The association between pregnancy-specific anxiety and preterm birth: a cohort study

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Abstract

Background: Antenatal anxiety may have long-term negative effects on pregnancy outcome. Antenatal anxiety can also be detrimental to maternal health during pregnancy. Therefore, this study aimed to determine the association between pregnancy-specific anxiety and preterm birth in pregnant women.

Methods: This prospective cohort study was conducted on 208 pregnant women who were referred to the prenatal clinic of Al-Zahra hospital in Rasht. Sampling was conducted through convenient (simple) method. Data gathering tools were a demographic characteristics questionnaire and pregnancy-specific anxiety scale. The data were analyzed using SPSS version 19. General Linear Model (GLM)-Repeated Measures test were used to study variations in anxiety along pregnancy period and tested levels of significance among inter-trimester anxiety scores.

Results: Results of the study showed that change in pregnancy-specific anxiety is significantly associated with preterm birth among participants in this study. Second trimester pregnancy-specific anxiety was not associated with preterm birth, but third trimester pregnancy-specific anxiety was associated with preterm birth.

Conclusion: According to the results of this study, third trimester pregnancy-specific anxiety was associated with preterm birth. Therefore, the health care providers should pay special attention to pregnancy-specific anxiety.

Keywords: Pregnancy-specific anxiety, preterm birth, pregnancy outcome.

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Introduction

Preterm birth is commonly defined as delivery that occurs at a gestational age less than 37 weeks¹. Preterm birth is a significant public health problem leading to increased neonatal morbidity and mortality and entailing substantial social and economic costs in the developed world². It is associated with 8 to 24% of pregnancies³. In most countries, the rates of preterm birth have been increasing in recent decades and this represents a primary obstacle to the World Health Organization’s Millennium Development Goal 4, which is to reduce childhood mortality⁴. Predisposing factors of preterm birth are still not obviously recognized⁵. However, some studies have shown maternal mental factors to play some role⁶. Therefore, it is important to identify modifiable risk factors that may lead to the primary prevention of preterm birth.

Pregnancy is often viewed as a very positive time in a woman’s life⁷. This despite the fact that this period is also characterized by many ongoing changes. Feelings of anxiety across pregnancy are relatively common, with about 10–15% of all pregnant women experiencing some level of anxiety or anxiety during this major transitional phase in one’s life⁸. Research suggests anxiety disorders are...
more common than depressive disorders in the perinatal period. Pregnancy-specific anxiety is defined as a mental state of a pregnant woman whose concerns are specific to the pregnancy itself, such as fears regarding the pregnancy, delivery, and health of the child. A woman’s ability to adapt to the changes and challenges of pregnancy is unique, therefore P-SA can vary from woman to woman.

Most studies reported varied prevalence rate from different parts of the world and the majority of them explored general anxiety than P-SA. Assessment of general anxiety during pregnancy may underestimate pregnancy specific anxiety. Only few studies have systematically assessed the specific fears and worries related to pregnancy and the structure of P-SA. Previous studies reported that 54% low risk pregnant women had P-SA and it varied at different trimesters of pregnancy with a U pattern of high anxiety during first and third trimesters. Elevated untreated anxiety in pregnancy may impact negatively on the developing baby.

Findings of Ding et al. and Behrman et al. revealed that P-SA was significantly associated with an increased risk for preterm birth and remained significant regardless of the timing of anxiety assessment. While much is known about the relationship between P-SA and PB, there is debate about the point in pregnancy at which P-SA has the greatest effect on length of gestation. Although some research suggests that the critical time is during the second trimester, other evidence points to third trimester as more predictive of preterm birth and length of gestation. Cross-sectional measurements of P-SA that are prevalent in the literature prevent firm conclusions regarding the time when P-SA has the greatest effect on birth outcomes. This gap also prevents understanding of the relationship between change in P-SA and length of gestation. The purpose of this study was to investigate longitudinally the association of P-SA with PB.

Methods
This prospective cohort study was conducted on 208 pregnant women who referred to the prenatal clinic of Al-Zahra hospital in Rasht to receive prenatal care. The cohort was limited to only those women with complete data for second and third trimester interviews and recorded gestational age, resulting in a sample size of 208 (Figure 1).

Figure 1: Consort diagram
Sampling was conducted through convenient (simple) method until the intended sample size was reached. The inclusion criteria were 18 to 35 years old, being Iranian, having singleton pregnancy, having a gestational age of 8 to 12 weeks, not smoking cigarettes or hookah, not consuming alcohol, not using any drugs, and not having a history of mental illnesses or known depression and anxiety at any other periods of life. The exclusion criteria were having a history of preterm delivery, having a history of abortion, stillbirths or infertility, having any diagnosed complications of the pregnancy, such as incompetent cervix, history of having any cardiovascular, respiratory, hematologic, renal, liver, infectious and endocrine diseases and history of diabetes or hypertension. To ensure a consistent approach in dating pregnancy we was used ultrasound furthermore the LMP 2. Of the 208 women, 119 (57.21%) had an ultrasound done in the first trimester and 89 (42.79%) had an ultrasound in the second trimester.

