

Postpartum psychosis: two cohorts compared, 1875–1924 and 1994–2005

S. TSCHINKEL, M. HARRIS, J. LE NOURY AND D. HEALY*

North Wales Department of Psychological Medicine, Hergest Unit, Bangor, UK

ABSTRACT

Background. There has been a long-standing debate as to whether postpartum psychoses are distinct from other psychoses. While the outcomes of postpartum psychosis are in general thought to be good, the disorder is linked to a high rate of suicide.

Method. We have utilized a database of 3872 admissions to the North Wales Asylum during the period 1875–1924 to extract data on the prevalence, course and clinical features of postpartum psychoses during this period. We have collected first admissions for postpartum psychosis between 1994 and 2005 in North West Wales to establish a current incidence rate for the disorder.

Results. The incidence of psychoses with a first onset in the postpartum period in North West Wales has fallen in the modern period, while the incidence of postpartum psychoses in women with a pre-existing mental illness remains the same. Some features of the clinical picture and course of postpartum psychoses differ from other psychoses, but may be gender rather than disorder linked.

Conclusions. These findings suggest that psychoses with their first onset in the postpartum period may be vanishing. If replicated, this would support claims that these disorders are distinct from other disorders. Alternately, if regarded as affective disorders, establishing the basis for the apparent decline in frequency of these disorders may have implications for other affective disorders.

INTRODUCTION

Postpartum psychosis emerged as an entity distinct from puerperal fever in the nineteenth century (Brockington, 1996; Marland, 2004). With the opening of the asylums, postpartum psychoses were referred there, diagnosed in the first instance as puerperal mania. Before the delineation of manic-depressive illness and schizophrenia by Kraepelin in 1899, there was a debate as to whether puerperal mania was a distinct illness or a typical insanity that happened during the puerperium (Brockington, 1996).

In favour of the postpartum psychoses being distinct is their unique time of onset. These

psychoses often follow a distinctive course, with recovery traditionally thought to be rapid and complete. The clinical picture differs somewhat from other disorders, being dominated by confusion, perplexity and changes in motility, such as overactivity and stupor. Kraepelin (1899) gave perhaps the best descriptions of these distinctive clinical features, under the heading of amentia, a condition he linked to states of exhaustion or depletion.

However, having provided distinctive descriptions of the syndrome, Kraepelin concluded that almost all postpartum psychoses were manifestations of manic-depressive illness or schizophrenia. The notion that postpartum psychosis does not represent a specific nosological entity but rather ordinary functional psychoses triggered puerperally has become the standard position (Gentile, 2005). It is argued that most of these cases are affective disorders,

* Address for correspondence: David Healy, M.D., North Wales Department of Psychological Medicine, Hergest Unit, Bangor LL57 2PW, UK.

(Email: Healy_Hergest@compuserve.com)

primarily bipolar affective disorder (Chaudron & Pies, 2003; Robertson *et al.* 2005; Taylor & Fink, 2006).

An alternate view of postpartum psychoses, based on their distinctive clinical features, classifies many cases as cycloid psychoses and indeed uses the occurrence of such cases as an argument in favour of the existence of cycloid psychoses (Perris, 1988; Pfuhlmann *et al.* 1998; Leonhard, 1999).

Recent interest in the disorder has centred on the fact that suicide is now the leading cause of maternal mortality (NCE, 1999). From the start, postpartum psychosis was linked to suicide of a mother (Marland, 2004) and infanticide (Rose, 1986; Spinelli, 2004). Against this background, a report that rates of 'puerperal insanity' had tripled in Edinburgh when data from the 1880s and 1970s were compared raises concerns (Rehman *et al.* 1990).

We have a complete set of admission records to the North Wales Asylum from North West Wales from 1875 to 1924 and have therefore been able to compare the rates of postpartum psychoses in North West Wales now and then, with a view to determining whether there are distinctive features to this illness and whether rates of admission for the disorder have changed.

METHOD

To address these questions we have used historical and contemporary datasets.

