Arch Womens Ment Health (2003) 6[Suppl.2]: s33–s42
DOI 10.1007/s00737-003-0004-x

Archives of
Women's
Mental Health
Printed in Austria

Special topic

Mood disturbance in the early puerperium: a review

C. Henshaw

Keele University School of Medicine, Harplands Hospital, Stoke on Trent, U.K.

Received February 19, 2003; accepted March 9, 2003
Published online May 9, 2003 © Springer-Verlag 2003

Summary

This paper reviews the range of symptoms, timing and measurement of mood disturbance in the early puerperium. The prevalence and risk factors for postpartum blues and elation are discussed. The most convincing relationships are between blues and dysphoria during pregnancy, a past history of depression, neuroticism and premenstrual depression. Biological research is inconclusive. Blues and elation are predictors of subsequent postpartum depression and appear to be an index of affective vulnerability.

Keywords: Postpartum blues; elation; postpartum depression.

Introduction

Scientific observation and investigation of dysphoric episodes in the early puerperium began in the 1950's. Three reviews concentrating on postpartum blues were written in the 1980's (Stein, 1982; Thirkettle and Knight; Kennerley and Gath, 1986). Blues has been described as a "trivial fleeting disorder" (Pitt, 1973), "brief and benign and therefore not a serious problem in clinical practice" (Kennerley and Gath, 1989a) and to be "without pathological significance" (Lucas, 1994).

This review outlines the wide range of symptomatology now known to occur in the puerperium; the epidemiology and aetiology of early puerperal mood change and considers the relationship between early dysphoria and affective disorders, particularly postpartum depression.

Method

The following databases were searched for English language papers: Medline 1965–2001, Cinahl 1982–2001, Embase 1980–2001 and Psychinfo 1887–2001. Search terms were postpartum blues, postnatal blues and baby blues. Close attention was also paid to studies of postpartum depression, which might include data on blues. Reference lists of all papers obtained were searched for additional sources.

Early descriptions

The first detailed description is credited to Moloney (1952) who described a mild depressive reaction, which involved fatigue, despondency, tearfulness and difficulty thinking clearly which he labelled "third day depression". Robin (1962) interviewed women on the eighth or ninth day after delivery. Two thirds complained of emotional lability and three quarters of "short lasting depression". In the same year, James Hamilton (1962) outlined the "transitory syndrome" by interviewing 10 nurses experienced in the care of new mothers and their infants. They reported a syndrome involved fatigue, crying, anxiety, confusion and headache.

Symptoms

Weeping or tearfulness are common (Moloney, 1952; Hamilton, 1962; Yalom et al., 1968), experienced by 50–80% of new mothers. Yalom emphasised that the women did not necessarily feel depressed at the time of weeping. Stein reported 76% of his mothers experienced an episode of weeping but a minority experienced more severe weeping associated with depression (Stein, 1980). Cox et al. (1982) and Kennerley and Gath (1989a) argued that depression was not part of the blues spectrum.

Emotional lability is prominent (Robin, 1962; Hapgood et al., 1988; Kuevi et al., 1983; Nott et al., 1976). Some women experience both happiness and dysphoria at the same time (Hapgood et al., 1988). Mood changes may take place several times a day.

New mothers often complain of confusion. Pitt (1973) found women who experienced low mood and weeping also reported anxiety and cognitive impairment. Kane et al. (1968) reported anxiety, depression, labile mood and cognitive difficulty (poor attention, distractibility, poor recent memory) in 64% on the third day after delivery. A later study examined 86 women in more detail using the Trail Making Test and the Porteous Maze (Jarrahi-Zadeh et al., 1969). Poor test performance was not correlated with emotional disturbance or reported cognitive difficulty. A prospective study comparing postpartum and nonpostpartum women found few differences in cognitive function. Those that did exist were likely to be influenced by lack of sleep (Swain et al., 1997).

Elation

The term "blues" might lead to the assumption that symptomatology is all related to low mood. However, Robin (1962), Ballinger et al. (1982) and Brinsmead et al. (1985) found that elation was common on the first or second day after birth. Robin's mothers reported themselves as "giggly", "excited" and "laughed at nothing" with "a tendency to garrulousness".

Glover et al. (1994) derived a "Highs Scale" from the criteria for hypomania in the Schedule for Affective Disorders and Schizophrenia – Lifetime version (SADS-L). When given to 258 women on day three postpartum, 10% were found to meet SADS-L criteria for hypomania. Symptoms of elation began on the first day after birth and irritability was common. Using the same cut-off as Glover in 289 women, Lane et al. (1997) found 18.3% scored high on the third postpartum day.

Timing

There is agreement that blues begin in the first few days after delivery and are over by the days seven to ten, although not all studies followed mothers daily or tracked symptoms beyond day five. There are reports of symptoms persisting for longer (e.g. Pitt, 1973) but some of these episodes could potentially be classified as depressive episodes.

The highest symptom scores have been found on day one (Moloney, 1952; Okano and Nomura, 1992), day three (Condon and Watson, 1987; Handley et al., 1977; Pitt, 1973) and day four (George and Wilson, 1981; Handley et al., 1980). Several groups found a day five peak (Kendell et al., 1981; York, 1990; Harris et al., 1994; Rohde et al., 1997). Two studies have found symptom peaks between days four and six (Stein, 1980; Wilkie and Shapiro, 1992). However, a study using Kendell's visual analogue scales (VAS) failed to show a day five peak (Hapgood et al., 1988). Nott et al. (1976) observed the highest scores "within the first 10 days" and Okano et al. (1989) found no peak when measuring symptoms over five days.

