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Psychosocial risk factors for depression during pregnancy

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Abstract

Objective. To assess the prevalence of antenatal depressive disorder in different trimesters and to evaluate the relation of psychosocial risk factors to antenatal depressive disorder. *Design*. Cohort follow-up. *Setting*. University Hospital, Kaunas, Lithuania. *Sample*. Two hundred and thirty pregnant women consecutively admitted. *Methods*. At 12–16 weeks, 22–26 weeks, and 32–36 weeks of pregnancy, participants were screened for depression using the World Health Organization's Composite International Diagnostic Interview Short Form (CIDI-SF). Women who gave at least one positive answer to the CIDI-SF depression-screening question were evaluated for depressive disorder using the non-patient version of the Structured Clinical Interview for DSM-III-R (SCID-NP). Psychosocial stressors and two Big Five Personality dimensions, neuroticism and extraversion, were also evaluated. *Main outcome measures*. Prevalence of depressive disorder. *Results*. The prevalence of the antenatal depressive disorder at 12–16 weeks' gestation was 6.1%, at 22–26 weeks 3.5%, and at 32–36 weeks 4.4%. In the first trimester, a greater prevalence of current depressive disorder was independently associated with unplanned and unwanted pregnancy, high neuroticism, low education, and a previous history of depression; in the second trimester with unplanned and unwanted pregnancy and high neuroticism; in the third trimester with unplanned and unwanted pregnancy, high neuroticism, and the occurrence of psychosocial stressors during the last year. *Conclusions*. The highest prevalence of depressive disorders was found in the first trimester, the lowest in mid-pregnancy. Several determinants (unwanted and unplanned pregnancy, high neuroticism) were independent predictors of antenatal depressive disorders throughout whole pregnancy, while other determinants (low education, previous history of depression, the occurrence of psychosocial stressors at the end of pregnancy) were trimester specific.

Key words: *Depressive disorders, pregnancy, neuroticism, psychosocial factors*

Abbreviations: *BFPI: Big Five Personality Inventory, CI: confidence interval, CIDI-SF: Composite International Diagnostic Interview Short Form, DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders Third Edition – Revised, SCID-NP: non-patient version of the Structured Clinical Interview for DSM-III-R, SD: standard deviation, SPSS: Statistical Package of Social Science*

Introduction

Psychiatric disorders, particularly mood and anxiety disorders, have the highest prevalence in women during childbearing years (1). A meta-analysis of 59 studies found an increased rate of onset of depression in pregnancy and in the postpartum period (2). Evidence suggests that postpartum depression can be part of a continuum, with onset of illness during pregnancy (3). A longitudinal cohort study showed that depressive symptoms are actually more common during gestation than in the postpartum period (4). The study by Gaynes et al. indicated that up to 11% of women suffer from major or minor depression during gestation (5).

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Depression during pregnancy can have serious implications for all family members. Relationship conflicts, decreased ability to care for other children and loss of employment are examples. Uncontrolled maternal depression puts the developing fetus at harm due to substance abuse, poor prenatal care and suicide attempts (6). Mood and anxiety disorders during pregnancy are associated with diminished fetal wellbeing, poor obstetric outcomes, including birthweight, body mass index and preterm delivery (7,8), and with persistent behavioral problems during childhood (9). Therefore, early detection of antenatal depression and intervention are important clinical tasks. However, antenatally as well as postnatally depressed women are poorly identified by their general practitioners (10). Symptoms of depressive disorder, such as disturbed sleep, appetite, energy and interest level, may be incorrectly assumed to be symptoms associated with pregnancy or the postpartum period (11).

Studies of antenatal depression have mostly examined antenatal mood as a predictor of postnatal depression. There have been several efforts to develop 'screening tools' to predict which women will become depressed postnatally (12). While the predictive value of these instruments has been poor (12), they became useful in identifying pregnant women who are currently depressed (13). Psychosocial risk factors that are indicators of distress during pregnancy, such as previous negative pregnancy experience (e.g. miscarriages, terminations), domestic violence, significant emotional losses prior to age 16 or within the past year may be associated with depressive mood during pregnancy (14,15).

Maladaptive personality traits, such as chronic anxiety and low self-esteem (16), may also impact depressive mood during pregnancy. Although there is substantial evidence on the association between specific personality dimensions, such as neuroticism or introversion, and major depression in general and in the postpartum period (17,18), there are no data with regard to pregnancy. Recent reviews demonstrate that substantial risk factors for depression during pregnancy are a personal history of mood and anxiety disorders, previous postpartum depression, family history of psychiatric disorders, younger age, unplanned pregnancy, ambivalence or negative feelings about the pregnancy, greater number of children, substance abuse or smoking, lower educational levels, and unemployment (19).

