

# Depression following childbirth — a search for predictive signs

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**SUMMARY.** Potential risk factors for depression after childbirth were correlated with 13 symptoms of depression in a sample of 618 women from 64 general practitioners.

Eight significant predictive factors were identified. The most important were stress after the confinement, depression during pregnancy, a severe attack of the 'five-day blues', a history of previous puerperal depression and previous miscarriage.

### Introduction

**S**AFE obstetric practice depends, *inter alia*, on the identification of mothers and babies at risk.

Significant advances have been made in recent years in the detection of maternal and fetal abnormalities. At the same time, considerable interest has been shown in puerperal mental disorders. Jacobson and colleagues (1965) and Pitt (1968) have indicated that depression after childbirth occurs much more often than was formerly realized, and that, although puerperal psychosis is rare and the 'five-day blues' common, many mothers experience a condition less dramatic than the former but considerably more severe than the latter. This realization has stimulated many investigators to search for predictive features.

In 1968 one of us (H.R.P.) took part in a pilot study to identify possible predictive signs of puerperal depression (Blair *et al.*, 1970). The findings of this study encouraged us to proceed to the investigation which this paper reports. While most recent work on this subject has been conducted by psychiatrists, this article describes research carried out by general practitioners.

### Aim

The aim was to identify symptoms, signs and other conditions presenting during the antenatal and perinatal periods which, either singly or in combination, indicate that depression is likely to occur after the birth. These predictive signs should be such that they can be readily identified by any doctor providing antenatal and perinatal care, using his own powers of clinical observation.

### Method

The investigation was carried out during 1972 and 1973 by 64 general practitioners in the British Isles. The majority were recruited from those on the research register of the Royal College of General Practitioners who had expressed an interest in psychiatry. A few responded to letters in the *British Medical Journal* and the *South West England Faculty Newsletter*; others were contacted through a similar letter sent locally.

Each observer was asked to recruit up to a total of 15 mothers consecutively as they presented for antenatal care, for a period of 12 months, and to record information at four times:

1. At the initial antenatal appointment (R1).
2. During the second trimester (R2).
3. During the second week following the birth (R3).
4. About three months after the birth (R4).

Not all doctors were able to adhere to a rigid timetable for the consultations, and the following acceptable ranges were decided for the four records:

R1—recruitment, up to the thirtieth week of pregnancy.

R2—from the twenty-second to the thirtieth week of pregnancy.

R3—from the sixth to the twentieth day after the birth.

R4—from the eighth to the twentieth week after the birth.

A total of 966 sets of records were received. It was decided to exclude the following: pregnancies ending in miscarriage or termination; incomplete sets of records, except for those mothers recruited between the nineteenth and thirtieth week who lacked an R2; records violating any of the above ranges; and records in which more than four questions were unanswered. On the above criteria, 618 sets of records (65 per cent) were accepted for the investigation.

At each interview, the mood of the mother and the presence of the following 13 symptoms of depression were recorded:

1. Tiredness/inability to cope.
2. Loss of appetite.
3. Poor sleep.
4. Tense/overanxious.
5. Easily tearful.
6. Irritable/easily annoyed.
7. Loss of interest.
8. Sadness.
9. Lack of response/retardation.
10. Restlessness/agitation.
11. Discontent.
12. Tendency to obsessional behaviour.
13. Self-accusation/guilt feelings.

Symptoms were recorded on a two-point scale—present or absent. In the preliminary briefing, the observers were asked to use their ordinary standards of clinical assessment, including the complaints of the mother and their own observations. They were asked neither to squeeze symptoms of depression out of patients, nor to ignore evidence of emotional disturbance because of preconceived attitudes.

Each observer was asked to place his perception of the mother's mood into one of four categories, according to whether she appeared to be her usual self, euphoric, showing forced cheerfulness or less cheerful than usual. These categories, in this order, were strongly associated with increasing levels of depression. The relationship was approximately linear, and therefore the mood states were used to form a simple four-point scale.

