DEPRESSION AND ANXIETY IN WOMEN DURING PREGNANCY IN SLOVENIA
DEPRESIJA IN ANKSIOZNOST PRI ŽENSKAH MED NOSEČNOSTJO V SLOVENIJI

Nuša PODVORNIK[1,*], Vislava GLOBEVNIK VELIKONJA[2], Peter PRAPER[1]

[1] University of Ljubljana, Faculty of Arts, Department of Psychology, Aškerčeva 2, 1000 Ljubljana, Slovenia
[2] University Medical Centre Ljubljana, Clinic of Gynaecology and Obstetrics, Zaloška 7, 1000 Ljubljana, Slovenia

ABSTRACT

Keywords:
depression, anxiety, pregnancy, prevalence

Objective. The aim of the study was to evaluate the prevalence of elevated depression and anxiety among pregnant women and to examine its correlation with medical complications and socio-demographic characteristics.

Methods. The study is based on a cross-sectional design of a sample of 348 women in three trimesters of pregnancy who received routine obstetrical care at the University Medical Centre Ljubljana, Department of Obstetrics and Gynaecology. The responding women filled out a questionnaire on socio-demographic variables, the Centre for Epidemiologic Studies Depression Scale CES-D and the State Trait Anxiety Inventory STAI.

Results. 21.7% of pregnant women were identified as suffering from elevated depression symptomatology, 15.7% reported high state anxiety and 12.5% had high trait anxiety. No significant differences in depression and anxiety across pregnancy trimesters were found. The women who have suffered from health complications during previous pregnancies showed higher state anxiety; those experiencing complications during their current pregnancy reported more intense symptoms of depression and of state and trait anxiety than women free of complications. Less educated, lower income and mothers of many children in the third pregnancy trimester reported more intensive symptoms of depression and trait anxiety.

Conclusions. Elevated depression and anxiety are frequent among pregnant women. The results draw attention to the need for early detection and treatment of depression and anxiety during pregnancy.

IZVLEČEK

Ključne besede:
depresija, anksioznost, nosečnost, prevalenca

Namen. Cilj raziskave je bil oceniti prevalenco povišane depresivne in anksiozne simptomatike pri ženskah med nosečnostjo ter preveriti njun odnos z zdravstvenimi zapleti in nekaterimi sociodemografskimi dejavniki.

Metode. V presečno raziskavo je bilo vključenih 348 nosečnic treh trimesečij nosečnosti, ki so se v okviru Ginekološke klinike Univerzitetnega kliničnega centra v Ljubljani udeležile rednih pregledov. Nosečnice so izpolnile vprašalnik demografskih spremenljivk, Lestvico depresivnosti CES-D ter Vprašalnik anksioznosti kot stanja in poteze STAI.

Rezultati. 21,7 % udeleženk je poročalo o pomembno povišani depresivni simptomatiki, 15,7 % jih je navajalo visoko anksioznost kot stanje, visoka anksioznost kot poteza je bila prepoznana pri 12,5 % nosečnic. Med nosečnicami treh trimesečij nosečnosti ni bilo pomembnih razlik v izraženosti depresivne in anksiozne simptomatike. Ženske z zdravstvenimi zapleti v preteklih nosečnostih so poročale o pomembno intenzivnejših simptomih anksioznosti kot stanja, tiste z zapleti v trenutni nosečnosti pa o pomembno intenzivnejši depresivni simptomatiki ter anksioznosti kot stanju in potezi v primerjavi z ženskami brez zdravstvenih zapletov. Udeleženke z nižjo stopnjo izobrazbe in nižjimi prihodki ter nosečnice tretjega trimesečja z večjim številom otrok so poročale o intenzivnejši depresivni simptomatiki in anksioznosti kot potezi.

Zaključek. Povišana depresivna simptomatika in anksioznost sta pogost in razširjen problem žensk med nosečnostjo. Rezultati opozarjajo na potrebo po zgodnjem odkrivanju ter zdravljenju depresivnih in anksioznih motenj v nosečnosti.