The aim of this study was to assess the prevalence of the current antenatal depressive disorders at different trimesters during gestation and to evaluate the relation between psychosocial risk factors and antenatal depressive disorder.

Material and methods

In 2005, women who attended for antenatal care at two antenatal clinics in Kaunas, Lithuania, were invited to participate. All were low risk, and midwives and family doctors gave antenatal care, while according to Lithuanian antenatal care regulations, there was an obligatory consultation with an obstetrician twice during pregnancy. Three hundred and seven consecutive women signed the informed consent. Women who did not attend all three study assessments ($n=77$) were excluded from the study. These 77 women were no different from those who attended all assessments in terms of psychosocial and demographic characteristics.

Data from 230 (74.9% response rate) eligible women were thus used for the final analysis (Table I). Age ranged from 18 to 43 years (mean 29 ± 5 years). All women were Caucasian and fluent in Lithuanian. None of the participating women received biological or psychological treatment for a depressive disorder.

The participants were interviewed three times by the same psychiatrist (LK): at 12–16, 22–26, and 32–36 weeks. During the first pregnancy assessment time (12–16 weeks of pregnancy), a translated version of the interview of the Dutch Royal Midwifery

Table I. Characteristics of the study sample of 230 pregnant women.

Characteristic	n	%
Age in years (mean±SD)	29±5	
Education		
Low	34	14.8
Middle	85	37.0
High	111	48.2
Employment		
No	37	16.1
Part time	42	18.3
Full time	151	65.6
Family status		
Married	179	77.8
Has a partner	48	20.9
Single	3	1.3
Parity		
0	141	61.3
1	71	30.9
2–5	18	7.8
Previous miscarriages in life	54	23.5
Unwanted and unplanned pregnancy	25	10.9
History of depression	22	9.6
History of depression in the family	46	20
Smoking during pregnancy	4	1.7
Alcohol consumption during pregnancy	58	25.2
High level of neuroticism	41	17.8
Low level of extraversion	47	20.4

Association was used to collect clinical and psychosocial data (age, level of education, working outside home, lifestyle habits, history of depression, history of depression in the family, obstetrical history, as well as was this pregnancy wanted or not) (20). During all three pregnancy assessment times, women were screened for depression using the World Health Organization's Composite International Diagnostic Interview Short Form (CIDI-SF) (21). All women who gave at least one positive answer to the CIDI-SF depression screening question were administered the detailed standard psychiatric diagnostic assessment with the non-patient version of the Structured Clinical Interview for DSM-III-R (SCID-NP) (22). During all three pregnancy assessment times, the occurrence of psychosocial stressors was evaluated using the validated translation of the DSM-III-R Severity of Psychosocial Stressors Scale in Adults during the last year (23). At the second assessment time (22–26 weeks), two personality dimensions, neuroticism and extroversion, were assessed using the Big Five Personality Inventory (BFPI) (24).

The CIDI-SF was developed by the World Health Organization from the full version of the CIDI to screen for the most commonly occurring psychiatric diagnoses.

A previously validated Lithuanian translation of the SCID-NP was employed for detailed psychiatric diagnostic assessment (25). The SCID-NP comprises a semi-structured clinical interview ensuring accurate and reliable psychiatric diagnosis and consists of several models designed to diagnose specific mental disorders. We used module 'A' for diagnosing mood syndromes such as major depression and dysthymia, and module 'I' for diagnosing adjustment disorder with depressive mood. Women who were diagnosed as having current major depressive disorder, current dysthymia or current adjustment disorder with depressed mood were classified as a case.

A previously validated Lithuanian translation of the DSM-III-R Severity of Psychosocial Stressors Scale in Adults during last year (23) was used to evaluate the occurrence of psychosocial stressors. The rating of the stressor is based on the clinician's assessment of how an 'average' person in similar circumstances and with similar sociocultural values would experience the particular stressor(s). The rating is based on the severity of the stressor itself, not on the person's vulnerability to the particular stressor.

