VULNERABILITY TO POSTPARTUM DEPRESSION: PSYCHOLOGICAL AND

PSYCHOSOCIAL FACTORS

by

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ABSTRACT

A review of the postpartum depression literature indicated the need for prospective research evaluating the role of demographics, psychosocial stressors, psychological vulnerability, and early postpartum symptomatology in the development of clinical depression. A sample of 98 primiparous women completed measures of mood, marital adjustment, life events, attributional style and expectations for infant behaviour during the third trimester. At ten days postpartum they rated symptom levels since delivery, and described their labour and delivery experiences. Between six and eight weeks postpartum, the subjects completed a second set of questionnaires identical to the first with the exception that the infant expectations questionnaire was replaced with a measure of infant behaviour. At this time subjects were also interviewed for depressive symptomatology occurring since delivery. Twenty-one percent of the sample reported a discrete episode of depression which fulfilled the DSM-III criteria for an affective disorder. Depression was related to: (i) poor marital adjustment and depressed mood during the third trimester, (ii) early postpartum symptoms of anxiety and agitation, and (iii) the tendency to attribute negative outcomes to internal causes. Life stress and expectations also predicted symptom levels but did not discriminate diagnostic groups. The results were interpreted to support the view that postpartum depression signals an adjustment crisis. Findings indicated that

future research should examine the interaction of infant characteristics with women's expectations of competence in the maternal role.

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CHAPTER I

INTRODUCTION

1.1 Postpartum Depression: Definition and Incidence

The period immediately following childbirth has been
identified as a time of increased risk for psychological
disturbance. Epidemiological studies demonstrate elevated rates
of both psychiatric contact (Kendell, Wainwright, Hailey &
Shannon, 1976) and admission to psychiatric facilities (Kendell,
Rennie, Clark & Dean, 1981). Because distress predominantly
takes the form of a mood disturbance (Kendall et al., 1981;
Meltzer & Kumar, 1985), the postpartum has come to be seen as a
time of specific vulnerability to depression. Three types of
postpartum depressive reactions are described in the literature.
While these have not always been treated as though they were
conceptually distinct, a consensus is emerging that they should
be delineated (Hopkins, Marcus & Campbell, 1984). Eventually
they may be viewed as more or less severe manifestations on a
continuum of mood disturbance. At present, however, clarity is
enhanced by treating them as separate constructs. The three
types are: (i) the "maternity blues", a brief period of
emotional lability occurring between three and ten days
postpartum; (ii) postpartum depression, a moderate mood
disturbance resembling that seen in outpatient clinics; and
(iii) postpartum psychosis. Although this review will focus on
postpartum depression, a brief description of the other

categories will serve to distinguish these phenomena.

The term "maternity blues" refers to transitory symptoms of tearfulness, irritability, depression and mood instability which peak on the fifth day postpartum (Kendell, Mackenzie, West, McGuire, & Cox, 1984). At least one of these symptoms is reported by approximately two-thirds of all new mothers (Yalom, Lunde, Moos & Hamburg, 1968). The same pattern pertains for both vaginal and Caesarian section deliveries, but the symptoms seem uniquely related to childbirth as they do not systematically follow related medical procedures such as hysterectomy (Kendell et al., 1984). The tearfulness associated with the blues also does not seem to reflect depressive affect, as crying is correlated positively with irritability and negatively with sadness (Yalom et al., 1968). Because this syndrome is so common and the symptoms reminiscent of premenstrual tension, the blues are assumed to be related to the adjustment of hormonal systems to delivery and lactation (Gelder, 1978).

Postpartum psychosis is an acute psychotic reaction precipitated by childbirth. Although postpartum psychoses tend to be characterized by the features of an acute state, i.e. hallucinations and agitation (Barzilai & Davies, 1972; Dean & Kendell, 1981), these reactions cannot be distinguished symptomatically from other acute psychoses (Herzog & Detre, 1976). This finding, in conjunction with a low incidence of less than .05%, has discouraged researchers from studying postpartum psychosis as an entity separate from other psychoses.

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Postpartum depression is comparable to a Major Affective

Disorder as specified by DSM-III (American Psychiatric

Association, 1980). That is, it involves a reasonably stable

disturbance of mood (feelings of depression or anger), cognition

(guilt, self-deprecation) and behaviour (social withdrawal).

Estimates of the incidence of postpartum depression vary

considerably with the method selected to classify subjects.

Studies using admission to a psychiatric facility or medical

treatment as the criterion produce the lowest rates in the range

of 5% (Dalton, 1971; Tod, 1964). Higher rates are obtained when

psychiatric diagnoses are made because these studies will

include women who are depressed but who would not necessarily

request treatment. These estimates range from 8-25% (Cox, Connor

& Kendell, 1982; Cutrona, 1983; Dalton, 1971; Kumar & Robson,

1978a; 1984; O'Hara, Neunaber & Zekoski, 1984; Paykel, Emms,

Fletcher & Rassaby, 1980; Pitt, 1968; Watson, Elliott, Rugg, &

Brough, 1984). The highest rates are produced by studies using

elevated scores on self-rated depression inventories. These

suggest that as many as one-third of new mothers experience mild

to moderate levels of symptomatology (Atkinson & Rickel, 1984;

Cutrona, 1983; Hayworth, Little, Bonham Carter, Raptopoulous,

Priest & Sandler, 1980; O'Hara, Rehm & Campbell, 1982; Pye,

1981).

The use of self-rated measures to estimate incidence is

contentious on several grounds. Self-report has been widely

criticized in depression research because the items on such

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questionnaires as the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961) emphasize subjective mood while neglecting other aspects of the clinical syndrome (Depue & Monroe, 1978), and because self-rated measures tend to reflect mood states rather than stable psychiatric disturbance (Bumberry, Oliver & McClure, 1978). Evidence is also accumulating that scores on self report depression measures are highly correlated with scores on other measures of psychological disturbance, such as anxiety (Dobson, 1985; Tanaka-Matsumi & Kameoka, 1986). These findings support the contention that high scores on depression inventories among non-psychiatric samples probably reflect generalized distress rather than clinical depression (Gotlib, 1984). In the postpartum context self-ratings may be especially inappropriate because postpartum women frequently experience many of the symptoms associated with depression, such as energy loss and appetite changes. Theoretically a woman could be classified as depressed on the basis of her associated symptoms without experiencing a mood disturbance. Finally, as self-rated measures are administered at a specific point in time, usually between six and eight weeks postpartum, they provide only point prevalence estimates and are uninformative about incidence in the broader time period since delivery. .

Diagnostic interviews have the potential to provide the most valid estimates of clinically significant depression. However, researchers selecting this method have not typically used

standardized interviews such as the Schedule for Affective Disorders and Schizophrenia (SADS; Endicott & Spitzer, 1978) or standardized classification systems such as DSM-III or the Research Diagnostic Criteria (RDC; Spitzer, Endicott & Robins, 1978). Two exceptions were Cutrona (1983) and O'Hara et al. (1984) who found, using standardized procedures, a period prevalence of 8% and 12%, respectively, over the first eight weeks postpartum.

Rates in the 10% range indicate that childbirth places women at significant risk for depression, a risk that is at least comparable to other major life stressors (Paykel, 1978). Moreover, the high rates of symptomatology found when self-rated measures are employed suggest that features of depressed mood are relatively common among postpartum women whose adjustment might otherwise be categorized as "normal". When one considers the profound effects of motherhood on self-concept, marital and work roles and women's relationships with their spouses and families (Grossman, Eichler & Winikoff, 1980), it should not be surprising to discover that new mothers at times doubt their ability to cope, or feel bored and trapped by the routines of childcare. However, the distinction of abnormal from normal reactions is complicated by this overlap of symptoms. The difficulty could be circumvented if adequate baseline measures existed so that postpartum women could be compared with one another. Unfortunately, the research on normal adjustment has been scanty and methodologically flawed. Thus the study of

postpartum depression would be greatly enhanced by the empirical study of large representative samples of postpartum women to determine what constitutes normal adjustment.

1.2 Etiological Factors in Postpartum Depression

The use of different definitional criteria makes comparisons between postpartum depression studies extremely difficult. In the following review the term "depression" is reserved for those studies using admission, treatment or psychiatric diagnosis to classify subjects as depressed. When self-rated measures were used this is denoted by the terms "depressed mood" or "depressed affect". Effects are treated as robust only when demonstrated for both depressed mood and psychiatrically rated depression. It is also important to note that studies evaluating women within the first two weeks postpartum have been excluded from this review to prevent confusion of the maternity blues with postpartum depression. The following sections review the results of investigations into four broad classes of predictor variables. These are: (i) demographics; (ii) psychosocial stressors; (iii) psychological constructs; and (iv) biological systems.

1.3 Demographic Predictors

Parity, the number of pregnancies carried to term, and gravidity, the number of conceptions, are probably unrelated to postpartum depression. Five studies found no association (Cox et al., 1982; Hayworth et al., 1980; O'Hara et al., 1982; Pitt, 1968; Watson et al., 1984), while others have reported conflicting results. Two studies (Kendell et al. 1981; Meltzer & Kumar, 1985) found higher psychiatric admission rates among first time mothers, while Tod (1964), using the same criterion, reported that primigravidae women were relatively immune to depression. A fluctuating pattern of results is to be expected if the true relationship is weak or nonsignificant. However, other findings suggest that parity may be related to the development of depression at different points during pregnancy and the postpartum. O'Hara (1986), for instance, found more depression during pregnancy among·multiparous women, while others have reported high rates among primiparous women in the 12 months following delivery (Bridge, Little, Hayworth, Dewhurst & Priest, 1985; Gard, Handley, Parsons, & Waldron, 1986). Thus, although parity seems unrelated to depression in the immediate postpartum, it is associated with depression developing during other phases of pregnancy.

Similar inconsistencies have emerged in studies of postpartum depression and age. Four studies reported no association (Bradley, 1983; Kendell et al., 1981; Pitt, 1968;

Tod, 1964), while two found a negative (Little, Hayworth, Bonham Carter, Dewhurst, Raptopoulous & Sandler, 1981; Paykel et al., 1980) and one (Kumar & Robson, 1978b) a positive relationship. Until recently pregnancies have tended to occur during a restricted age range, particularly first pregnancies which have been studied most often. With more women electing to begin motherhood in their thirties and early forties, a relationship between age and depression may emerge in future research.

Marital status also seems unrelated to depression (Cox et al., 1982; Hayworth et al., 1981; O'Hara et al., 1982; Pitt, 1968; Watson et al., 1984), although single mothers may be more likely to be admitted to psychiatric facilities for treatment (Kendell et al., 1981). However, the almost exclusive use of married women as research subjects may have obscured the importance of this variable.

Socioeconomic status also appears irrelevant (Bradley, 1983; Cox et al., 1982; Hayworth et al., 1981; Kendell et al., 1981; Kumar & Robson, 1984; O'Hara et al., 1982; Pitt, 1968; Tod, 1964; Watson et al., 1984), although Lips (1983) reported an interesting finding. She found the husband's occupational status to be positively correlated with self rated depressed mood, while the mother's education was negatively correlated. However, this finding has not been reported elsewhere.

In summary, no consistent relationships have been demonstrated between postpartum depression and such demographic

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variables as parity, gravidity, age, marital status or
socioeconomic status. However, age and marital status may prove
important in future studies as more women choose to have
children later in their lives and/or choose to become single
parents. Alternatively, demographic variables may be most potent
in combination, while showing only modest correlations when
examined as isolated variables.