*Corresponding author: Tel: +386 40 853 788; E-mail: nusa.podvornik@gmail.com

1 INTRODUCTION

Pregnancy represents an important turning point in the lifecycle of a woman and her family and is a time of enormous biological, psychological and social challenges for the mother to be. Although it is a period of fulfilment, it can also be a time of emotional and psychological disturbances when dealing with new demands. There is growing evidence that the antenatal period is a time of increased liability to mental disorders. The most common psychiatric illnesses during pregnancy and the postpartum period are depressive and anxiety disorders (1).

According to international data, estimates of the prevalence of depression during pregnancy vary widely, from 7–15% in developed to 19–25% in poorer countries (2). Studies in Sweden (3) and Norway (4) showed that approximately 10% of pregnant women meet the criteria for anxiety disorders. There are no exact data available on the incidence and prevalence of depression and anxiety disorders among women of reproductive age in Slovenia. However, this can be assessed considering available statistics on patients seeking medical attention due to mental disorders. In the period between 2005 and 2007, in the population of women aged 20 to 39, which corresponds to 95% of the population of pregnant women in Slovenia, on average 44.2 out of 1000 women had been administered for the first time at the primary level because of a mental disorder (5). The predominant causes were depression, anxiety, reactions to stress and somatoform disorders (5).

Depressive and anxiety disorders during pregnancy can have detrimental effects on the course of the pregnancy, its outcome, the development of a child and maternal well-being. According to studies, high levels of depressive symptoms in pregnant women have been found to be associated with adverse obstetric and neonatal outcomes, including increased risk for spontaneous preterm delivery (6-8), low birth weight (9), preeclampsia (10), etc. Depression in late pregnancy has been linked to increased risk of epidural analgesia, operative deliveries and admissions to neonatal care units (11). Field et al. (12) have noted that maternal depressive symptoms during pregnancy may be contributing to newborn neurobehavioral functioning. High anxiety during pregnancy has been linked to lower birth weight, shorter birth length, shorter gestations (13) and increased uterine artery resistance (14). Studies have shown that antenatal anxiety is associated with elevated risk of having an infant with non-optimal neuro-motor development (15). Anxiety in pregnancy could have long-term effects on children's behavioural/emotional problems (16). However, some studies did not report significant associations between maternal anxiety and perinatal outcomes (17).

As there are limited data on the epidemiology of depression and anxiety among pregnant women in Slovenia, the aim of the present study was to examine the prevalence of elevated depressive and anxiety symptomatology during the three trimesters of pregnancy and to explore whether there is an association between depression/anxiety and medical complications as well as socio-demographic characteristics.

2 METHODS

2.1 Participants

350 women attending routine obstetrical care or antenatal classes at the University Medical Centre Ljubljana, Department of Obstetrics and Gynaecology were approached and invited to participate in the study. The inclusion criteria were: age 18 and above and the ability to read and speak Slovenian. 348 women consented to cooperate. The response rate was 99%.

The data collection was conducted according to the appropriate pregnancy trimester. The sample in the first trimester consisted of 100 women that attended the nuchal translucency screening test or the first antenatal visit between the 10th and 13th week of pregnancy. The sample of women in their second trimester, between the 16th and 26th gestational week, comprised of 117 women who consented to cooperation before attending the foetal morphology ultrasound scan or other regular antenatal visits. For the third trimester, data was collected on 131 women who participated in antenatal classes for expectant parents or other regular examinations. The following women were pregnant for 29 weeks or more.

Participants were recruited prior to undertaking their medical examinations or antenatal classes between April 2011 and July 2011. Upon giving an informed consent, women completed a self-administered, anonymous survey. Research was conducted according to ethical principles and was approved by The National Medical Ethics Committee in January 2011, reference number 150/02/11.