The North West Wales historical database

The first dataset consists of all admissions from North West Wales to the North Wales Asylum at Denbigh between 1875 and 1924. These records offer an opportunity to shed light on comparative admission incidence rates for mental illness as the population of North West Wales has remained essentially constant. In 1891 there were 116 924 people between 15 and 55, while in 1991 there were 119 323 (Southall *et al.* 2004). The region has remained undeveloped, so that patterns of service utilization can be more readily compared over time than elsewhere. In addition, geographical and financial constraints minimize the clinical and economic selection biases that appear to have affected other pre-community care mental illness service

utilization studies. There was nowhere else for nineteenth-century patients to go other than the asylum at Denbigh, and no private facilities or alternate public facilities for patients in the 1990s other than the District General Hospital (DGU) unit in Bangor.

The procedures underpinning diagnosis in the asylum sample have been outlined elsewhere (Healy *et al.* 2001). All diagnoses were made according to ICD-10 criteria and had been made before this study was undertaken. The historical records offered five sets of information relevant to diagnosis. First, all patients were compulsorily detained and their medical and legal certificates outlined the circumstances of detention. Second, the records contain standard demographic data including age, sex, educational, employment and marital status, a family history of mental illness and prior mental or physical illness. Third, there were standard assessments of dangerousness, suicidality, seizure-proneness, along with food refusal and a range of other clinical features. Fourth, there was a description of the patients' mental and physical state on admission. Fifth, there was a set of case-notes covering the patient's stay in hospital until discharge or death. We could retrieve the records of prior admissions back to 1865 or subsequent admissions through to 1965. Clinicians making a diagnosis did so on the basis of a full set of records from all admissions for that patient rather than simply on the case record for each admission.

Based on this information, two ICD-10 diagnoses were given to the entire cohort of admitted women. Those whose records note a birth in the previous 6 months were diagnosed as F53 (postpartum disorders). In addition, all women received another appropriate ICD-10 diagnosis. These were either schizophrenia (F20), schizo-affective disorder (F25), and acute and transient psychotic disorders (F23) in the case of relatively clear-cut non-affective disorders. If there were difficulties determining whether a psychosis was affective or non-affective, these patients were coded as unspecified non-organic psychoses (F29). Diagnoses for manic psychoses (F30), bipolar disorder (F31), depressive psychoses (F32) and recurrent depressive psychoses (F33) were also clear-cut. In the case of difficult to diagnose disorders that appeared to be affective in origin, F38 and F39

Table 1. ICD-10 diagnoses in 1875–1924 postpartum sample (n = 101): with and without a cycloid psychosis diagnostic option

Category	No.	Diagnosis without cycloid psychosis	No.	Category	No.	Diagnosis with cycloid option	No.
Organic	21	Catatonia F06	14	Organic	10	Catatonia F06	3
Non-affective psychoses	26	Schizophrenia F20	12	Non-affective psychoses	18	Schizophrenia F20	11
		Acute and transient psychoses F23	4			Acute and transient psychoses F23	1
		Schizo-affective psychosis F25	5			Schizo-affective psychosis F25	4
		Other psychoses F29	5			Other psychoses F29	2
Affective psychoses	52	Manic episode F30	9	Affective psychoses	33	Manic episode F30	5
		Bipolar disorder F31	9			Bipolar disorder F31	6
		Depressive psychosis F32.3	19			Depressive psychoses F32.3	15
		Recurrent depressive psychoses F33.3	5			Recurrent depressive psychoses F33.3	5
		Other affective psychosis F38/39	10			Other affective psychosis F38/39	2
Other	2			Other	2		
Cycloid psychoses	0			Cycloid psychoses	38		

codes were used. The breakdown of diagnoses is shown in Table 1.

Cases were only included in this study if there were clear psychotic features. Cases of postpartum depression without psychotic features are not included. The vast majority of women had psychoses with onsets within days of delivery but we included all cases with onset up to 6 months. We have excluded psychoses occurring after miscarriage ($n = 3$).

A number of cases involved clear organic concomitants (F06, F09). Two-thirds of F06 cases, however, were diagnosed as 'organic' because of marked catatonic features in the absence of other indicators of schizophrenia as ICD offers only two options: organic catatonia or catatonic schizophrenia. Of the remaining seven cases diagnosed as F09, five had physical conditions potentially consistent with a postpartum delirium. One of these women died of pulmonary embolus and one from diarrhoea. Two had tuberculosis.