Subscales of neuroticism and of extraversion of the BFPI (24) consist of eight statements each. Each statement is scored from zero to five according to the extent to which someone agrees or disagrees with the listed characteristic of personality. A high neuroticism score indicates a tendency to experience unpleasant emotions easily and to react more intensely than normal. A low extraversion score indicates inhibition and shyness in social interactions. We used categorical classification of these subscales. Subjects scoring higher than the mean $+1$ SD on the subscale of neuroticism were considered as cases with high neuroticism. Subjects scoring lower than 1 SD below the mean on the subscale of extraversion were considered as cases with low extraversion. Hence, a score of ≥ 28 on the subscale of neuroticism was used to define high neuroticism ($n = 41$, 17.8%), and a score of ≤ 23 on the subscale of extraversion was used to define low extraversion ($n = 47$, 20.4%).

The CIDI-SF and the BFPI were translated into Lithuanian using the standard procedure of double translation by two psychiatrists: RB and LK.

The Biomedical Research Ethics Committee at the Kaunas University of Medicine approved this study.

Statistical analysis

The normality of the distribution of personality subscales was checked using the one sample Kolmogorov–Smirnov test. Data on the psychosocial and demographic characteristics of the subjects were summarized using descriptive statistics. Prevalence rates for antenatal depressive disorders during each trimester of pregnancy were compared using McNemar tests (Table II). Logistic regression analysis was used to examine factors associated with a depressive disorder as the dependent variable (OR, 95% CI). Independent variables were selected based on the data published in the literature, such as demographic, psychosocial, and personality factors. To assess an association between psychosocial factors and antenatal depressive disorder, first a univariate logistic model was used. Subsequently, only those variables that were significant in the univariate model during different trimesters of pregnancy were entered in a multiple logistic regression model. All comparisons were two-way and at 5% significance level. Analysis was performed using the Statistical Package of Social Science (SPSS).

Results

In total, 17% ($n = 38$), 11% ($n = 26$), and 11% ($n = 25$) of women were screened positive for depressive disorders at 12–16, 22–26, and 32–36 weeks of pregnancy, respectively. The prevalence rate of

Table II. Prevalence of antenatal depressive disorders.

	12–16 weeks' gestation	22–26 weeks' gestation	32–36 weeks' gestation
Depressive disorders	Cases (%)	Cases (%)	Cases (%)
Major depression	12/230 (5.2)*	6/230 (2.6)*	7/230 (3.5)
Dysthymia	1/230 (0.4)	1/230 (0.4)	1/230 (0.4)
Adjustment disorder with depressed mood	1/230 (0.4)	1/230 (0.4)	1/230 (0.4)
All depressive disorders	14/230 (6.1)	8/230 (3.5)	10/230 (4.4)

*$p = 0.03$ (McNemar test).

clinical diagnosis of any depressive disorder was 6.1% ($n = 14$) at 12–16 weeks, 3.5% ($n = 8$) at 22–26 weeks, and 4.4% ($n = 10$) at 32–36 weeks of pregnancy (Table II). In total, 17 (7.4%) women were diagnosed as having a depressive disorder at least once during pregnancy. Depressive disorders consisted of major depression (14 women), adjustment disorder with depressed mood (two women) and dysthymia (one woman). The prevalence of major depression was 5.2% ($n = 12$) at 12–16 weeks, 2.6% ($n = 6$) at 22–26 weeks, and 3.5% ($n = 7$) at 32–36 weeks of pregnancy.

Seven of the 14 women diagnosed with a depressive disorder at 12–16 weeks of pregnancy recovered without any treatment, the other seven remained depressed during the second and third trimester of pregnancy, also without any treatment. One of seven women who recovered from depression reported a non-planned pregnancy, while five of seven who did not recover during gestation (OR: 15.0, 95% CI: 1.03; 218.3). In the second trimester of pregnancy, one woman who was newly diagnosed as having adjustment disorder with depressed mood, remained depressed during the third trimester. In the third trimester of pregnancy, two women were newly diagnosed as having a mild episode of major depression.

In Table III, the results of a univariate logistic regression are shown with a diagnosis of a depressive disorder as the dependent variable. There were four determinants significantly associated with depression at all assessments: non-planned pregnancy, a personal history of depression in the past, a personal history of psychiatric treatment in the past and high neuroticism scores. During the first trimester, low education, the occurrence of psychosocial stressors and a family history of depression were also significantly related to depression. Psychosocial stressors were related to depression during the last trimester. Smoking was related to depression at a 90% significance level during the second and third trimesters.

