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PREDICTORS OF INFANT FOSTER CARE IN CASES OF MATERNAL PSYCHIATRIC DISORDERS

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ABSTRACT

Purpose: Our aim was to investigate the factors associated with mother-child separation at discharge, after joint hospitalization in psychiatric mother-baby units (MBUs) in France and Belgium. Because parents with postpartum psychiatric disorders are at risk of disturbed parent-infant interactions, their infants have an increased risk of an unstable early foundation. They may be particularly vulnerable to environmental stress and have a higher risk of developing some psychiatric disorders in adulthood. **Methods:** This prospective longitudinal study of 1018 women with postpartum psychiatric disorders, jointly admitted with their infant, to 16 French and Belgian psychiatric mother-baby units (MBUs), used multifactorial logistic regression models to assess the risk factors for mother-child separation at discharge from MBUs. Those factors include some infant characteristics associated with personal vulnerability, parents' pathology and psychosocial context.

Results: Most children were discharged with their mothers, but 151 (15%) were separated from their mothers at discharge. Risk factors independently associated with separation were: i) neonatal or infant medical problems or complications; ii) maternal psychiatric disorder; iii) paternal psychiatric disorder; iv) maternal lack of good relationships with others; v) mother receipt of disability benefits; vi) low social class.

Conclusions: This study highlights the existence of factors other than maternal pathology that lead to decisions to separate mother and child for the child's protection in a population of mentally ill mothers jointly hospitalized with the baby in the postpartum period.

KEYWORDS: Mother and child separation; Psychiatric disorders; Risk factors for foster care; Postpartum Mother and baby hospitalization; Multivariate analysis.

INTRODUCTION

As attachment theory emphasizes, early life experiences are crucial for social and emotional development. Because very severe mental illness almost systematically results in disabilities in social interaction skills and activities of daily living, the parenting skills of mentally ill parents are a crucial issue for the child [7]. Children with an unstable early foundation are thus left more vulnerable to environmental stress and the development of psychiatric disorders in adulthood. Moreover, early childhood experiences may dramatically influence the infant's capacity for healthy social and emotional development [5-6, 10, 17-18, 25, 28]. Marmorstein, Malon & Iacono [16] showed that paternal antisocial behavior is also significantly — and independently of maternal depression — associated with depression and later behavioral disorders in offspring.

Women hospitalized in Mother and Baby Units (MBUs) generally present very severe mental disorders. Thus, the caregivers in such clinical settings face especially complex situations where women with severe mental disorders are mothering infants who may already be especially vulnerable. This vulnerability may be due to both pregnancy risk factors (pregnancy with psychotropic medications, poor pregnancy care and lifestyle risk factors due to maternal mental health) and genetic vulnerability [4, 14, 21, 26, 30].

This concatenation of negative factors sometimes produces situations where, even after optimal care for both mother and child in an MBU, it is inappropriate for the baby to be discharged with the mother. Families' ability to supervise the mother's care for their babies and the potential need for separation are thus difficult questions faced on a daily basis in MBU practice since these units were first set up [11].

Previous studies of large MBU patient samples have focused on the quality of the mother-child relationship, her difficulties in caring for the baby, and the risk of harm to the child, all severe problems that can lead to a discharge with social services supervision, either informal, formal, or court-ordered (supervision orders) or, in more serious cases, to separation (care and protection orders) [12-13, 24]. The few studies specifying the separation rate at discharge report that from 5 to 50% of cases result in separation (including voluntary placement, foster care, court-ordered care, or adoption) [1-2, 8, 15, 19, 22, 29]. Some of these studies used univariate analysis of small samples to highlight maternal pathology, social difficulties, and partners' mental health problems as risk factors for separation. The few studies using regression analysis of larger samples have confirmed these results [1, 22, 29].

The aim of this study was to evaluate new risk factors concomitantly with other relevant known risk factors and mother-baby separation at the end of the hospitalization, in a sample of 1018 inpatient mother-baby pairs in MBUs in France and Belgium.

