical procedure facing a healthy child.

Personality and mental factors such as anxiety and depression are reported to influence PTSD. In our sample we found that depressed women are between 12.5% (Time 1) and 9.7% (Time 2), a result comparable with other unselected studies. After delivery, significant anxiety levels exist for 19.4% of women (re: state anxiety) and 23.7% (re: trait anxiety), again quite comparable with others studies.

We did not find a relationship between state/trait anxiety and the insurgence of PTSD, but only between depression at Times 1 and 2 (measured by the Beck Inventory) and PTSD. The link between depression pre- and post-delivery is also confirmed.

If we look carefully at these data, we can observe that only the intrusion scale of PTSD is related to pre-delivery depression: the other subscales are associated with depression only when measured at the same time of PTSD (i.e., Time 2). Note how reviews on co-morbidity show that depression commonly occurs in people with PTSD [56].

In the cognitive theory [57,58], trauma could be interpreted as the result of the 'shattered assumption'. According to this theory, we all have a frame of conceptions and assumptions concerning ourselves and the world: when these assumptions are shattered by a terrible event, the subjects will develop the symptoms of PTSD. But this interpretation might not be valid for all cultures and it enables one to explain why subjects with a history of psychological problems or depression who already have a negative

vision about the world and themselves [59] are more likely to develop PTSD.

We confirm that depressed subjects are more susceptible to PTSD. The fact that only the subscale of intrusion is related to pre-existing depression could be explained by different neuro-biologic pathways and different memory networks which are involved in the different aspects of PTSD. For example, in a longitudinal study, McFarlane [60] found that intrusive levels predict a lower recovery. We should also note that when the attribution of the events is to the Self, there is an increase in depressive symptoms and a higher level in the intrusion scale confirming the relation between intrusion and depression [61].

On the contrary, the avoidance scale is more related to a relational context in accordance with the fact that the intervention of support after the crisis reduces this dimension specifically [62]. In addition, we could confirm that personality variables influence the incidence and recovery of PTSD but also personality traits could be influenced by PTSD [63]: in fact, in non-PTSD subjects the re-test depression is lower than before pregnancy (4.67 versus 5.53).

In the present study we also look for other pre-existing factors that are reported to influence PTSD: socio-demographic variables, marital status, and number of children did not show any effect on PTSD, but having medical problems during pregnancy, such as hyperemesis, preterm contractions, changes in biological rhythms, hospitalization during pregnancy, and previous miscarriages, are factors related to PTSD. We clustered them together as 'risk factors' and we found an increase risk for PTSD symptoms after delivery with reference to the relationship between previous miscarriages/arousal, preterm contraction/avoidance, and changes in biological rhythms/intrusion. In this study attending a birth class does not play a protective role, which was also confirmed by other studies [64]. Note that an increase in nausea and vomiting, contractions, spontaneous abortions, and excessive fetal growth was also reported in a sample of 455 women with PTSD compared to those without PTSD ($n=638$) [65]. We may assume that a biological vulnerability exists in women who are at risk for PTSD, making these results particularly relevant from the medical viewpoint. Note also that the reported risk factors are not related to the bias of the post-delivery memories since these questions were asked before delivery or obtained through medical records of problems.

Intra-partum variables do not seem to influence chronic PTSD although some authors reported a risk factor for intra-partum variables [66]. While general medical interventions during delivery do not seem to increase the risk for PTSD, some authors suggested an increase in PTSD after instrumental delivery or

cesarean section [3]: in particular, pain in the first stage, feelings of powerlessness, low self-efficacy, internal locus of control, trait anxiety, coping [6] and negative interaction with the medical staff [3,4] are also reported to be associated with PTSD.

In our sample the neonatal Apgar score was very high. Therefore, it is possible that the subjects did not have the experience of threatened death or serious injury to the baby, which are the key concept in PTSD. Another possible explanation is that cesarean sections and instrumental deliveries have a traumatic effect because of the associate perception of non-care from the personnel; the association of both high level of medical intervention and poor intra-partum care account for the 22% of the total sample variance in the prediction of acute trauma between four and six weeks after delivery [3]; it is also possible that this association between intra-partum variables and PTSD is present only in acute PTSD and disappears in longer follow up as in our study.