1.4 Psychosocial Stressors

The psychosocial factors consistently associated with
postpartum depression are marital tension and life stress during
and after pregnancy. Several authors have reported increased
rates of marital dissatisfaction among depressed postpartum
women (Cox et al., 1982; Kumar & Robson, 1978a; Paykel et al.,
1980; O'Hara, 1986; Tod, 1964; Watson et al., 1984) and
significant correlations between marital stress and depressed
mood (Bradley, 1983). Women's dissatisfaction with their
partners focusses on the lack of both instrumental and emotional
support. Husbands have been described as unwilling to help with
domestic chores and uncommunicative (O'Hara, 1986; Paykel et
al., 1980). Unfortunately, this body of research has tended to
examine marital satisfaction as a covariate of depression
because, with two exceptions (O'Hara, 1986; Watson et al.,
1984), ratings have been obtained concurrently. Clearly,
prospective research is needed to establish the role of marital
dissatisfaction in the development of depression.

Life stress during pregnancy may also be important. Depressed women are more likely to retrospectively recall negative life events during pregnancy (Paykel et al., 1980). Stressful life events and/or severe longterm difficulties were also identified in the case histories of more than 80% of depressed women admitted to psychiatric facilities (Dean & Kendell, 1981), and in 76% of the depressed cases identified in a non-psychiatric sample (Watson et al., 1984). Thus, retrospectively, life events are frequently identified as causal factors in the development of postpartum depression. One prospective study found life stress reported during the second trimester to account for 7% of the variance in postpartum depressed mood (O'Hara et al., 1982). However, this variable was not significant in a subsequent study by the same primary author (O'Hara et al., 1984).

Social support has been hypothesized to interact with life stress, as depressed women report unsatisfactory relationships with spouses and immediate family members (O'Hara, 1986), and the lack of a confidante other than the spouse (Paykel et al., 1980). Global measures of social adjustment were not found to be predictive in a study of depressed mood (O'Hara et al., 1982), although mood did covary with the perceived absence of positively reinforcing activities (Atkinson & Rickel, 1984). A prospective study found depressed mood to be predicted by lower prepartum levels of social integration and by the absence of relationships characterized by the provision of guidance and

assistance (Cutrona, 1984). The importance of these particular aspects of support for postpartum women is apparent. Membership in a peer group provides not only social stimulation but normative information about infants. Similarly, knowledgeable others may be able to reassure postpartum women that their experiences are neither as negative nor as alarming as the new mother might think. It is important to note, however, that in this study social support and stress level interacted such that under conditions of high stress the level of support had no appreciable impact on depressed mood.

Researchers have also examined stressors specific to the postpartum, such as pregnancy and delivery complications and childcare difficulties. The evidence concerning pregnancy complications and postpartum depression is equivocal. Two studies failed to establish a relationship (Kendell et al., 1981; Paykel et al., 1980), while one (Pitt, 1968) found fewer complications among women who later became depressed. Depressed women tend to recall that their pregnancies were more stressful than obstetric notes indicate (Paykel et al., 1980). However, these ratings were made retrospectively by subjects and were probably confounded by concurrent mood. No significant differences have been reported between depressed and nondepressed women with regard to the time spent in labour or the incidence of prolonged labour, i.e. lasting more than 24 hours (Cox et al., 1982; Dalton, 1971; Pitt, 1968). Inconsistent patterns have emerged when delivery method is considered.

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Kendell et al. (1981) found evidence of a disproportionate number of Caesarian section deliveries among women subsequently admitted for psychiatric treatment. However, this finding was not confirmed in another study of admission rates (Barzilai & Davies, 1972). Two studies reported no association between delivery method and depressed affect or depression (Bradley, 1983; Cox et al., 1982). In contrast other researchers have shown depression and depressed mood to be predicted both by less complicated_, i.e. vaginal, deliveries (O'Hara et al., 1982; Paykel et al., 1980) and by more stressful (Pye, 1981) or higher risk deliveries (O'Hara et al., 1984).

Surprisingly cursory attention has been given to the role of infant characteristics in postpartum depression. Demanding infants or excessive criers seem likely etiologic agents, and depressed women do report more problems with their infants. These women perceive their infants as "difficult" (Pitt, 1968) and are more likely to report crying, vomiting and frequent night disturbances (Dalton, 1971). They report more difficulties coping with their infants and express doubt about their mothering capabilities (Cox et al., 1982). Mothers of infants with feeding problems report more depression and less confidence in their caretaking abilities (Bradley, 1983). Similarly, mothers reporting excessive infant crying rate themselves as more depressed and rate parenthood and their infants more negatively (Wilkie & Ames, in press). The number of reported childcare stressors has been found to predict concurrently both

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mood (Cutrona, 1983) and diagnosis (O'Hara et al, al., 1984).
However, because negative evaluations of both the self and the
environment are a central aspect of depression, the mother's
perception that her infant is difficult may incorporate rather
than explain her mood. Alternatively, infants may be evaluated
as difficult because their behaviour conflicts with maternal
expectations. Expectations may be especially important among
first time mothers who have had little previous experience with
infants. Prepartum expectations about global aspects of
childcare have not predicted postpartum depressed mood (Atkinson
& Rickel, 1984). However, expectations about specific
behaviours, such as crying, may be more useful. Ideally, both
expectations and behavioural ratings should be obtained to
clarify the relationship between infant characteristics and
maternal mood.

To summarize, psychosocial stressors both during pregnancy
and in the immediate postpartum appear to be related to
depression. Depressed women are more negative toward their
marriages and infants, and are more likely to recall the
occurrence of negative life events during pregnancy. Prospective
research is needed to establish whether marital dissatisfaction
exists prior to the onset of depression, and to resolve
contradictory findings about the role of life stress during
pregnancy. In addition, the relationship between maternal mood
and perceptions of infant characteristics might be clarified by
measuring both prepartum expectations about infants and specific

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infant behaviours in the early postpartum. Pregnancy and delivery complications have not shown consistent relationships with depression, although delivery stress may be important and should be further evaluated.

1.5 Psychological Predictors

Very little research has examined psychological precursors of postpartum depression. Lips (1983) reported the results of a study of attitudes toward pregnancy and motherhood. She found depressed mood at four weeks postpartum to be predicted by parental beliefs that children are a necessary part of a satisfying life, and the spouse's attitude that the birth of a child reflects positively on his masculinity. These findings may be related to an earlier one that depression is predicted by positive attitudes toward breastfeeding (Dalton, 1971). Lips speculated that depressed mood is related to traditional attitudes toward motherhood. She suggested that traditional women may be disappointed after birth because they expect too much from motherhood. However, this explanation seems at odds with her finding that positive mood at postpartum was best predicted by identification with the feminine sex role. The role of attitudes in both normal and abnormal adjustment to childbirth clearly requires further research.

Three studies have explicitly examined the importance of cognitive variables in postpartum depression. Contemporary

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formulations of depression have implicated distorted (Beck, 1967) and self-deprecatory (Abramson, Seligman & Teasdale, 1978) cognitive processes in the etiology and maintenance of depressed mood. Although the evidence for the explanatory power of these models has been equivocal (Coyne & Gotlib, 1983), modest relationships have been established between cognitive style and the onset of depressed mood after a negative outcome (Peterson & Seligman, 1984).

O'Hara et al. (1982) prospectively evaluated the predictive utility of self control deficits (Rehm, 1977), dysfunctional attributional style (Abramson et al., 1978), dyfunctional beliefs (Beck, 1972) and social skills deficits (Lewinsohn, 1974). Subjects completed self-report questionnaires during the second trimester and at 12 weeks postpartum. The authors reported that collectively these variables were signficant, but accounted for less than 3% of the variance in a multiple regression equation. A second study by the same author reported similar results, although only self control deficits were significant of the cognitive variables examined (O'Hara et al., 1984). Cutrona (1983) evaluated women in their third trimester and at two and eight weeks postpartum. In addition to completing the Attributional Style Questionnaire (ASQ; Peterson, Semmel, von Baeyer, Abramson, Metalsky & Seligman, 1982), subjects were asked to make causal attributions for childcare stressors and blues symptoms. The reformulated learned helplessness model of depression hypothesizes that vulnerability to depression is

manifest in the tendency to make self-deprecatory attributions about causality (Abramson et al., 1978; Seligman, Abramson, Semmel & von Baeyer, 1979). That is, depressives and the depression-prone are thought to blame themselves for negative outcomes, while projecting responsibility for positive outcomes onto external agents. The reformulated model would therefore predict that the tendency to make self-blaming attributions for blues symptoms and infant stressors would be correlated with depressed mood. Among women who were not depressed prepartum, the self-derogating attributional style significantly predicted postpartum depressed mood scores, accounting for approximately 10% of the variance. Self-blaming attributions for blues symptoms were also important predictors beyond the absolute number of symptoms reported. However, among the women who had been diagnosed as depressed during pregnancy, neither attributional style nor specific attributions were significant predictors.

These studies indicate that cognitive vulnerability influences the development of depressed mood in the postpartum, although the effects may be modest. Cutrona's (1983) study also highlights the importance of measuring depression during pregnancy. Although most researchers have assumed that depression appears spontaneously after childbirth, by far the most consistent predictor of postpartum depressed mood is prepartum mood (Cutrona, 1983; Dalton, 1971; Lips, 1983; O'Hara et al., 1982; O'Hara et al., 1984; Pye, 1981; Watson et al.,

1984). Estimates of the amount of variance accounted for by prepartum depressed mood scores range from 12%-26%, making this variable the most substantive of those considered in this review.

Women's emotional state during pregnancy has been considered by several authors. Most have reported a relationship between anxiety during pregnancy and postpartum depression (Dalton, 1971; Hayworth et al., 1981; Tod, 1964; Watson et al., 1984; but see Cox et al., 1982, and Pitt, 1968, for contrary findings). However, other research has suggested that during pregnancy anxiety and depression tend to covary (Zajicek & Wolkind, 1978), and that anxiety scores per se do not contribute uniquely to the explained variation (Pye, 1981).

The statement that depression predicts depression may seem trite. However, for some women depression measured after childbirth is less "postpartum depression", as it is typically conceived, than it is the most recent manifestation of an ongoing mood disturbance. The few studies which have distinguished depressions originating in pregnancy from those occurring postpartum have identified some consistent group differences. Most have reported that a history of psychiatric contact prior to the.pregnancy distinguishes the women who became depressed during pregnancy (Cutrona, 1983; Kumar & Robson, 1978a; 1978b; Zajicek & Wolkind, 1978; but see Bridge et al., 1985, for contrary findings). In contrast, true postpartum depression seems related to the various psychosocial stressors

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considered earlier (Cutrona, 1983; Kumar & Robson, 1978a; 1978b; O'Hara, 1986). The failure to control for depression levels during pregnancy may explain the inconsistencies apparent in this literature. Predictive studies of postpartum depression need to differentiate the correlates of depression from its potential causes. By combining data obtained from two distinct subgroups- women whose depression developed during pregnancy and "true" postpartum depressives- important relationships between predictor variables and postpartum depression may have been minimized or obscured.

In summary, prospective research has demonstrated modest relationships between dysfunctional cognitive processes and postpartum depression. However, the most consistent and substantial psychological predictor of postpartum depression appears to be depressed mood during pregnancy, underscoring the importance of including this variable in prospective research.

1.6 Biological Factors

Earlier in this chapter postpartum depression was distinguished from the maternity blues with the latter thought to be a manifestation of biological disturbance. This section will review the literature examining both the biological basis of the blues and the relationship between blues symptoms and the subsequent development of depression.