MATERIALS AND METHODS

Data collection and population

Data were collected with the French version of the Marcé clinical checklist [3], originally developed in the UK for clinical data collection in MBUs. The Marcé clinical checklist includes information on the woman's mental illness, both parents' present mental health and mother past history, the mother's social and demographic characteristics, her treatment and MBU admission, and outcome at discharge. The French version of the questionnaire includes additional questions about traumatic events that parents might have experienced during their own childhood or adolescence, the partner/father's social and demographic characteristics and mental health history, and more detailed data on the woman's diagnosis and treatment. The physician managing the MBU completes the questionnaire and follows a standardized procedure for collecting information and coding the data.

Our study population included all women hospitalized in the participating MBUs (13 MBUs in France and 3 in Belgium) who were discharged from January 1, 2001, through December 31, 2007. Women were eligible to participate in the study if they were jointly hospitalized with a baby aged less than one year and had a hospitalization of at least five consecutive days. Although 1019 women were included in the study, after they gave their informed consent, one woman died, so that our final sample included 1018 admissions: 869 in France [9] and 149 in Belgium. The study was performed in accordance with the ethical standards of the French National Data Protection Authority (CNIL) and with their approval.

Outcome and predictor variables

The child's legal status at discharge was collected with a 4-item question, as follows: 1) discharged with mother without any supervision by child protection services; 2) discharged with mother, with informal supervision by these social services (ASE in France or SAJ in Belgium); 3) discharged with mother, under a formal supervision order by a judge for children or public prosecutor; 4) discharged separately from mother, under either voluntary or court-ordered foster care. With the agreement of the clinicians participating in the MBU-SMF working group, we regrouped the first three categories (responses 1+2+3) as "no separation" and the last category (4) as "separation", and analyzed them as a binary variable.

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Predictor variables

Our model included nine predictor variables, chosen from the literature and the available data, and two adjustment variables (country where the unit is located and child's age at admission). The predictor variables covered the following six categories:

- 1) Neonatal or infant complications, including preterm birth (before 37 weeks of gestation), low birth weight (less than 2500 g), transfer to intensive care unit or any other hospitalization during the first month of life (for somatic problems or any other reason);
- 2) Social and demographic characteristics, specifically, the mother's age, occupation, marital status, and social class (the higher of the mother's or father's);
- 3) History of foster care during the mother's childhood or adolescence;
- 4) Mother's relationships with others (partner, family, or friends);
- 5) Mother's mental illness
- 6) Mental illness of the partner or, if there is no partner, of the child's father.

In the analyses, we considered six groups of maternal mental illnesses, using ICD-10 codes: a) Depressive episode or recurrent depressive disorder: F30, F31 and F25; b) Psychotic affective disorders: F32 and F33; c) Acute or transient psychotic disorder: F23; d) Schizophrenia or other non-affective psychotic disorder: F20 to F22 and F28 to F29; e) Disorder of adult personality and behavior: F60 to F69; f) Neurotic or other mood disorder: F34, F38, F39 and F40 to F43 and F50 to F53; g) Other diseases or disorders: F00 to F19 and F70 to F94 and missing.

We created a composite variable called "pregnancy with risk factors" that included factors that might be harmful to the baby's health, including: inadequate prenatal care (none, or fewer than 3 visits, or only during the third trimester), inpatient admission for obstetric complications, psychotropic drug treatment, high tobacco use (at least 10 cigarettes a day), abuse of illicit drugs or alcohol during pregnancy, or HIV infection.

Women's relationships with relevant others were collected in the Marcé clinical checklist in three questions about relationships: a) with the partner or father; b) with her own mother, and c) with other friends or family. Each was rated as: 1) known to be good, 2) known to be bad 3) no relationship or no known information. We combined the answers to the three relationships and created a new variable "women's relationship with others" with 3 levels: 1) all three relationships were known to be good; 2) at least one relationship was known to be good; 3) no relationship was known to be good (that is, all relationships were either bad or non-existent); level 3 also included 3 women with missing data for these three questions).