Data gathering tools were a demographic and obstetric characteristics questionnaire (including age, job, and educational status, number of deliveries and history of preterm deliveries, abortions, stillbirths and infertility), pregnancy-specific anxiety scale to assess P-SA. The validity of the demographic, social and obstetric characteristics questionnaire was approved using content validity; meaning that the primary version of the questionnaire was developed after reviewing the most recent books and articles about the research and after modification, was distributed among 12 academic members of the Guilan University of Medical Sciences. Then applying their opinions and recommendations, the final version of the questionnaire was developed. Pregnancy-specific anxiety scale is a standardized questionnaire to assess P-SA. It measures the intensity of a woman’s anxiety in four main areas of pregnancy and childbirth anxiety. Pregnancy-specific anxiety scale has 40 items self-report questionnaire on a five-point Likert scale with a maximum score of 200°. The first part deals with anxiety about being pregnant with 16 items to explore anxiety related to pregnancy. The second part is related to anxiety of childbirth with 10 items. The third part with eight questions related to anxiety about breastfeeding and the fourth part with 6 questions related to anxiety about newborn care. The reliability of the pregnancy-specific anxiety scale was established using the split half method and the reliability coefficient obtained was 0.82 which indicated that the tool was reliable. The face and content validity of the pregnancy-specific anxiety scale was established to review by 5 psychologists and psychiatrists. After selecting eligible pregnant women, and completely explaining the aims of the study for them, written informed consent was obtained from all the participants.

Also the participants were assured that they could leave the study at any desired time without any changes in their prenatal care. Then demographic and obstetric characteristics questionnaire was filled by the participants. All the participants were followed-up until the end of their pregnancy to determine preterm birth. So mother’s phone numbers were recorded. Initially, pregnant women who met the inclusion criteria and volunteered were recruited to the study as convenient sample. Each pregnant woman was contacted at their 8-12 weeks asked to self-rate their anxiety using a pregnancy-specific anxiety scale. They were followed up throughout their pregnancy and postpartum period. The P-SA were assessed at second trimester (20–28 weeks) and third trimester (30 -38 weeks). The assistants of the researchers were present at the time of delivery to record the time of delivery and observe and record the pregnancy and neonatal outcomes. To prevent any bias in data collection, assistants were not aware of mothers’ depression condition. Deliveries that were occurring sooner than the 37th week of the pregnancy were considered preterm birth. To describe the characteristics of the studied participants descriptive statistics, distribution (mean and standard deviation), and frequency distribution was used. General Linear Model (GLM)-Repeated Measures test were used to study variations in anxiety along pregnancy period and tested levels of significance among inter-trimester anxiety scores. The data were analyzed using SPSS version 19 with two-tailed significance level of less than 0.05.

Results

Results of the study showed that the mean age of the participants was 26.6 ± 2.1 years old, the highest frequencies belonged to housewives (78.36%), diploma educational level (47.11%), being nulliparous (50.96%), and wanted pregnancy (62.98%). The study revealed that nulliparous status is an influencing factor for the high prevalence of P-SA.
Four areas of P-SA such as anxiety of being pregnant, anxiety about childbirth, anxiety about breast feeding and anxiety about newborn care were analyzed separately. With advancing gestational age, P-SA scores significantly increased. The highest prevalence of (58.65%) moderate levels of P-SA was reported in second trimesters. The highest prevalence of (53.84%) severe degree of P-SA was reported during the third trimester. The inter-trimester differences of means were statistically tested using GLM test. The value of \( F = 321.47 \) shows that P-SA across the two trimesters differed significantly at 0.01 levels. 

Also, most (78.36%) of the pregnant women had a moderate level of anxiety about breastfeeding during the third trimester. During third trimester, women rated the highest levels (71.15%) of severe degree anxiety about newborn care.

Change in P-SA is significantly associated with preterm birth among participants in this study. Second trimester P-SA was not associated with preterm birth, but third trimester P-SA was associated with preterm birth (Table 1).

