Arch Womens Ment Health (2005) 8: 97–104
DOI 10.1007/s00737-005-0078-8

Archives of
Women's
Mental Health
Printed in Austria

Original contribution

Depressive symptoms in early pregnancy, two months and one year postpartum-prevalence and psychosocial risk factors in a national Swedish sample

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Received January 14, 2004; accepted November 28, 2004
Published online May 11, 2005

Summary

Background: Depression and other psychiatric disorders during pregnancy and postpartum is an important health problem, especially if the symptoms are recurrent or sustained.

Methods: All Swedish speaking women attending their first antenatal care visit during three predestined weeks were invited to participate. Depressive symptoms were evaluated using the Edinburgh Postnatal Depression Scale (EPDS) in early pregnancy, two months and one year postpartum.

Results: In all, 2430 women completed three questionnaires. A dose-effect relation was found between the numbers of stressful life events experienced in the year prior to pregnancy and mean EPDS score in pregnancy. The prevalence of recurrent or sustained depressive symptoms (EPDS ≥ 12 on all three evaluations) was 3% (79/2430). Three factors were associated with depressive symptoms, two or more stressful life events in the year prior to pregnancy, native language other than Swedish and unemployment.

Conclusions: Apart from questions about psychiatric history, a psychosocial history in early pregnancy including stressful life events, native language and employment status could help the health professionals to identify women at risk for recurrent or sustained depression during pregnancy and the year after giving birth.

Keywords: Depressive symptoms; postpartum depression; EPDS; risk factors; stressful life events.

Introduction

Depression is a major cause of disability in women and the first episode often takes place in the childbearing years (Weissman and Olfson, 1995) with onset during pregnancy or postpartum (Cox et al., 1993; O'Hara, 1986). Other psychiatric disorders occurring in the postpartum period might be postpartum psychoses, posttraumatic stress disorders, anxiety disorders, morbid preoccupations, eating disorders and obsessions of child harm (Brockington, 2004; Jones and Venis, 2001). Several investigators have found that antenatal depression is as common as postnatal depression (Evans et al., 2001; Green and Murray, 1994; Rubertsson et al., 2003). In a recent longitudinal study (Luoma et al., 2001), maternal depressive symptoms at any time, especially antenatally, were a risk factor for the child's well being. Antenatal as well as recurrent maternal depressive symptoms were associated with the least favorable child outcome. Depression postpartum has also been associated with serious negative effects on the family (O'Hara, 1997) and the child's wellbeing (Hammen and Brennan, 2003) especially if the depression is long-lasting or recurrent (Civic and Holt, 2000; Cogill et al., 1986; Cooper and Murray, 1997; Murray and Cooper, 1997). Moreover, depression is increasingly recognized as a disorder with risk for recurrent episodes followed by high levels of chronic stress and other difficulties for these women (Feske et al., 2001; Hammen, 2003). Few studies have however assessed depressive symptoms during the entire childbearing episode, from early pregnancy to one year after delivery (Austin and Lumley, 2003), and none in a national sample.

Research on risk factors for postnatal depression increased during the past decade and at least two meta-analyses have been published (Beck, 2001; O'Hara and Swain, 1996). Important risk factors were past history of psychopathology, psychological disturbance during pregnancy, poor marital relationship, poor social support and stressful life events (O'Hara and Swain, 1996). Beck (2001) added low self esteem, child-care stress, single marital status, unplanned or unwanted pregnancy and infant temperament. We have previously reported that lack of support from the partner during pregnancy, experiencing more than two stressful life events during the year prior to pregnancy and native language other than Swedish were factors associated with depressive symptoms during pregnancy (Rubertsson et al., 2003). Moreover we found that unemployment, lack of support and physical health problems were risk factors for postpartum depressive symptoms (Rubertsson et al., 2005). The aim of this study was to investigate the prevalence of women with depressive symptoms in early pregnancy, two months and one year postpartum. A second aim was to study indicators in early pregnancy for experiencing depressive symptoms on all three assessments.