2.2 Measures

Responding women filled out a questionnaire on socio-demographic variables, the Centre for Epidemiologic Studies Depression Scale CES-D and the State Trait Anxiety Inventory STAI. The women were able to complete the whole survey in approximately 15 minutes.

The following variables about the participants were included in the socio-demographic survey: age, educational level, employment, socioeconomic status, marital status, duration of relationship, number of previous children and gestational age. Presence of medical complications in previous and current pregnancies was also recorded.

The Centre for Epidemiologic Studies Depression Scale CES-D is a short self-report measure, originally designed to assess the intensity of depressive symptomatology in the general population (18), but it has also been used as a screening test for depression disorders in medical settings (19) and in numerous studies with pregnant women. It measures affective, cognitive, behavioural and somatic symptoms of depression within the previous seven days. The scale is composed of 20 items. Each of them is scored on a 4 point scale for evaluating the frequency of depressive symptoms. The total score ranges from 0 to 60, with higher scores indicating more severe symptoms of depression. Although the CES-D does not allow for a clinical diagnosis of depression, studies have shown that a score

greater than 16 can differentiate between depressed and non-depressed subjects (18) and that a score ≥ 22 represents severe depressive symptoms (20). For the purposes of the study, both cut-off scores were used. The scale has been shown to be valid and reliable across diverse demographic groups (18). In the present study, CES-D demonstrated high internal consistency with Cronbach α, ranging from 0.84 to 0.88 across all three trimesters of pregnancy.

State Trait Anxiety Inventory (STAI) is a short self-report instrument composed of two subscales measuring two distinct anxiety concepts, state and trait anxiety. State anxiety is defined as a transitory emotional condition, while trait anxiety refers to a relatively stable proneness of a person to respond with anxiety in different situations. Each scale contains 20 items. Each of the items is rated on a 4 point scale, asking the respondent to evaluate how she feels at a particular moment (state-anxiety) or how she generally feels (trait-anxiety). Higher scores indicate greater levels of state and trait anxiety. Although there is no cut-off score established for STAI, some previous studies used scores of 45 as an indication of high state-anxiety (21) and trait-anxiety (22). In this study, we used the score of 45 to differentiate between anxious and non-anxious groups. The results of the reliability generalisation study for STAI, based on 816 research articles between 1990 and 2000, suggest that the internal consistency estimates of the measure are generally satisfactory for various populations (23). Cronbach α of the STAI in the current study were >0.92 for state subscale and >0.84 for trait subscale across pregnancy trimesters and reflect good internal consistency.

2.3 Statistical analysis

The frequency of positive depression and anxiety screens, based on established cut-off scores on CES-D and STAI, were determined. The normality of the distribution of depression and anxiety scales were tested using the Shapiro-Wilk test. Due to non-normality distribution appropriate non-parametric tests were conducted.

For the analysis of differences in depression, state and trait anxiety scores according to pregnancy trimesters and the presence of medical complications, the Mann-Whitney U and the Kruskal-Wallis tests were used. The associations between scores of depression and anxiety and socio-demographic variables were examined using Spearman's rho correlation coefficients. The internal consistency of CES-D and STAI was assessed using Cronbach's alpha.

In all statistical tests, a p-value of 0.05 or less was considered as significant.

Statistical analysis was performed using SPSS, version 20.

3 RESULTS

The age of women who took part in the study varied between 20 and 39 years of age (M=31.23; SD=4.61). More than half of the women (56.3%) were pregnant with their first child, 29.3% with their second. The majority of the participants were married or cohabiting with a partner and the average duration of their relationship was 7.19 years (SD=4.59). 2% of the women were single. 48.4% of the responding women had an average socioeconomic status. 19.3% of the women had medical complications during previous pregnancies, while 16.7% had complications during the current pregnancy, with the highest frequency among the women who were in their third trimester of pregnancy.

There were no significant differences in maternal age, educational level, employment status and matrimonial and socio-economic statuses between the respondents in all three pregnancy trimesters.