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A hormonal basis to the blues is indicated both by the nature of blues symptoms, i.e. "irrational" outbursts unrelated to subjectively experienced emotion, and by the rapid onset of symptoms after delivery. It is thought that the sharp decline in estrogen and progesterone levels within the first three postpartum days is implicated (e.g. Gelder, 1978). Indirect support for a hormonal basis is construed from studies finding that women who experience severe blues symptoms tend to have a history of gynaecological difficulties (Gard et al., 1986; Nott, Franklin, Armitage & Gelder, 1976; Yalom et al., 1968). Gelder and his associates tested three hypothesized relationships between hormonal levels and blues symptoms: (i) that the blues are preceded by abnormally high progesterone levels pre-delivery; (ii) that progesterone levels drop too sharply after delivery; and (iii) that the ratio of estrogen to progesterone is abnormal (Nott et al., 1976). These authors measured hormonal levels and self-rated symptomatology from 28 weeks gestation to 6 weeks postpartum. Comparing the women on the basis of blues symptom levels, they did not find consistent hormonal differences between high and low blues sufferers. Subsequently, individual symptoms and hormonal levels were compared. No relationship was established between hormonal levels and mood lability. However, high predelivery estrogen levels were related to postpartum irritability, and a rapid decline in progesterone levels was correlated with depressed mood. The authors construed these findings as weak support for a hormonal explanation of the blues as the observed patterns were

not consistent across women, and the correlations between mood and hormonal level were significant but small.

Other researchers have applied biological hypotheses about depression to blues symptomatology. Coppen, Stein and Wood (1978) suggested that the blues are related to low levels of tryptophan, the amino acid precursor of serotonin (5HT). While the role of 5HT in depression remains unclear, it has been implicated by the therapeutic action of tricyclic antidepressants and MAO inhibitors which affect 5HT synaptic activity. The authors reported a strong negative correlation between levels of free tryptophan and depressed mood rated by subjects during the first ten days postpartum. Similar results were reported in a study of women from 36 weeks gestation to 6 weeks postpartum (Handley, Dunn, Waldron & Baker, 1980). Levels of free tryptophan between 38 weeks gestation and 3 days postpartum were lower among women experiencing severe blues symptoms. Specifically, the level of total available tryptophan failed to rise rapidly on days 1 and 2 as was observed for low blues subjects. A subsequent replication verified the findings for tryptophan and extended them by establishing the presence of higher prepartum levels of nonesterified fatty acids (NEFA), which compete with tryptophan for binding (Gard et al., 1986). However, the administration of tryptophan to recently delivered women did not have the anticipated effect of reducing blues symptomatology (Harris, 1980). While these studies provide support for a biological basis to blues symptoms, the precise

mechanism involved and the influence of environmental factors remain undetermined.

What is the relationship between the blues and postpartum depression? The evidence is unclear. A history of premenstrual tension is not predictive of postpartum depressed mood (Cutrona, 1983; O'Hara et al., 1982), although a history of gynaecological problems may be related to a diagnosis of depression (Gard et al., 1986). Similarly, tryptophan levels at six weeks postpartum are uncorrelated with concurrent mood (Handley et al., 1980). These findings fail to support the hypothesis that the blues and postpartum depression share a similar biological basis. However, depressed women are twice as likely to retrospectively recall early blues symptoms (Paykel et al., 1980), and self-rated depressed mood is moderately correlated with the number of blues symptoms reported concurrently (Cutrona, 1983). Prospective studies reporting a relationship between blues symptoms and a diagnosis of depression found more early tearfulness (Pitt, 1968) and greater blues symptomatology (Cox et al., 1982; Gard et al., 1986) among women who subsequently became depressed. The relationship between the blues and postpartum depression may be mediated by beliefs about early symptomatology. Women's explanations for their blues symptoms are important, with women who blame themselves for their symptoms reporting more depression than women who perceive their symptoms as due to external causes (Cutrona, 1983). Perhaps the women who later become depressed are those who interpret their symptoms as

psychologically meaningful, that is, as reflecting negative feelings about motherhood or a failure to cope.

In summary, there is evidence to support the hypothesis that blues symptoms are related to biological processes, although the specific mechanism has not been explicated. In contrast, there is no evidence to implicate biological factors in postpartum depression. Yet a link between early and later symptomatology is indicated. Postpartum depression may represent a failure to recover from early symptomatology. However, causal explanations may mediate this relationship, with women who blame themselves for early blues symptoms being especially vulnerable to depression.

1.7 The Present Study

The preceding review identified several methodological and conceptual issues in the study of postpartum depression. Specifically, further research is required to establish the incidence of clinically significant depression in the postpartum and to identify potential causative factors.

Estimates of the incidence range from 5% - 33% depending on the method used to classify subjects as depressed. However, postpartum women frequently experience many of the somatic features of depression, and the period of adaptation to a new infant is certain to be a highly emotional time, with transient feelings of dysphoria or boredom occurring as part of the

adjustment process. Thus, the incidence of depression should be determined by standardized interview and classification procedures to ensure that women are experiencing both stable dysphoric mood and the associated features that comprise clinical depression. Two studies utilizing this methodology have established a period prevalence of 8% - 12% over the first 8 weeks postpartum.

Previous research has tentatively identified prepartum mood, marital dissatisfaction, life stress, blues symptoms, infant stressors and dysfunctional cognitions as important factors postpartum depression. However, these variables have typically been evaluated concurrently or retrospectively. Because negativity of outlook is a critical consequence of dysphoric mood, depressed women's ratings and recollections may have been coloured by mood and prejudiced in a negative direction. Prospective research is needed to establish the role of these variables in the development of depression. In addition, these relationships have often been examined by correlating isolated variables with postpartum depression. Multivariate statistical procedures are needed to evaluate the existence of relationships among the variables and to establish the unique contributions of variable clusters to the explained variability.

The present study was designed to provide both descriptive and predictive information about postpartum depression. Specifically, the goals were: (i) to establish the incidence of clinical depression among a sample of primiparous women; (ii) to

ascertain the prevalence of depressive symptoms among nondepressed women; and (iii) to evaluate the relative utility of mood, dysfunctional cognitions and psychosocial stressors as predictors of depression.

The following hypotheses were advanced about the relationship between depressed mood/diagnosed depression and variables measured prepartum. Postpartum depression was predicted to be associated with:

1. lower marital adjustment

2. more life stress during pregnancy

3. more internal, global and stable attributions for recently occurring negative events

4. less perceived control over the occurrence of negative events

5. more optimistic expectations about early infant behaviour

6. greater depressed mood

In addition, the following predictions were made about the relationship between postpartum depression and measures of early postpartum symptomatology; depression was hypothesized to be related to:

1. more severe blues symptoms

2. more internal attributions for blues symptoms

3. less perceived control over blues symptoms

Finally it was hypothesized that depression at postpartum would be associated concurrently with:

1. maternal ratings of infants as difficult

2. greater differences between prepartum expectations and ratings of infant behaviour

CHAPTER II

METHOD

2.1 Subjects

The participants were 122 primiparous women solicited in their third trimester through prenatal classes offered by the Grace Hospital and Vancouver area Health Departments. To be included in the study the women had to be: (i) at least 18 years old; (ii) intending to deliver in a hospital; (iii) involved in a stable marital or common-law relationship; and (iv) at low risk for complications. The research was presented as a study of postpartum adjustment. After a brief description of the purpose and measures, interested women were provided with a set of questionnaires and a stamped, self-addressed envelope for returning the material to the investigator. Of the 183 packets distributed, 70% were returned. A check of 20 randomly selected nonrespondents indicated that the majority of packets were either lost in the mail (20%) or forgotten until after the baby's birth (45%). However, some subjects expressed objections to the questionnaires, saying that they were too long and difficult to answer (20%) or that the questions were too personal (15%).

Six respondents were excluded from the study: three did not meet the inclusion criteria, one delivered before she could be interviewed for suspected depression during pregnancy, one spoke

English too poorly to complete the questionnaires properly and one found it inconvenient to be interviewed during the selected postpartum period. Among the remaining 122 participants, there was no subject attrition.

2.2 Measures

Beck Depression Inventory

The Beck Depression Inventory (BDI; Beck et al., 1961) was used as the self report measure of depressed mood. The BDI was originally intended to measure the severity of depressive symptoms. The 21 items sample the affective, cognitive, motivational and physiological aspects of depression. The scores range from 0 to 63, with cutoff scores of 10, 16, and 24 designating mild, moderate and severe levels of symptomatology. In both psychiatric and student samples, the BDI has shown high convergent validity (r=.62-.77) with psychiatric ratings of depression severity (Beck et al., 1961; Bumberry et al., 1978; Metcalfe & Goldman, 1965). However, with delays of up to 14 days the correlation between BDI scores and psychiatric ratings dropped into the .3 range (Bumberry et al., 1978), reflecting the "state" nature of this measure. The BDI is also a sensitive screening device for current symptomatology, producing few or no false negatives when compared with DSM-III affective disorder diagnoses (Oliver & Simmons, 1984).

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Marital satisfaction was assessed by the Locke Wallace Marital Adjustment Test (MAT; Locke & Wallace, 1959). The MAT evaluates marital satisfaction in four respects: (i) the amount of agreement on issues such as sex and finances; (ii) mutual activity and decision making; (iii) current feelings about the decision to marry; and (iv) global satisfaction. Scores range from 2 to 161 with higher scores indicating better adjustment. The authors recommended that scores less than 100 be considered indicative of a need for treatment. The MAT has shown high split-half reliability (r=.89-.90) and acceptable levels of convergent and discriminant validity (Coleman & Miller, 1975; Locke & Wallace, 1959). Scores on the MAT showed moderate correlations (r=-.48) with therapists' ratings of marital conflict, but were uncorrelated with patients' ratings of satisfaction with their children, indicating that low MAT scores do not reflect generalized dissatisfaction with the family (Coleman & Miller, 1975). Scores have also discriminated marital therapy clients from a matched group of nondistressed subjects (Locke & Wallace, 1959).

Life Events Inventory

The Life Events Inventory (Cochrane & Robertson, 1973) is a 55 item checklist encompassing a wide range of potentially stressful events. For this study two items referring to miscarriage and abortion were omitted, as subjects were asked to

identify events occurring during and immediately following pregnancy. Although in its original form the Inventory is simply a checklist, participants in the present study were asked for three pieces of information. Events occurring during pregnancy were identified. Subsequently subjects indicated how positive or negative the event was on a 7 point scale, where "4" indicated neutrality and "1" and "7" were labelled "very positive" and "very negative", respectively. Subjects also rated the degree of stress produced by both positive and negative events on a 7 point scale, with higher scores indicating greater perceived stress. Finally, all events reported by subjects were assigned a value reflecting the "objective" amount of stress created by the events. These values were derived from weights assigned by three groups of subjects, psychiatrists and psychologists, psychiatric patients and university students (Cochrane & Robertson, 1973). The authors noted that the magnitude of the assigned weights were arbitrary and varied across the three samples. However, the rank ordering of the events was stable. For the present study, the events were rank ordered from least to most stressful, and the appropriate rank assigned to all reported events. Thus, three scores were obtained from this measure: (i) the number of perceived negative events reported; (ii) total perceived stress associated with all reported events and (iii) the objective stress associated with reported events.

Attributional style was evaluated by a series of questions appended to the Life Events Inventory, the Marital Adjustment Test and the postpartum questionnaire about infant behaviour (see *Ames Crying Questionnaire* contained in Appendix A). Subjects were asked to select the most upsetting event identified on the Life Events Inventory and to answer several questions about the causes of this event. The wording of the questions, taken from Gong-Guy and Hammen (1980), was as follows:

(i) How much control over the occurrence of this event did you have? (control)

(ii) Did this event occur primarily because of something about *you* (such as personality, effort) or was it primarily due to something about the situation or another person or persons? (internal versus external locus of causality)

(iii) Did this event occur because of something about you or the situation that changes readily (such as mood, effort, luck or fate) or something relatively unchanging (e.g. ability, unchanging qualities of the situation or person)? (stability versus instability)

(iv) To what extent do the *causes* of this event affect other areas of your life? (globality versus specificity)

The subjects answered each question by circling a number on a seven point rating scale. Lower scores indicated less perceived control and greater internality, stability and globality. Thus for negative outcomes low scores on all four dimensions reflected a self-derogating attributional style (Abramson et al., 1978). To evaluate attributions for negative marital and infant events, subjects were asked to think of the most upsetting thing that had happened in their relationship and with their infant and to answer the questions as described above. Scores on each dimension were averaged for each time period to provide a summary score.

