Postpartum Anxiety in a Cohort of Women from the General Population: Risk Factors and Association with Depression during Last Week of Pregnancy, Postpartum Depression and Postpartum PTSD

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ABSTRACT

Background: In contrast to postpartum depression, postpartum anxiety receives less attention, especially in the general population. Acknowledging the phenomenon is important, as it may lead to significant distress and impair maternal functioning.

Objectives: To explore the phenomenon in a cohort of women in the general population and to investigate possible associated factors.

Methods: Within the first days after childbirth, women at Chaim Sheba Medical Center maternity ward were interviewed. Questionnaires included psychosocial variables, feelings and fears during pregnancy and childbirth, and the Edinburgh Postnatal Depression Scale (EPDS) (referring to the last week before delivery). A month later, subjects completed the EPDS, a modified Spielberger Anxiety Scale and the Posttraumatic Stress Diagnostic Scale via telephone.

Results: 40.4% had high anxiety scores. A significant association was noted between postpartum anxiety and depression during the last week of pregnancy, postpartum depression, as well as postpartum PTSD. Anxiety scores were almost 50% higher in those who suffered from postpartum PTSD compared to those who experienced postpartum depression. Associations were also found with fear of the birth, fear of death during delivery (mother and fetus), feeling lack of control during labor and less confidence in self and medical staff. Of women who developed postpartum anxiety, 75% reported feeling anger, fear or emotional detachment during childbirth. No association was found with birth complications.

Conclusions: Anxiety symptomatology appears to be a common manifestation after childbirth. It is therefore important to inquire about depression and fears during pregnancy and childbirth and subjective experience in order to anticipate postpartum anxiety symptoms, even by means of a brief screening test. The finding that postpartum PTSD was associated with the severity of postpartum anxiety may be used in the future as a potential identifier of PTSD symptoms in women with high anxiety scores.

Approximately 13% of women will suffer from symptoms of depression during pregnancy and/or the postpartum period (1, 2). What however is less commonly known is that anxiety is also prominent in the postpartum period. While a vast database on postpartum depression has accumulated over the past 20 years, in contrast, anxiety in the perinatal period has received less research and attention. Several studies have shown that the postpar-

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tum period clearly elevates the risk of experiencing an exacerbation of anxiety-related symptoms in women who are already vulnerable to such experience.

Initial case reports on the impact of pregnancy and the postpartum period on the severity of panic disorder suggested that pregnancy protects against panic attacks while the postpartum period is a time of increased risk and severity of panic disorder (3, 4).

However, other evidence suggests that the most common effect of perinatal status on panic disorder may be no change in symptom severity (5, 6).

Williams and Koran (7) assessed the course of OCD across the perinatal period. They report that the majority of women reported no change in symptomatology during pregnancy with 29% reporting postpartum exacerbation of symptoms.

Not many studies have examined postpartum anxiety in the general population. Stuart et al. (8) reported a point prevalence of anxiety of 8.7% at 14 weeks postpartum and 16.8% at 30 weeks postpartum in a community sample. In this study, the Edinburgh Postnatal Depression Scale was found to have a strong correlation with the State Anxiety Scale of the State-Trait Anxiety Inventory, suggesting that the Edinburgh Postnatal Depression Scale may be a good screening instrument for anxiety as well as depression. Several studies found that the rate of OCD (2.7%- 3.9%) (9, 10) and GAD (4.4%- 8.2%) (9, 11, 12) are higher in postpartum women than in the general population. The rate of panic disorder however was not noted to be different from that in the general population.

These observations are not surprising since the mean age of onset of many anxiety disorders is in the early 20s - a time during which many women are contemplating childbirth (13). Thus postpartum anxiety appears to be a common experience in part because of its prevalence among women in this age, as well as the fact that childbirth is a well established stressor related to a higher incidence of anxiety disorder than what would be expected by chance (14). It is thus understandable that the postpartum period would be a time of vulnerability predisposing to the development and onset of anxiety disorder, as women are often overwhelmed by changing roles, multiple demands and lack of sleep (6). While the phenomenon has been noted, not many have explored which women will suffer from postpartum anxiety symptomatology.