Based on cut-off scores for denoting clinically relevant levels of depressive symptomatology (CES-D≥16), 21.7% of participants reported elevated depressive symptoms, with the highest frequency in the first pregnancy trimester and lowest in the second. Overall, 8.4% of pregnant women reported severe depressive symptoms (CES-D≥22). In the anxiety questionnaire, 15.8% of the women had an elevated state anxiety (STAI-S≥45), with the highest frequency in the first trimester. The rate of high trait anxiety (STAI-T≥45) was 12.5% among all pregnant women. Mean, standard deviation and percentage of pregnant women whose scores exceeded the proposed cut-off scores on CES-D and STAI for each pregnancy trimester are presented in Table 1.

No significant differences in depression (x^2(2)=0.458, p=0.795), state anxiety (x^2(2)= 2.614, p=0.271) and trait anxiety (x^2(2)=0.660, p=0.719) scores due to pregnancy trimesters were observed using the non-parametric Kruskal-Wallis test.

The results of the Mann-Whitney U test showed that women experiencing medical complications in previous pregnancy (pregnancies) reported a significantly higher state anxiety when compared with those without prior pregnancy complication(s) (U=3669.0, p=0.035). No significant difference in depression and trait anxiety scores between the two groups (p=0.760 and p=0.286, respectively) was found.

Women having complications during their current pregnancy had significantly higher levels of depression (U=6515.0, p=0.013) as well as state (U=6419.0, p=0.004) and trait anxiety (U=-6454.0, p=0.008) when compared with women without complications.

Bivariate associations between socio-demographic factors and depression as well as state and trait anxiety scores are shown in Table 2. Scores of elevated depression and trait anxiety were significantly correlated with lower levels of education and lower income. State anxiety scores were in correlation only with level of income. The number of children was significantly correlated with depressive symptoms and trait anxiety for women in the 3rd pregnancy trimester (r=.210 and r=.197 respectively; both p-values<0.05). There were no significant associations of depression and anxiety scores with maternal age and the duration of partnerships.

Table 1. CES-D and STAI scores for three pregnancy trimesters.

| | Pregnancy trimester | | | |
	1st trimester	2nd trimester	3rd trimester	Total
	Cases (%)			
CES-D				
≤15	75.0	81.7	77.9	78.3
≥16	25.0	18.3	22.1	21.7
≥22	7.0	8.7	9.1	8.4
STAI-S				
≤44	82.0	84.6	85.5	84.2
≥45	18.0	15.4	14.5	15.8
STAI-T				
≤44	88.9	87.9	86.0	87.5
≥45	11.1	12.1	14.0	12.5
	Mean (*SD*)			
CES-D	10.86 (7.58)	11.03 (8.26)	10.51 (7.67)	10.79 (7.83)
STAI-S	36.06 (9.41)	35.79 (9.37)	34.33 (8.81)	35.32 (9.18)
STAI-T	34.37 (7.26)	35.61 (8.76)	34.87 (7.93)	34.98 (8.03)

Table 2. Correlation matrix of socio-demographic variables, depression and anxiety scores.

	CES-D	STAI-S	STAI-T
Age	-.020	-.027	-.024
Education	-.175**	-.049	-.199**
Income	-.177**	-.128**	-.224**
Duration of partnership	-.099	-.025	-.035
Number of children	.077	.040	.061

** Significance levels based on *p*<0.05.

Depression and anxiety scales were highly correlated (depression and state anxiety scale r=.614, depression and trait anxiety scale r=.618, both p-values<0.001).