The results of a multiple logistic regression analysis with depression as the dependent variable at three different trimesters of pregnancy are shown in Table IV. In the first trimester, depression was independently related to unplanned and unwanted pregnancy, high neuroticism, low education and a previous history of depression; in the second trimester, depression was independently related to unplanned and unwanted pregnancy and high neuroticism; in the third trimester, depression was independently related to unplanned and unwanted pregnancy, high neuroticism and occurrence of psychosocial stressors during the last year.

Discussion

Our study has demonstrated that the highest prevalence of antenatal depressive disorders was at the beginning of pregnancy, the lowest in mid-pregnancy. Unwanted und unplanned pregnancy and high neuroticism scores were stable determinants of antenatal depression. Furthermore, depression was associated with low education and a previous history of depression at the beginning of pregnancy, and with the occurrence of psychosocial stressors at the end of pregnancy.

A recent review of the literature on antenatal major depression reported a point prevalence ranging from 3.1 to 4.9% at different times during pregnancy (5). Our data on the prevalence rates of antenatal depressive disorder are in the same range, 2.6–5.2% at different trimesters of pregnancy. Our prevalence rate data of any antenatal depressive disorder ranges from 3.5 to 6.1% and correspond to data from other studies. Pop et al. (20), using the CIDI as a diagnostic instrument, reported the prevalence of depression ranging from 5.3% during the first trimester of pregnancy to 2.9% during the third trimester of pregnancy. Lee et al. (26), using the SCID-NP, reported a 6.4% prevalence of depression in Chinese women at the 38th week of pregnancy.

The role of personality dimensions in major depression has long been studied. Many reports have consistently documented that personality traits, such as high neuroticism, low extraversion, low self-esteem, excessive self-criticism or interpersonal dependency, are associated with depression in both

Table III. Univariate logistic regression analysis in 230 women at three assessments during gestation.

	OR	95% CI	*p*-Value
12–16 weeks' gestation			
Age[a]	1.02	0.91–1.14	0.74
Working outside home	0.45	0.13–1.52	0.2
Low education	**3.70**	**1.23–11.07**	**0.02**
Obstetrical features			
Unwanted and unplanned pregnancy	**7.78**	**2.44–24.77**	**0.001**
Nulliparity	0.45	0.15–1.34	0.15
Miscarriage earlier in life	1.33	0.4–4.42	0.64
Lifestyle habits			
Smoking during gestation	5.46	0.53–56.2	0.15
Alcohol intake	1.20	0.36–3.98	0.77
Risk factors of depression			
History of depression	**11.71**	**3.67–37.30**	**0.000**
History of psychiatric treatment	**6.11**	**1.85–20.19**	**0.003**
Depression in the family	**3.63**	**1.19–11.08**	**0.024**
Psychosocial stressors during a year	**3.64**	**1.11–11.96**	**0.03**
Personality dimensions			
High neuroticism	**5.35**	**1.76–16.24**	**0.003**
Low extraversion	0.92	0.29–3.99	0.92
22–26 weeks' gestation			
Age[a]	0.97	0.84–1.13	0.72
Working outside home	1.35	0.16–11.35	0.78
Low education	2.06	0.48–8.94	0.33
Obstetrical features			
Unwanted and unplanned pregnancy	**16.83**	**3.74–75.69**	**0.000**
Nulliparity	0.37	0.09–1.57	0.18
Miscarriage earlier in life	2.01	0.47–8.71	0.35
Lifestyle habits			
Smoking during gestation	10.43	0.96–113.24	0.05
Alcohol intake	0.42	0.05–3.44	0.41
Risk factors of depression			
History of depression	**10.10**	**2.35–43.49**	**0.002**
History of psychiatric treatment	**6.06**	**1.35–27.23**	**0.02**
Depression in family	2.73	0.63–11.89	0.18
Psychosocial stressors during a year	3.70	0.86–15.90	0.08
Personality dimensions			
High neuroticism	**8.61**	**1.97–37.65**	**0.004**
Low extraversion	1.31	0.26–6.70	0.75
32–36 weeks' gestation			
Age[a]	0.97	0.85–1.11	0.69
Working outside home	1.76	0.22–14.33	0.60
Low education	1.46	0.36–5.84	0.60
Obstetrical features			
Unwanted and unplanned pregnancy	**10.00**	**2.67–37.49**	**0.001**
Nulliparity	0.49	0.13–1.88	0.30
Miscarriage earlier in life	1.42	0.35–5.69	0.68
Lifestyle habits			
Smoking during gestation	8.04	0.76–85.06	0.08
Alcohol intake	0.32	0.04–2.56	0.28
Risk factors of depression			
History of depression	**6.67**	**1.74–25.61**	**0.006**
History of psychiatric treatment	**4.29**	**1.03–17.88**	**0.046**
Depression in family	1.93	0.48–7.78	0.36
Psychosocial stressors during a year	**7.00**	**1.75–28.01**	**0.01**
Personality dimensions			
High neuroticism	**5.11**	**1.41–18.56**	**0.013**
Low extraversion	1.71	0.43–6.90	0.45

Note: Dependent variable, depressive disorder. Significant ORs are shown in bold.
[a]OR shows greater risk 'per unit' (one year).