Measuring blues

Scales

A variety of instruments have been used to study early mood disturbance. Early investigators devised specific scales for blues (Hamilton, 1962; Yalom, 1968; Pitt, 1973; Stein, 1980; Kendell et al., 1981). These have been used in later studies. Some have used very simple measures such as the number of episodes of crying; others have devised their own measures. Multiple adjective checklists, VAS and rating scales for anxiety and depression have been widely used (e.g. the Edinburgh Postnatal Depression Scale (EPDS), the Beck Depression Inventory and the Speilberger State Anxiety Inventory). These do not always reflect the range of symptoms present in blues and most have not been validated for use in the puerperium. One study used the Present State Examination (George and Wilson, 1981). The only specific scale for the blues that has been systematically developed and validated using psychometric techniques is the Blues Scale (Kennerley and Gath, 1989a).

Timing

Some investigators have rated symptoms on one day only; others have carried out daily assessments over several consecutive days. Many estimations of blues have been retrospective, relying on recall at the end of the first week or even several weeks or months later. Retrospective recall of blues at 12 weeks postpartum is known to be unreliable (Kennerley and Gath, 1989b).

Samples and analysis

Some studies include as few as 20 or 30 women; others have 200 or more participants. Often samples are not representative and have included women whose hospital stay was longer (usually as a result of complications or obstetric interventions), who were on restricted diets, bed rest or suffering from medical conditions e.g. anaemia; all of which may influence mood. Most studies involve multiple analyses but do not make explicit whether corrections have been made to avoid type I errors.

Prevalence

Prevalence estimates for blues range from 15.3% (Murata et al., 1998) to 84% (Oakley and Chamberlain, 1981). Stein (1982) argued that the unimodal distribution of symptoms and consequent lack of clear distinction between what is a case and a non-case contributes to this wide range. The variation in criteria used to establish a case, timing and number of assessments, and sample differences may also contribute.

Most early reported prevalences were around 50% (e.g. Pitt, 1973). If severity is rated the overall prevalence may be 49% with 29% moderately affected and 20% severely affected (Fossey et al., 1997). O'Hara et al. (1991) found a prevalence of 26.4% using Handley criteria and 25.8% when using Kendell's VAS.

In addition to studies in Europe and North America, blues have also been described in widely differing cultures such as Japan (Murata et al., 1998; Okano, 1989), Tanzania (Harris, 1980a), Jamaica (Davidson, 1972), Dubai (Ghubash and Abou-Saleh, 1997) and Brazil (Rohde et al., 1997) suggesting that blues is a cross-cultural phenomenon. The Japanese studies have produced the lowest prevalence rates and it is not clear whether this is a result of cultural differences or whether some cases were missed.

Psychosocial risk factors

Sociodemographic

Several studies have found no relationship between blues and social class (Jarrahi-Zadeh, et al., 1969; Ballinger et al., 1979; Stein, 1980; Newnham et al., 1984). O'Hara et al. (1991) failed to show a relationship between age, educational status and whether receiving private or public healthcare and blues. High scores on the EPDS and the Highs Scale on day three postpartum were associated with failure to obtain school qualifications, single status and being in receipt of public healthcare (Lane et al., 1997).

Davidson (1972) and Ballinger et al. (1979) found no relationship with marital status. One study found an association with reported discontent with the quality of the marital relationship and sympathy from the partner (Ehlert et al., 1990) but marital adjustment measured with validated instruments during pregnancy did not predict blues in a large US study (O'Hara et al., 1991).

Obstetric

Studies have suggested blues was more common in primiparous women (Yalom, 1968; Nott et al., 1976, and in multiparous women (Davidson, 1972; Jarrahi-Zadeh et al., 1969) but the majority find no association with parity (Robin, 1962; Pitt, 1973; Handley et al., 1980; Stein, 1980; Kendell et al., 1981; Condon and Watson, 1987; Bergant et al., 1998; Kennerley and Gath, 1989b; Ehlert et al., 1990; O'Hara et al., 1991). Associations with unplanned pregnancy have been found (Condon and Watson, 1987; Kalyani et al., 2001), the first study also reported an association with having considered terminating the pregnancy. Low birth weight (<2 kg), a more difficult delivery than expected, Caesarean section and bottle feeding were associated with high scores on the EPDS on day five (Hannah et al., 1992b). No relationship between obstetric factors and blues was found by (Davidson, 1972; Stein, 1980; Twining, 1983; McIntosh, 1986; Hapgood et al., 1988; Kennerley and Gath, 1989b; O'Hara et al., 1991; Pop et al., 1995; Murata et al., 1998).

No difference has been found in the incidence of blues between women who delivered in hospital and those who delivered at home (Pop et al., 1995). However blues was assessed retrospectively at four weeks postpartum. It has been suggested that mothers who returned home 48 hours after delivery experience less severe blues (Kendell et al., 1984) but an earlier study by the same group on an unselected series of women found that day of leaving hospital made no difference (Kendell et al., 1981).

Infant feeding and care

Pitt (1973) found an association between blues and difficulty breastfeeding. Mothers scoring high on the

Highs Scale on day three were more likely to be bottle-feeding (Lane et al., 1997) but no association with feeding was found by others (Ballinger et al., 1979; Hapgood et al., 1988; Kendell et al., 1981; Kennerley and Gath, 1989b; Stein, 1980). One study found blues was associated with not having previous experience of caring for infants (McIntosh, 1986).