Two case records note a prior admission for postpartum psychosis to another asylum and one a prior probable postpartum psychosis without admission; these were included in the prior mental illness group.

The diagnosis of cycloid psychosis as elaborated by Leonhard (1961, 1999) and operationalized by Perris (1988) was considered for all cases and applied where indicated. The presence of clinical features such as confusion, motility disorders and delusions were readily determined from the notes.

In addition to diagnosing postpartum cases occurring during the period 1875–1924, we set up a cohort of 101 women from the historical sample, matched for ICD-10 diagnosis and for age, to control for the occurrence of clinical features such as confusion and motility disturbances. There were sufficient cases within all diagnostic groups to make a one-to-one match for all postpartum cases.

Modern first admissions for puerperal psychosis

The second dataset was drawn from an ongoing study of the incidence of service utilization for non-affective and affective psychoses from North West Wales. From this we have assembled all admissions to the sole DGH unit accessible from the area for the years between 1994 and 2005. The catchment area for this unit is the same as that for the 1875 North West Wales cohort. We selected from the computerized psychiatric case register the records of all patients diagnosed F53 (postpartum disorders). We also selected from the register all records of all female admissions coded as F20–F39 and cross-checked these with cases from the obstetric register for possible postpartum psychoses coded as either schizophrenia or affective disorders. In addition, we reviewed all admissions recorded on the obstetric register of patients coded O99 (behavioural problems in pregnancy) and F53, and cross-checked these with the psychiatric register. A meeting was convened with the consultants and midwives of the obstetric service to seek possible postpartum

Table 2. *The incidence of postpartum psychoses in North West Wales: 1875–1924 v. 1994–2005*

	1875–1924	1994–2005
Female admissions	1946	3956
Women	1577	1827
Women of childbearing age	1100	1032
Postpartum psychotic episodes	103	7
Postpartum psychoses/decade	21	6
Postpartum psychotic women	101	7
Women with postpartum onset	80	1
Women with prior illness	21	6
Postpartum cases/all admissions from women of childbearing age (%)	9.2	0.68
All postpartum cases/1000 births	0.34	0.19
Postpartum onset cases/1000 births	0.26	0.03
All postpartum cases/100 000 childbearing years	3.43	0.94
Postpartum onset cases/100 000 childbearing years	2.70	0.13

psychoses managed in the obstetric unit or the community without mental health referral. The records of all women coded O99 at any point during pregnancy were scrutinized for later contact with out-patient mental health services. We have also checked with all treating teams for cases of postpartum psychosis that might have been transferred out of the area for care and cross-checked with details of admissions to the only specialized mother and baby unit in North Wales, based out of the area.

Patients were included in this study if they were native to or resident in North Wales prior to and following their initial episode. One patient not originally resident in or native to North Wales, who had a record of mental illness before coming to North Wales and who left the region shortly after her postpartum psychosis, has not been included in these figures. The DGH unit runs at 85% occupancy, so bed pressure has not been a factor in determining admissions.

Initial cross-sectional diagnoses of schizophrenia and other psychoses made by sector consultant psychiatrists were supplemented by longitudinal data with renewed consultant and community mental health team diagnostic input for all modern cases. In the modern sample, we categorized as patients with a previous mental illness, patients who had at least one prior admission for mental illness, along with one woman who had a clear history of treatment without admission.

In terms of assessing rates at which postpartum psychoses occurred, it is not clear

whether the denominator should be births or women. In the case of women with pre-existing mental illness, the correct denominator may be women. If factors linked to pregnancy or birth play a part, then births may be the correct denominator. We supply figures for both, as well as absolute rates per decade.

The figures for the number of women of childbearing age and numbers of births in North West Wales for the historical sample were obtained from the Great Historical Database (Southall *et al.* 2004) and from the Registrar General's Annual Reviews 1881–1921, obtainable from the Office of National Statistics (ONS, 2006). Data for the contemporary sample came from the ONS.