Attention to the phenomenon of postpartum effects of maternal anxiety is important since anxiety in this context impairs maternal functioning, leads to significant distress and may seriously disturb mother-infant interaction, with consequences ranging from maternal neglect and failure to thrive to infanticide (15).

Since depression and anxiety frequently co-occur, it is likely that women who report depressive symptoms in the postpartum period also experience clinically significant symptoms of anxiety (16). For example, Wenzel et al. (10) noted that approximately 20% of postpartum mothers in a community sample reporting dysphoria also endorsed subsyndromal panic and obsessive compulsive symptoms. Austin et al. (17) in a cohort study of 1,549 women found that 20.4% of the women who demonstrated anxiety disorder had comorbid depression. Furthermore, 37.7% of the women with a major depressive episode (MDE) exhibited comorbid anxiety disorder.

Since postpartum anxiety is poorly understood including knowledge of risk and predisposing factors, the aim of this study was to explore the phenomenon in a cohort of women in the general population and to investigate factors associated with the development of the condition

MATERIALS AND METHODS

STUDY POPULATION

Criteria for inclusion included women of any age who gave birth at the hospital during the study and who were able to sign the informed consent form. The study was approved by the Chaim Sheba Medical Center Helsinki Committee Ethical Review Board.

STUDY DESIGN AND STUDY MEASUREMENTS

Within the first few days after childbirth (2 days for natural delivery and 5 days for caesarian section), women who were hospitalized in the Chaim Sheba Medical Center (a large academic general hospital) maternity ward were approached for study participation. Every woman who agreed to participate in the study answered a specially designed package of questionnaires with the assistance of the researcher. The study inventory inquired about demographic and socioeconomic variables, history of trauma, previous childbirth, fears during pregnancy and childbirth, mode of delivery, discomfort with the undressed state, feeling control during labor, confidence in self and medical staff, breastfeeding and future plans regarding pregnancy. In addition the Edinburgh Postnatal Depression scale (EPDS) was administered. The EPDS referred to a report of the last week before delivery, aiming to measure depressive symptoms at the end of pregnancy. A month later, these women were contacted via telephone and requested to complete once again the study questionnaires consisting

of questions exploring subjective experience of obtaining sufficient postpartum help, emotional detachment from husband, desire for more children and breastfeeding , as well as the EPDS, the modified Spielberger Anxiety Scale and the Posttraumatic Stress Diagnostic Scale (PDS).

BACKGROUND FOR STUDY QUESTIONNAIRES

1. The Edinburgh postnatal Depression scale (EPDS) was developed as a screening test for postnatal women. It has been validated (as has its Hebrew version) (18) and is widely used around the world. A score > 10 indicates symptoms of depression and a score > 12 indicates significant depressive symptoms (19, 20). In our analysis we referred to EPDS > 10.
2. The Posttraumatic Diagnostic Scale (PDS) provides an indication of whether DSM-IV criteria for PTSD have been met, the severity of the symptoms, the number of symptoms and the severity of dysfunction. It has been validated in those who have undergone a traumatic event in the month previous to the test (21).
3. The modified Spielberger Anxiety Scale is an adaptation of the Spielberger Anxiety Scale aimed at identifying current anxiety state. The questionnaire consists of statements regarding mental state, such as "I am stressed," "I am disturbed." The patient is requested to note the intensity of the experienced emotion: "very much," "medium," "little," "not at all." The questionnaire is intended for use when use of the full questionnaire is impossible (due to lack of time, for example). The questionnaire combines elements found to be most correlated with anxiety in the expanded version. A version of the short questionnaire has been found to be reliable and valid (22).

