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Midwifery

Associations of life events during pregnancy with longitudinal change in symptoms of antenatal anxiety and depression

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ABSTRACT

Objective: to investigate the association of life events during pregnancy with change in antenatal anxiety and depression symptoms. We distinguished pregnancy related and non-pregnancy related events and assessed specificity of these associations for depressive or anxious symptoms. In addition, we investigated whether the associations were affected by personality or childhood adversities.

Design: observational prospective cohort study

Setting: primary and secondary obstetric care centres in the Netherlands

Participants: 1603 women during their first trimester of pregnancy between May 2010 and May 2012

Measurements and findings: we performed linear regression analyses to test the associations of pregnancy related, non-pregnancy related life events, childhood adversities and the personality traits neuroticism and extraversion with the change in symptoms of anxiety (State Trait Anxiety Inventory) and depression (Edinburgh Postnatal Depression Scale) from week 12 to week 36.

Life events during pregnancy were associated with increasing antenatal symptoms of anxiety and depression. Effect sizes associated with the highest numbers of events observed ranged from 0.59 to 1.31. Pregnancy related events were specifically associated with increasing symptoms of anxiety ($p = 0.009$), whereas non-pregnancy related events were merely associated with an increase in symptoms of depression ($p < 0.001$). Neither personality traits nor childhood trauma influenced the associations under study.

Key conclusions: the most important finding is that pregnancy related life events during pregnancy increase levels of antenatal anxiety, whereas depression levels increase when women experience life events that are unrelated to pregnancy. Furthermore, non-pregnancy related events show stronger associations with increases in symptoms of anxiety or depression compared to pregnancy related events.

Implications for practice: our findings may help midwives to tailor psychosocial care to the specific risks of the pregnant woman which may eventually have a positive impact on the health of mother and child.

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Background

During pregnancy, 10–15% of all women experience mild to moderate symptoms of anxiety or depression (Evans et al., 2001; Dayan et al., 2006). In addition to the burden to women themselves, these symptoms are associated with unfavourable obstetric outcomes, as well as with an adverse cognitive, motor and psychosocial development of the child (Van den Bergh et al., 2005; Talge et al., 2007).

Apart from a history of depression, one of the most consistent predictors of depression in both the general population (Brown and Harris, 1978; Ormel et al., 2001) and pregnant women (Leigh and Milgrom, 2008), is having experienced life events a consistent predictor of onset of depression during pregnancy. However, studies among pregnant women mostly considered events that happened before pregnancy, ignoring life events experienced

during pregnancy. Recency of a life event, however, has shown to be associated with particularly high levels of anxiety or depression (Surtees et al., 1986). Therefore, stressors that occur during pregnancy, e.g. physical problems (Perlen et al., 2012), are likely to have a higher impact on antenatal symptoms of anxiety or depression than those occurring before pregnancy. Moreover, we hypothesise that in particular life events that are specifically related to pregnancy might trigger anxious or depressive feelings. As far as we know, neither life events during pregnancy as a separate category nor specific pregnancy related life events have been investigated in relation to change in levels of antenatal anxiety or depression to date.

Besides the experience of life events, personality traits are known to be closely linked to psychopathology (Klein et al., 2010; Kotov et al., 2010). High levels of neuroticism and low extraversion are not only directly associated with depression and anxiety. They have also shown to modify the promoting effects of life events on the onset and maintenance of psychopathology in such a way that being high neurotic or low extraverted makes people more vulnerable to become anxious or depressed when experiencing negative life events (Ormel et al., 2001).

In addition to personality traits, a history of traumatic childhood events such as physical or sexual abuse or loss of a parent have been suggested as modifiers of the association of adult life events with psychopathology. Indeed, having experienced childhood trauma makes people more vulnerable to depression in adult life (Brown and Harris, 1978; Hovens et al., 2012).

It is presently unknown whether the aforementioned relationships are any different during pregnancy. Animal studies have shown that female brains change during the transition to motherhood and that these changes might lead to a change in their behaviour (Kinsley and Amory-Meyer, 2011). Women may therefore respond differently to an event during pregnancy than outside pregnancy, and personality traits as well as childhood events may play a disparate role herein.