4 DISCUSSION

High incidence of significant depressive symptomatology and high anxiety was found during pregnancy. 21.7% of pregnant women in all three trimesters scored above the cut-off score of 16 in the CES-D, while 8.4% of women reported severe depressive symptoms. High state anxiety was found in 15.8% of pregnant women, while 12.5% of women suffered high trait anxiety. Especially in the first pregnancy trimester, a substantial number of pregnant women reported elevated depressive symptoms (25.0%) and nearly one in five pregnant women (18.0%) suffered from high state anxiety. The results pose a great concern, as it has been debated previously that high scores on self-report measures of depressive symptomatology may correspond to clinical diagnosis and/or predispose a person to the experience of a clinical depression in the future (24). Furthermore, it has been shown that about half of the women scoring over 40 on the STAI anxiety scale meet the criteria for anxiety disorder (25). Elevated levels of anxiety and depression during pregnancy should be taken as a serious problem, as recent research provides an extensive body of evidence demonstrating the adverse impact of such disorders on the course of the pregnancy, the development of the foetus and maternal well-being.

As different stages of pregnancy are associated with physical and emotional changes in women, we expected significant differences in scores of depression and anxiety across respondents of all three pregnancy trimesters, but the results did not confirm our hypothesis. The results are consistent with meta-analysis on the prevalence of depression by pregnancy trimesters, assessed by validated screening instruments and structured interviews on a total sample of 19,284 pregnant women, indicating that the prevalence of depression during pregnancy does not differ significantly by trimester (26). Similarly, the study on 3,472 pregnant women showed the stage of pregnancy was not correlated with depression as measured by CES-D (27).

In the context of providing adequate care for women, an important issue is whether previous and/or current pregnancy complications affect psychological functioning during the pregnancy. Our data showed that women who experienced complications in the previous pregnancy (pregnancies) reported significantly higher levels of state anxiety, but not depression and trait anxiety, when compared to women without previous complications. According to results, the elevated anxiety is situational in nature (state-anxiety) and could be correlated to the moment of data collection, occurring before regular antenatal examinations. The setting of data collection could contribute to the remembering of difficult past pregnancy experiences and thus reactivate emotional tension and anxiety in women. A recent study has shown the location of data collection had a significant impact on state anxiety scores; women who completed the STAI questionnaire in a "high-risk" hospital-based clinic had higher state anxiety scores in comparison to women approached at "low-risk", community based clinics (28). A longitudinal study in Germany

showed that women who had previously experienced still-birth and miscarriage had increasing levels of anxiety on the STAI questionnaire despite the obstetrician's confirmation of good health of the foetus and normal development of the pregnancy (29).

Women experiencing medical difficulties in current pregnancies reported significantly higher levels of depressive symptomatology as well as state and trait anxiety when compared to women free of complications. Similarly, King et al. (30) reported that women with medical disorders had considerably higher scores on measures of depression and anxiety when compared to the control group of antenatal women. Dayan et al. (31) found significant associations between stress related to the health of the foetus and depression. It is not to be doubted that medical complications in a pregnancy are highly aggravating life circumstances for women, making them more vulnerable, sad and worried.

Findings regarding socio-demographic characteristics indicated that a lower socio-economic status (as measured in education and income levels) is an important correlation factor in depression and trait anxiety symptoms' severity, while state anxiety was significantly associated only with lower income. Lower income, reflected mainly in material resources of a woman or her family, can be a source of distress as pregnancy and birth of a child brings additional existential and financial burdens. Previous reports have shown that socio-economic status is related to psychological well-being; women with a higher education experience less anxiety during pregnancy in comparison to those with lower educational levels (32-34). Studies in the United States have shown pregnant women of lower SES are more likely to experience antenatal depression in comparison to women of the middle or upper income classes (35, 36). Similarly, the results of other studies showed depressive symptoms were significantly associated with lower maternal education, unemployment and poverty (37) and that a low socio-economic status was significantly and independently related to the presence of depression and/or anxiety diagnosis in the second pregnancy trimester (3).