STATISTICAL ANALYSIS

The analysis examined the relationships between the characteristics of postpartum anxiety, depression during the last week of pregnancy and postpartum and demographic characteristics of previous pregnancies, current pregnancy, birth process and various factors after birth. Associations were calculated using of chi-square and t-tests as appropriate according to variables nature.

Scores on the modified Spielberger Anxiety Scale showed a biased distribution, with mainly low scores. Therefore, scores were categorized according to a median split into low (0-4) or high (5-20) anxiety groups. This approach to analysis of scores is similar to that of Shindel et al. (23) where scores were divided into quartiles for subsequent analysis. EPDS scores were analyzed using the conventional cut-point of EPDS>10 as indicating postpartum depression. PDS analysis was used to indicate presence or absence of DSM-IV criteria of PTSD.

All tests were set with a two-tailed significance level of 5%. Analyses were performed by SPSS software (version 16).

RESULTS

DEMOGRAPHICS

The demographic characteristics of the cohort have been described elsewhere (24). In summary, 102 women agreed to participate and were interviewed; 89 of the group completed the one month follow-up interview. Mean age was 32 years (range 20-40 years). For 29% of the study sample this was their first delivery. Mean parity=1.3. 95.5% percent of the women surveyed were married, 3.3% with partners and 1% was divorced. Mean number of years of educations =14.7; 84% percent of the women reported that they work, with 12.4% describing their income as significantly above average, 38.2% as slightly above average, 34.8% average, 9% less than average and 5.6% significantly less than average. With respect to religious orientation, 49.4% described themselves as secular, 29.2% as traditional, 9% as national religious and 11.2% as ultra-orthodox.

DEMOGRAPHIC ASSOCIATIONS WITH ANXIETY AND DEPRESSION

Among demographic variables only anxiety was significantly associated with mean education years (14.3 years in low anxiety group vs. 15.6 years in high anxiety group) (t test, p=0.045).

CLINICAL ASSOCIATIONS WITH POSTPARTUM ANXIETY

1. *Modified Spielberger Anxiety Scale results*
   Most women, n=53 (60%), showed low scores of 4 or less on a modified version of the Spielberger Anxiety Scale while the remaining n=36 (40%), showed high scores. Therefore it was deemed inappropriate to use the anxiety score as a continuous variable and scores were categorized by means of the median split to separate the sample into low (0-4) or high (5-20) anxiety groups.
2. *EPDS results*
   With a score of at least 10 on the EPDS indicating possible depression, 22 (24.7%) subjects scored above 10 during their last week of pregnancy and 4 (4.5%) subjects above 10 postpartum. There was a significant association between depression during last week of pregnancy (EPDS>10) and postpartum anxiety (chi test, $p<0.01$) as well as postpartum depression (EPDS>10) and postpartum anxiety (chi test, $p<0.05$).

Figure 1. *Incidence and association of postpartum anxiety, depression during the last week of pregnancy, postpartum depression and PTSD*