The present study is the first to investigate the change in symptoms of antenatal anxiety or depression associated with life events during pregnancy making a distinction between pregnancy and non-pregnancy events. The specificity of these associations for depressive symptoms and symptoms of anxiety is investigated as well as their potential modification by neuroticism, extraversion and childhood trauma.

Methods

Subjects

The present study was carried out within the ongoing Pregnancy, Anxiety and Depression (PAD) Study. This is a prospective cohort study that was set up to investigate symptoms of and risk factors for anxiety or depression during pregnancy and the first half year post partum. All pregnant women visiting a total of 116 primary (97%) and secondary obstetric care centres in the Netherlands are invited during their first trimester. Written consent is obtained from each participant. No further inclusion criteria were applied so as to have a sample from the general population (Table 1).

Follow-up assessments using online questionnaires take place at conventional moments, i.e. at the end of the second and third trimesters of pregnancy as well as at six months post partum. Follow-up data used in the current study was collected at a pregnancy duration of approximately 36 weeks. The study protocol was approved by the medical ethical committee of the University Medical Center Groningen.

Table 1
Characteristics of the study population ($N = 1603$).

Maternal age in years, mean (min–max)	30 (17–46)
Primiparae, N (%)	655 (41%)
Education, N (%)	
Elementary education	5 (0.3%)
Lower tracts of secondary education	71 (4%)
Higher tracts of secondary education	609 (38%)
Higher vocational education	640 (40%)
University education	278 (17%)
Total family income N (%)	
0–30.999 euros	294 (18%)
31.000–59.999 euros	823 (51%)
60.000 euros or more	486 (30%)
Pregnancy related life events [*]	
One or more, N (%)	914 (57%)
Median number (min–max)	1 (0–4)
Non-pregnancy related life events [*]	
One or more, N (%)	1250 (78%)
Median number (min–max)	2 (0–20)
Childhood adversities [†]	
One or more, N (%)	417 (26%)
Median number (min–max)	0 (0–6)
Anxiety (STAI) baseline level[‡], mean (SD)	32.35 (8.41)
Anxiety (STAI) follow-up level[§], mean (SD)	32.96 (9.20)
Depression (EPDS) baseline level[‡], mean (SD)	4.32 (3.52)
Depression (EPDS) follow-up level[§], mean (SD)	4.93 (3.68)

STAI—State Trait Anxiety Inventory.
EPDS—Edinburgh Postnatal Depression Scale.
[*] Experienced during pregnancy.
[†] Before age of 16.
[‡] Pregnancy duration of 12 weeks.
[§] Pregnancy duration of 36 weeks.

Response and missing data

For the present study we used data that was collected from May 2010 to May 2012. By the end of that period, 3358 women had completed the initial screening. The eligible population consisted of those women ($N = 1603$, 48%) who filled out the follow-up questionnaire at 36 weeks by the time of the database closure for the present study. The majority of women who did not respond to the follow-up questionnaire had pregnancy durations of less than 36 weeks or gave birth before even reaching this duration and was therefore not eligible to be included in the present study. Women with pregnancy durations of 36 weeks or more who had not responded to the follow-up questionnaire, 453 in number (26%), showed no marked differences with those who did complete the follow-up assessment, with respect to mean baseline anxiety and depression, personality scores, number of life events, parity, age, educational level or income.

The percentage of missing data in the present study ranged from 3.5 to 37.1 for the variables of main interest; anxiety (3.7%), depression (4.2%), childhood trauma (3.5%), non-pregnancy related events during pregnancy (37.3%), pregnancy related events during pregnancy (35.1%), neuroticism (5.2%) and extraversion (4.4%). The percentage of missing data of the potential confounders ranged from 5.9 (maternal age) to 40.7 (total family income). Complete case analysis can give biased results and exclusion of patients with missing data will decrease the statistical power of a study (White et al., 2010). Missing values for all variables except for the outcome variables were imputed because it has been shown that when outcome measures are not imputed, the precision of a study is generally larger (White et al., 2010). Missing data was imputed using multiple imputation by chained equations under the assumption that missing values were missing at random or missing completely at random. Multiple data sets ($N = 5$) were generated to account for the uncertainty in imputed data. The regression coefficients and standard errors were pooled using Rubin's method for multiple imputation inference (Rubin, 1987).