Material and methods

Participants

The antenatal health care system in Sweden reaches almost 100% of all pregnant women and offers regular check-ups by midwives during pregnancy and puerperium. The sample of this longitudinal study was drawn from the total population of pregnant women registered at the antenatal health clinics in Sweden during three predestined recruitment weeks spread over one year (May and September 1999, and January 2000). The only exclusion criterion was inability to understand Swedish. All 608 antenatal clinics in Sweden were approached and 593 (97.5%) chose to participate in the study. One region with 7 antenatal clinics withdrew because of other ongoing studies and another 8 clinics chose not to participate because of a heavy workload. The total number of women scheduled for antenatal care during the three recruitment weeks was approximately 5400. This figure is an estimation based on data from the national Swedish Birth Register and information from the antenatal care midwives. About 550 women were not approached, mainly because of language difficulties, 102 reported to us that they had an early miscarriage and 75 were scheduled at a non-participating clinic. Of the remaining 3353 women eligible for the study, 3011 answered the first questionnaire. However, of these women 60 reported a miscarriage and 25 babies were stillborn. Three hundred forty two women did not answer the first and second questionnaire and therefore did not get the third questionnaire. In all, 2926 women participated in the study and 2430 (83%) of these completed all three questionnaires. A comparison was performed between the study group and a cohort of all women who gave birth in Sweden 1999, as registered by the Swedish Medical Birth Register. It showed that in addition to a significantly larger proportion of women born in Sweden, the study group included more women who were 35 years or older (RR 1.3 CI 1.2–1.4) and fewer who had three or more children (RR 0.7 CI 0.6–0.8). However no statistical differences were observed regarding parity i.e. the proportion of nulliparous vs. parous women, marital status, history of previous miscarriage and average age.

Procedure

The women were invited to the study at their first scheduled visit after having received both written and oral information from the midwives. The project was described to the women as a study concerning their experiences of pregnancy and childbirth. Women consented to participate by signing a form including their personal identity code and contact details. Data were collected by mailed questionnaires in early pregnancy, at two months and one year after delivery. After each recruitment week the consent form was sent to the research team, and the first questionnaire was then mailed to the women on the list. On average, the first questionnaire was completed in gestational week 16, the second 10 weeks postpartum and the third, one year and three weeks postpartum. Two letters of reminder were sent to the non-responders.

Assessments

Depressive symptoms were evaluated by using the Edinburgh Postnatal Depression Scale (EPDS), a ten-item self-report scale, designed to screen for postpartum depression in community samples (Cox et al., 1987). Normal changes that might occur during pregnancy and the postpartum period such as appetite changes and fatigue are not included in the EPDS scale to not be misleading as depressive symptoms. Each item is assessed on a four-point scale (0–3) and the total score consequently ranges from 0 to 30. The scale expresses the intensity of depressive symptoms over the preceding 7 days. In Sweden, the EPDS has been validated postnatally, and the recommended cut-off score for major depression (DSM-III-R) is 11/12 (Wickberg and Hwang, 1996). The scale has not been validated for antenatal use in Sweden. However, the EPDS has been validated for antenatal use in the United Kingdom where EPDS scores were compared with the results of psychiatric interviews in gestational week 24–38. The authors suggested 14/15 as the optimum cut-off for major depression during pregnancy (Murray and Cox, 1990). In the current study, the Swedish validated cut-off at 12 points or more was used at all three assessments for comparison reasons. In addition to the EPDS, the antenatal questionnaire included questions about the following possible associated variables: Socio-demographic background (age, parity, number of children, native language, marital status, education, employment status, residential area), number of stressful life events during the year prior to pregnancy and chronic illness. The stressful life event scale was derived from a more extensive life event scale (Rosengren et al., 1993) and included ten items relating to close relatives' serious illness, divorce, economic and employment problems, unemployment, any