R2 was taken as the baseline for the above symptoms during pregnancy, and also for the mood of the mother and her attitude to the pregnancy. This provided a baseline time comparable with that of Pitt (1968) and also avoided the problem of the wide variation in recruitment dates. The exceptions to this were 15 mothers recruited late (between the nineteenth and thirtieth week) for whom there was no R2; the responses

**Table 1.** High scorers at R4 in relation to number of predictive factors present.

Number of factors present	Number of mothers at R2	Number of high scorers at R4	
		3 +	6 +
0	315	31	6
1	191	45	8
2	67	37	24
3	32	26	17
4 or 5	11	11	7
Total	616*	150	62

\*two unknown.

at R1 were used for these mothers. Although there was some variation in the times at which the interviews took place, it was not possible to isolate any trends within each range, and it seems justified to regard R2, R3 and R4 as well-defined periods.

The data collected at R1 included the age, marital status and social class of the mother, previous obstetric and psychiatric history and perception of menstruation. At the assessment following the birth (R3), details of the birth, the feelings of the mother about it and the condition of the baby were noted. At the final assessment (R4), information was obtained on the condition of the baby and the occurrence of external stress unrelated to the confinement.

In order to reduce the number of variables, Guttman scale analysis (Nie *et al.*, 1975) was applied to certain groups of questions. In the cases of previous psychiatric history and anxiety, it was possible to form additive scales created from three questions.

As the purpose of the study was to search for indicators of depression which could be easily identified by a family doctor in a routine consultation, we considered it essential to use simple lists of questions comprising the most common and typical symptoms of depression. At R2, R3 and R4, the sums of the positive responses to the 13 symptoms of depression were taken as a 'symptom score'. This procedure was supported by principal factor analyses of the question batteries, as in each case there was a single significant factor with approximately equal weighting from each symptom. The symptom score at R4 was taken as the measure of depression after childbirth, and predictors for this score were obtained by multiple regression.

## Results

### Depressive symptoms

Of the 618 mothers, 150 (24.3 per cent) had three or more symptoms of depression at, or about, three months after the birth (R4), and 62 (10 per cent) had six or more symptoms (Table 1).

**Table 2.** Presence of depressive symptoms (percentages in brackets).

Symptom	R2	R3	R4
1. Tired, unable to cope	190 (30.7)	165 (26.7)	146 (23.6)*
2. Loss of appetite	47 (7.6)	92 (14.9)	46 (7.4)
3. Sleepless	184 (29.8)*	82 (13.3)	85 (13.8)
4. Tense, overanxious	109 (17.6)	116 (18.8)*	131 (21.2)*
5. Tearful	159 (25.7)	179 (29.0)	115 (18.6)
6. Irritable	192 (31.1)	111 (18.0)	158 (25.6)
7. Loss of interest	46 (7.4)	25 (4.0)	49 (7.9)
8. Sadness	50 (8.1)	52 (8.4)*	52 (8.4)*
9. Retardation	41 (6.6)	26 (4.2)**	33 (5.3)
10. Agitation	72 (11.7)	51 (8.3)	47 (7.6)
11. Discontent	39 (6.3)	29 (4.7)	48 (7.8)
12. Obsessional	34 (5.5)	27 (4.4)**	42 (6.8)
13. Guilt	28 (4.5)*	24 (3.9)	49 (7.9)*
Numbers	618	618	618

\*1 patient not known.

\*\*2 patients not known.

**Table 3.** Cumulative percentage frequencies of symptom scores.

Number of symptoms	R2	R3	R4
0	35.1	46.9	53.6
1	56.2	65.2	68.3
2	71.7	75.9	75.7
3	80.4	82.5	81.9
4	85.9	88.5	86.2
5	91.1	91.7	90.1
6	94.0	95.3	92.6
7	96.4	97.4	95.1
8	98.1	98.7	97.6
9	98.7	99.5	98.1
10	99.7	99.8	99.2
11	99.8	100.0	99.8
12	100.0	100.0	99.8
13	100.0	100.0	100.0

The number of positive responses to the 13 symptoms at R2, R3 and R4 (as defined earlier) are given in Table 2. In general, the relative frequency of the symptoms remained very stable; at R2 and R4, the same group of five symptoms were most frequently reported, namely irritableness, inability to cope, overanxiousness, tearfulness and sleeplessness. At R3 the same symptoms predominated, except that loss of appetite ousted sleeplessness. At R2 and R3, guilt feeling was the symptom least frequently recorded, but its prevalence doubled at R4. This increase is significant at the five per cent level.