RESULTS

In the modern period there has been a greater rate of admissions of both women and women of childbearing age to the DGH unit than there was to the North Wales asylum in the historical period (Table 2). If only for this reason, postpartum psychoses in the historical period would have formed a much greater proportion of female admissions to the asylum than they do to the DGH unit now (Table 2).

However, while patients with a postpartum psychosis who had a pre-existing diagnosis of mental illness are admitted at roughly the same rate – one every 2 years – in the historical period and now, the rate of hospital service utilization for *de novo* onset postpartum psychoses is significantly different between the historical and contemporary periods.

The birth rate in 1901 was 25.2/1000, and in 2001 was 11.8/1000. Using birth as a denominator, the rate of all puerperal psychoses in the 1875 to 1924 period was 0.34/1000 births. The rate for *de novo* onset postpartum psychoses was 0.26/1000 births. By contrast, modern rates for all postpartum psychoses are 0.19/1000 births, with a rate of 0.03/1000 births for *de novo* onset postpartum psychoses. There is no significant difference between the overall postpartum mental illness rate in the historical and contemporary periods, expressed this way: relative risk 1.73 [95% confidence interval (CI) 0.8–3.7]. However, there is a significant difference in the rate of *de novo* onset postpartum psychoses between the historical and contemporary

Table 3. Nineteenth- and twentieth-century samples: Edinburgh and Wales, clinical features and rates compared (taken from Rehmann et al. 1990)

	Edinburgh		Wales				2000 All cases
	1880s	1970s	1900			Control group	
			All cases	Puerperal onset	Prior onset		
Number	63	108	101	80	21	101	7
Delusions (%)	82	48	62	60	85	66	86
Hallucinations (%)	35	26	28	33	25	37	57
Motility (%)	94	57	82	79	90	58	71
Confusion (%)	75	41	77	76	80	50	14
Median length of stay (days)	152	39	215	228	216	344	27
Rate all postpartum psychoses/births	0.3/1000	1/1000	0.3/1000			—	0.2/1000
Rate postpartum onset psychoses/births			0.26/1000	0.26/1000	0.07/1000	—	0.03/1000

periods: relative risk 8.1 (95% CI 1.13–58.2, $p=0.013$).

Figures for the rates expressed in terms of person years are as follows. In the historical period there was a mean of 60 000 women of childbearing age per annum, and 62 000 per annum in the modern period. This gives a rate of 103 postpartum episodes in 3 000 000 childbearing years in the historical period *versus* a rate of seven postpartum episodes in 744 000 childbearing years in the contemporary period. There was a 3.65 (95% CI 1.7–7.8, $p=0.0004$) greater relative risk of postpartum psychoses on this basis in the historical period. The relative risk of a *de novo* onset puerperal psychoses calculated on the same basis in the historical period was 20 times greater (95% CI 2.8–144.0).

When we applied the operational diagnostic criteria for cycloid psychosis outlined by Perris (1988), 32 of the historical sample had a definite cycloid psychosis, with six further possible cases meeting cycloid psychosis criteria. When these diagnoses were made, the catatonic patients, as well as most acute and transient psychoses, and most manic episodes, and almost all cases diagnosed previously as F38/F39 were recoded as cycloid (see Table 1). In the contemporary sample, three out of seven patients met criteria for cycloid psychosis.

The clinical features of the postpartum patients in historical samples from Edinburgh and Wales show a high rate of motility disturbances and confusion (see Table 3). When we controlled for the effect of gender, women with comparable ICD diagnoses showed some

overlap in terms of these clinical features with the postpartum cases. What such a table cannot readily convey is the extent to which postpartum cycloid cases demonstrated a multiform clinical picture, swinging from excited to inhibited motoric states or confusion to lucidity or anxiety to happiness, as outlined by Leonhard (1999) in his account of cycloid psychoses. This mixed clinical picture, which might in some cases have been diagnosed as a mixed affective state, was present to some extent in the control group, but we have not operationalized switching of this sort and cannot state whether it differs in postpartum and control groups, although our impression is that it does.