Anxiety, expectations and mood during pregnancy

Anxiety during pregnancy (Davidson, 1972; Kennerley and Gath, 1989b), a subjective feeling that pregnancy was emotionally stressful (Condon and Watson, 1987), non-specific mood changes (Stein, 1980), anxiety, depression and hysteria in the eighth month of pregnancy (Harris, 1980b), and tearfulness (Gard et al., 1986) have all been associated with blues as has fear of labour (Yalom, 1968; Kennerley and Gath, 1989b). One study found pessimistic or negative expectations about the delivery occurring in late pregnancy (Condon and Watson, 1987) to be associated with blues and another correlated blues positively with subjective "childbirth burden" (Bergant et al., 1998). Mothers' subjective experience of pregnancy or delivery in relation to their expectations do not appear to be predictive (McIntosh, 1986; Knight and Thirkettle, 1987).

Personality and early life experience

Blues appears to be associated with neuroticism (Twining, 1983; Kendell et al., 1984; Kennerley and Gath, 1989b; Henshaw, 2000). However both Pitt (1973) and Nott et al. (1976) found no relationship. There are two reports of trait anxiety being associated with blues (Ehlert et al., 1990; Bergant et al., 1998).

A Japanese study found that women with blues scored lower on the Parental Bonding Instrument indicating less maternal care during their own childhoods (Murata et al., 1998).

Life events, stressors and social support

Pitt's mothers with blues were no more likely than those without to have "housing or money worries" (Pitt, 1973). O'Hara et al. (1991) found that women who scored higher on blues measured by VAS were more likely to have experienced negative life-events during pregnancy than those who did not. Women who scored high on Handley Blues criteria reported more childcare stressors. However, no association between blues and negative life events during pregnancy has also been demonstrated (Kennerley and Gath, 1989b).

Murata et al. (1998) interviewed mothers about their supports. Those with blues reported fewer people in the household to support them in the first week after birth, and less support from mothers, husbands, other relatives and friends. However, a New Zealand study found variables relating to help from the woman's mother after birth did not predict blues (Hapgood et al., 1988) but there was a weak association with an ambivalent relationship with mother.

Previous mood disorder

There are reports of an association with past history of psychiatric disorder and family history of psychiatric disorder (Hapgood et al., 1988) but the type of illness was not specified. Women with the most severe bouts of crying were more likely to report a past postnatal depression (Yalom, 1968). Stein reported that the most severe symptoms in the first postpartum week occurred in women with a history of "neurotic depression" or a previous postnatal depressive episode (Stein, 1980).

O'Hara et al. (1991) found that women with blues were more likely to report depressive symptoms during pregnancy but no more likely to meet criteria for RDC major or minor depression when interviewed in the second trimester. They were more likely to have a history of depression before pregnancy and to have experienced a postnatal depressive episode. Those meeting VAS criteria for blues were more likely to have a depressed first degree relative. Henshaw (2000) identified a past history of RDC depression (including pregnancy episodes) as an independent predictor of blues. However, one study found no relationship between blues and past psychiatric history (Kennerley and Gath, 1989b).

There are reported associations between blues and a history of premenstrual tension or depression (Ballinger et al., 1979; Hapgood et al., 1988; Nott et al., 1976) and of no relationship (Okano, 1989; Okano and Nomura, 1992). More specifically moderate or severe premenstrual depression is associated with blues in one study (Kennerley and Gath, 1989b) and the severity of premenstrual depression predicted blues in another (Condon and Watson, 1987). Retrospective reporting of

premenstrual symptoms is unreliable but the most reliable means is using the Premenstrual Assessment Form. A history of premenstrual depression assessed by this instrument in early pregnancy was associated with blues (O'Hara et al., 1991).

Biological risk factors

Glucocorticoid hormones

Several studies report an association between cortisol levels and mood in the early puerperium. Handley et al. (1977) found plasma cortisol to be correlated with positive mood change between days two and five but in a later study after controlling for seasonal variation, plasma cortisol was only found to be higher in blues cases at 38 weeks gestation (Handley et al., 1980). Ballinger et al. (1982) found that 24-hour urinary excretion of 11-hydroxy cortisol steroids was higher in women who experienced positive mood change in the early puerperium. Higher salivary morning cortisol levels over the first five days after delivery have been found in women who experienced blues compared with those who did not on the days they experienced symptoms. No differences were found with respect to afternoon or evening levels (Ehlert et al., 1990). Okano (1989) and Okano and Nomura (1992) found morning serum levels of bound cortisol to be higher in blues women. The second study was replicated and extended by Taylor et al. (1994) who found scores on the Blues Scale on day three associated with high serum cortisol levels and scores on the Highs Scale associated with low serum cortisol. There was no relationship between EPDS scores and cortisol.

A study examining corticotrophin–releasing hormone (CRH) suppression found that the women with blues and one who experienced depression had a persistent and more severe blunting of ACTH response to ovine (o) CRH at three, six and 12 weeks after delivery when compared to women who remained euthymic but no differences in cortisol responses (Magiakou et al., 1996).