We may conclude that obstetrical interventions do not play a causative role in PTSD insurgence, but rather the cognitive attribution about these conditions or the feeling of blame on the self or on others could play some pivotal role.

The emotional dimension of care was assessed by a questionnaire on perception about different aspects of real/desired help from family members and medical staff. We tested the hypothesis that a cognitive expectation of a specific kind of delivery might also influence this attribution of help as well as PTSD.

Hoping for a 'quick labor' is the ideal delivery especially for those women who already have a child. We can suppose that these women are more susceptible to the events; they lack a positive view and tend to avoid confrontations with the events and their development.

The ideal delivery as 'quick with no pain' is the more frequent representation: it is chosen by the majority of subjects (31.4%); in this group, pain is mentioned and the wish is that it will be manageable.

Finally, a group of women wishes a 'natural' delivery with two different meanings: on the one hand this basically means 'control' (e.g., 'I would like to chose my posture, my time') (20%), on the other this means wishing to find competent and reliable people and to be accompanied by tender loving care (25.7%).

These expectations do not directly influence the insurgence of PTSD but they determine the way the support is perceived and they are an expression of the anxiety levels; indeed, the 'quick group' is more anxious (with anxiety trait score above the threshold).

The perception of help received from the family members during pregnancy and during childbirth is

not deceiving and do not interfere with PTSD insurgence, but the support effectively received from the medical staff was lower than the ideal score before the delivery ($t(37) = -4.076$; $p < 0.001$) and especially after it ($t(76) = -4.811$; $p < 0.001$) and more specifically in the 'quick group'.

Globally, in our study PTSD was not related to expectations, neither to desired or perceived support. On the contrary, a complex relationship exists among perception of support, anxiety levels, and expectations. Our results indicate that the expectation of a 'quick labor' with no other meaningful content could account for an anxious personality trait, together with a decrease in the perceived support from medical staff.

In this direction we could argue that women who have higher expectations of medical help are more deceived after delivery because of anxiety and not because the expectations of the delivery occurrence were 'high' since they only imagine a 'quick delivery' (and nothing more).

The way women afford the delivery experience is influenced by their expectations, which in turn reflects personality structure; in particular, anxious woman are more likely to express the wish to go through delivery as fast as possible (38.9%) and depressed women are more likely to wish an unpainful delivery (33.3%) and to ask for more anesthesia (81.8%).

This could reflect a coping style of attribution for blame on others by anxious women (and in this direction it could play a protective role against PTSD [2,67,71], while depressed women asking for more epidural anesthesia are less deceived by others and more self-concerned, that is more susceptible to PTSD.

Conclusions

From a theoretical perspective, studying PTSD in women before delivery offers the possibility to study the personality risk factors [49,50], to test the 'mismatching hypothesis' on expectations [63,64], and the perception of support before the traumatic event [51] and this may help to understand why PTSD develops in some but not in all the subjects [52–54,68]. We found that a very high percentage of women after 3–6 months still suffer from PTSD and depression.

From an obstetrical point of view we focused on detailed obstetric variables and compared the medical record with the patients' subjective records, but none of the intra-partum events explains this increase in depression and PTSD rates.

We found that the personality structure [54,67,69] influences PTSD: pre-delivery depression increases the risk for PTSD especially on the intrusion subscale. We also found that pre-pregnancy risk factors

increase the risk for PTSD especially on the arousal scale, suggesting a psychosomatic vulnerability for some subjects independent from depression.

Since activation of the biological response remains months after delivery, it is possible that some subjects are more susceptible or that their interpretation of the biological events is already compromised. However, past risk experiences increase the alert response even later and lead to a PTSD response.

Perceived support [68,70,71] may influence, buffer or increase women's reaction to the events but only in a sample of very anxious subjects. In this direction, expectations modulate the perception of help from the medical staff although this perception is previously influenced by the levels of anxiety.

Expectations of a 'quick' ideal delivery predict the following levels of anxiety independently from the delivery history.

We can conclude that childbirth is a critical event in a woman's life, and none of her pre-existing problems will find a solution: on the contrary, depression will show a co-morbidity association with PTSD and a psychosomatic vulnerability will also increase the incidence of PTSD. So far, the screening for PTSD has not been a part of the obstetrical postpartum survey and consequently detection is very poor. A suffering mother may have profound impact on infants and children, and more work is needed to enhance detection, referral, and treatment.

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