Attributions for negative life events have shown moderate correlations with spontaneous verbalizations about causality (Gong-Guy & Hammen, 1980), particularly for the dimensions of control and internal versus external locus (r=.32 to .47). Attributions for real negative outcomes also correlate moderately with attributions made for the hypothetical situations comprising the Attributional Style Questionnaire (r=.55; Zautra, Guenther, & Chartier, 1985). Finally, attributions for the most upsetting life event have distinguished depressed from nondepressed groups in both inpatient (Miller, Klee & Norman, 1982) and outpatient settings (Gong-Guy & Hammen, 1980). Thus this procedure for measuring attributional style has demonstrated acceptable convergence with both judges' ratings and the hypothetical scenario method preferred by Seligman and his associates (Peterson et al.,

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1982).

Ames Crying Questionnaire

The Ames Crying Questionnaire (Ames, Gavel, Khazaie &
Farrell, 1984; 1985) was developed to investigate variables
potentially related to crying in infancy. A Principal Component
Analysis of 337 questionnaires yielded five components, one of
which was identified as a measure of the amount of crying. The
results suggested that, contrary to popular opinion, excessive
crying is independent of the discomfort associated with
gastrointestinal problems. The questions loading on the "amount
of crying" component related to the frequency and average length
of crying episodes, infant temperament, and maternal beliefs
about picking up crying infants. The version of the
questionnaire used in this study included all items loading on
the amount of crying component and several items pertaining to
feeding, sleeping and the overall difficulty of infant care (see
Appendix A). This questionnaire was administered prepartum, to
evaluate expectations about infant behaviour, and postpartum to
obtain ratings of infant behaviour over the previous week. Total
scores ranged from 11 to 53 with higher scores indicating more
difficult infant behaviour. A "cry index" was also calculated by
summing the three items with the highest loadings on the "amount
of crying" component. Scores on both the expected and reported
cry index ranged from 3 to 14, with higher scores indicating
more crying.

Demographics

Basic demographic information, such as age, marital status and education, was collected at prepartum. To evaluate the subject's and her partner's socioeconomic status participants were asked to list all the jobs they and their partner had held in the previous three years. These occupations were assigned a socioeconomic index from the tables provided by Blishen and McRoberts (1976). The authors calculated indices for the 500 occupational titles listed by Statistics Canada by combining in a linear equation the variables: average salary, prestige ranking and education required for the occupation.

Maternity Blues

Maternity blues symptoms were assessed by having subjects rate the severity of 15 symptoms culled from the published literature (see Appendix B). Such symptoms as depressed mood, anxiety, irritability and cognitive impairment were rated on a 7 . point scale. Total symptomatology was determined by summing across the 15 items. Thus, total scores ranged from 15 to 105 with higher scores indicating greater severity. Subjects were also asked to provide attributions for the symptom rated as most severe, using the questions described earlier (see *Attributional Style*).

At this time subjects also described their labour and delivery. Delivery method was assigned a complication rating on a five point scale increasing with greater medical intervention.

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The following values were assigned: 1= vaginal delivery; 2= forceps delivery; 3= induced labour after natural labour had faltered; 4= planned Caesarian section; and 5= emergency Caesarian section.

Schedule for Affective Disorders and Schizophrenia (SADS)

The SADS (Endicott & Spitzer, 1978) is a structured interview designed to reduce diagnostic disagreement by eliciting standard information from subjects. The interview consists of a series of questions intended to provided detailed information about the duration and severity of dysphoric mood and associated features of depression. Symptoms are rated on a scale of 1 to 6 or 7 with a score of "3" connoting mild levels of severity. The SADS manual provides for the conversion of scale scores into Hamilton Depression Scale (Hamilton, 1960) equivalents. Scores on the Hamilton summary scale range from 0 to 62 with higher scores indicating greater levels of symptomatology. Inter-rater reliabilities for summary scale scores based on joint interviews are very high, with all reported correlations exceeding .90 (Endicott & Spitzer, 1978).

A modified version of the SADS was employed to assess depressive symptomatology. The scales included were sufficient to produce both Hamilton Depression Scale summary scores and DSM-III diagnoses of Major Affective Disorder. Thus a total of 18 items from the SADS were inquired for in the interview. These were: depressed mood, guilt, negative self image, hopelessness,

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insomnia, hypersomnia, fatigue, decreased appetite, increased appetite, decision making difficulties, concentration difficulties, anhedonia, irritability, psychomotor agitation and retardation, somatic and psychic anxiety, and global functioning. A screening question was used to detect hallucinations and/or delusions. Audiotapes were made of all interviews, and scored by the investigator at a later date. A subset of 17 taped interviews were rated independently by the investigator and a senior clinical Ph.D. student who has had extensive experience with the SADS. The inter-rater reliability for total scores was .95. The average inter-rater correlation for the individual scales was .82, with 23 of the 26 correlations exceeding .70.

2.3 Procedure

Upon entry into the study all subjects completed a set of questionnaires measuring: (i) depressed mood rated for the previous week (BDI); (ii) marital adjustment (MAT); (iii) life events occurring during pregnancy (Life Events Inventory); (iv) attributions for recently occurring outcomes; (v) expectations about early infant behaviour (Ames Crying Questionnaire); and (vi) demographic variables. These questionnaires were completed an average of 35.6 days (SD=16.4; Range= 5-70) prior to subjects' due dates or at approximately 35 weeks gestation.

To identify those women who were depressed before delivery, the BDI was used to screen for current symptomatology. Subjects exceeding the cutoff score for mild depression were interviewed for episodes of clinical depression occurring during pregnancy, as well as for symptomatology in the previous week. These interviews were administered an average of 14.5 days (SD=8.5; Range=10-21) after the self-report questionnaires had been completed.

On approximately the 11th day postpartum (SD=2.1; Range= 8-18), subjects were contacted by telephone. At this time they rated the severity of maternity blues symptoms experienced since delivery, and provided attributions for the most severe of these symptoms. They also supplied information about labour and delivery.

At five weeks postpartum a second set of questionnaires was mailed to subjects' home addresses. A covering letter instructed them to complete the questionnaires between six and eight weeks postpartum. This packet included: (i) the BDI rated for the previous week; (ii) the MAT; (iii) the Life Events Inventory rated for events occurring since the previous testing date (which was provided); (iv) attributions for recently occurring outcomes; and (v) the Ames Crying Questionnaire rated for the previous week. These questionnaires were completed an average of 45 days (SD=6.1; Range=34-65) postpartum. During this period subjects were also interviewed for depressive symptomatology using the SADS diagnostic interview. The interviewer inquired

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both for depressive episodes occurring since delivery and for symptomatology in the previous week. These interviews were conducted an average of 51.7 days (SD=4.4; Range=42-63) postpartum.

CHAPTER III

RESULTS

3.1 Data Analysis

This section outlines the statistical procedures employed to analyse the data. The dual goals of the research were to provide descriptive and predictive information about postpartum depression. The first was accomplished by classifying the subjects into one of three diagnostic groups based on their responses to the structured interview for depressive symptomatology. Women who reported an episode satisfying the DSM-III criteria for depression at any time during the postpartum period were categorized as depressed. Those who reported a mood disturbance but who did not have sufficient associated symptoms to meet the DSM criteria were classified as dysphoric. The remaining subjects were considered "never depressed". These categories were used to determine: (i) incidence rates throughout the immediate postpartum and (ii) rates for the week preceding the postpartum interview, between approximately six and eight weeks postpartum. To identify the specific symptoms associated with depression, a multivariate analysis of variance (MANOVA) was conducted on symptom ratings reported for the six to eight week period, comparing the subjects by diagnostic status at that time. Subsequently, a discriminant analysis was performed on the ratings to ascertain the symptoms maximizing the discrimination between the groups.

The results of these analyses are reported in section 3.4.

The second purpose of the research was to evaluate a set of predictors to target those which might be causally related to the development of postpartum depression. Because of the large number of variables measured, and the probable existence of relationships among variables measured concurrently, the data obtained at the prepartum, post delivery (10 days postpartum) and postpartum testing points were submitted to three separate Principal Component Analyses (PCA) with varimax rotation. The purpose of this procedure was to identify variable clusters which might be more meaningfully related to postpartum depression than single variables. The Principal Component Analyses are summarized in section 3.5.

Two methods were identified to assess the predictive efficacy of the derived components. First, diagnostic group differences could be examined. This was accomplished by performing a MANOVA of the three sets of component scores with subjects' "worst" postpartum diagnostic status as the grouping variable. Once diagnostic group differences were demonstrated, a discriminant analysis was used to isolate the variables maximizing between group differences (see section 3.6). Second, 6 to 8 week symptom levels, as measured by the "Depression" component derived from the postpartum PCA, were regressed onto the prepartum and post delivery component scores using a multiple regression analysis. These results are reported in section 3.7. It should be emphasized that the results of these

latter two procedures are not necessarily equivalent. The purpose of the discriminant analysis was to distinguish discrete diagnostic groups as determined by a clinical assessment of the entire immediate postpartum, whereas the purpose of the regression analysis was to predict self-reported levels of symptomatology at approximately 45 days postpartum. Both procedures were utilized to determine whether diagnostic status and symptomatology are comparable measures of the construct "postpartum depression", and to enhance confidence in the predictors selected by seeking convergence between the methods.

The final set of analyses, reported in section 3.8, were conducted after subjects with suspected depression during the third trimester were removed from the sample. Subjects who had reported a mood disturbance during the prepartum interview were excluded, and the MANOVA, discriminant analysis and multiple regression procedures described above were repeated. The purpose of this analysis was to determine whether a different set of factors was involved in the development of "true" postpartum depression, that is, depression occurring in the absence of an affective disturbance during pregnancy.

3.2 Missing Data

Individual pieces of missing data were estimated by the BMD program "PAM". This procedure uses multiple regression equations to estimate missing values from known data. When one or two

items on a questionnaire were omitted, these values were estimated and inserted into the data set. However, for 24 of the 122 subjects substantial amounts of data were missing. For some subjects (21%) this occurred because an entire questionnaire had been omitted or was only partially completed. However, the majority of missing data resulted from subjects' failure to supply a negative outcome about which attributions could be made (46%) or inability to understand how to answer the attribution questions (33%). This finding underscores the limitations of this procedure for assessing causal attributions. The data from these 24 subjects were excluded from further analyses, leaving 98 subjects in the final sample.

The excluded subjects did not differ from their cohorts on such demographic variables as age, number of years married, their own or their partner's occupational status, annual family income, their own or their partner's education and whether or not their pregnancy had been planned. Self reported depressed mood, as measured by both prepartum and postpartum BDI scores also did not distinguish the excluded subjects. However, they did tend to receive lower depression scores in the postpartum diagnostic interview, $t(120)=2.26$, $p<.05$. Yet the proportion of subjects diagnosed as depressed, dysphoric or nondepressed was not significantly different, χ^2 (2,122)= .136, $p>.05$.

3.3 Characteristics of the Sample

The subjects were an average of 28 years old (SD=3.6) and had been married to or living with their partners for an average of 4.1 years (SD=2.7). All but one of the subjects was married. Forty-seven percent had obtained at least an undergraduate degree and 43% reported an annual family income greater than $45,000. The median socioeconomic status of the women's occupations was equivalent to that of an elementary school teacher (rank=53). The median ranking for their partners' occupations was equivalent to that for a managerial position in the service industries (rank=57.3). Thus, this sample was well-educated and affluent.