However, others have found no links between cortisol and early mood disturbance (Kuevi et al., 1983; Feksi et al., 1984; Brinsmead et al., 1985; Bonnin et al., 1992; Harris et al., 1994; Nappi et al., 2001). One study failing to find a link between cortisol and EPDS scores had sampled women on day seven when blues symptoms would be over or declining (Abou-Saleh et al., 1999). O'Hara et al. (1991) found no differences between women who had blues and those who did not with respect to serum cortisol on days one to six and eight, urinary free cortisol on days two and four or response to dexamethasone suppression on day four. A study the following year found no relationship between pre- and post-dexamethasone cortisol and symptoms of anxiety and depression in the early puerperium (Maes, 1992).

Reproductive hormones

The rapid fall in gonadal steroid hormones after delivery make it tempting to assume they have a causal relationship with mental changes occurring postpartum and a number of investigators have pursued this line of inquiry. Nott et al. (1976) reported that women whose blues symptoms peaked at some point during the first week had lower pre-delivery levels of oestrogen than those whose symptoms did not peak. Oestrogen levels before birth were higher in those rating themselves as irritable and lower in women experiencing more sleep disturbance. There was a greater drop in progesterone levels in women who rated themselves as depressed but lability of mood did not correlate with any hormonal factor. Others found no association between mood and plasma concentrations of FSH, oestrone, oestradiol or progesterone (Kuevi et al., 1983). Women with blues were found to have higher platelet α_2 adrenoceptor binding capacity at 10 days postpartum (Metz et al., 1983). Best et al. (1988) replicated this finding with a larger sample and showed binding capacity was higher in women with blues at 10 and 20 days postpartum but the difference was not evident at three or six months. The authors proposed that these findings might be the basis of an association between psychological symptoms and the post-delivery fall in gonadal steroids.

Women showing most mood disturbance (elation) on day three were found to have the highest levels of urinary cyclic AMP (cAMP) (Ballinger et al., 1979). This group also demonstrated that those exhibiting most mood change (in a positive direction) showed a great fall in whole blood cAMP during pregnancy, higher whole blood cAMP on day three, and a greater fall in levels from day three to day ten. They had a greater rise in plasma cAMP and urinary excretion of cAMP from day one to three. Whole blood adenosine triphosphate was lower on day three

but there were no differences in progesterone levels (Ballinger et al., 1982).

Feksi et al. (1984) found concentrations of salivary progesterone and oestradiol to be higher in those experiencing severe blues symptoms but only five cases and controls were studied. In a study of 182 women, those who met Handley Blues criteria were no different when compared with those who did not with respect to oestradiol or progesterone levels and ratios of these hormones with prolactin but had higher free oestriol levels at 38 weeks gestation, higher total oestriol at 34 weeks and 36 weeks gestation, days two and three postpartum. They also had a significant drop in the mean free oestriol concentrations from pregnancy levels to day one after delivery (O'Hara et al., 1991).

Harris et al. (1994) found women with blues to have significantly higher salivary progesterone levels the day before delivery, a higher rate of rise of progesterone antenatally, decreasing concentrations from the day of delivery to the day of peak blues score and lower concentrations on the day of peak blues score than women who did not have blues but others have found no differences in serum concentrations of oestradiol and progesterone between those with and without blues (Heidrich et al., 1994).

Allopregnanolone is a neurosteroid and has similar effects on GABA-A receptors to progesterone and its metabolites. Levels rise during pregnancy in parallel with progesterone. Lower levels have been observed on day three than have been recorded in other healthy postnatal populations, those who had blues had lower levels than those who did not and no there was no correlation between allopregnanolone concentrations and progesterone levels which had been observed in euthymic mothers. Oestradiol and progesterone levels were not significantly different between the two groups (Nappi et al., 2001).

Three studies have found no relationship between blues and prolactin (Kuevi et al., 1983; O'Hara et al., 1991; Nappi et al., 2001). One has shown testosterone levels to be associated with symptoms of depression on the first two days postpartum and anger on day three (Hohlagschwandtner et al., 2001).

Tryptophan

Free plasma tryptophan levels have been shown to be positively correlated with degree of affective disturbance in the early puerperium (Stein et al., 1976; Handley et al., 1977). In the first study the one woman with elation had lower levels. Others have found reduced levels of free plasma tryptophan in women with blues (Handley et al., 1980; Gard et al., 1986). The first of these controlled for seasonal variation of tryptophan.

Maes et al. (1992) also demonstrated lower levels of tryptophan in the puerperium and found the tryptophan/competing amino acid ratio (CAA) negatively correlated with depression and anxiety symptoms. Lower tryptophan, neopterins and biopterins have been demonstrated in postpartum women compared with non-postpartum controls; those scoring high on the EPDS on day seven had a lower neopterin : biopterin ratio and lower folate levels (Abou-Saleh et al., 1999). A recent study found the lowered availability of plasma tryptophan postpartum was not associated with anxiety or depression symptoms or the tryptophan/CAA ratio on days one to three postpartum (Maes et al., 2001).

Platelet monoamine oxidase (MAO) activity was correlated with depression, obsessionalism and loss of concentration in puerperal women (George and Wilson, 1981). Subsequent work found platelet ^{14}C-5HT uptake to be reduced in women with high day five EPDS scores. No differences were observed in the maximal rate of uptake, imipramine-binding capacity or in platelet MAO activity (Hannah et al., 1992a).

The single study examining the relationship between hypofolatemia and postpartum blues found no association between serum or erythrocyte folate levels on the third day and blues (Rouillon et al., 1992).

Thyroid hormones

Free T_3 has been demonstrated to be lower in blues women on day five than at 37 weeks gestation and one month after birth; and lower than levels in controls. Blues mothers had higher levels of reverse T_3 and TSH than controls (Ijuin et al., 1998). Okano (1989) found no differences between women with and without blues with respect to T_3, T_4 and TSH.