Not surprisingly, many more postpartum cases were married than non-postpartum cases from the historical period (see Table 4). Modern patients appear less likely to be married. There is a trend for modern cases to have a younger onset. The puerperal onset cases in the historical series show a higher recovery rate than the matched historical controls, even though these were matched for ICD-10 diagnoses and therefore included a large number of patients who necessarily recovered – such as patients with acute and transient psychoses or bipolar disorders. It is too early to give definitive data on the outcomes for modern cases. However, over a mean follow-up period of 6 years, there has hitherto been a 60% rate of rehospitalization.

Our data confirm that women with puerperal psychoses were often suicidal. However, the matched historical sample, which includes a large number of affective disorder cases, makes

Table 4. Demographic features of historical and contemporary cohorts of postpartum and non-postpartum cases

	1875–1924			Control cohort (<i>n</i> = 101)	1994–2005 Postpartum cases (<i>n</i> = 7)
	Puerperal onset (<i>n</i> = 80)	Other postpartum cases (<i>n</i> = 21)	All postpartums (<i>n</i> = 101)		
Age of onset	29	27	28	30	24
Marital status (%)	80	85	81	28	29
Recovered (%)	76	70	75	60	?
Death in year 1 (%)	6	10	7	1	0
Death in care (%)	10	14	16	32	—
Suicidal (%)	35	15	31	33	29
Recovered and no relapses (%)	60	43	57	51	—
Relapsed or chronic (%)	40	57	43	49	57

it clear that the rates of suicidality were not greatly in excess of what might have been expected from a cohort of affective disorder patients. By contrast, in this assay system, the rates of suicidality for patients with schizophrenia historically were much lower than in a contemporary sample (Healy *et al.* 2006). Two of the postpartum patients in the historical sample committed suicide during the week of their discharge from the asylum. This gave the postpartum psychosis group the highest suicide rate of any diagnostic group admitted to the North Wales asylum.

DISCUSSION

Women with schizophrenia and bipolar disorder clearly may get pregnant and have a psychotic episode postpartum, perhaps today because prior pharmacotherapy has been discontinued during pregnancy. Alternately, the stress of the postpartum period may precipitate an affective or schizophreniform disorder that follows the typical course for these disorders. In these cases, it would seem that, by definition, these disorders are not distinct from schizophrenia or manic-depressive illness.

Our main findings concern a further group with an onset during the postpartum period, whose disorder demonstrates a symptom profile that differs to some extent from that of schizophrenia and manic-depressive illness, and a course that is not typical for either schizophrenia or manic-depressive disorders. Finally, there appears to be evidence that, for whatever reason, the hospital admission rate for this third group of cases has substantially declined in

frequency in the modern period, at least in North West Wales. If these figures are reliable, the fall in admission incidence of this disorder would seem to be relatively recent. The rates from our historical sample for all postpartum psychoses are identical to those quoted for puerperal insanity in the Edinburgh sample from the 1880s (Rehmann *et al.* 1990). The figures from Edinburgh for historical (0.3/1000 births) and recent samples (1970s) (1.0/1000 births) (see Table 3), however, point in the opposite direction to the data here. The discrepancies between Scottish and Welsh samples may not be as great as this suggests in that the recent Edinburgh sample included a large number of patients with pre-existing mental disorders (44%) and of non-psychotic disorders (20+%).

More recently, Nager *et al.* (2005) reported a 30% drop in rates of admissions for postpartum psychosis in Sweden, between 1986 and 1996. They attributed this decline to a loss of hospital beds. This is unlikely to be the explanation in North Wales, where despite an ostensible drop in bed numbers, there was a nearly 10-fold increase in the number of mental health admissions per year. Against this background, it seems unlikely that severely ill and often suicidal women would have been preferentially denied admission. In fact, as of 1995, North Wales had three specialized postpartum units within its three DGH facilities, but two of these three units have since closed owing to disuse.

It is uncertain what factors may be responsible for the decline in the hospital admission incidence of *de novo* onset postpartum psychoses. It is possible that postpartum psychoses

are still occurring at the same rate in the community, but are resolved through early detection and treatment. One argument against this possibility is that classic postpartum psychoses are florid and hazardous and, as such, difficult to miss and not suitable cases for home management. A second point is that figures from Edinburgh and elsewhere suggest that the admission incidence of milder conditions such as postnatal depression may in fact be increasing.