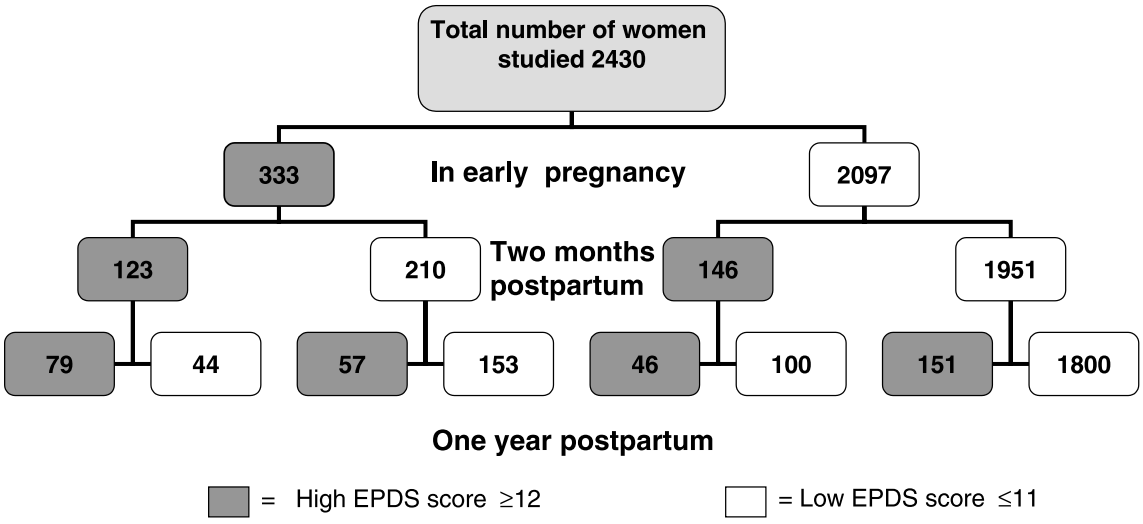

Fig. 1. Women scoring high or low on the EPDS on early pregnancy, two months and one year postpartum

Table 1. Analysis of EPDS scores obtained in early pregnancy, two months and one year postpartum n = 2430

High EPDS present			Number	Percent	In pregnancy			Two months postpartum			One year postpartum		
					Mean	Median	Range	Mean	Median	Range	Mean	Median	Range
Pregnancy	postpartum	one year	79	3.3	16.0	15.0	12–26	15.2	14.0	12–24	16.9	16.0	12–26
–	postpartum	one year	46	1.9	7.9	8.0	1–11	15.7	15.0	12–29	15.4	15.0	12–24
Pregnancy	–	one year	57	2.3	14.9	15.0	12–21	8.2	9.0	3–11	15.0	14.0	12–23
–	–	one year	151	6.2	6.9	7.0	1–11	7.2	7.0	1–11	14.4	14.0	12–25
–	–	–	1800	74.1	4.6	4.0	0–11	4.5	4.0	0–11	4.7	5.0	0–11
Pregnancy	postpartum	–	44	1.8	15.5	14.0	12–29	15.0	14.5	12–26	8.3	9.0	0–11
Pregnancy	–	–	153	6.3	14.4	14.0	12–21	6.4	6.0	0–11	6.7	7.0	0–11
–	postpartum	–	100	4.1	6.9	7.0	0–11	13.9	13.0	12–25	7.3	8.0	1–11

events that involved legal consequences and death among relatives and whether these events occurred earlier in life, during the last year or never. In our study a question about own serious illness was added to the life event scale.

Data analysis

The mean and median values were calculated on the EPDS scale for early pregnancy, two months postpartum and one year after childbirth. The women were divided into two groups: one group including women who scored above the EPDS cut-off level at all three evaluations and a reference group including those women who scored below the cut-off level on all occasions. The association between each variable and depressive symptoms was estimated using comparison with the reference group. Associations were calculated as the relative risk (RR) of depressive symptoms calculated as a ratio between the percentages and a 95% confidence interval with a method described by Mantel-Haenszel (Rothman, 2002). The statistically significant variables in the bivariable analysis were then tested simultaneously in a multiple logistic regression. Analyses were conducted using the Statistical Package SPSS for Windows 11.0 (2002).

The study was approved by the Ethical Research Committee at the Karolinska Institute, Stockholm, Sweden (Dnr 98–358).

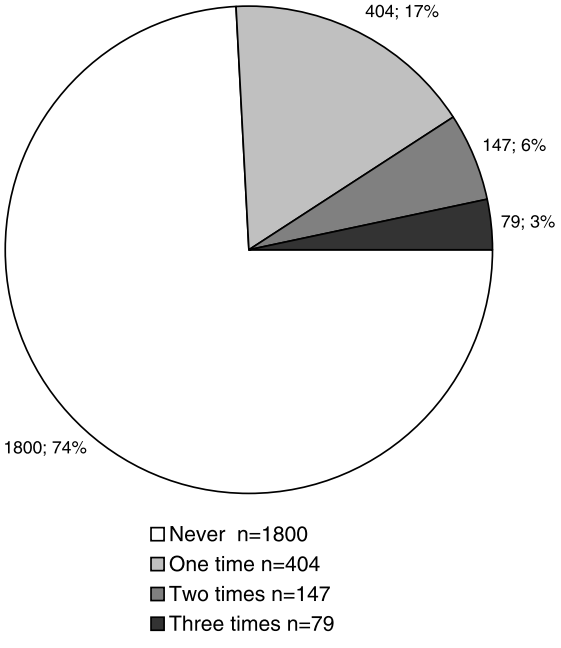

Fig. 2. Number of times women scored high on EPDS (≥12) when assessed in early pregnancy, two months and one year postpartum n = 2430