Endorphins

Newnham et al. (1984) found a negative correlation between blues and β-endorphin levels at 36 weeks gestation and no relationship between blues and

levels at labour, 24 h later or the rate of fall from labour to the puerperium. A large study correlating β-endorphin levels in postpartum uterine blood with variables from case records and interview at eight months postpartum, found a negative correlation with reported blues and/or psychiatric consultation (Kimball et al., 1984). A year later cognitive performance on days two to four was shown to be associated with the fall in β-endorphin levels from labour to day four (Brinsmead et al., 1985). A more recent study found raised serum prolyl endopeptidase activity in women with anxiety symptoms on days one and three after delivery (Maes et al., 2000a). This enzyme is thought to play a role in stress and psychiatric disorders.

Immune factors

Maes et al. investigated the relationship between inflammatory response system (IRS) markers and early postpartum mood. Anxiety symptoms on the first and third postpartum days were associated with lower levels of leukaemia inhibitory factor receptor, suggesting a reduced anti-inflammatory capacity, whereas depressive symptoms were associated with higher serum interleukin-6 receptor (IL-6R) levels. Proinflammatory cytokines such as IL-6R, if administered to humans, can induce symptoms very similar to those occurring in depression (Maes et al., 2000b).

Clara Cell protein (CC16) is a natural immunosuppressor and anti-inflammatory protein, which is thought to have a role in IRS activation in mental disorders. Serum concentrations have been found to be lower in women who experienced a DSM IV postpartum major or minor depression, but not related to symptoms of anxiety or depression in the early puerperium (Maes et al., 1999).

Sleep deprivation

Women whose sleep is disrupted in late pregnancy or who labour at night are more likely to experience blues (Wilkie and Shapiro, 1992). This study has not been replicated but Henshaw (2000) found a non-significant trend towards those who laboured at night having severe blues. Postpartum women wake more frequently than non-postpartum women and spend more time awake but compensate by waking later in the morning and taking daytime naps so their overall amount of sleep is no different (Swain et al., 1997). These differences are most marked during the first postpartum week and may contribute to the development of blues.

Others

Postpartum weight changes and electrolyte disturbances appear no different in women with blues compared with those without but women with a clear abrupt onset of mood change showed a simultaneous rapid weight loss and increased excretion of sodium (Stein et al., 1981). Kuevi et al. (1983) demonstrated that women who only had a single day of blues symptoms had lower levels of noradrenaline and adrenaline on that day compare with the preceding or following days.

Are blues specific to childbirth?

It has been argued that blues are not specific to childbirth but may occur after emotional trauma (Yalom, 1968) or surgery (Levy, 1987). The latter study claimed that "the dysphoria called the maternity blues is not unique to the puerperium" but still found a different pattern of symptoms in postpartum and post-operative women. The number of postpartum women experiencing symptoms peaked on days three and four after delivery while the number of postoperative women showing symptoms declined steadily throughout the first week after surgery. Similar findings emerged when postpartum women were compared with those who had had gynaecological surgery. The surgical group's symptoms declined steadily from day two to day ten while the newly delivered women's score peaked on day five (Iles, 1989).

When new mothers' symptoms were compared with those of their partners using the EPDS and the Highs Scale, mood disturbance in partners was less common and more likely to be elation than depression (Lane et al., 1997).

Blues and subsequent affective disorder

Postpartum depression

Several studies have demonstrated a link between retrospective recall of blues symptoms and depression later in the postpartum period (Pitt, 1968; Paykel et al., 1980; Buesching et al., 1986; Whiffen, 1988; Sharp, 1993).

Prospective studies have also demonstrated a relationship: (Handley et al., 1977; Stein, 1980; Kendell et al., 1981; Playfair and Gowers, 1981; Cox et al., 1982; Hapgood et al., 1988; Harris et al., 1989; O'Hara et al., 1991; Beck et al., 1992; Hannah et al., 1992b; Rouillon et al., 1992; Levy and Kline, 1994; Fossey et al., 1997; Lane et al., 1997) but several diagnosed depression on the basis of scores on a self-report scale (Stein, 1980; Buesching et al., 1986; Beck et al., 1992; Hannah et al., 1992b; Rouillon et al., 1992; Levy and Kline, 1994; Lane et al., 1997; Yamashita et al., 2000).

Three studies have demonstrated no relationship between blues and postpartum depression (Oakley, 1980; Paykel et al., 1980; Kennerley and Gath, 1989b).

One study, which followed 103 women with severe blues and their controls with no blues for six months found severe blues to be an independent predictor of RDC major and minor depression. Depressive episodes in the severe blues group onset earlier in the puerperium, lasted longer and were more likely to be major then minor depression. The relationship was maintained even when those women whose depressions were continuations of blues were excluded from the analysis (Henshaw, 2000).

Women who are elated in the early puerperium are also more likely to become depressed later (Hannah et al., 1993; Glover et al., 1994).

Affective disorder in later life

Recall of blues distinguished those experiencing consistent depressed mood related to menopausal changes and those recovering in 347 women taking part in the Seattle Midlife Women's Health Study (Woods and Mitchell, 1996).

Interventions

Hamilton (1982) recalled anecdotal evidence that suppression of lactation by oestrogen eliminated blues symptoms. Harris (1980b) administered 3 g of L-tryptophan or placebo in a double blind randomised controlled trial to 55 women but failed to reduce symptoms of blues. A Swiss group treating postpartum anaemia with recombinant human erythropoetin or placebo in the first five days after birth also had no impact on blues (Meyer et al., 1995).