Possible contributory factors to a changing admission prevalence for postpartum psychoses include the active management of labour leading to less exhaustion. The local rate for caesarean sections is high. In addition, the local obstetric unit provides morphine-based pain relief rather than less potent analgesia. Another factor may be a liberal prescription of benzodiazepine hypnotics postpartum; given that benzodiazepines are very effective for motility disturbances such as catatonia, it may be that these measures prevent the evolution of a classic cycloid picture. It is possible that antenatal supplements, such as folate, may have a beneficial effect. In addition, antenatal scans may promote greater bonding between mother and child. Furthermore, the general health of women in the modern period is almost certainly better than previously. Finally, a small group of historical cases appear to have had a postpartum delirium, but the rates of postpartum complications stemming from organic disorders of this sort were negligible by the 1960s.

It seems less likely that social factors have made a difference, as while some *de novo* postpartum psychoses in the historical sample occurred to women giving birth illegitimately, 80% of the historical sample were married and suggestions of martial disharmony in their case records were infrequent. In terms of adversity, in the period from 1875 to 1910 up to 15% of infants died each year, a rate 90% higher than current rates. The mortality rate began to fall in 1910, but there is no suggestion from our data of any fall in postpartum psychosis rates from 1910 to 1924. Our historical sample furthermore appears to have had a lower infant mortality rate (5%) than might have been expected for the time.

The clinical features elaborated here offer some support for the argument that within the

de novo onset postpartum psychosis group outlined above, there is/was a disorder distinct from bipolar disorder or schizophrenia. The clinical records fit a cycloid picture that is distinct from typical affective or schizophrenic disorders today. However, many of these 'cycloid' features are also found in our historical control group, opening up the possibility that cycloid clinical pictures are linked to gender and nosocomial factors rather than to diagnosis. Women presenting during this period with disorders such as melancholia not linked to the puerperium were highly likely to show stupor, confusion and perplexity and the mixed clinical states supposedly typical of cycloid psychoses.

The overall picture outlined here is ambiguous. While the trigger to postpartum psychoses is unique, the data regarding its course and typical features are more complex. An absolute distinction in terms of clinical features is not needed for a distinct disorder; thus while there is clearly some overlap in the clinical features between *de novo* onset postpartum psychoses and both schizophrenia and affective disorders, there was also overlap between the psychosis of general paralysis of the insane and schizophrenia, such that Kraepelin reported that it was difficult to make the diagnosis on a cross-sectional basis.

As regards the clinical course of postpartum psychoses, Kraepelin's sample of patients was highly selected compared to those admitted in North Wales. It was also not possible for Kraepelin to establish what the course of the illness was for all patients with *de novo* onset postpartum psychoses in that he was only able to follow-up those with recurrences, whose clinical picture as a consequence necessarily came to resemble that of manic-depressive illness or schizophrenia more closely.

With regard to prognosis, the data on relapses, chronicity and suicide from our historical sample are consistent with follow-up studies from the modern era (Robling *et al.* 2000). Our control group indicates that women with postpartum psychoses had a better outcome than other women but that nevertheless a large number of postpartum cases either became chronic or had a number of relapses (40%). The true figure for further mental disturbances will have been somewhat higher than this, but we can be reasonably certain that

very few additional women will have been admitted to hospital, as few, if any will, have left the area and none could be admitted without their records being part of our sample. Present indications are that the contemporary sample will have a higher relapse rate than the historical sample, but this sample is dominated by individuals with an already existing mental illness.

In conclusion, if these data are supported and postpartum psychoses are declining in frequency, the finding has implications for psychopathology and treatment primarily of the affective disorders. Pinpointing what factors have led either to an absolute decline or to a transmutation of psychotic/cycloid clinical pictures into more straightforward bipolar disorders or postnatal depressions may have implications for our understanding and management of other affective disorders. It remains, however, to be established whether this finding of a changing admission incidence for *de novo* onset postpartum psychoses is a more general one or is confined to localized areas such as North West Wales.