Almost three-quarters of the pregnancies had been planned. Ninety percent of the subjects had normal pregnancies and the remaining 10% had minor complications, such as first trimester bleeding, which resolved spontaneously. Their labour and delivery experiences were as follows. The subjects spent an average of 13.6 hours (SD=8.9) in labour. Fifty-three percent had uncomplicated vaginal deliveries, while forceps, labour induction and Caesarian section procedures were required in 24.5, 5.1 and 17.3 percent of the deliveries, respectively. Sixty-one percent of the sample had episiotomies. Exactly one-half of the infants were female and one-half male. The average birthweight was 3525 grams (SD=371). The women spent an average of 4.2 days (SD=1.9) in hospital after delivery.

3.4 Incidence and Symptomatology of Postpartum Depression

Thirty-eight percent of the subjects reported a period of depressed mood or pervasive loss of pleasure in activities (anhedonia), lasting at least three days per week for at least two weeks. This is Criterion A for a Major Affective Disorder in DSM-III. Consistent with DSM criteria, women reporting at least mild levels of depressed mood (scale score = 3) or pervasive anhedonia (scale score = 5) were classified as depressed only if they also reported at least moderate levels (scale score = 4) of four or more of the associated symptoms of depression. Those subjects who reported a mood disturbance but who failed to meet the criteria for associated features were categorized as "dysphoric". The remaining subjects were classified as nondepressed.

The validity of these diagnostic categories was verified by performing one way ANOVAs on the postpartum BDI and postpartum Hamilton Depression Scale (HDS) scores comparing the three postpartum diagnostic groups. These analyses confirmed that the postpartum BDI scores of the three groups were significantly different, F (2,95) = 19.23, p<.0001, with group means of 4.3, 6.1 and 9.9 respectively for the nondepressed, dysphoric and depressed groups. Planned comparisons indicated that the depressed group had higher BDI scores than both the dysphoric and nondepressed groups, but that the latter groups were not significantly different. The HDS scores of the three groups were

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also significantly different, F (2,95) = 64.98, p<.0001, with means of 4.7, 11.6 and 18.7 for the nondepressed, dysphoric and depressed groups respectively. Planned comparisons demonstrated that all three groups differed significantly.

Sixteen of the 98 subjects (16.3%) were interviewed before delivery because they obtained elevated scores on the prepartum BDI. Assessment of their prepartum symptom levels indicated that 6 of the subjects were depressed, 3 were dysphoric and 7 were not depressed. Of this group, 13 women subsequently reported a period of depressed mood in the postpartum, including all 9 of those women whose mood was definitely disturbed prepartum. Thus, when depressed mood was present in late pregnancy it persisted into the postpartum.

The prevalence of clinical depression throughout the first eight postpartum weeks was 21%, with an additional 17% of the sample reporting dysphoric mood. However, at least nine of the postpartum episodes, or 23.7% of the depressed and dysphoric cases, had their origins in pregnancy as these women's mood was already disturbed during the third trimester. Many of the postpartum depressive episodes had resolved by the 6 to 8 week interview. The rates of diagnosed depression and dysphoria at that time were 6% and 14%, respectively. Among these women, whose mood was still disturbed at 6 to 8 weeks postpartum, four women, or 20% of the 6 to 8 week cases, had reported dysphoric mood during the prepartum assessment.

In order to identify the specific symptoms distinguishing the depressed, dysphoric and nondepressed groups, a MANOVA was conducted on the symptom ratings derived from the postpartum interviews. The groups were defined by their diagnostic status at 6 to 8 weeks to allow between group comparisons for symptoms rated at precisely the same point in the postpartum. The results of this analysis and group means are reported in Table 1. The omnibus F test for the MANOVA was significant, Hotelling's $T(36)=3.44$, $p<.0001$, indicating overall differences between symptom ratings for subjects in the three diagnostic groups. Inspection of the univariate F tests showed the groups to differ on all assessed symptoms, with the exception of disturbances in sleeping and eating, and psychomotor retardation. Thus, reports of psychomotor slowing, insomnia or hypersomnia, and of appetite changes relative to pre-pregnancy were not necessarily associated with a diagnosis of depression. It is also noteworthy that the nondepressed group reported fatigue and concentration difficulties at levels approaching clinical significance, with means of 3.14 and 2.79 respectively.

Table 1: Univariate F probabilities and mean symptom ratings for 6 to 8 week diagnostic groups

Symptom	p(F)	Nondepressed (N=78)	Dysphoric (N=14)	Depressed (N=6)
Depressed mood	.01	1.38	3.36	4.00
Guilt	.03	1.86	2.50	2.83
Negative self image	.01	2.44	2.71	3.83
Hopelessness	.03	1.99	2.43	3.17
Insomnia	.10	1.52	2.14	2.33
Hypersomnia	.45	1.99	1.57	1.83
Fatigue	.04	3.14	3.43	4.50
Decreased Appetite	.13	1.61	2.21	2.50
Increased Appetite	.21	2.00	1.79	3.00
Decision making	.01	1.45	2.21	3.00
Concentration	.01	2.79	3.71	4.50
Anhedonia	.01	1.86	1.86	3.17
Irritability	.01	2.00	3.14	4.67
Agitation	.01	1.29	1.35	2.50
Retardation	.24	1.58	1.43	2.33
Somatic Anxiety	.01	2.08	3.00	4.83
Psychic Anxiety	.01	1.92	2.71	3.33
Global Functioning	.01	1.85	1.64	3.17

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The results of a discriminant analysis of these data are presented in Table 2. The analysis produced two discriminant functions, with canonical correlations of .86 and .48, respectively. The first function indicates that the nondepressed, dysphoric and depressed groups were distinguished by increasing levels of depressed mood and irritability.[1] The second function, which discriminates the dysphoric from the depressed group, indicates that depression, but not dysphoria, was associated with poorer global functioning and with higher levels of psychomotor agitation, anhedonia and increased appetite. The obtained functions correctly classified 98% of the subjects, with two dysphoric subjects being misclassified as depressed.

To summarize, the period prevalence of diagnosed depression in this sample was 21%, with approximately one-quarter of these cases originating in pregnancy. The depressive episodes, which were untreated with two exceptions, tended to resolve quickly. By the time of the interview only 6 of the 21 diagnosed cases (28%) reported sufficient symptomatology to be considered still depressed. Both dysphoric and depressed subjects reported higher levels of depressed mood and irritability than nondepressed subjects. However, depression was distinguished from dysphoria by psychomotor agitation, anhedonia and increased appetite, and by greater disruption of daily functioning.

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[1] The variable "decreased appetite" was also selected by the program but does not appear to contribute significantly to the discriminant function.

Table 2: Correlations between discriminating symptoms and functions distinguishing 6 to 8 week diagnostic groups

Symptom	Function 1	Function 2
Depressed Mood	.88	-.31
Irritability	.36	.21
Decreased Appetite	.12	-.02
Global Functioning	.14	.65
Psychomotor Agitation	.14	.46
Anhedonia	.13	.39
Increased Appetite	.05	.29

3.5 Principal Component Analyses

This section summarizes the results of three separate Principal Component Analyses with varimax rotation performed on the data obtained at the prepartum, post delivery and postpartum testing points (see Tables 3, 4 and 5). For all three analyses the components selected were those which had an eigenvalue greater than or equal to one.

Analysis of the prepartum and delivery variables produced a 7 component solution accounting for 67.0% of the variance. The first component, accounting for 17.6% of the variance, is labelled "Life Stress" and includes the number of perceived negative life events, the total perceived stress experienced during pregnancy from both positive and negative events, and the total "objective" stress associated with all reported events. BDI scores also load moderately on this component. The second component, "Demographics", accounts for 11.1% of the variance

Table 3: Factor loadings for the prepartum and delivery variables

Measure	Components						
	I	II	III	IV	V	VI	VII
Subjective stress	.92						
Objective stress	.91						
Negative events	.88						
SES-Subject		.72					
SES-Partner		.71					
Income		.67				.36	
Age		.64					
Years married		.64					
Expected crying			.92				
Expected difficulty			.88				
Hours in labour			.47	.40			
Delivery type				.87			
Days in hospital				.73			
No episiotomy				.67			
Control					.82		
Internal Locus					-.81		
Instability					.46		
Specificity						.75	
Planned pregnancy						-.62	
Marital adjustment						.32	.80
Depressed Mood	.38						-.69

and comprises the following variables: the socioeconomic status of the subject's and her partner's occupation, their annual family income, the subject's age and the number of years the couple had been together. Component three, "Expectations" accounts for 9.7% of the variance, and includes subjects' beliefs about the amount infants cry, global expectations about infant difficulties and the number of hours spent in labour. The

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fourth component, "Delivery Complications" accounts for 8.6% of the variance. The variables loading on this component are the amount of medical intervention entailed by the delivery method, the number of days spent in hospital, and not having an episiotomy. High scores on this component indicate a Caesarian section delivery. The fifth component accounts for 8.0% of the variance. This is an "Attributions" component including the variables perceived control, locus of causality and stability. The direction of the loadings indicates that high scores on this component reflect perceptions of control over negative events and beliefs that negative events were caused by internal but unstable factors. The number of hours spent in labour also load moderately on this factor. The sixth component is not named. Accounting for 6.8% of the variance it includes the third dimension hypothesized to indicate a depressive attributional style, globality/specificity, and the variable "planned pregnancy". Income and marital adjustment also load moderately on this component. The direction of the loadings suggests that beliefs about the specificity of the causes of negative outcomes and reporting a planned pregnancy, higher income and greater marital adjustment are inter-related. The final factor "Marital Adjustment/Depressed Mood", accounts for 5.2% of the variance and comprises high marital adjustment and low self-reported depressed mood.

The results of the Principal Component Analysis of the post delivery variables are reported in Table 4. This analysis

Table 4: Factor loadings for the postdelivery variables

Measure	Components				
	I	II	III	IV	V
Sensitive	.79	.34			
Sad	.78				
Moody	.68				
Tearful	.66			.31	
Confused	.48		.34		.43
Tense		.74			
Anxious		.72			
Restless		.63			
Argumentative		.56			-.46
Irritable	.41	.55			-.32
Tired		.45		.31	.39
Forgetful			.81		
Decreased Concentration			.81		
Distractible			.77		
External Locus				.88	
Lack of Control				-.64	
Insomnia					.78

produced a 5 component solution accounting for 63.8% of the variance. The first component accounts for 30.2% of the variance and includes those variables typically associated with the "Maternity Blues". These are sensitivity, sadness, moodiness, tearfulness and confusion. Irritability also loads moderately on this component. The second component is labelled "Tension". It comprises ratings of tension, anxiety, restlessness, argumentativeness, irritability and tiredness, and accounts for 10.9% of the variance. Sensitivity also loads moderately on this component. The third component, accounting for 8.5% of the variance, reflects "Cognitive Impairment", as it includes the

variables forgetfulness, decreased concentration and distractibility, with confusion loading moderately as well. Component four is labelled "Blues Attributions"; ratings of external locus of causality and perceived lack of control are indicated by high scores on this component. Feeling tired and tearful also loads moderately on this component. The percent of variance accounted for is 7.3. The final component is not named, although it seems related to sleep deprivation. This component, accounting for 6.9% of the variance, comprises only insomnia ratings, although confusion, tiredness, and the lack of both irritability and argumentativeness load moderately as well.

A summary of the Principal Component Analysis of the postpartum variables is shown in Table 5. Overall the derived structure accounts for 75.8% of the variance. The first component accounts for 27.8% of the variance and is labelled "Postpartum Life Stress" as it includes the number of negative events and both the perceived and objective stress associated with all events since the prepartum report. "Difficulties with the Infant" includes global ratings of difficulty, infant crying and ratings that the infant's behaviour is more negative than prepartum expectations. The second component accounts for 16.0% of the variance. The third component is "Postpartum Attributions". It accounts for 14.2% of the variance and reflects beliefs in control over negative outcomes, internal locus of causality and the instability of causes. Component four accounts for 9.5% of the variance and is labelled "Postpartum

Table 5: Factor loadings for the postpartum variables

Measure	Components				
	I	II	III	IV	V
Subjective stress	.94				
Objective stress	.90				
Negative events	.89				
Infant Difficulty		.94			
Infant crying		.86			
Expected/Actual Difference		-.84			
Control			.86		
Internal Locus			-.83		
Instability			.59		
Hamilton Depression Scale				.86	
Beck Depression Inventory				.81	
Marital adjustment				-.34	.71
Globality				-.35	-.68

Depression" as it comprises the Hamilton Depression Scale
(derived from the psychiatric interview) and the BDI scores. Low
marital adjustment and beliefs about the globality of the causes
of negative outcomes also load moderately on this component. The
fifth component is not labelled. It accounts for 8.2% of the
variance and includes marital adjustment and beliefs about the
globality of causes of negative outcomes.