Conclusions

The most convincing relationships with early mood disturbance are dysphoria during pregnancy, a past history of depression, neuroticism, premenstrual depression and depression later in the postpartum period suggesting it is a marker of affective vulnerability. Biological correlates are inconclusive. Caution is advised in interpreting the results of studies with small numbers, use instruments that do not reflect the full range of symptomatology, sample on only one occasion or use retrospective assessments. Future investigators should seek to address these methodological problems.

References

Abou-Saleh MT, Ghubash R, Karim L, Krymski M, Anderson DN (1999) The role of pterins and related factors in the biology of early postpartum depression. Eur Neuropsychopharmacol 9: 295–300.

Ballinger CB, Buckley DE, Naylor GJ, Stansfield DA (1979) Emotional disturbance following childbirth: clinical findings and urinary excretion of cyclic AMP (adenosine 3′5′ cyclic monophosphate. Psychol Med 9: 293–300.

Ballinger CB, Kay DS, Naylor GJ, Smith AHW (1982) Some biochemical findings during pregnancy and after delivery in relation to mood change. Psychol Med 12: 549–556.

Beck CT, Reynolds M, Rutowski P (1992) Maternity blues and postpartum depression. J Obstet Gynecol Neonatal Nursing 21: 287–293.

Bergant AM, Heim K, Ulmer H, Illmensee K (1998) Early postnatal depressive mood: associations with obstetric and psychosocial factors. J Psychosom Res 46: 391–394.

Best N, Wiley M, Stump K, Elliott JM, Cowen PJ (1988) Binding of tritiated yohimbine to platelets in women with maternity blues. Psychol Med 18: 837–842.

Bonnin F (1992) Cortisol levels in saliva and mood changes in early puerperium. J Affect Disord 26: 231–240.

Brinsmead M, Smith R, Singh B, Lewin T, Owens P (1985) Peripartum concentrations of beta-endorphin and cortisol and maternal mood states. Aust NZ J Psychiatry 25: 194–197.

Buesching DP, Glasser ML, Frate DA (1986) Progression of depression in the prenatal and postpartum periods. Women Health 11: 61–78.

Condon J, Watson T (1987) The maternity blues: exploration of a psychological hypothesis. Acta Psychiatr Scand 76: 164–171.

Cox J, Connor Y, Kendell RE (1982) Prospective study of the psychiatric disorders of childbirth. Br J Psychiatry 140: 111–117.

Davidson J (1972) Post-partum mood change in Jamaican women: a description and discussion on its significance. Br J Psychiatry 121: 659–663.

Ehlert U, Patalla U, Kirschbaum C, Piedmont E, Hellhammer DH (1990) Postpartum blues: salivary cortisol and psychological factors. J Psychosom Res 34: 319–325.

Feksi A, Harris B, Walker RF, Riad-Fahmy D, Newcombe RG (1984) "Maternity blues" and hormone levels in saliva. J Affect Disord 6: 351–355.

Fossey L, Papiernik E, Bydlowski M (1997) Postpartum blues: a clinical syndrome and predictor of postnatal depression. J Psychosom Obstet Gynecol 18: 17–21.

Gard P, Handley S, Parsons A, Waldron G (1986) A multivariate investigation of postpartum mood disturbance. Br J Psychiatry 148: 567–575.

George A, Wilson K (1981) Monoamine oxidase activity and the puerperal blues syndrome. J Psychosom Res 25: 409–413.

Ghubash R, Abou-Saleh, MT (1997) Postpartum psychiatric illness in Arab culture: prevalence and psychosocial correlates Br J Psychiatry 171: 65–68.

Glover V, Liddle P, Taylor A, Adams D, Sandler M (1994) Mild hypomania (the highs) can be a feature of the first postpartum week: association with later depression. Br J Psychiatry 164: 517–521.

Hamilton J (1962) The transitory syndrome. In: Postpartum psychiatric problems. CV Mosby, St Louis, pp 107–111.

Hamilton J (1982) The identity of postpartum psychosis. In: Brockington I, Kumar R (eds) Motherhood and mental illness. Academic Press, London, pp 1–17.

Handley SL, Dunn TL, Baker JM, Cockshott C, Gould S (1977) Mood changes in puerperium, and plasma tryptophan and cortisol concentrations. Br Med J 2: 18–20.

Handley S, Dunn T, Waldron G, Baker JM (1980) Tryptophan, cortisol and puerperal mood. Br J Psychiatry 136: 498–508.

Hannah P, Adams D, Glover V, Sandler M (1992a) Abnormal platelet 5-hydroxytryptamine uptake and imipramine binding in postnatal dysphoria. J Psychiatry Res 26: 69–75.

Hannah P, Adams D, Lee A, Glover V, Sandler M (1992b) Links between early post-partum mood and post-natal depression. Br J Psychiatry 160: 777–780.

Hannah P, Cody D, Glover V, Adams D, Kumar R, Sandler M (1993) The tyramine test is not a marker form postnatal depression: early postpartum euphoria may be. J Psychosom Obstet Gynecol 14: 295–304.

Hapgood CC, Elkind GS, Wright JW (1988) Maternity blues: phenomena and relationship to later post partum depression. Aust NZ J Psychiatry 22: 299–306.