DECLARATION OF INTEREST

None.

REFERENCES

- Brockington, I. F.** (1996). *Motherhood and Mental Illness*. Oxford University Press: Oxford.
- Chaudron, L. H. & Pies, R. W.** (2003). The relationship between postpartum psychosis and bipolar disorder: a review. *Journal of Clinical Psychiatry* **64**, 1284–1292.
- Gentile, S.** (2005). The role of estrogen therapy in postpartum psychiatric disorders: an update. *CNS Spectrums* **10**, 944–952.
- Healy, D., Harris, M., Tranter, R., Gutting, P., Austin, R., Jones-Edwards, G. & Roberts, A. P.** (2006). Lifetime suicide rates in the course of the treatment of schizophrenia in North Wales: two cohorts 1875–1924 and 1994–1998. *British Journal of Psychiatry* **188**, 223–228.
- Healy, D., Savage, M., Michael, P., Harris, M., Hirst, D., Carter, M., Cattell, D., McMonagle, T., Sohler, N. & Susser, E.** (2001). Psychiatric bed utilisation: 1896 and 1996 compared. *Psychological Medicine* **31**, 779–790.
- Kraepelin, E.** (1899). *Psychiatrie. Ein Lehrbuch für Studierende und Ärzte* (6th edn) (trans. J. M. Quen). Watson Publishing: Canton, USA.
- Leonhard, K.** (1961). Cycloid psychoses – endogenous psychoses which are neither schizophrenic nor manic-depressive. *Journal of Mental Science* **107**, 633–648.
- Leonhard, K.** (1999). *Classification of Endogenous Psychoses and their Differentiated Etiology* (trans. C. H. Cahn). Springer Books: New York.
- Marland, H.** (2004). *Dangerous Motherhood. Insanity and Childbirth in Victorian Britain*. Macmillan: Basingstoke.
- Nager, A., Johansson, L.-M. & Sundquist, K.** (2005). Are socio-demographic factors and year of delivery associated with hospital admission for postpartum psychosis? A study of 500,000 first-time mothers. *Acta Psychiatrica Scandinavica* **112**, 47–53.
- NCE** (2001). National Confidential Enquiry into Maternal Deaths. *Why Mothers Die 1997–1999*. Royal College of Obstetricians and Gynaecologists: London.
- ONS** (2006). Office of National Statistics (www.statistics.gov.uk).
- Perris, C.** (1988). The concept of cycloid psychotic disorder. *Psychiatric Developments* **1**, 37–56.
- Pfuhlmann, B., Stöber, G., Franzek, E. & Beckmann, H.** (1998). Cycloid psychoses predominate in severe postpartum psychiatric disorders. *Journal of Affective Disorders* **50**, 125–134.
- Rehmann, A. U., St Clair, D. & Platz, C.** (1990). Puerperal insanity in the 19th and 20th centuries. *British Journal of Psychiatry* **156**, 861–865.
- Robertson, E., Jones, I., Haque, S., Holder, R. & Craddock, N.** (2005). Risk of puerperal and non-puerperal recurrence of illness following bipolar affective (post-partum) psychosis. *British Journal of Psychiatry* **186**, 258–259.
- Robling, S. A., Paykel, E. S., Dunn, V. J., Abbott, R. & Katona, C.** (2000). Long-term outcome of severe puerperal psychiatric illness: a 23 year follow-up study. *Psychological Medicine* **30**, 1263–1271.
- Rose, L.** (1986). *The Massacre of the Innocents. Infanticide in Britain 1800–1939*. Routledge and Kegan-Paul: London.
- Southall, H. R., Aucott, P., Dorling, D. & Ell, P.** (2004). Great Britain Historical Database: Census Data: Age and Sex Statistics, 1851–1971 [computer file]. Colchester, Essex: UK Data Archive [distributor], August 2004. SN: 4551.
- Spinelli, M. G.** (2004). Maternal infanticide associated with mental illness: prevention and the promise of saved lives. *American Journal of Psychiatry* **161**, 1548–1557.
- Taylor, M. A. & Fink, M.** (2006). *Melancholia Defined*. Cambridge University Press: Cambridge.