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Separately from the category of “no known mental illness in partner/father”, we created a category of “mental illness in the partner/father unknown” for cases where the clinicians lacked sufficient information to provide a definite response about the man’s mental health (n=75) or where there was no partner and the child’s father was unknown (n=222).

For certain variables included in the model, we added a response category for the few cases in which the clinician lacked sufficient information to provide a definite response. These concerned especially about the mother’s history of foster care (n=6) (“no known history of foster care”), the baby’s medical complications (n=4) (“no known neonatal complication”), the woman’s occupational status (n=7) (“other or unknown occupational status ”), and the mother’s diagnosis (n=38) (“other or unknown diseases and disorders”). The absent diagnoses are due to various reasons unrelated to the disorder, mainly administrative issues or record problems. In particular, in one unit in Belgium the reference clinician had left and we could not go back to the hospital files to confirm diagnoses for 34 women; in addition, one woman in France had a diagnosis at admission of “mental health disorder not defined”, one women in another Belgium unit had no psychiatric diagnosis at admission, and two women in another had no specific psychiatric pathology recorded at admission.

Analysis

We calculated proportions (with 95% binomial exact confidence intervals, CIs) of mother-child separation for each category of predictor variable. We used chi-square tests to assess the statistical significance of differences in the proportions of separation across the categories. Using logistic regression models, we then estimated the unadjusted and adjusted ORs and their 95% CIs for the effects of each predictor variable on the likelihood of separation. ORs were then adjusted for the predictor and confounding variables noted above. As the child’s legal status at admission and pregnancy with risk factors (described above) were closely associated with the child’s status at discharge, we tested the impact of each on the variables of the adjusted model. Adjusted odds ratios were tested also for the French sample alone to verify the stability of predictive factors.

All analyses were done with SAS version 9.1 (SAS Institute).

RESULTS

Characteristics of the study population (Table 1)

Most of the 1018 inpatient admissions occurred in the early postpartum period (56% before 8 weeks postpartum, including 30% before 3 weeks). The babies' mean age was 9.6 ± 10.3 weeks (range 0 to 50 weeks). Thirty-one children had been breast fed for at least one week.

More than half of the pregnancies involved at least one risk factor: inadequate prenatal care (10%), obstetric complications (22%: 9% treated outpatient and 13% inpatient), prescriptions for one or more psychotropic drugs (38%) (22% for neuroleptics), or high tobacco (36%), alcohol (8%), or illicit drug use (8%) during pregnancy. Of the 14 HIV-positive women, 11 had other pregnancy risk factors.

One third of the babies had at least one of the following neonatal problems: transfer to a neonatal intensive care unit just after birth (23%), preterm birth (9%), low birth weight (14%), or hospitalization after discharge from the maternity unit during the first month of life (24%). Almost a quarter of the babies with problems had more than one.

At admission, 13% of the children were subject to court orders; 20% had some somatic or behavioral problems (9% mainly somatic and 11% mainly behavioral).

The mothers' mean age was 31 years (15 to 47 years); 39% were multiparous (including 21 fetal or neonatal deaths during previous pregnancies); 33% had a high school diploma or higher level of education. Only 16% of the women were not born in either France or Belgium (in this group, more than 60% were from Africa, mostly Algeria, Morocco; and the Republic of the Congo), and 64% were living with a partner (38% married). Among partners, or fathers who were not partners, 66% were employed, and 25% had a high school diploma or higher level of education.

A quarter of the women reported that they had been separated from their own mothers, and 31% reported a history of sexual and/or physical abuse during childhood or adolescence (information missing for 7%).

Admission was voluntary for 90% of the women. The most frequent maternal diagnoses were mood disorders, adult personality or behavior disorders, cognitive or mental organic disorders and, less frequently, schizophrenia and other non-affective delusional disorders.