Harris B (1980a) Maternity blues. Br J Psychiatry 136: 520–521.

Harris B (1980b) Prospective trial of L-tryptophan in maternity blues. Br J Psychiatry 137: 233–235.

Harris B, Johns S, Fung H, Thomas R, Walker R, Read G, Riad-Fahmy D (1989) The hormonal environment of post-natal depression. Br J Psychiatry 154: 660–667.

Harris B, Lovett L, Newcombe R, Walker R, Riad-Fahmy D (1994) Maternity blues and major endocrine changes: Cardiff puerperal mood and hormone study II. Br Med J 308: 949–953.

Heidrich A, Schleyer M, Spingler H, Albert P, Knoche M, Fritze J, Lanczik M (1994) Postpartum blues: relationship between not-protein bound steroid hormones in plasma and postpartum mood changes. J Affect Disord 30: 93–98.

Henshaw CA (2000) A longitudinal study of postnatal dysphoria. Unpublished MD, University of Aberdeen.

Hohlagschwander M, Husslein P, Klier C, Ulm B (2001) Correlation between serum testosterone levels and peripartal mood states. Acta Obstet Gynecol Scand 80: 326–330.

Ijuin T, Douchi T, Yamamoto S, Ijuin Y, Nagata Y (1998) The relationship between maternity blues and thyroid dysfunction. J Obstet Gynaecol Res 24: 49–55.

Iles SG, Gath D, Kennerley H (1989) Maternity Blues II: a comparison between post-operative women and post-natal women. Br J Psychiatry 155: 363–366.

Jarrahi-Zadeh A, Kane FK Jr, Van de Castle RV, Lachenbruch PA, Ewing JA (1969) Emotional and cognitive changes in pregnancy and the early puerperium. Br J Psychiatry 115: 797–805.

Kendell R, Maguire R, Connor Y, Cox JL (1981) Mood changes in the first three weeks after childbirth. J Affect Disord 3: 317–326.

Kendell RE, Mackenzie W, West C, Cox JL (1984) Day-to-day mood changes after childbirth: further data. Br J Psychiatry 145: 620–625.

Kennerley H, Gath D (1989a) Maternity blues I: detection and measurement by questionnaire. Br J Psychiatry 155: 356–362.

Kennerley H, Gath D (1989b) Maternity blues III: associations with obstetric, psychological and psychiatric factors. Br J Psychiatry 155: 367–373.

Kimball CH, Chang CM, Chapman MB (1984) Endogenous opioid peptides in intrapartum uterine blood. Am J Obstet Gynecol 149: 79–82.

Knight RG, Thirkettle J (1987) The relationship between expectations of pregnancy and birth, and transient depression in the immediate post-partum period. J Psychosom Res 31: 351–357.

Kuevi V, Causon R, Dixson A, Everard DM, Hall JM, Hole D, Whitehead SA, Wilson CA, Wise JCM (1983) Plasma amine and hormone changes in "postpartum blues". Clin Endocrinol 19: 39–46.

Lane A, Kelville R, Morriss M, Kinsella A, Turner M, Barry S (1997) Postnatal depression and elation among mothers and their partners: prevalence and predictors. Br J Psychiatry 171: 550–555.

Levy V (1987) The maternity blues in post-partum and post-operative women. Br J Psychiatry 151: 368–372.

Levy V, Kline P (1994) Perinatal depression: a factor analysis. Br J Midwifery 2: 154–159.

Lucas R (1994) Puerperal Psychosis: vulnerability and aftermath. Psychoanalytic Psychotherapy 8: 257–272.

Maes M, Claes M, Schotte C, Delbeke L, Jaquemyn Y, Verkerk R, De Meester I Scharpe S (1992) Disturbances in dexamethasone suppression test and lower availability of L-tryptophan and tyrosine in early puerperium and in women under contraceptive therapy. J Psychosom Res 36: 191–197.

Maes M, Ombelet W, Libbrecht I, Stevens K, Kenis G, de Jongh R, Lin AH, Cox J, Bosmans E (1999) Effects of pregnancy and delivery on serum concentrations of Clara Cell protein (CC16), an endogenous anticytokine: lower serum CC16 is related to postpartum depression. Psychatry Res 87: 117–127.

Maes M, Libbrecht I, Lin A, Goossens F, Ombelet W, Stevens K, Bosmans E, Altamura C, Cox J, de Jongh R, Scharpe S (2000a) Effects of pregnancy and delivery on serum prolyl endopeptidase (PEP) activity: alterations in serum PEP are related to increased anxiety in the early puerperium and to postpartum depression. J Affect Disord 57: 125–137.

Maes M, Lin AH, Ombelet W, Stevens K, Kenis G, De Jongh R, Cox J, Bosmans E (2000b) Immune activation in the early puerperium is related to postpartum anxiety and depressive symptoms. Psychoneuroendocrinol 25: 121–137.

Maes M, Ombelet W, Verkerk R, Bosmans E, Scharpé S (2001) Effects of pregnancy and delivery on the availability of plasma tryptophan to the brain: relationships to delivery-induced immune activation and early post-partum anxiety and depression. Psychol Med 31: 847–858.

Magiakou MA, Mastorakos G, Rabin D, Dubbert B, Gold PW, Chrousos GP (1996) Hypothalamic corticotropin-releasing hormone suppression during the postpartum period: implications for the increase in psychiatric manifestations at this time. J Clin Endocrinol Metab 81: 1912–1917.