An association between depression, anxiety and the number of children was significant only to women in the third pregnancy trimester. Other studies also observed women with children reporting higher levels of psychological distress (38) and that parity moderated psychological functioning during pregnancy (39). It is possible that the results are reflecting differences in adjustment to the pregnancy of women with and without children as the pregnancy progresses. The third trimester is a time of physical demands, and changes that occur may be more straining to women who are already challenged with care for their families. Furthermore, women who are pregnant for a second time or more have an insight into the potential hazards of labour and are thus more aware of the demands of the postnatal period. For them, the birth of a child requires not only the reorganisation of intimate relationships but also that of the previously existing family systems.

In our study, no significant associations were found between the duration of partnerships, depression and anxi-ety, although a large number of studies reported a strong association between relationship quality and psychological well-being of the pregnant women. A recent population-based study in Norway confirmed a strong association between relationship satisfaction and maternal emotional distress, more precisely anxious and depressive symptomatology during pregnancy (40). One can assume the duration of an intimate relationship could reflect its stability and could contribute to the feelings of safety; however, it does not reflect its quality and satisfaction of the partners.

We did not find any significant correlations between depression, anxiety and the age of women, which is consistent with some other studies (24, 27, 31).

Depression and anxiety often co-occur. Likewise observed in this study, the depression and anxiety scales were highly correlated, thus supporting comorbidity statistics in primary care (41).

This study has some limitations that should be acknowledged when interpreting the results. The symptoms of depression and anxiety were assessed using only self-report measures, which are not equivalent to diagnostic criteria but only show a possibility for psychiatric diagnosis. However, it has been argued that high scores on self-report measures of depression and anxiety may correspond with clinical diagnosis (24, 25). A structured diagnostic interview would have strengthened the study and could therefore be included in further research regarding this topic. Information on mental health conditions before pregnancy were not evaluated, although it is known that previous psychiatric disorders are associated with new-onset of depressive and anxiety disorders (42). Previous and/or current psychiatric diagnosis and comorbid mental health conditions should be evaluated in future studies. Furthermore, smoking status should also be addressed in future researches that include pregnant women, as it has been demonstrated that smoking during pregnancy is related to low birth weight (43).

5 CONCLUSIONS

One cannot ignore our findings that elevated anxiety and especially depression are frequent among pregnant women, whereas the highest prevalence is observed in the first pregnancy trimester. Women of lower socio-economic status and those facing medical complications are observably more liable to depression and anxiety during their pregnancies. Our findings are notably highlighting the importance of implementing better early detection and treatment strategies for women during pregnancy in order to reach what should be a common goal: a reduction of the burden of mental health problems among pregnant women in Slovenia. Screening for depression and anxiety as an integral part of systematic healthcare for pregnant women would constitute an important step in this direction.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exist.

REFERENCES

1. Bödecs T, Horváth B, Szilágyi E, Gonda X, Rihmer Z, Sándor J. Effects of depression, anxiety, self-esteem, and health behavior on neonatal outcomes in a population-based Hungarian sample. Eur J Obstet Gynecol Reprod Biol 2011; 154: 45-50.

2. O'Keane V, Marsh MS. Depression during pregnancy. BMJ 2007; 334: 1003-5.

3. Andersson L, Sundström-Poromaa I, Wulff M, Åström M, Bixo M. Implications of antenatal depression and anxiety for obstetric outcome. Obstet Gynecol 2004; 104: 467-76.

4. Berle J, Mykletun A, Daltveit AK, Rasmussen S, Holsten F, Dahl AA. Neonatal outcomes in offspring of women with anxiety and depression during pregnancy. Arch Womens Ment Health 2005; 8: 181-9.

5. Mihevc Ponikvar B, Tomšič S. Breme duševnih bolezni v rodni dobi. In: Duševno zdravje in nosečnost, porod ter zgodnje starševstvo: strokovno srečanje ob Svetovnem dnevu duševnega zdravja. Ljubljana: Inštitut za varovanje zdravja Republike Slovenije, 2009: 6.

6. Dayan J, Creveuil C, Herlicoviez M, Herbel C, Baranger E, Savoye C. et al. Role of anxiety and depression in the onset of spontaneous preterm labor. Am J Epidemiol 2002; 155: 293-301.