**Table 1.** Prevalence and level of significance of pregnancy-specific anxiety and four areas across trimesters 2, 3 of pregnancy.

| Variables                             | Mild   | Moderate | Severe  | Mean  | SD    | GLM-test                  |
|---------------------------------------|--------|----------|---------|-------|-------|---------------------------|
| Pregnancy-specific anxiety (T2)       | 25     | 58.65    | 16.35   | 98.21 | 12.02 | \( F = 321.47, p<0.01 \) |
| Pregnancy-specific anxiety (T3)       | 10.57  | 35.57    | 53.86   | 103.4 | 9.572 |                           |
| Anxiety of being pregnant (T2)       | 63.46  | 13.94    | 22.6    | 50.23 | 6.392 | \( F = 183.63, p<0.1 \)  |
| Anxiety of being pregnant (T3)       | 66.82  | 12.98    | 20.2    | 49.38 | 5.656 |                           |
| Anxiety about childbirth (T2)        | 8.17   | 77.88    | 13.95   | 34.16 | 2.741 | \( F = 375.81, P<0.001 \) |
| Anxiety about childbirth (T3)        | 2.88   | 9.13     | 87.99   | 65.41 | 2.344 |                           |
| Anxiety about Breast Feeding (T2)    | 4.8    | 47.11    | 48.09   | 13.47 | 2.607 | \( F = 42.79, P<0.05 \)  |
| Anxiety about Breast Feeding (T3)    | 3.36   | 78.36    | 18.28   | 14.92 | 3.236 |                           |
| Anxiety about New born Care (T2)     | 9.13   | 41.84    | 49.03   | 39.60 | 2.715 | \( F = 38.24, P<0.05 \)  |
| Anxiety about New born Care (T3)     | 7.21   | 21.63    | 71.15   | 51.71 | 2.371 |                           |

*T2, 3: Trimester 2, Trimester 3  
*GLM: General Linear Model
Both multiparous and nulliparous mothers reported high third trimester PSA compared to second trimesters. Nulliparous pregnant women reported higher PSA across second and third trimesters with the highest during third trimester, PSA (mean 131.86) compared to parous women (mean 98.16). GLM test revealed significant levels at 0.05 for score differences among nulliparous and parous pregnant women. This indicates that pregnancy-specific anxiety is higher among nulliparous women (Table 2).

| Variable         | Nulliparous pregnant women (106) | Parous pregnant women (102) | GLM-test |
|------------------|-----------------------------------|----------------------------|----------|
| Trimester-2      | Mean 131.86, SD 8.011              | Mean 98.16, SD 8.92        | $F = 162.69$ |
| Trimester-3      | Mean 147.32, SD 9.172              | Mean 102.23, SD 3.29       | $P < 0.05$ |

*GLM: General Linear Model

**Discussion**

P-SA varies from trimester to trimester\(^{20}\). The level of anxiety a pregnant woman experiences affects the outcome of pregnancy. An observational, analytical cross-sectional study among 174 third trimester pregnant women in Spain revealed that pregnant women's anxiety levels were higher than average levels in the general population\(^{21}\). Evidence also established the relationship between high levels of P-SA and preterm birth\(^{22,23}\). The current study reported very high prevalence of severe degree of the third trimester P-SA during the third trimester. Previous studies also reported high P-SAscore among pregnant women\(^{17,20,24}\). It has been reported that women with a high P-SA tend to have more preterm birth\(^{25}\). The study revealed that nulliparous status is an influencing factor for the high prevalence of P-SA. These findings are consistent with previous studies\(^{22}\).

The highest prevalence of anxiety about childbirth was reported during the third trimester. Throughout the course of pregnancy, high levels of anxiety about childbirth were observed in the third trimester with low prevalence in second trimester\(^{26}\). The current finding is consistent with similar findings in other studies\(^{27}\). Nulliparous women reported higher childbirth anxiety than parous mothers; these results are consistent with similar previous studies\(^{28,29}\). So current study recommends that the prenatal care should focus on measures to reduce pregnancy specific anxiety, particularly among nulliparous women which would reduce preterm birth.

**Conclusion**

The findings from this study have significant implications for the health care provider. Antenatal anxiety must be considered as a top priority to reduce adverse pregnancy outcomes such as preterm birth. A formal antenatal screening for P-SA should be a part of routine antenatal check up to identify the high risk groups of pregnant women with pregnancy anxiety and fear. The findings of the present study suggest the necessity of implementing interventions to reduce P-SA and thereby positively influence birth outcomes. In the present study, we measured P-SA at the second and third trimester which provides a very limited assessment of the psychosocial health of the pregnant women throughout the pregnancy.

A larger longitudinal cohort study, with multiple measures of stress, depression, and cortisol levels, as well as a measure of P-SA may add new knowledge and enhance our understanding of the relationship between stress, depression, P-SA, cortisol levels and preterm birth.

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**Conflict of interest**

The authors declare that they have no conflicts of interest.
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[1] Pregnancy-specific anxiety (P-SA)
[2] Last Menstrual Period