3.6 Postpartum Diagnostic Group Differences

A MANOVA of the prepartum, post delivery and postpartum
component scores showed the diagnostic groups to differ
significantly, Hotelling's $\underline{T}(34)= 1.24$, p<.0001. Inspection of

Table 6: Univariate F probabilities and mean component scores for postpartum diagnostic groups

Component	p(F)	Nondepressed (N=60)	Dysphoric (N=17)	Depressed (N=21)
Prepartum				
Life Stress	.84	-.04	0.11	0.03
Demographics	.88	-.04	0.09	0.04
Expected Difficulty	.38	0.10	-.08	-.24
Delivery Complications	.44	-.09	0.06	0.22
Internal Attributions	.03	-.12	-.20	0.50
Specificity/Planned pregnancy	.25	0.05	0.21	-.30
Marital Adjustment/Depressed Mood	.01	0.21	0.05	-.64
Postdelivery				
Maternity Blues	.01	-.25	0.22	0.52
Tension	.01	-.22	-.08	0.70
Cognitive Impairment	.11	-.16	0.14	0.33
External Attributions	.85	0.03	0.03	-.11
Insomnia	.62	-.03	0.21	-.08
Postpartum				
Life Stress	.20	-.11	-.03	0.35
Infant Difficulty	.40	-.10	0.05	0.24
Internal Attributions	.47	0.06	-.27	0.04
Depression	.01	-.41	0.18	1.04
Marital Adjustment/Globality	.88	-.03	-.18	0.10

the univariate F tests (see Table 6) showed the groups to differ on the following components: (i) Prepartum Attributions, $F(2,95)=3.51$, $p<.05$; (ii) "Marital Adjustment/Depressed Mood", $F(2,95)=6.23$, $p<.005$; (iii) "Maternity Blues", $F(2,95)=5.57$, $p<.01$; (iv) "Tension", $F(2,95)=7.70$, $p<.001$; and (v) "Postpartum Depression", $F(2,95)=24.85$, $p<.0001$. [2]

Once diagnostic group differences had been established, a discriminant analysis of the groups was performed to identify the components associated with diagnostic group membership. The discriminant analysis produced one function with a canonical correlation of .66 which discriminated the depressed group from both the dysphoric and nondepressed groups. The pooled within groups correlations between the discriminating components and the discriminant function are reported in Table 7. Inspection of these values suggests that the depressed group was best discriminated by the components: (i) Marital Adjustment/ Depressed Mood ($r= -.41$); (ii) Prepartum Attributions ($r=.29$); (iii) Tension ($r=.46$); and (iv) Maternity Blues symptoms

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[2]A MANOVA of the major single variables measured at the prepartum, post delivery and postpartum testing points also showed the three groups to differ significantly, Hotelling's T (64)= 1.60, $p<.01$. Inspection of the univariate F tests showed that group differences achieved statistical significance for five variables: the depressed group had lower prepartum marital adjustment scores, $F(2,95)=6.07$, $p<.01$; made more internal attributions for negative outcomes during pregnancy, $F(2,95)=3.31$, $p<.05$; reported higher levels of blues symptoms in the first ten days, $F(2,95)=14.58$, $p<.0001$; and made more global attributions than nondepressed subjects at postpartum, $F(2,95)=4.12$, $p<.05$. The three groups also differed with regard to the discrepancy between expected and actual ratings of infant behaviour, $F(2,95)=3.34$, $p<.05$, with nondepressed subjects reporting that their infants' behaviour was not as difficult as anticipated.

Table 7: Correlations between discriminating components and the function distinguishing postpartum diagnostic groups

Component	Function 1
Tension	.46
Marital Adjustment/Depressed Mood	-.41
Maternity Blues	.36
Prepartum Internal Attributions	.29
Cognitive Impairment	.23
Postpartum Life Stress	.21
Specificity/Planned Pregnancy	.16
Expected Difficulty	.15
Prepartum Life Stress	.03

(r=.36). This function successfully classified 74.5% of the subjects into diagnostic groups, 95% of the nondepressed and 67% of the depressed subjects. However, the function discriminated depression from nondepression better than dysphoria from either group. The discriminant function scores of the dysphoric subjects tended to resemble those of nondepressed subjects more than depressed subjects, as 82% of the dysphoric group were misclassified as nondepressed.

3.7 Multiple Regression Analysis of Depressive Symptomatology

This section describes the results of a multiple regression analysis whereby scores on the component, "Postpartum Depression", were regressed onto the component scores derived from prepartum and post delivery Principal Component Analyses. It will be recalled that the Postpartum Depression component was comprised of self-rated scores on the Beck Depression Inventory

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and scores on the Hamilton Depression Scale calculated from the interviewer's ratings of SADS items. The results of this procedure are reported in Table 8. The prepartum and delivery components were entered into the equation first. This set of predictors was significant, $\underline{F}(7,90)=5.32$, $p<.0001$, producing an adjusted R^2 of .24. Four components contributed significantly to the regression equation. These were: (i) Delivery Complications, $\beta=.19$, $p<.05$; (ii) Life Stress, $\beta=.23$, $p<.01$; (iii) Expected Difficulty, $\beta=-.27$, $p<.005$; and (iv) Marital Adjustment/Depressed Mood, $\beta= -.33$, $p<.001$. Next, the set of post delivery components was entered. These variables were also significant, $\underline{F}(12,85)=6.54$, $p<.0001$, and produced a cumulative adjusted R^2 of .41. Inclusion of the post delivery components had the effect of reducing the statistical significance of Delivery Complications and Life Stress, although the beta weights for both Expectations and Marital Adjustment/Depressed Mood remained significant, $\beta=-.24$, $p<.005$ and $\beta= -.22$, $p<.01$, respectively. Three of the post delivery components were significant predictors of postpartum depressive symptomatology. These were: (i) Tension, $\beta=.34$, $p<.0001$; (ii) Cognitive Impairment, $\beta=.20$, $p<.01$; and (iii) Blues Attributions, $\beta= -.16$, $p<.05$. The component comprising the maternity blues symptoms did not achieve statistical significance.

To summarize, the regression of the postpartum depression component onto the prepartum and post delivery components produced a multiple regression equation accounting for 41% of

Table 8: Prepartum and postdelivery components as predictors of 6 to 8 week depressive symptomatology

Component	Beta	p (Beta)	Adjusted R^2
STEP 1			.24
Prepartum			
Life Stress	.23	.01	
Demographics	.02	.82	
Expected Difficulty	-.27	.01	
Delivery Complications	.19	.04	
Internal Attributions	.03	.73	
Specificity/Planned Pregnancy	-.15	.10	
Marital Adjustment/Depressed Mood	-.33	.01	
STEP 2			.41
Prepartum			
Life Stress	.13	.14	
Demographics	.02	.81	
Expected Difficulty	-.24	.01	
Delivery Complications	.14	.08	
Internal Attributions	.03	.68	
Specificity/Planned Pregnancy	-.09	.26	
Marital Adjustment/Depressed Mood	-.22	.01	
Postdelivery			
Maternity Blues	.14	.11	
Tension	.34	.01	
Cognitive Impairment	.20	.02	
External Attributions	-.16	.05	
Insomnia	.09	.26	

the variance in depression component scores. Of the prepartum variables evaluated, more optimistic expectations about infant behaviour, lower marital adjustment and higher depressed mood during the third trimester predicted depressive symptom levels. There was a tendency for life stress and delivery complications to be predictive; however these components did not meet conventional standards of statistical significance once the post delivery variables had been entered into the equation.

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Demographic variables and attributions for negative outcomes were not significant predictors. Of the post delivery variables considered, postpartum depressive symptoms were related to greater tension and cognitive impairment in the first ten days, and to the tendency to make self blaming attributions about the causes of early symptoms. The teariness and sensitivity normally associated with the maternity blues tended to be predictive, but was not a statistically significant predictor.

Attempts to predict other postpartum components from the prepartum and post delivery components were uninformative. None of the postpartum components other than depression could be predicted with any accuracy. The blues component, tension, was related to prepartum components, but the amount of variance accounted for was small, approximately 25%.

3.8 Predictors of "True" Postpartum Depression

"True" postpartum depression is conceptualized as a depressive reaction occurring in the absence of symptomatology during pregnancy. In order to determine whether a different set of components was involved in the development of true postpartum depression, those subjects who had reported a mood disturbance during the prepartum interview (N=9) were removed from the sample and the MANOVA, Discriminant Analysis and Multiple Regression procedures were repeated with the remaining subjects.

Table 9: Univariate F probabilities and mean component scores for the postpartum diagnostic groups with prepartum depressed and dysphoric subjects excluded

Component	p(F)	Nondepressed (N=58)	Dysphoric (N=16)	Depressed (N=15)
Prepartum				
Life Stress	.86	-.09	0.03	-.15
Demographics	.47	-.05	0.22	0.21
Expected Difficulty	.19	0.09	-.05	-.45
Delivery Complications	.45	-.06	0.07	0.32
Internal Attributions	.01	-.14	-.18	0.78
Specificity/Planned Pregnancy	.66	0.04	0.19	-.14
Marital Adjustment/Depressed Mood	.13	0.23	0.07	-.28
Postdelivery				
Maternity Blues	.04	-.26	0.31	0.21
Tension	.01	-.21	-.02	0.77
Cognitive Impairment	.39	-.17	0.14	0.10
External Attributions	.88	0.03	0.08	-.10
Insomnia	.28	0.01	0.27	-.28
Postpartum				
Life Stress	.05	-.13	-.11	0.56
Infant Difficulty	.88	-.06	0.03	0.07
Internal Attributions	.48	0.07	-.28	0.05
Depression	.01	-.42	0.23	0.83
Marital Adjustment/Globality	.95	-.01	0.01	0.08

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The omnibus F test for the MANOVA was significant, Hotelling's $\underline{T}(34)=1.10$, $p<.001$, indicating overall differences between the diagnostic groups (see Table 9). Inspection of the univariate F tests showed group differences to exist for the following components: (i) Prepartum Attributions, $\underline{F}(2,86)=5.59$, $p<.005$; (ii) Maternity Blues symptoms, $\underline{F}(2,86)=3.22$, $p<.05$; (iii) Tension, $\underline{F}(2,86)=6.31$, $p<.005$; (iv) Postpartum Life Stress, $\underline{F}(2,86)=3.02$, $p<.05$; and (v) Postpartum Depression, $\underline{F}(2,86)=17.66$, $p<.0001$.