The cumulative percentage frequencies of the symptom scores are shown in Table 3. The number of symptom-free patients increases steadily through R2, R3 and R4 ( $\chi^2$  for trend = 42.2 on 1 df;  $p < 0.001$ ), although there is a compensating increase at R4 in the

**Table 4.** Correlations between numbers of symptoms at R2, R3 and R4.

Record	2	3	4
2	1.00		
3	0.40	1.00	
4	0.40	0.49	1.00

**Table 5.** Potential risk factors, correlations with the symptom score at R4.

*External stress after birth unrelated to confinement	0.40
Mood (R3)	0.32
Anxiety	0.28
*History of previous puerperal depression	0.26
History of psychiatric illness	0.21
Mood (R2)	0.20
Previous pregnancies of less than 28 weeks' duration	0.19
*Housing stress during pregnancy	0.17
Premenstrual tension	0.15
Painful menstruation	0.15
*Previous painful labours	0.15
*Adverse experience in previous pregnancies	0.14
*Financial stress during pregnancy	0.14
Previous pregnancies lasting at least 28 weeks	0.13
*Condition affecting baby sufficient to require medical attention	0.12
+ Partner's employment status	0.12
+ Partner's social class	0.11
Attitude towards pregnancy	0.07

R (0.05 per cent) = 0.08.

\*Dichotomous variable: the correlation is point-biserial.

+ Lower class or status is associated with increased depression.

number scoring five or more. The scores at the different periods have highly significant correlations (Table 4).

### Associated factors

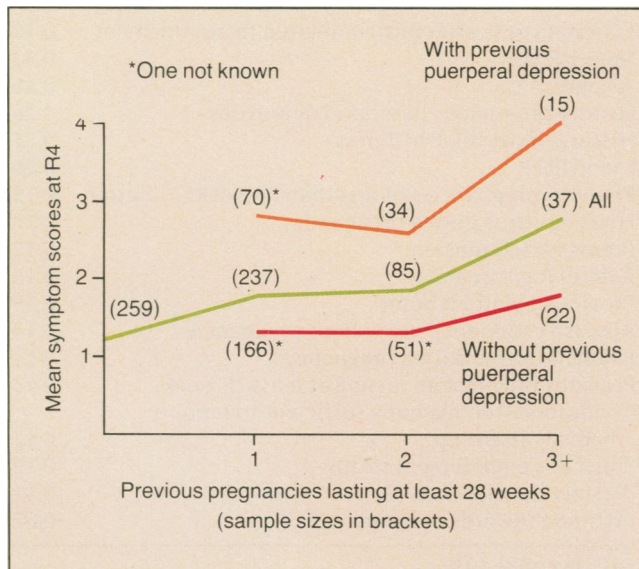
The information obtained at the various interviews has been divided into those factors which can be identified during antenatal care, and those which result from or occur after the birth. Examples of antenatal factors are a previous history of puerperal depression or the expectation that the partner will be absent at the birth; examples of peri- and postnatal factors are the absence of the partner or congenital malformation of the baby.

Table 5 lists those factors whose correlation with the symptom score at R4 is significant at the five per cent level. The most important factor is stress after the birth which is unrelated to the confinement. The kinds of stress reported included personal difficulties with the husband and in-laws, ill health of the patient or relatives, and financial and housing difficulties (Table 6). Difficulties with the partner were caused either by his enforced absence because of his job or by problems in the personal relationship. All but two of the 11 patients who had such relationship problems (including the

**Table 6.** Classification of external stress after the birth.

Symptom score at R4	Partner "a problem"	Partner enforced absence	Housing difficulties	Financial worries	Physical illness of patient	Illness in family	Other
6+	9	3	11	2	5	2	9*
3, 4, 5	1	3	11	2	2	9	4
0, 1, 2	1	6	11	2	2	15	13
Total	11	12	33	6	9	26	26

\*Includes 5 having personal difficulties with in-laws, etc.

**Figure 1.** Depression scores by parity and previous puerperal depression.

partner leaving them) had symptom scores of six or more at R4 and scored significantly higher than the group coping with enforced absence of the spouse ( $p < 0.01$ , Mann-Whitney test). Of the latter group, over half scored three or more, which is in turn significantly different from the general distribution ( $p < 0.05$ ). Illness in the family (outside the immediate parent-child unit) did not predispose mothers to depression.