Results

In all, 2430 women (83%) completed the EPDS questionnaire in early pregnancy, two months and one year postpartum. The stability of depressive symptoms over the time period and the number of women scoring high or low on the EPDS is illustrated in Fig. 1. This figure makes it possible to distinguish groups of 'new cases' from groups with recurrent or sustained symptoms of depression. The different groups of women are presented in Table 1. The point prevalence of women with high EPDS scores was 13.7% in pregnancy, 11.1% at two months and 13.7% one year after the birth. The mean

Table 2. Association with EPDS score ≥ 12 in early pregnancy, two months and one year postpartum and possible indicators in early pregnancy. Bivariable analysis

		EPDS ≤ 11 (n = 1800)		EPDS ≥ 12 (n = 79)		RR	95% CI
		n	(%)	n	(%)		
Age	n = 1864						
<25		230	(93.9)	15	(6.1)	1.5	0.9–2.7
25–35		1288	(96.0)	53	(4.0)	1.0	reference
>35		268	(96.4)	10	(3.6)	0.9	0.5–1.8
Parity at study entry	n = 1866						
Nulliparous women		802	(96.2)	32	(3.8)	1.0	reference
Parous women		985	(95.5)	47	(4.5)	1.2	0.8–1.8
Number of previous children	n = 1865						
0 child		802	(96.3)	31	(3.7)	1.0	reference
1 child		650	(95.9)	28	(4.1)	1.1	0.7–1.8
2 children		267	(95.7)	12	(4.3)	1.2	0.6–2.2
3 or more children		64	(90.1)	7	(9.9)	2.6	1.2–6.7
Native language	n = 1854						
Swedish		1665	(96.5)	60	(3.5)	1.0	reference
Other than Swedish		111	(86.0)	18	(14.0)	4.0	2.4–6.6
Marital status	n = 1855						
Married or cohabiting		1717	(96.1)	70	(3.9)	1.0	reference
Single		60	(88.2)	8	(11.6)	3.0	1.5–6.0
Education	n = 1849						
University		351	(97.2)	10	(2.8)	1.0	reference
College		377	(96.4)	14	(3.6)	1.3	0.6–2.9
High school		962	(95.4)	46	(4.6)	1.6	0.8–3.2
Elementary school		84	(92.3)	7	(7.7)	2.8	1.1–7.1
Employment	n = 1836						
Employed*		1604	(96.6)	56	(3.4)	1.0	reference
Unemployed		157	(89.2)	19	(10.8)	3.2	1.9–5.2
Residential area	n = 1845						
Rural area		585	(97.2)	17	(2.8)	1.0	reference
Small city		370	(94.4)	22	(5.6)	2.0	1.1–3.7
Middle sized city		317	(95.5)	15	(4.5)	1.6	0.8–3.2
Large city		496	(95.6)	23	(4.4)	1.6	0.8–2.9
Number of stressful life events during the year prior to pregnancy	n = 1852						
None		868	(97.9)	19	(2.1)	1.0	reference
One		436	(97.5)	11	(2.5)	1.1	0.6–2.4
Two		307	(94.2)	19	(5.8)	2.7	1.4–5.1
Three		108	(85.7)	18	(14.3)	6.7	3.6–12.4
Four		41	(87.2)	6	(12.8)	6.0	2.5–14.2
Five or more		16	(84.2)	3	(15.8)	7.4	2.4–22.8
Chronic illness	n = 1851						
No		1561	(96.4)	58	(3.6)	1.0	reference
Yes		217	(93.5)	15	(6.5)	1.8	1.0–3.1

* Employed = employed, student, on parental-leave, own business, housewife and unspecific others.

EPDS score was 6.3 (range 0–29) in pregnancy, 6.0 (range 0–29) two months postpartum and 6.5 (range 0–27) one year postpartum. Of those women who scored high on the EPDS during pregnancy, 37% (123/333) also scored high on the EPDS two months postpartum and of those women who scored high two months postpartum, 46% (125/269) also scored high on the EPDS at one year postpartum. Three per cent of all studied women (79/2430) scored high on EPDS on all three occasions, 6 per cent (147/2430) scored high twice and 17 per cent (404/2430) on one of the three assessments. In all, 26 per cent of the studied women scored high on at least one of the assessments (Fig. 2).