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The mean length of stay for the MBU joint admission was 75 days (5 days to 19 months). Most women (67%) were discharged with a marked improvement of their mental health.

Mother-child separation

Most children were discharged with their mother: 65% had no formal supervision, 9% formal supervision by child protective services, and 11% court-ordered supervision. Mother-child separation at discharge and voluntary or court-ordered foster care occurred for 151 children (14.8%; 95% CI {12.7-17.2}). Among them, 41% were placed in foster families, 41% in institutions, 13% with family members (3% with their fathers), and 1% stayed in the MBU for more than a month after the mother's discharge. Information on type of placement was missing for only one child.

Among the separated pairs, mental health had not improved during the MBU hospitalization for 82% of the mothers, and 58% of the children had at least one neonatal complication, such as transfer to an intensive care unit (28%), hospitalization after discharge from the maternity unit within the first month of life (25%), low birth weight (23%), or preterm birth (17%). Nearly half (47%) were admitted under a court-ordered care order. However, almost half (49%) of all the children admitted under such a care order were finally discharged with their mother from MBUs.

Predictive factors for separation

Table 1 shows the associations of each potential predictive factor with the risk of separation at discharge. The most important of these variables included neonatal/infant medical complications, maternal social and demographic characteristics (mainly younger women, receiving disability payments, not living with a partner, and low social class), and the absence of good relationships with others. The current psychiatric diagnoses of both parents' mental illnesses were also highly associated with the likelihood of separation, as was her history of foster care.

Table 2 shows the results of multivariable analyses aimed at estimating the independent effects associated with each predictive variable (crude odds ratio) and in a logistic regression model (adjusted odds ratio: ORa).

The most important factors independently associated with separation in our logistic regression model were neonatal/infant complications (ORa=2.9, 95% CI {1.8-4.6}) and schizophrenia and other non-affective psychotic disorders of the child's parents (for mothers ORa=2.2, 95% CI {1.1-4.3}) and for fathers ORa=4.5, 95% CI {1.7-12.4}). Moreover, children whose fathers had an adult personality or behavior disorder (compared to no known pathology) had an almost quadrupled risk of placement (ORa=3.8, 95% CI {1.8-8.1}). Similarly, women receiving disability benefits were more than five times more likely to be separated from their child than women with jobs (ORa=2.5, 95% CI {1.2-5.2}). Other factors significantly associated with the risk of separation were low social class (ORa=2.7, 95% CI {1.4-

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5.1}}, compared with middle or high) and the absence of good social relationships (ORa=2.5, 95% CI {1.2-5.1}) compared with women with at least one good relationship). None of the other factors included — even marital status or mother's history of foster care — was significantly independently associated with the likelihood of mother-child separation in the adjusted logistic regression model.

Discussion

In this cohort study of 1018 women prospectively assessed during a joint admission in 13 French and 3 Belgium Mother-baby units (MBUs), children were mostly admitted with their mothers very soon after birth, for an average of 10 weeks, and were mainly discharged with their mothers (85%). Separation was nonetheless decided for 15% of the children at the MBUs. Our results identified the following risk factors as independently associated with separation at discharge: i) neonatal/infant medical complications; ii) type of maternal psychiatric disorder; iii) type of paternal psychiatric disorder; iv) mother's lack of any good social relationships; v) mother's receipt of disability benefits; and vi) low social class.

As underlined in a study of predictors of social services supervision at discharge from MBUs in the UK [12], the rate of separation in individual units varies. A single-center study in France (92 women (1991-1998)) found a 23% rate of separation at discharge [13]. Lower rates of separation at discharge were found (3% to 10%) in Great Britain in two different single-center studies (486 women 1998-2007 [29], and 100 women 1988-1989 [15]) and in Australia in a study in three MBUs (234 women in 2002 [2]).