The place of delivery was broadly classified as being at home, in hospital or in a general practitioner nursing home. Those in the last category had lower scores at R4 than the other groups, and there was a tendency for those delivered at home to score highly. These trends persisted when we allowed for the effect of parity.

#### Influence of parity

It has been suggested (Kaij *et al.*, 1967) that puerperal depression is an accumulating condition that becomes more likely, and possibly more severe, with increasing parity. Figure 1 shows the proportions of mothers exhibiting three or more symptoms at R4 against parity (defined as the number of previous pregnancies lasting at least 28 weeks). However, the trend consists of the

average of two separate groups, those with a history of previous puerperal depression and those without. The former show some tendency to suffer increased depression after three or more pregnancies, but this is not statistically significant. Those without a previous history have lower scores which show no tendency to increase with parity. The differences between those with and without a previous history of puerperal depression were significant at the five per cent level within each parity group using the Mann-Whitney test.

#### Psychotic and neurotic breakdowns

In the postnatal period 17 mothers (2.75 per cent) suffered breakdowns serious enough to require a psychiatric opinion. In five cases, the breakdown was primarily psychotic; in the others, it was primarily neurotic.

None of the psychotic mothers had more than two symptoms at R2 or R3, and only two had three or more symptoms at R4. They did not show any clear trends with regard to the predictive factors, but this was not surprising in view of the small numbers.

In contrast, seven of the 12 mothers suffering a neurotic breakdown had three or more symptoms at R2, eight had three or more symptoms at R3, and nine had five symptoms or more at R4. Five (42 per cent) reported external stress since the confinement (against 18 per cent overall), and five had babies who needed medical attention (against 17 per cent overall). Eight of the neurotic group were parous and, of these, five had a history of previous puerperal depression.

These findings confirm the importance of the predictive factors elicited for the complete sample of 618 mothers (see the following section), but the small numbers referred for psychiatric opinion mean that the above results are significant only at the 10 per cent level.

#### Predicting postnatal depression

The antenatal factors, together with the symptom score at R2, were entered as predictors for the symptom score at R4 in a step-wise multiple regression analysis. The following emerged as predictors significant at the 5 per cent level:

1. Symptom score at R2.
2. Previous history of puerperal depression.

3. Number of previous pregnancies under 28 weeks' duration.
4. Painful menstruation.
5. Previous psychiatric illness.
6. Partner's employment status.

In the case of the partner's employment, a low status was associated with increased depression at R4.

When the peri- and postnatal factors were included in the predictor list, the symptom score at R3 and external stress appeared as the first two predictors and the list of significant predictors was modified as follows:

1. Symptom score at R3.
2. Stress after the confinement unrelated to the pregnancy.
3. Symptom score at R2.
4. A history of previous puerperal depression.
5. Number of previous pregnancies under 28 weeks' duration.
6. Painful menstruation.
7. Previous psychiatric illness.
8. Partner's employment status.

These variables explained 42 per cent of the variance (multiple correlation with symptom score at R4 = 0.65).

In only one case was an interaction between the above factors significant at less than 5 per cent. This was a positive interaction between external stress and previous puerperal depression, which was significant at the 0.1 per cent level.

The way in which the chance of depression at R4 increases with the number of predictive factors may be seen in Table 1, which gives the number of mothers suffering from three or more symptoms and six or more symptoms at R4, according to the number of associated factors present. For simplicity, only the five most important factors, down to previous pregnancies under 28 weeks, are included (they account for 40 per cent of the variance). In this table, the symptom scores at R2 and R3 are defined to yield a positive response if the score is six or more.

## Discussion

Although pregnancy is popularly viewed as a time of well-being, the results of this study confirm the widespread prevalence of depression during pregnancy and the puerperium; at each recording period, between eight and 10 per cent of the sample reported six or more symptoms.

Previous reports on puerperal depression have produced widely varying results; it is possible that the conflicting incidence rates are due to some workers referring to psychotic depression and others to less extreme states. We have used the term 'depression' in its

broadest sense to describe a condition of mental or emotional distress characterized by depression and anxiety in varying proportions. It indicates a failure to cope on the part of the mother, with attendant risks, not only to her well-being, but also to that of the family.