McIntosh J (1986) Postnatal blues: a biopsychosocial phenomenon. Midwifery 2: 187–192.

Metz A, Cowen P, Gelder MG, Stump S, Elliott JM, Grahame-Smith DG (1983) Changes in α_2-adrenoceptor binding postpartum: possible relationship to maternity blues. Lancet 1: 495–498.

Meyer JW, Eichorn K-H, Vetter K, Christen S, Scleusner E, Klos A, Huch A, Huch R (1995) Does recombinant human erythropoetin not only treat anemia but reduce postpartum (emotional) distress as well? J Perinat Med 23: 99–109.

Moloney J (1952) Post partum depression or third day depression following childbirth. New Orleans Child Parent Digest 6: 20–32.

Murata A, Nadaoka T, Morioka Y, Oiji A, Saito H (1998) Prevalence and background factors of maternity blues. Gynecol Obstet Invest 46: 99–104.

Nappi RE, Petraglia F, Luisi S, Polatti F, Farina C, Genazzani AR (2001) Serum allopregnanolone in women with postpartum "blues". Obstet Gynecol 97: 77–80.

Newnham J, Dennett PM, Aron S, Tomlin S, Legg C, Bourne GL, Rees LH (1984) A study of the relationship between circulating β endorphin-like immunoreactivity and postpartum "blues". Clin Endocrinol 20: 169–177.

Nott P, Franklin M, Armitage C, Gelder M (1976) Hormonal changes and mood in the puerperium. Br J Psychiatry 128: 379–383.

Oakley A (1980) Women confined: towards a sociology of childbirth. Martin Robertson, Oxford.

O'Hara MW, Schlechte JA, Lewis DA, Wright EJ (1991) Prospective study of postpartum blues. Biologic and psychosocial factors. Arch Gen Psychiatry 48: 801–806.

Okano T (1989) Clinicoendocrine study of maternity blues. Mie Med J 39: 189–200.

Okano T, Nomura J (1992) Endocrine study of the maternity blues. Prog Neuro-Psychopharmacol Biol Psychiatry 16: 921–932.

Paykel E, Emms E, Fletcher J, Rassaby ES (1980) Life events and social support in puerperal depression. Br J Psychiatry 136: 339–346.

Pitt B (1968) "Atypical" depression following childbirth. Br J Psychiatry 114: 1325–1335.

Pitt B (1973) Maternity blues. Br J Psychiatry 122: 431–433.

Playfair H, Gowers J (1981) Depression following childbirth – a search for predictive signs. J Roy Coll Gen Pract 31: 201–206.

Pop V, Wijnen H, van Montfort M, Essed GG, de Geus CA, van Son MM, Komproe IH (1995) Blues and depression during early puerperium: home versus hospital. Br J Obstet Gynaecol 102: 701–706.

Robin AA (1962) The psychological changes of normal parturition. Psychiatric Quart 36: 129–150.

Rohde L, Busnello E, Wolf A, Zomer A, Shansis F, Martins S, Tramontina S (1997) Maternity blues in Brazilian women. Acta Psychiatr Scand 95: 231–235.

Rouillon F, Thalassinos M, Miller H, Lemperiere (1992) Folates and postpartum depression. J Affect Disord 25: 235–242.

Sharp D (1993) Childbirth-related emotional disorders: a longitudinal prospective study in primary care. Unpublished PhD, University of London.

Stein G (1982) The maternity blues. In: Brockington I, Kumar R, (eds) Motherhood and mental illness. Academic Press, London, pp. 119–154.

Stein GS (1980) The pattern of mental change and body weight change in the first post-partum week. J Psychosom Res 24: 164–171.

Stein G, Marsh A, Morton J (1981) Mental symptoms, weight changes, and electrolyte excretion in the first postpartum week. J Psychosom Res 25: 395–408.

Stein G, Milton F, Bebbington P, Wood K, Coppen A (1976) Relationship between mood disturbances and free and total plasma tryptophan in postpartum women. Br Med J 2: 457.

Swain A, O'Hara M, Starr KR, Gorman L (1997) A prospective study of sleep, mood, and cognitive function in postpartum and nonpostpartum women. Obstet Gynecol 90: 381–386.

Taylor A, Littlewood J, Adams D, Dore C, Glover V (1994) Serum cortisol levels are related to moods of elation and dysphoria in new mothers. Psychiatry Res 54: 241–247.

Whiffen V (1988) Vulnerability to postpartum depression: a prospective multivariate analysis. J Ab Psychol 97: 467–474.

Wilkie G, Shapiro C (1992) Sleep deprivation and the postnatal blues. J Psychosom Res 36: 309–316.

Woods NF, Mitchell ES (1996) Patterns of depressed mood in midlife women: observations from the Seattle Midlife Women's Health Study. Res Nurs Health 19: 111–123.

Yalom IL, Lunde DT, Moos RH, Hamburg DA (1968) Postpartum blues syndrome. Arch Gen Psychiatry 18: 16–27.

Yamashita H, Yoshida K, Nakano H, Tashiro N (2000) Postnatal depression in Japanese women: detecting the early onset of postnatal depression by closely monitoring the postpartum mood. J Affect Disord 58: 145–154.

York R (1990) Pattern of postpartum blues. J Reprod Infant Psychol 8: 67–73.

Correspondence: Carol Henshaw, Keele University School of Medicine, Academic Unit, Harplands Hospital, Hilton Road, Stoke on Trent ST4 6TH, U.K., e-mail: chenshaw@bankhouse.u-net.com