Table IV. Multiple logistic regression analysis in 230 women at three assessments during gestation.

Time of assessment	OR	95% CI	*p*-Value
12–16 weeks' gestation			
Unwanted and unplanned pregnancy	6.07	1.64–22.46	0.007
Low education	3.68	1.06–12.79	0.040
History of depression	6.28	1.78–22.15	0.004
High neuroticism	3.89	1.12–13.52	0.030
22–26 weeks' gestation			
Unwanted and unplanned pregnancy	15.35	3.18–74.24	0.001
High neuroticism	7.73	1.59–37.50	0.010
32–36 weeks' gestation			
Unwanted and unplanned pregnancy	7.30	1.79–29.74	0.006
Psychosocial stressors during a year	5.23	1.22–22.42	0.026
High neuroticism	4.40	1.09–17.74	0.037

Note: Dependent variable, depressive disorder.

general and postpartum populations (18, 27). There is ample evidence showing that, during a major depression, the scores for neuroticism are increased. This effect is usually attributed to the state effect of depression (27). A recent general population-based study of 4,796 subjects showed that personality-related vulnerability (high levels of neuroticism, depressive coping style and low self-esteem) was present more than one year before the onset of the episode of major depression, which increased further during the episode of depression to return to premorbid levels after full remission (28). The authors suggest the ongoing expression of vulnerability as a personality deviance and synchrony of change between severity of depressive symptoms and personality deviance. Our study is the first to examine the relation between personality and antenatal depressive disorder. We found that high neuroticism but not low extraversion was significantly associated with depression during each trimester of pregnancy. This is in accordance with results from previous studies in the general population (27) and in postpartum women (18).

Pregnancy and birth itself are often regarded as stressful life events possibly leading to depression (28). The relation between life events, vulnerability to stress and the onset of depression is well established in a psychiatric population. In this study, we found that stressful life events, such as unwanted and unplanned pregnancy, were associated with depressive disorder through all trimesters of pregnancy. Pakenhalm et al. (29) reported that during the third trimester of pregnancy, higher rates of depression are related to higher reports of stressful life events. These findings correspond with our data showing that an association between depression and psychosocial stressors in the third trimester of gestation is not limited to unwanted pregnancy and covers other psychosocial stressors as well.

We found lower education to be an independent risk factor of depression at early pregnancy, which has also been described in other studies (19). Lower education is frequently related to lower socioeconomic status, which is also a risk factor for depression.

Smoking and depression were related at a 90% significance level in the second and third trimesters of pregnancy. Others also report a relation between smoking and depression (30). The fact that this relation in the current study was not significant at a 95% level is mainly explained by the low number of women who smoked during gestation. According to the Lithuanian National Birth Register for the year 2006, before pregnancy 8.3% of women reported smoking and during pregnancy 5% reported smoking (31). The lower prevalence of smokers found in our study might suggest that the more vulnerable women did not participate in the study. A high prevalence of alcohol intake might be explained by women being considered as alcohol consumers if they used at least one drink of alcohol during pregnancy, according to Dutch Royal Midwifery Association interview format used.

A limitation of the study is the relatively small sample. Another limitation is the lack of a control group of non-pregnant women. Moreover, biological determinants of depression, such as thyroid dysfunction and immunity (20), and certain social factors, such as domestic violence and use of narcotics, were also not evaluated in this report.

The strengths of this study are its prospective design, the fact that one psychiatrist performed the psychiatric evaluation using standardized instruments (including syndromal diagnoses of psychiatric disorders) and that personality traits such as neuroticism and extroversion were evaluated.

Until recently, researchers and health care providers have especially focused on recognizing and treating depression during the postnatal period. However, unrecognized and untreated antenatal depression also has a negative impact on the well-being of the fetus and mother. Therefore, it is important to diagnose and treat depression in pregnancy. A better understanding of the factors that increase the risk of developing antenatal depression may contribute to achieving this goal.

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