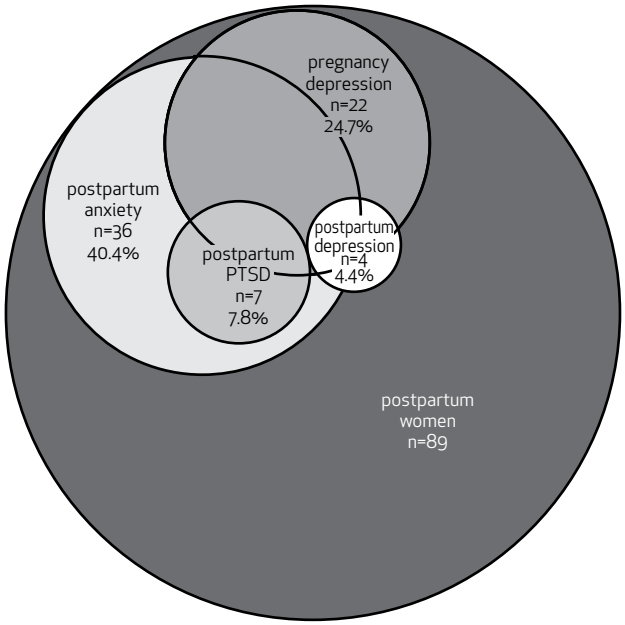

Table 1. *Mean Anxiety Scores*

		Number	Mean Anxiety Score
Depression during last week of pregnancy	EPDS<10	67	4.1791
	EPDS>10	22	7.0455
Postpartum depression	EPDS<10	85	4.6706
	EPDS>10	4	9.5000
Postpartum PTSD	NO PTSD	82	4.1707
	Yes PTSD	7	13.2857

3. *PDS results*
   The PTSD scores of the cohort have been described elsewhere by our team (23). In summary, results as expressed by means of the PDS questionnaire analysis indicated that 3 (3.4%) women fulfilled the full criteria of PTSD one month after birth. The results were analyzed including women with full PTSD criteria and women missing one or two criteria, providing a total of 7 (7.8%) women. As expected, a significant association with presence of anxiety was found in the subgroup of patients who developed postpartum PTSD (chi test, p<0.001). All the women in the PTSD group had high anxiety scores as defined by the median split. In addition, it is important to note that women in the PTSD group had almost twice the mean anxiety scores than women with depression during their last week of pregnancy and 50% higher than women with post-partum depression.

   See Figure 1 for summary of incidence and association of postpartum anxiety, depression during last week of pregnancy, postpartum depression and PTSD See Table 1 for comparison of mean anxiety score of women with depression during last week of pregnancy, postpartum depression and postpartum anxiety.
4. *Prior history*
   No significant associations were found between depression during last week of pregnancy, postpartum anxiety or depression and previous psychological or psychiatric treatment, family psychiatric disorders, drug use, past traumatic events, sexual abuse, previous birth experience, and report of sadness or anxiety during or after previous pregnancies.
5. *Current pregnancy*
   Unplanned pregnancies were associated with depression during last week of pregnancy (chi test, P=0.038). No associations were found to waiting time for pregnancy, fetal medical problems, fertility treatment or to duration and methods of preparation for birth (birthing course, books, Internet, etc.). However, as expected an association was noted between crises during pregnancy and depression during last week of pregnancy (chi test, P=0.024).
6. *Birth expectations*
   Women with high postpartum anxiety had higher mean of fear of birth during pregnancy (t test, P=0.018); 50% of women who were depressed during last week of pregnancy reported a high fear of birth compared to 27.3% of those without depression (chi test, P=0.05). No association was found to severity of pain expectations.
7. *Delivery*
   No associations were found with delivery week, mode of delivery, use of analgesia, or intensity of pain experienced during delivery.
8. *Feelings during childbirth*
   Women with high postpartum anxiety reported higher levels of "feeling of danger to their lives or health or health of the fetus during labor" compared with those with low anxiety (t test, P=0.053, P=0.005). Postpartum anxiety was also associated with reports of feeling less confidence in themselves and staff during labor (t test, P=0.04, P=0.04). The women were asked about feeling anger, fear or emotional detachment during childbirth. More women with depression during last week of pregnancy, postpartum depression and postpartum anxiety reported at least one of these negative feelings (chi test P=0.05, P=0.081, P = 0.012). An association between

depression at the end of pregnancy and discomfort with the undressed state during labor was found (chi test, P=0.013). A tendency towards significance was noted in women with high anxiety (chi test, P=0.082).