7. Dayan J, Creveuil C, Marks MN, Conroy S, Herlicoviez M, Dreyfus M. et al. Prenatal depression, prenatal anxiety, and spontaneous preterm birth: a prospective study among women with early and regular care. Psychosom Med 2006; 68: 938-46.

8. Orr TS, James SA, Blackmore Prince C. Maternal prenatal depressive symptoms and spontaneous preterm birth among African-American women in Baltimore, Maryland. Am J Epidemiol 2002; 156: 797-802.

9. Neggers Y, Goldenberg R, Cliver S, Hauth J. The relationship between psychosocial profile, health practices, and pregnancy outcomes. Acta Obstet Gynecol Scand 2006; 85: 277-85.

10. Kurki T, Hiilesmaa V, Raitasalo R, Mattila H, Ylikorkala O. Depression and anxiety in early pregnancy and risk for preeclampsia. Obstet Gynecol 2000; 95: 487-90.

11. Chung TK, Lau TK, Yip AS, Chiu HF, Lee DT. Antepartum depressive symptomatology is associated with adverse obstetric and neonatal outcomes. Psychosom Med 2001; 63: 830-4.

12. Field T, Diego M, Hernandez-Reif M, Schanberg S, Kuhn C, Yando R. et al. Pregnancy anxiety and comorbid depression and anger: effects on the fetus and neonate. Depress Anxiety 2003; 17: 140-51.

13. Hosseini SM, Biglan MW, Larkby C, Brooks MM, Gorin MB, Day NL. Trait anxiety in pregnant women predicts offspring birth outcomes. Paediatr Perinat Epidemiol 2009; 23: 557-66.

14. Teixeira J, Fisk NM, Glover V. Association between maternal anxiety in pregnancy and increased intrauterine artery resistance index: cohort based study. BMJ 1999; 318: 153-7.

15. Van Baterburg-Edes T, de Groot L, Huizink AC, Steegers EA, Hofman A, Jaddoe VW. et al. Maternal symptoms of anxiety during pregnancy affect infant neuromotor development: the generation R study. Develop Neuropsychol 2009; 34: 476-93.

16. O'Connor TG, Heron J, Golding J, Beveridge M, Glover V. Maternal antenatal anxiety and children's behavioral/emotional problems at 4 years: report from the Avon Longitudinal Study of parents and children. Br J Psychiatry 2002; 180: 502-8.

17. Littleton HL, Breitkopf CR, Berenson AB. Correlates of anxiety symptoms during pregnancy and association with perinatal outcomes: a meta-analysis. Am J Obstet Gynecol 2007; 196: 424-32.

18. Radloff LS. The CES-D Scale: a self-report depression scale for research in the general population. Appl Psych Meas 1977; 1: 385-401.

19. Serec M. Depression in post-myocardial infarction patients. Zdrav Var 2008; 3: 143-8.

20. Li D, Liu L, Odouli R. Presence of depressive symptoms during early pregnancy and the risk of preterm delivery: a prospective cohort study. Hum Reprod 2009; 24: 146-53.

21. Teixeira C, Figuerido B, Conde A, Pachecho A, Costa R. Anxiety and depression during pregnancy in women and men. J Affect Disord 2009; 119: 142-8.

22. Austin M, Tully L, Parker G. Examining the relationship between antenatal anxiety and postnatal depression. J Affect Disord 2007; 101: 169-74.

23. Barnes LB, Harp D, Jung WS. Reliability generalization of scores on the Spielberger state-trait anxiety inventory. Educ Psychol Meas 2002; 62: 603-18.

24. Da Costa D, Larouche J, Dritsa M, Brender W. Psychosocial correlates of prepartum and postpartum depressed mood. J Affect Disord 2000; 59: 31-40.