The discriminant analysis produced one function with a canonical correlation of .595. The pooled within groups correlations between the discriminating components and this function are reported in Table 10. These results indicate that the depressed group was discriminated from both the dysphoric and nondepressed groups by: (i) Prepartum Attributions ($\underline{r}=.48$); (ii) Tension ($\underline{r}=.52$); and (iii) Postpartum Life Stress ($\underline{r}=.35$). Two substantive differences are evident when these results are compared with those obtained from the analysis of the entire sample. Prepartum levels of depressed mood and poor marital adjustment did not discriminate true postpartum depressives from the dysphoric and nondepressed groups ($\underline{r}= -.09$), and both prepartum internal attributions and postpartum life stress appeared to be more discriminating in the selected than in the unselected sample. A statistical test of the difference between these latter two pairs of correlations is not possible. However, comparison of the results obtained by the two discriminant

Table 10: Correlations between discriminating components and the function distinguishing postpartum diagnostic groups with prepartum depressed and dysphoric subjects excluded

Component	Function 1
Tension	.52
Prepartum Internal Attributions	.48
Postpartum Life Stress	.35
Maternity Blues	.24
Insomnia	.16
Cognitive Impairment	.14

analysis procedures shows that the pooled within groups correlation between Prepartum Internal Attributions and the discriminant function increased from .29 to .48 with the exclusion of subjects whose mood was disturbed during pregnancy. Similarly, the correlation between Postpartum Life Stress and the discriminant function increased from .21 to .35. The Maternity Blues component was included in the discriminant functions generated for both the selected and unselected samples, although its correlation with the two discriminant functions varies. This suggests that maternity blues symptoms were relatively more discriminating in the entire sample. However, the difference is small and may not be meaningful. The obtained discriminant function accurately classified 70% of the subjects into diagnostic groups, 91% of the nondepressed and 53% of the depressed subjects. The percentage of depressed subjects correctly classified is lower than that achieved when the entire sample was used (67%). Again, the discriminant scores of the dysphoric subjects closely resembled those of the nondepressed

subjects, with 75% of the dysphoric group being misclassified as nondepressed.

The results of the multiple regression analysis closely paralleled those for the analysis of the entire sample (see Table 11). The set of prepartum variables significantly predicted postpartum depressive symptomatology, $\underline{F}(7,81)=5.44$, p<.0001, producing an adjusted R^2 of .26. The following components were significant predictors: (i) Delivery Complications, $\beta=.18$, p<.05; (ii) Life Stress, $\beta=.23$, p<.01; (iii) Marital Adjustment/ Depressed mood, $\beta=-.30$, p<.001; and (iv) Expected Difficulty, $\beta=-.34$, p<.0005. Next, the post delivery variables were entered into the equation. These were also significant, $\underline{F}(12,76)=6.47$, p<.0001, and produced a cumulative R^2 of .43. Inclusion of the post delivery variables had the effect of diminishing the contribution of Life Stress. The beta weights for Delivery Complications, Marital Adjustment/Depressed Mood and Expected Difficulty remained significant, $\beta=.17$, p<.05, $\beta=-.20$, p<.05, and $\beta=-.30$, p<.001, respectively. Of the post delivery components, only Tension was a significant predictor, $\beta=.39$, p<.0001, although the Blues Attributions component approached statistical significance, $\beta=-.16$, p<.06. Although a different set of predictors met the statistical criterion for significance in the selected sample, a comparison of the beta weights obtained for the selected and unselected samples shows parallel results with no striking exceptions.

Table 11: Prepartum and postdelivery components as predictors of 6 to 8 week depressive symptomatology with prepartum depressed and dysphoric subjects excluded

Component	Beta	p (Beta)	Adjusted R^2
	STEP 1		.26
Prepartum			
Life Stress	.23	.02	
Demographics	.03	.71	
Expected Difficulty	-.34	.01	
Delivery Complications	.18	.05	
Internal Attributions	.05	.56	
Specificity/Planned Pregnancy	-.18	.06	
Marital Adjustment/Depressed Mood	-.30	.01	
	STEP 2		.43
Life Stress	.15	.08	
Demographics	.04	.66	
Expected Difficulty	-.30	.01	
Delivery Complications	.17	.05	
Internal Attributions	.06	.45	
Specificity/Planned Pregnancy	-.13	.13	
Marital Adjustment/Depressed Mood	-.20	.03	
Postdelivery			
Maternity Blues	.12	.18	
Tension	.39	.01	
Cognitive Impairment	.12	.17	
External Attributions	-.16	.06	
Insomnia	.02	.84	

To summarize, the exclusion of subjects reporting a mood disturbance during pregnancy produced a pattern of results similar to the original analysis. The beta weights produced by the multiple regression procedures are virtually identical, and the discriminant analysis procedure tended to select the same variables for inclusion into a discriminant function. There are two notable exceptions to this general trend. Prepartum depressed mood and poor marital adjustment did not discriminate

well between diagnostic groups in the selected sample, probably because the correlation was attenuated by the removal of high scoring subjects. Second, prepartum attributions and postpartum life stress tended to be more discriminating in the selected than the unselected sample. Overall these results do not support the view that true postpartum depression is related to a different set of predictors than depressions originating in pregnancy, although they do appear to underscore the importance of a self-blaming attributional style and stressful events occurring in the early postpartum in the development of true postpartum depression.

CHAPTER IV

DISCUSSION

The objectives of this research were twofold. The first goal was to estimate the prevalence of depression in the immediate postpartum and to distinguish normal fluctuations in postpartum mood and associated symptoms from the stable disturbance seen in clinical depression. The second purpose was to test simultaneously predictors of postpartum depression implicated by the extant literature and to evaluate their relative utilities in prediction equations.

Using standardized assessment and classification procedures this study established a period prevalence of 21% for clinical depression[1], with an additional 17% of the sample reporting a discrete episode of dysphoric mood which lacked sufficient associated features to qualify for an affective diagnosis. At least one-quarter of the depressed and dysphoric cases originated in pregnancy; when depressed mood was present in the third trimester it persisted into the postpartum. This finding indicates that a substantial minority of women who become depressed after childbirth are either clinically depressed during pregnancy or experience low grade depressive symptoms which are exacerbated by the stresses of the early postpartum. Similar findings have prompted other investigators to question

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[1] When the diagnostic status of the subjects excluded because of missing data is taken into account the overall rate is slightly lower at 19.8%.

whether the risk of depression after childbirth exceeds that during pregnancy (O'Hara et al., 1984). While the methodology employed in this research prohibits statements about the prevalence of depression during pregnancy, the continuity of mood from the prepartum to postpartum is striking enough to suggest that future researchers expand their investigations to include the entire pregnancy.

The rate of depression obtained for this sample is considerably higher than those reported elsewhere. Previous studies have suggested that 8% - 12% of recently delivered women show clinical depression in the eight weeks following delivery (Cutrona, 1983; O'Hara et al., 1984). Both the previous studies and current research used standardized procedures and obtained samples which tended to be well-educated and affluent. The details of Cutrona's diagnostic procedures were not provided in her publication. However, O'Hara et al. reported that symptom severity levels were "adjusted" for changes attributable to the physical effects of pregnancy and delivery. Specifically, the authors downgraded severity scores if they were not convinced that a mood disturbance was responsible for the symptom. The impact of this procedure on the diagnostic rate was not reported; however, its effect could only have been either to leave the rate unchanged or to reduce it, which may account for the discrepancy between these and the current findings. It should also be emphasized that both the present and the two published studies used small samples for the purpose of

establishing prevalence, with sizes ranging from 85 to 99.
Sampling variability alone could account for the range of
obtained rates, underscoring the need for a large,
representative sample to address what is essentially an
epidemiological question.

Although this research found postpartum depression to be
relatively common, it was also short-lived, with 72% of the
episodes resolving spontaneously within eight weeks. The
relative brevity of postpartum episodes and the high rates of
dysphoric mood reported in this sample suggest that moderate
levels of depression may be normative among postpartum women.
This conclusion is not surprising when one considers the
dramatic impact of childbirth on women's lives. Early efforts to
cope with the demands of infant care and with drastic changes in
routine must, at times, result in frustration and doubt about
the wisdom of one's choice. Thus depressed mood may signal an
adjustment crisis but be no more "abnormal" than anxiety in the ·
first few weeks of a new job or sadness at the death of a close
friend. However, if feelings of depression are normal, how is
atypical depression to be identified? One obvious criterion is
duration; as rapid symptom reduction is the norm, depression
lasting longer than 6 to 8 weeks might be considered atypical.
Other markers are suggested by the present research. Some
symptoms usually associated with depression were commonly
reported by nondepressed as well as depressed subjects. These
included disturbances of sleeping and eating patterns and

psychomotor retardation. In addition, ratings of fatigue and concentration difficulties among nondepressed women approached clinically significant levels. Thus the presence of these symptoms is not diagnostic among postpartum women. Comparison of the depressed and dysphoric subjects at 6 to 8 weeks postpartum indicated that depression was associated with psychomotor agitation, anhedonia and increased appetite, and with greater disruption of daily functioning. The latter finding deserves particular attention because it underscores the need to consider the impact of symptoms as well as their severity. Dysphoric women who are able to meet the minimal requirements of housekeeping and infant care will at least feel that they are coping, which may prevent the further deterioration of mood. Also noteworthy is the finding that anhedonia or pervasive loss of pleasure and interest distinguished depressed from dysphoric subjects. Reports of boredom or apathy may be critical in determining whether a mood disturbance falls beyond the range anticipated in normal adjustment. Thus a mood disturbance lasting longer than a few weeks, involving feelings of boredom or apathy and resulting in substantial impairment of function would appear distinct from the normal fluctuations associated with postpartum adjustment.

The second purpose of this study was to determine prospectively a set of variables which would be useful as predictors of depression. The data pertinent to this question were analysed in two ways, by performing a discriminant analysis

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on postpartum diagnostic groups and by regressing levels of depressive symptomatology reported between six and eight weeks postpartum onto the prepartum and post delivery measures. Generally, the two methods converged in the predictors selected. Both diagnosis and 6 to 8 week symptom levels were related to marital tension and depressed mood in the third trimester, to early postpartum symptomatology, particularly symptoms reflecting tension, and to self-blaming attributions.

Marital dissatisfaction and depressed mood were the only prepartum variables consistently identified as important. The purpose of including marital adjustment as a prepartum variable was to clarify the role of marital tension in the development of postpartum depression, because this had typically been evaluated concurrently or retrospectively by previous investigators. Unfortunately for this purpose, depressed mood and marital tension were so inextricably related by the third trimester of pregnancy that they loaded on the same component. Similarly, postpartum marital adjustment scores loaded moderately on the postpartum depression component. This finding is consistent with other research demonstrating a strong correlation between depression and marital difficulties (Crowther, 1985), and higher levels of conflict, tension and negative expressiveness in the interactions of depressed women with their spouses (Hinchcliffe, Hooper, & Roberts, 1978). The relationship between marital tension and depression may be amplified during pregnancy because women's feelings toward the pregnancy seem to be critically

linked to feelings about the spouse or partner. The present data do not permit causal inferences about the relationship between marital dissatisfaction and depressed mood. However, it is clear that they are closely associated during pregnancy and that the conjunction of these variables is predictive of both depressive symptoms and clinical depression in the postpartum.

Early postpartum symptomatology clustered into three distinct sets of variables: the moodiness and sensitivity generally associated with the maternity blues, tension and cognitive impairment. Thus early symptomatology is neither homogeneous nor necessarily suggestive of a hormonal imbalance. Of the three components identified, tension was most potently related to both depressive symptomatology and clinical depression. The symptoms encompassed by this component- tension, anxiety and agitation- are more suggestive of an individual who is struggling to cope with a stressful situation than one who is passive and helpless in the face of circumstances. Thus postpartum depression is signalled less by the sadness and teariness which seems phenomenologically akin to depression, than by early signs of anxiety and agitation. This finding was recently confirmed by other investigators who observed a relationship between high levels of post delivery anxiety and depressed mood measured 4 weeks later (Barnett & Parker, 1986). Although, as previously noted, self reported levels of depression and anxiety tend to covary, the results of the present study are consistent with the notion of a developmental

sequence whereby anxiety, induced by the perception that a threat is imminent, is followed by depression once the threatening event has occurred (Dobson, 1985). Among postpartum women, especially primiparous women, anxiety may be provoked by doubts about maternal competence and the ability to cope with the demands of a new infant. Depression would be predicted to result if the new mother's fears materialized, either because of her own inadequacies or because her infant was particularly trying.