9. *Immediate postpartum factors*
   No significant associations were found with mother and baby complications, mother pain after birth or to Apgar scores. In addition no significant associations were found with reports of desire for more children or breastfeeding.
10. *One-month postpartum factors*
    More women who had depression during the last week of pregnancy reported feeling emotional detachment from their husbands after delivery (chi test, P=0.051). In women with high postpartum anxiety this did not reach statistical significance (chi test P=0.196). Fewer women with postpartum depression (EPND>10) or postpartum anxiety reported that they had desire for future pregnancies, but the finding did not reach statistical significance (chi test, P=0.085, P=0.146). No association was found between anxiety and breastfeeding one-month postpartum, although a tendency was noted in women with depression at the last week of pregnancy or post-partum (chi test p=0.092, p=0.135).

DISCUSSION

Observations from this epidemiological study – to the best of our knowledge the first of its kind in Israel - indicate that approximately 40% of women postpartum experienced severe anxiety. Considering that we studied a cohort of subjects from the general population, this is remarkable since results from this study indicate that such anxiety symptomatology appears to be very high in the community. It should be noted, however, that this finding by nature included all subjects with PTSD, many with postpartum depression and many with anxiety disorder who would have remained undiagnosed and untreated.

Postpartum anxiety was associated with postpartum PTSD. This finding is not surprising given that PTSD has been classified according to the DSM-IV as an anxiety disorder. In contrast Maggioni et al. (25), by means of the State Trait Inventory rating scale, noted that 3-6 months after delivery 19% of women investigated suffered from state anxiety and 23.7% from trait anxiety with no association between PTSD and anxiety. However, Czarnocka and Slade (26) did note an association between PTSD and anxiety. Differences between these study results may be explained by the use of different rating and evaluation scales.

The study observation that postpartum anxiety was correlated with depression during pregnancy and postpartum depression indicates the close relationship between the two disorders; 60% of the women who suffered from depression during their last week of pregnancy and 75% of the women who were depressed after childbirth also suffered from postpartum anxiety. However, severity scores of anxiety were almost twice the level of those who suffered from postpartum PTSD compared to those who experienced depression during last week of pregnancy and 50% higher in women who experienced postpartum depression.

It appears from study results that women with higher educational status suffered more from postpartum anxiety. This is in some ways in contrast to what is generally believed about the relationship between education and anxiety (27). Similar to our findings, Bener et al. (28) in a study of 2,091 women noted that young mothers and those with higher education were more depressed, anxious, and under stress.

Similar to previous studies (29, 30), we noted that unplanned pregnancies were associated with depression during pregnancy – a finding which did not extend to anxiety. It thus appears that unplanned pregnancies did not increase anxiety and women in such situations deal with the unplanned experience by responses of painful depression rather that increased anxiety.

We did not find a significant association between postpartum anxiety and fertility problems even though a tendency was noted. Our findings are similar to the Warmelink et al. (31) study of 907 women who conceived via medically assisted conception or conceived naturally. He did not find significant differences in the prevalence of PTSD, anxiety and depression between women who conceived via medically assisted conception and those who conceived naturally.

It is important to note that among the most important findings of the study were the associations that were not observed. No association was noted between postpartum anxiety and/or depression and any objective risk factors during pregnancy and after. Thus no association was found with difficult childbirth or birth complications. This finding is similar to the Adams et al. (32) study which found no association between mode of delivery and maternal postpartum emotional distress in a prospective study of 55,814 women, unlike other studies such as that of Mei and Huang (33) which noted an association between labor complications and postpartum depression.

However, we did note associations with several subjective factors. These women reported higher fear of birth

during pregnancy. During childbirth these individuals reported feeling less control, more fear, anger and emotional detachment, a greater feeling of danger to their and the fetus' lives or health and thus less reliance upon themselves and on the staff.

The observation of increased "fear of childbirth" and fears during childbirth being associated with increased postpartum anxiety is not surprising and it supports the consideration that anxiety may be a trait that endures and is expressed in several different manifestations and situations in a person's life and which may be exacerbated around pregnancy, childbirth and the postpartum period.