The bivariable analysis revealed eight factors to be associated with depressive symptoms on all three evaluations. These factors were: three or more children prior to current pregnancy, native language other than Swedish, single status, elementary school as education level, unemployment, small city as residential area, experiencing two or more stressful life events during the year prior to pregnancy and chronic illness (Table 2). When taking all these factors into account in the multiple logistic regression analysis, the following factors were significantly associated with depressive symptoms at all three assessments; experiencing two or more stressful life events during the year prior to pregnancy, native language other than Swedish and unemployment (Table 3). When analysing the number of stressful life events during the year prior to pregnancy, we found a dose-effect relation between the numbers of stressful life events and mean EPDS score in pregnancy (Fig. 3). The higher the number of stressful life events experienced, the higher was the mean score on the EPDS scale in pregnancy (Pearsons correlation 0.27).

Table 3. Factors associated with EPDS ≥ 12 in early pregnancy, two months and one year postpartum analysed by multiple logistic regression

	OR	95% CI	p
Two or more stressful life events during the year prior to pregnancy	3.7	2.2–6.1	<0.001
Native language other than Swedish	3.6	2.0–6.8	<0.001
Unemployment	2.6	1.5–4.7	0.001

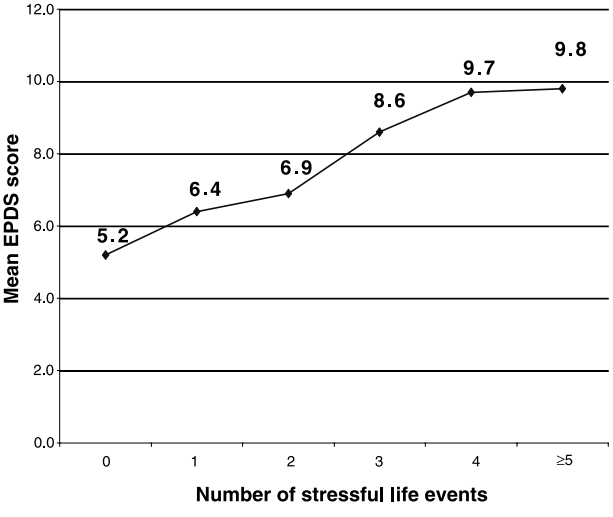

Fig. 3. Mean EPDS score in early pregnancy and number of stressful life events experienced in the year prior to pregnancy n = 2430

Discussion

In this national sample, three per cent of the women were prospectively identified with depressive symptoms on all three assessments performed. Indicators in early pregnancy for sustained or recurrent depressive symptoms were women experiencing two or more stressful life events during the year prior to pregnancy, having a native language other than Swedish and unemployment.

Experiencing stressful life events in the year prior to pregnancy was correlated to mean EPDS score in early pregnancy. The higher the number of stressful life events experienced the higher was the mean EPDS score in pregnancy. Moreover, an association was found between experiencing two or more stressful life events during the year prior to pregnancy and depressive symptoms on all three assessments. A relationship between stressful life events and postnatal depression was also found in a meta-analysis where results from 15 studies on life events were analysed (O'Hara and Swain, 1996). A substantial body of evidence shows a relationship between stressful life events and onset of depression. Life events may also affect remission and relapse of depression (Paykel, 2001; Paykel, 2003). The influence of the event on depressive outcome is still uncertain. However, in a recent study Kendler showed that in addition to loss, humiliating events that directly devalue an individual in a core role were strongly linked to risk for depressive episodes (Kendler et al., 2003).

Not having Swedish as the native language was another indicator for sustained or recurrent depressive symptoms during pregnancy through one year postpartum. The reasons for immigration to Sweden may differ depending upon social and cultural backgrounds. A recent study found that all foreign born women in childbearing age irrespectively of being a refugee or labour immigrant, had higher risks of first psychiatric hospital admission compared to Swedish born women (Robertson et al., 2003). Depression among immigrants can be at-

tributed to a number of possible explanations and the impact of migration on mental health needs to be further investigated (Bhugra, 2003). Lack of extended family and social support may be an important stress factor for immigrant pregnant and postpartum women. These women are often excluded from surveys because of language difficulties, and consequently their views and well being are often neglected. The possibility that non-Swedish origin is an even stronger risk factor than observed in the current study must be taken under consideration, since only those who mastered the Swedish language were included in the study. During antenatal care the importance of paying special attention to the needs of immigrant women i.e. interpretation service has been encouraged (Darj and Lindmark, 2002).