There is considerable disagreement among other workers as to which factors are associated with puerperal depression. In contrast to Jacobson and colleagues (1965), but in agreement with Martin (1977), we did not find any association with complications during the pregnancy or at birth. Nor did we find associations with marital status, absence of the partner at the time of the birth, age or the condition of the baby. Because it was difficult to get complete record sets from many widely scattered and otherwise busy observers, we did not feel it was possible to obtain reliable data on the sexual adjustment of the mothers, although this has been claimed as a relevant factor by other workers, including Nilsson (1972).

The most important factor associated with postnatal depression was external stress occurring after the birth. This is in keeping with the findings of Martin (1977). Certain types of stress appeared to be more specifically associated with depression than others (Table 6); marital difficulties, housing problems and the mother's physical ill-health were especially prominent. It may be argued that, as a predictive factor, external stress after the birth is of extremely short-range value. Nevertheless, marital disharmony may be detected, or housing problems foreseen, during pregnancy. It may be that some mothers reporting external stress are externalizing a more fundamental inner stress or inadequacy, and that a more stable person suffering the same conditions would not have mentioned them. However, whether the mother was reporting a genuine causal agent or was merely indicating that she perceived her circumstances as stressful, the prognostic value of the observation remains.

A previous history of puerperal depression also predisposes to further depression after childbirth, even when the mother has become completely symptom-free in the interim, and also accounts for the increased incidence of depression with parity. The positive interaction between a history of puerperal depression and external stress after the confinement suggests that such stress may in some cases act as a catalyst and precipitate the mother into depression.

Anxiety during the pregnancy, whether overt, pent-up or expressed as superstitions, is another significant factor and has been noted by Tod (1964) and Meares and colleagues (1976). In our study, signs of anxiety as observed by the doctor were correlated with the symptom score during pregnancy. However, the latter proved to be the stronger indicator for subsequent depression. Similarly, the observations of mood during pregnancy and immediately after the birth were also correlated with later depression and with the symptom scores taken at the same time. Again, the symptom scores were the

stronger predictors, possibly because of their larger scope.

## Conclusions

Five principal prognostic factors have been identified: a history of previous puerperal depression at the initial antenatal examination; at the same stage, a history of previous miscarriage; during the pregnancy, the presence of six or more symptoms of depression; shortly after the birth, a severe attack of the 'blues' with a symptom score of six or more; and, following the birth, external stress, in particular marital difficulties, housing problems and physical ill-health of the mother.

Three less significant, but nevertheless ominous, pointers to be noted at the initial antenatal examination are dysmenorrhoea, a history of psychiatric illness and low employment status of the partner. The presence of these signs should alert the doctor to a greater probability of depression during the puerperium.

There is already close surveillance of the mother during pregnancy and labour, and the presence of abnormal physical findings usually leads to additional or extraordinary care. The present study shows that being aware of the psychiatric problems which may affect a mother is equally important, and that there are simple indicators to the onset of these problems.

A screening programme which uses imperfect indicators will inevitably waste time and effort in unnecessary follow-up; some sufferers will also slip through the net. Table 1 shows that the presence at initial interview of two or more of our five principal signs identified 74 of the 150 mothers who subsequently had three or more symptoms at R4. A total of 110 mothers presented two or more factors under a screening programme using the indicators in this study; only 36, or one third, of these would have been screened needlessly. Thus surveillance using the indicators identified in this study would detect half of all those affected by postnatal depression and would be wasted on only a third of all pregnant women.

In conclusion, we need more extensive research into these indicators. General practitioners have a vital and integral role in such research, and we hope that epidemiologists, psychiatrists and general practitioners will work together towards understanding and preventing this common and distressing syndrome.

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### Hepatitis B vaccine

Three doses of an inactivated hepatitis B vaccine were given to 549 homosexual men known to be at high risk for hepatitis B; the trial was placebo-controlled, randomized and double blind. Ninety-six per cent of those vaccinated had high levels of antibody after the third dose. During the first 18 months of follow-up, fewer than one in 25 of the vaccinated group had any evidence of hepatitis B infection, compared to about one in five of those given placebo. The vaccine probably works even if given after exposure to the infection.

Source: Szmuness, W., Stevens, C. E., Harley, E. J. *et al.* (1980). *New England Journal of Medicine*, 303, 833-841.