However, the separation rate in our sample was the same as in a preliminary multicenter study during an earlier period (1999-2000) of 149 women admitted to 11 MBUs in France and Belgium [8]. Moreover, compared with other multicenter studies of broad samples for the same categories of maternal pathology, the rates of foster care at discharge in our study were similar: 25% for mothers with “schizophrenia and psychotic chronic or acute psychosis” and 6 to 8% for those with “affective disorders or depression illness” [1, 22]. This rate was also similar to that found in the single-center study by Kumar et al. [15].

As mentioned several times in the literature on MBUs, these differences between units could be due to various differences in the demographic and mental health characteristics of the study samples and in health professionals' views of the child's best interests. Another reason could be the availability of outpatient mother-baby care after inpatient admission as Whitmore et al. [29] mentioned: “in regions where access to a semi-supported environment is limited, the decision to remove the infant might be taken at an earlier stage”. Kumar et al. [15] suggested that

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differences between countries might be also due to major national differences in the approach to the care of mentally ill women and their babies.

Our results are in line with previous studies for the risk factors previously tested. However, we have studied new variables and tested them together with the previous factors in a multivariate model. One of the principal original results of this study is the increased risk of mother-child separation for infants with neonatal medical complications.

The child's complications and the early separations, just after birth, present additional challenges to the mother, both in caring for the baby and in establishing early attachment. Moreover, infants weakened by difficult conditions of pregnancy and birth may lack the defenses to compensate for the emotional instability, irritability, or passivity of mothers with psychiatric disorders. The child's difficulties may thus induce a spiral of negative interactions. The baby's fragility may also increase the anxiety of caregivers for the baby's safety. Howard et al. [13] found in their final regression models that neonatal complications were indeed associated with an increased staff-rated risk of harm to child and problems in practical baby-care but not with an increase in decisions to require social service supervision at discharge; this study did not report on separation outcomes.

A second important result in our study was that maternal schizophrenia and other non-affective psychotic disorders were associated with a doubling of the risk of separation. These results might have been expected in the light of studies showing that these disorders affect women's mothering skills as well as secure attachment. Several comparisons between women with schizophrenia and with bipolar disorders found that schizophrenic mothers were "more remote, insensitive, intrusive and self-absorbed" [20] and, as mentioned in several papers cited in the introduction, their children are at greater risk later on. However, as shown by Abel et al [1] for children with mothers with schizophrenia, a mentally healthy father, family stability, and access to family financial and social resources help protect against mother-child separation and are "predictors of better parenting outcome". If placement is required, Walker and colleagues [27] found that "separation from a schizophrenic mother had beneficial effects only when the child was placed in a foster care or in the care of other relatives, rather than in a state-run institution". Therefore, when separation appears desirable, it is important to take the time, in a non-urgent fashion, to try to secure familial and social relationships and networks. Admission to a MBU may be one way to be able to achieve this.

A third original aspect of our study is the integration of the paternal diagnosis in the model and the showing that paternal schizophrenia or another psychotic or behavioral disorder significantly and independently increases the risk of mother-child separation. Although several single-center bivariate studies [1-2, 19, 29] showed that a partner with a psychiatric illness increases the risk of mother-infant separation at discharge, those studies did not report on the

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characteristics of the paternal illness. Regardless of maternal pathology, paternal pathology is an additional risk factor that can endanger the baby and make caregivers still more reluctant to let the child leave the unit with the mother.

Consistently with previous results showing that a good relationship with her partner is important in preventing mother-child separation [1-2], our results showed that, even after adjustment for other related variables in the model, women without any good close relationships — not only with their partner, but also with their own mother, or with any other close confidant — have a higher risk of separation from their child than women with at least one good relationship.

We also showed that women receiving disability benefits had a significantly higher rate of separation from their children, after adjustment for other related variables in the model. These payments require medical recognition of a high level of chronic disability, a characteristic which can increase the difficulty of establishing a stable mother-child relationship.