25. Grant KA, McMahon C, Austin MP. Maternal anxiety during the transition to parenthood: a prospective study. J Affect Disord 2008; 108: 101-11.

26. Bennett HA, Einarson A, Taddio A, Koren G, Einarson TR. Prevalence of depression during pregnancy: systematic review. Obstet Gynecol 2004; 103: 698-709.

27. Marcus SM, Flynn HA, Blow FB, Barry KL. Depressive symptoms among women screened in obstetric settings. J Womens Health (Larchmt) 2003; 12: 373-80.

28. Gunning MD, Denison FC, Stockley CJ, Ho SP, Sandhu HK, Reynolds RM. Assessing maternal anxiety in pregnancy with the State-Trait Anxiety Inventory (STAI): issues of validity, location and participation. J Reprod Infant Psychol 2010; 28: 266-73.

29. Brisch KH, Munz D, Kächele H, Terinde R, Kreienberg R. Effects of previous pregnancy loss on level of maternal anxiety after prenatal ultrasound screening for fetal malformation. J Loss Trauma 2005; 10: 131-53.

30. King NM, Chambers J, O'Donnell K, Jayaweera SR, Williamson C, Glover VA. Anxiety, depression and saliva cortisol in women with a medical disorder during pregnancy. Arch Womens Ment Health 2010; 13: 339-45.

31. Dayan J, Creveuil C, Dreyfus M, Herlicoviez M, Baleyte JM. Developmental model of depression applied to prenatal depression: role of present and past life events, past emotional disorders and pregnancy stress. PloS One 2010; 5: 1-8.

32. Lublin B, Gardener SH, Roth A. Mood and somatic symptoms during pregnancy. Psychosom Med 1975; 37: 136-46.

33. Buist A, Gotman N, Yonkers KA. Generalized anxiety disorder: course and risk factors in pregnancy. J Affect Disord 2011; 131: 277-83.

34. Arch JJ. Pregnancy-specific anxiety: which women are highest and what are the alcohol-related risks? Compr Psychiatry 2013; 54: 217-28.

35. Hobfoll SE, Ritter C, Lavin J, Hulsizer MR, Cameron RP. Depression prevalence and incidence among inner-city pregnant and postpartum women. J Consult Clin Psychol 1995; 63: 445-53.

36. Siefert K, Bowman PJ, Heflin C, Danzinger S, Williams DR. Social and environmental predictors of maternal depression in current and recent welfare recipients. Am J Orthopsychiatry 2000; 70: 510-22.

37. Horwitz SM, Briggs-Gowan MJ, Storfer-Isser A, Carter AS. Prevalence, correlates, and persistence of maternal depression. J Womens Ment Health (Larchmt) 2007; 16: 678-91.

38. DiPietro JA, Costigan KA, Sipsma HL. Continuity in self-report measures of maternal anxiety, stress, and depressive symptoms from pregnancy through two years postpartum. J Psychosom Obstet Gynaecol 2008; 29: 15-124.

39. DiPietro JA, Costigan KA, Gurewitsch ED. Maternal psychophysiological change during the second half of gestation. Biol Psychol 2005; 69: 23-38.

40. Røsand GB, Slinning K, Eberhard-Gran M, Røysamb E, Tambs K. Partner relationship satisfaction and maternal emotional distress in early pregnancy. BMC Public Health 2011; 11: 1-12.

41. Hirschfeld RMA. The comorbidity of major depression and anxiety disorders: recognition and management in primary care. J Clin Psychiatry 2001; 3: 244-54.

42. Andersson L, Sundström-Poromaa I, Wulff M, Åström M, Bixo M. Depression and anxiety during pregnancy and six months postpartum: a follow up study. Acta Obstet Gynecol Scand 2006; 85: 937-44.

43. Brooke OG, Anderson HR, Bland JM, Peacock JL, Stewart CM. Effects on birth weight of smoking, alcohol, caffeine, socioeconomic factors, and psychosocial stress. BMJ 1989; 298: 795-801.