Finally, unemployment was associated with depressive symptoms on all three assessments. Similarly, a study conducted in France reported that unemployment was associated with an excess of psychological distress one year after the birth (Saurel-Cubizolles et al., 2000). Also in an earlier study, we found antenatal depressive symptoms (Rubertsson et al., 2003) and postpartum depressive symptoms (Rubertsson et al., 2005) to be associated with unemployment. Unemployment during pregnancy provides women the lowest rate of parental allowance, which may cause a stressful economic situation.

Three per cent of the women in our study were identified with depressive symptoms at all three assessments performed. We found that 37 percent (123/333) of the women with high scores already when pregnant continued with high EPDS scores postpartum. This continuity has also been reported in a study of 128 women who underwent psychiatric interviews during pregnancy and the year postpartum (Watson et al., 1984). Furthermore, of those women who scored high two months postpartum, 46% (125/269) also scored high on the EPDS one year postpartum. This stability in depressive symptomatology has been described by Beeghly (Beeghly et al., 2002) who studied 106 first time mothers two months postpartum and followed them with repeated assessments throughout the first postpartum year. The women with high levels of depressive symptomatology at two months were at increased risk of depressive symptomatology during the first postpartum year (Beeghly et al., 2002). Those women with recurrent or sustained problems may constitute an even more vulnerable group with higher levels of chronic strain during the transition to parenthood than women who have depressive symptoms only on one assessment (Green and Murray, 1994). The group of women who has depressive symptoms during pregnancy but not postpartum could also be interesting to explore further, since they might add further understanding of alternative mechanisms behind this.

The prevalence rates of depressive symptoms in early pregnancy 13.7%, postpartum 11.1% and one year postpartum 13.7% are similar to other reported prevalence rates in western countries. However, comparisons are compromised by varying follow-up data in relation to delivery, variation in EPDS thresholds and selection problems when samples are on specified populations (Evans et al., 2001; Green and Murray, 1994; Johanson et al., 2000; Josefsson et al., 2001). In comparison to our results, Cooper and colleagues reported significant remission in diagnosed depression over the course of the first postpartum year (Cooper et al., 1988). Similar results have also been described by others where postnatal depression tends to remit spontaneously in 4–6 months (O'Hara, 1997). We have to find alternative explanations to our relatively high prevalence rate at one year postpartum. In spite of a possible beneficial effect of a generous parental leave system, other factors, not investigated in this study, such as child care stress, poor parental self-esteem and high expectations on parenthood might be associated with depressive symptoms.

To our knowledge this is the first study using a national sample to estimate the prevalence of depressive symptoms in early pregnancy, at two months and one year postpartum. The prospectively collected information and a validated screening instrument provided the information of both point prevalence and the frequency of women with recurrent or sustained depressive symptoms during this period. Women who did not complete all three questionnaires, compared with those who answered all three questionnaires, had a two-fold increased risk to be identified with depressive symptoms. Thus the true prevalence of depressive symptoms in this study is probably spurious low.

A limitation of our study is that no question was asked about previous history of depression. The association between history of depression and antenatal and postnatal depression has been established by others (Nielsen Forman et al., 2000; O'Hara et al., 1984). Another limitation of our study is lacking questions about treatment, such as antidepressant medication or psychotherapy during the study period. However, regarding medication, three of the 79 women with recurrent depressive symptoms reported antidepressant medication in early pregnancy and 11 women at one year after giving birth.

Women with recurrent or sustained depressive symptoms at all three assessments constituted a group of

women with psychosocial distress where the depressive episode may have started already prior pregnancy. Strategies to evaluate maternal emotional well being seem appropriate during the entire period as we recognized groups of ''new cases'' as well as those women with recurrence depressive symptoms. Today, the Swedish Child Health Services recommend a screening with the EPDS at 8–10 weeks postpartum by the Child Health Care nurses at the well baby clinics. The implication of this study is that it may be possible to recognize those women who are at risk for recurrent or sustained depression already in early pregnancy. Accordingly, it seems reasonable to ask women early in pregnancy about life events and experiences during the year prior to pregnancy, pay attention to native language and employment status as possible indicators for depression. Antenatal health care in Sweden reaches almost 100% of all pregnant women and all check-ups are free of charge. The booking in interview today last for about 45–60 minutes and the midwives are already familiar with sensitive questioning. A psychologist is included in the antenatal health care team for referrals.

One of the future targets for antenatal health care is a more structured way to offer treatment and support that hopefully not only help the woman with depressive symptoms but also have a positive impact on the child's well being.

Acknowledgements

We thank all these women who participated in this survey. The study was supported by grants from Vårdalstiftelsen and the Karolinska Institute, Stockholm.

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