Moreover, in agreement with authors previously cited, we found that even after adjustment for other related variables in the model, women from a low social class had a risk of separation at discharge almost three times higher than middle- or upper-class women.

Finally, several other variables, although significantly associated in the univariate analysis, were not independent predictive factors of separation. This was probably due to the correlation between these variables and other factors included in the model or to the fact that despite our relatively large sample size we probably had limited power to detect the statistical significance of all the variables included in the model.

We note that we have no data about maternal race or ethnicity, which could be considered a limitation of our study. French law currently prohibits the collection of this type of data (because it is subject to misuse).

Although separation during the mother's childhood appeared to be extremely frequent in our study population in MBUs (43%), compared with the general population (1.7% [23]), this variable does not appear to be an independent factor of risk for separation after adjustment for other factors in our model.

Conclusion

Our sample is not representative of all women with psychiatric disorders after childbirth, and these results should not be generalized to the entire population of mentally ill mothers. This is nonetheless one of the largest studies of its kind in the literature on separation and the first prospective multicenter study that has examined the joint effects of such a

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wide range of different variables. The extent of maternal disease is clearly a major factor in separation from her child. However, this study also highlights the existence of other factors related to the children themselves, to both parents and to their environment, which contribute to the mother's inability to cope with the infant's needs and may thus lead to a decision to place the child for his or her protection.

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Declaration of interest

The statistics and database set-up were performed in unit 953 of INSERM (French National Institute of Health Research). The protocol can be obtained from the corresponding author.

The authors declare that they have no conflict of interest.

REFERENCES

1. Abel KM, Webb RT, Salmon MP, Wan MW & Appleby L (2005) Prevalence and predictors of parenting outcomes in a cohort of mothers with schizophrenia admitted for joint mother and baby psychiatric care in England. *J Clin Psychiatry* 66:781-789.
2. Buist A, Minto B, Szego K, Samhuel M, Shawyer L & O'Connor L (2004) Mother-baby psychiatric units in Australia - the Victorian experience. *Arch Women's Ment Health* 7:81-7.
3. Cazas O & Glangeaud-Freudenthal NMC (2004) The history of Mother-Baby Units (MBUs) in France and Belgium and of the French version of the Marcé checklist. *Arch Women's Ment Health* 7:53-58.
4. Chung TK, Lau TK, Yip AS Chiu, HF & Lee DT (2001) Antepartum depressive symptomatology is associated with adverse obstetric and neonatal outcomes. *Psychosom Med* 63:830-834.
5. Dean K, Stevens H, Mortensen PB, Murray RM, Walsh E & Pedersen CB (2010) Full spectrum of psychiatric outcomes among offspring with parental history of mental disorder. *Arch Gen Psychiatry* 67:822-829.
6. Donatelli J-AL, Seidman LJ, Goldstein JM, Tsuang MT & Buka SL (2010) Children of parents with affective and nonaffective psychoses: a longitudinal study of behavior problems. *Am J Psychiatry* 167:1331-1338.
7. Gladstone BM, Boydell KM & McKeever P (2006) Recasting research into children's experiences of parental mental illness: beyond risk and resilience. *Soc Sci Med* 62:2540-2550.