Although maternity blues symptoms were related to diagnostic status, this was more clearly the case when women who were depressed during pregnancy were included in the sample, suggesting that severe maternity blues symptoms are more often a manifestation of ongoing mood than a new disturbance. However, maternity blues symptoms are neither trivial nor transient, as they are commonly depicted in the literature. The present research indicates that early symptomatology- both the blues and . anxiety- is strongly predictive of postpartum depression, and should not be dismissed as the result of a temporary hormonal imbalance.

The construct "attributional style", as conceptualized by Seligman, Abramson and associates (Abramson et al., 1978; Seligman et al., 1979), was only partially evident in this research. Perceived control and attributions about the locus of causality and stability loaded on the same component. However, beliefs about globality were rated independently of the other

dimensions, being more related to having a planned pregnancy (prepartum) or to poor marital adjustment (postpartum). In addition, beliefs that negative outcomes were due to internal causes were associated with perceptions of instability and control, rather than with stability and lack of control as hypothesized by the reformulated learned helplessness model. Further cause for concern can be found in the fact that 79% of the missing data occurred because 19 subjects (15.6% of the sample) were unable to supply causal attributions for real outcomes, raising doubts about the ecological validity of the construct and/or about the use of real outcomes to assess attributional style.

Yet despite these departures from theory, attributional components were related to both symptomatology and diagnostic status. The predictive utility of attributions was especially evident when subjects whose mood was disturbed prepartum were removed from the sample. In the selected sample prepartum attributions clearly discriminated the depressed from nondepressed and dysphoric groups, a finding which confirms earlier results (Cutrona, 1983) and underscores the importance of cognitive vulnerability in the development of true postpartum depression. The finding that blues attributions predicted 6 to 8 week symptom levels, whereas prepartum attributions predicted diagnostic status may not be meaningful. However, it is curious that in both instances attributions predicted subsequent mood while a concurrent relationship with depression was not

apparent. This pattern is interesting because it is in opposition to most research in the area, which usually finds attributional style to covary with depressed mood but not to precede it (cf. Coyne & Gotlib, 1983). However, this finding is consistent with previous work in depression showing a modest association between prepartum attributions and postpartum mood (Cutrona, 1983; O'Hara et al., 1982).

Levels of prepartum and postpartum stress, as measured in this study, played a less significant role than has been demonstrated in previous research (e.g. O'Hara et al., 1982; 1984). Prepartum life stress was weakly predictive of postpartum symptom levels and postpartum life stress was associated with diagnostic status, particularly once women who were dysphoric during pregnancy were eliminated from the sample. Although life stress was somewhat important, in this study its contribution tended to be overwhelmed by the inclusion of more potent factors.

The role of the infant in maternal depression cannot be clearly discerned from this research. During the postpartum interview women expressing feelings of depression were asked explicitly to identify the reasons for their feelings. While many women named multiple causes, the majority (54%) definitely attributed their mood to difficulties with their infants. These ranged from specific problems, such as excessive crying, to feelings of inadequacy about their maternal capabilities. These reports are certainly consistent with previous findings (Cox et

al., 1982; Dalton, 1971; Pitt, 1968). Yet as a group the depressed subjects did not rate their infants' behaviour as more problematic. This discrepancy leaves the source of the mothers' "difficulties" obscured.

Two hypotheses are viable. It may be the case that depressed women have more demanding infants who communicate by temperament or specific difficulties that maternal efforts to care for them are ineffective. While the present research does not support this hypothesis, the explanation cannot be rejected because maternal ratings may be unreliable, that is, confounded with the mother's self-evaluation and her mood. Objective or corroborative ratings of infant behaviour are needed to properly evaluate the role of infant characteristics. Alternatively, mothers' capabilities may not meet their own standards. In theoretical formulations depressives are described as having high performance standards and as being overly critical of their shortcomings (Beck, 1967). Certainly, prepartum expectations about infants were important, with more optimistic expectations predicting depressive symptom levels. The variables loading on this component included expectations about both global and specific behaviours, especially the amount of crying anticipated. The women who were later to report high symptom levels apparently imagined more contented versions of their newborns than did their cohorts. Perhaps in their imaginings they also envisioned themselves as more potent than is realistic to expect of a new mother. One likely source of such high

standards, for both the infant and the mother in her new role, is lack of previous exposure to infants. In a similar vein, Cutrona (1984) suggested that integration into a supportive network may mitigate depression by fostering the realistic appraisal of upsetting situations. Inexperienced women who lack an appropriate peer group or family network to provide normative information may be particularly likely to maintain unrealistic standards for both their infants and their own performance. Vulnerability to postpartum depression is probably enhanced both by discrepancies between imagined and real states, and by infant behaviour which is sufficiently ambiguous to raise doubts about maternal competence. However, in the absence of objective or corroborative data on both infant characteristics and maternal capabilities, one can only conclude that when a depressed mother reports that her infant is difficult, the message she is communicating is that she cannot cope.

The discriminant analysis and multiple regression procedures selected a similar combination of variables, even though individual variables were weighted somewhat differently. This convergence contrasts with the findings of O'Hara et al. (1984) who reported that two distinct patterns were related to diagnosis and symptom levels. The major difference between the present study and that of O'Hara and his associates is that in this study symptom levels were defined by high scores on both the BDI and the HDS. Whenever a construct is defined by combining scores from independent reliable sources, our

confidence is enhanced that we are actually measuring the phenomenon of interest, and not confusing measures with the constructs they designate. The finding that both diagnosis and symptom levels are related to a similar set of variables makes sense theoretically and also increases our confidence that the variables selected are substantively related to postpartum depression.

Few differences were observed when subjects reporting a prepartum mood disturbance were removed from the sample. Depressive symptomatology was predicted by the same variables, with virtually identical beta weights. When the two sets of results for postpartum diagnostic status are compared, it is apparent that for women whose mood was not disturbed during pregnancy, prepartum attributions and postpartum life stress are very important. However, no unique variables were involved in the development of "true" postpartum depression.

Of the potential predictors considered, prepartum marital dissatisfaction and depressed mood, early postpartum anxiety and an attributional style focussing blame on internal causes over which subjects felt they had control were the most consistent predictors of postpartum depression and depressive symptomatology. Life stress, in the form of life events and delivery complications, and prepartum expectations about infants were also predictive, but they tended to be more strongly related to depressive symptomatology than to a diagnosis of depression. Demographic variables were not important in this

study, although the predominance of well-educated and affluent subjects in the sample may have attenuated these relationships. Considered collectively these findings suggest that a postpartum mood disturbance signals an adjustment crisis. Future research might profitably focus on atypical postpartum depression, that which persists beyond 8 weeks postpartum and results in substantial impairment of function. Fruitful avenues for research include the predisposing and concurrent factors maintaining depression and the impact of depression on maternal relationships with the spouse or partner and infant. There is evidence to suggest that postpartum depressive episodes have deleterious consequences for the mother-infant relationship, the mother's perception of her child and her view of herself in the maternal role (Uddenberg & Englesson, 1978; Wrate, Rooney, Thomas, & Cox, 1985).

In many ways postpartum depression seems to represent a crisis in self-efficacy. If the birth of a first child is conceived as an achievement experience, as a novel situation which must be mastered, then postpartum depression may represent a failure to perform at a level consistent with self-expectations. The role of infant characteristics in the mother's failure to meet her standards cannot be addressed without an objective evaluation of the infant's behaviour and of mother-infant interactions. However, women's perceptions of their own skill and coping efforts may be more relevant to an understanding of postpartum depression than any observable

characteristic of the infant.

APPENDICES

Appendix A: Ames Crying Questionnaire

Prepartum Version

The following questions refer to your expectations about your baby in the first few weeks after birth.

1. How often do you think your baby will regurgitate (e.g. spit up food) after feeding? ... Often ...Sometimes ...Seldom or never

2. How often do you think your baby will vomit after feeding? ...Often ...Sometimes ...Seldom or never

3. During the day, after a feeding, do you think your baby will be: ...Drowsy/asleep ...Alert and content ...Ready for play ... Crying/fussing ... Other (Please specify)

4. During a 24 hour period, approximately how many hours do you think your baby will be awake? ... hours

5. How often do you think your baby will enjoy being cuddled? ... Often ... Sometimes ... Seldom or never

6. Do you believe that babies should be picked up when they cry? ... Always ... Sometimes ... Seldom or never

7. Overall when your baby cries what proportion of the time do you think you will be able to stop his/her crying? ... % of the time

8. Approximately how many times per day do you think your baby will cry? ... Less than 5 times ... Between 5 and 9 times ... Between 10 and 15 times ... More than 15 times

9. How long do you think the single longest crying episode might last each day? ... Less than 2 minutes ... 2 to 5 minutes ... 5 to 10 minutes ...10 to 30 minutes ... Longer than 30 minutes

10. During this single longest episode do you think you should try to stop your baby's crying? ... Always ... Sometimes ... Seldom or never

11. How long do you think an average crying episode lasts? ... Less than 2 minutes ... 2 to 5 minutes ... 5 to 10 minutes ... 10 to 30 minutes ... Longer than 30 minutes

12. At what age do you expect that your baby will regularly sleep through the night? ... Within 2 months ... Between 2 and 3 months ... Between 4 and 6 months ... After 6 months

The following questions concern your baby's behaviour. Please rate these aspects for the <u>past</u> <u>week</u>.

1. Does your baby feed well? ... Yes ... No

2. Does your baby regurgitate (e.g. spit up food) after feeding? ... Often ... Sometimes ... Seldom or never

3. Following a feeding is it easy to burp your baby? ... Often ... Sometimes ... Seldom or never

4. During a 24 hour period approximately how many hours is your baby awake? ... hours

5. During the day, after a feeding, is your baby usually: ... Drowsy or asleep ... Alert and content ... Ready for play ... Crying and/or fussing ... Other (please specify)

6. How would you describe your baby? ... Easygoing ... Average temperament ... Highly strung

7. Does your baby enjoy cuddling? ... Often ... Sometimes ... Seldom or never

8. Do you believe that babies should be picked up when they cry? ... Often ... Sometimes ... Seldom or never

9. Overall, when your baby cries, what proportion of the time are you able to stop his/her crying with your soothing techniques? ... % of the time

10. Approximately how many times per day does your baby cry? ... Less than 5 times ... Between 5 and 9 times ... Between 10 and 15 times ... More than 15 times

11. How long does the single longest crying episode last each day? (Do not count periods when s/he is fussing but never actually cries) ... Less than 2 minutes ... 2 to 5 minutes ... 5 to 10 minutes ... 10 to 30 minutes ... Longer than 30 minutes

12. During this single longest crying episode do you try to stop the baby's crying? ... Often ... Sometimes ... Seldom or never

13. How long does an average crying episode last? ... Less than 2 minutes ... 2 to 5 minutes ... 5 to 10 minutes ... 10 to 30 minutes ... Longer than 30 minutes

14. Has anyone ever said that your baby has colic?

...Yes... No
If yes, who? (Check as many as apply) ... You ... Your
spouse/ partner ... Doctor or nurse ... Relative ... Friend

15. How often does your baby sleep through most of the night?
    ... nights per week

16. On average how many hours per night does s/he sleep? ...
    hours

17. Overall is taking care of your baby: ... Much easier than
    you expected ... Somewhat easier than you expected ... About
    the same as you expected ... Somewhat harder than you
    expected ... Much harder than you expected

Appendix B: Maternity Blues Symptoms

Instructions: I am going to read you a list of adjectives which may describe how you have been feeling over the past week. Please tell me how much the adjective describes your feelings on a scale from 1 to 7 where "1" means "not at all" and "7" means "very descriptive".

Tired
Tense
Argumentative
Restless
Overly sensitive
Distractible
Tearful
Sad
Anxious
Irritable
Moody
Confused
Unable to concentrate
Forgetful
Having difficulty sleeping

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