The finding of heightened expectations of fear of childbirth being associated with depression at the end of pregnancy and one month postpartum is consistent with previous research among 98 primaparous women recruited from antenatal classes and who evaluated their expectations and experiences of pregnancy and delivery before and after birth. In this study the most consistent predictors of depression in the days immediately after birth were trait anxiety and fear of birth assessed during pregnancy (34).

We found no significant association between anxiety and breastfeeding immediately after birth and one month postpartum. In contrast to our findings, Zanardo et al. (35), in a study of 204 women in the third to fourth day postpartum, found that increased state anxiety levels impaired success rates of breastfeeding (measured by the state-trait anxiety inventory).

Similar to our previous finding of an association between discomfort with the exposed state during labor and PTSD, we noted an association between discomfort from exposure during labor and postpartum anxiety and depression – a finding which did not extend to a significant association with postpartum anxiety.

Study limitations include the sample size which while useful could yield more generalized findings in a bigger sample. In addition, future studies of this nature should consider longer time to follow-up, exploration of the various subtypes of anxiety and increasing the sensitivity of the evaluation by conducting the follow-up in person rather than by telephone. In addition, further similar studies on the subject should document study subject refusal rates and comparisons with national demographic data in order to better generalize study findings. Finally, evaluation of pregnant women in the final stages of pregnancy for mood changes and expectations of childbirth was retrospective in this study. Future studies may want to consider evaluation of these factors in real time in order to exclude potential bias of memory recall.

In conclusion, findings from this study indicate a high incidence of self-reported postpartum anxiety symptoms and high comorbidity between depression during the end of pregnancy, postpartum depression, postpartum PTSD and anxiety. Since postpartum anxiety may be expressed in several forms including PTSD as noted in our previous study, it may be cost effective to evaluate postpartum anxiety in general by means of a brief screening test postpartum. Only if positive for anxiety would it then be valuable to probe for the specific nature of the anxiety.

The finding that postpartum PTSD was associated with the severity of postpartum anxiety could be used in the future as a potential "red flag" to identify PTSD symptoms in women with high anxiety scores.

Anxiety after childbirth was found to be associated with fears during pregnancy and childbirth and not to the delivery process itself. It was related to fear of the birth, fear to her life and to the fetus during delivery, to feeling lack of control during labor and to less self-confidence in her ability to deal with labor and less confidence in the medical staff. Therefore it is important to inquire about depression during pregnancy and about fears during pregnancy and childbirth in order to anticipate anxiety symptoms after childbirth.

It appears that more of a focus on the subjective experience during childbirth is indicated in order to predict anxiety development. Future studies with larger samples would be important in order to replicate these findings and further our understanding of these common and important phenomena during the postpartum period.

CURRENT KNOWLEDGE ON THIS SUBJECT

- In contrast to postpartum depression, anxiety in the perinatal period has received little attention and research.
- Several studies have shown that the postpartum period elevates the risk of experiencing an exacerbation of anxiety-related symptoms in women.
- Attention to the phenomenon of postpartum effects of maternal anxiety is important since anxiety in this context impairs maternal functioning, leads to significant distress and may seriously disturb mother-infant interaction, with consequences ranging from maternal neglect, failure to thrive and even to infanticide.

WHAT THIS STUDY ADDS

- Observations from this epidemiological study indicate that approximately 40% of women postpartum experienced severe anxiety. Considering that we studied a cohort of subjects from the general population, this is

remarkable since results from this study indicate that such anxiety symptomatology appears to be very high in the community.

- A significant association was found between postpartum anxiety and depression during last week of pregnancy, postpartum depression as well as postpartum PTSD.
- Postpartum PTSD was found to be associated with the severity of postpartum anxiety.
- Anxiety after childbirth was found to be associated with fears during pregnancy and childbirth and not to the delivery process itself. No association was found with birth complications.
- It is important to inquire about fears during pregnancy and childbirth and subjective experience in order to anticipate postpartum anxiety symptoms, even by means of a brief screening test.

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