Glangeaud et al. PREDICTORS OF INFANT FOSTER CARE

8. Glangeaud-Freudenthal NMC (2004) Mother-Baby psychiatric units (MBUs): national data collection in France and in Belgium (1999-2000). *Arch Women's Ment Health* 7:59-64.
9. Glangeaud-Freudenthal NM, Sutter AL, Thieulin AC, Dagens-Lafont V, Zimmermann MA, Debourg A, Massari B, Cazas O, Cammas R, Rainelli C, Poinso F, Maron M, Nezelof S, Ancel P-Y & Khoshnood B (2011) Inpatient mother-and-child postpartum psychiatric care: Factors associated with improvement in maternal mental health. *Eur Psychiatry*, 26:215-223
10. Higgins J, Gore R, Gutkind D, Mednick SA, Parnas J, Schulsinger F & Cannon TD (1997) Effects of child-rearing by schizophrenic mothers: a 25-year follow-up. *Acta Psychiatr Scand* 96:402-404.
11. Howard LM (2000) The separation of mothers and babies in the treatment of postpartum psychotic disorders in Britain 1900-1960. *Arch Women's Ment Health* 3:1-5.
12. Howard L, Shah N, Salmon M & Appleby L (2003) Predictors of social services supervision of babies of mothers with mental illness after admission to a psychiatric mother and baby unit. *Social Psychiatry and Psychiatr Epidemiol* 38:450-455.
13. Howard LM, Thornicroft G, Salmon M & Appleby L (2004) Predictors of parenting outcome in women with psychotic disorders discharged from mother and baby units. *Acta Psychiatr Scand* 110:347-355.
14. Jablensky AV, Morgan V, Zubrick SR, Bower C & Yellachich LA (2005) Pregnancy, delivery, and neonatal complications in a population cohort of women with schizophrenia and major affective disorders. *Am J Psychiatry* 162:79-91.
15. Kumar R, Marks M, Platz C & Yoshida K (1995) Clinical survey of a psychiatric mother and baby unit : characteristics of 100 consecutive admissions. *J Affect Disorders* 33:11-22.
16. Marmorstein NR, Malone SM & Iacono WG (2004) Psychiatric disorders among offspring of depressed mothers: associations with paternal psychopathology. *Am J Psychiatry* 161:1588-1594.
17. Murray L, Arteché A, Fearon P, Halligan S, Croudace T & Cooper P (2010) The effects of maternal postnatal depression and child sex on academic performance at age 16 years: a developmental approach. *J Child Psychol Psychiatry* 51:1150-1159.
18. Niemi LT, Suvisaari JM, Haukka JK & Lonnqvist JK (2005) Childhood predictors of future psychiatric morbidity in offspring of mothers with psychotic disorder: results from the Helsinki High-Risk Study. *Br J Psychiatry* 186:108-114.
19. Poinso F, Gay MP, Glangeaud-Freudenthal NMC & Rufo M (2002) Care in a mother-baby psychiatric unit: analysis of separation at discharge. *Arch Women's Ment Health* 5:49-58.
20. Riordan D, Appleby L & Faragher B (1999) Mother-infant interaction in post-partum women with schizophrenia and affective disorders. *Psychol Med* 29:991-995.
21. Sacker A, Done DJ & Crow TJ (1996) Obstetric complications in children born to parents with schizophrenia: a meta-analysis of case-control studies. *Psychol Med* 26:279-287.

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22. Salmon MP, Abel K, Webb R, Warbuton AL & Appleby L (2004) A national audit of joint mother and baby admissions to UK psychiatric hospitals: an overview of findings. *Arch Women's Ment Health* 7:65-70.
23. Saurel-Cubizolles MJ (2005) Violences envers les femmes et état de santé mentale: résultats de l'enquête Enveff 2000. *Bulletin Epidémiologique Hebdomadaire* 9:36-37.
24. Seneviratne G, Sue C & Marks M (2003) Parenting assessment in a psychiatric mother and baby unit. *British J Soc Work* 33:535-555.
25. Sutter-Dallay AL, Murray L, Dequae-Mechadou L, Glatigny-Dallay E, Bourgeois ML & Verdoux H (2011) Impact of 6 weeks maternal postnatal depressive symptoms on the developmental outcome of the child: a two-year follow-up study of the Matquid cohort. *European Psychiatry* 26, 484-489.
26. Verdoux H, Sutter AL, Glatigny-Dallay E & Minisini A (2002) Obstetrical complications and the development of postpartum depressive symptoms: a prospective survey of the MATQUID cohort. *Acta Psychiatr Scand* 106:212-219.
27. Walker EF, Cudeck R, Mednick SA & Schulsinger F (1981) Effects of parental absence and institutionalization on the development of clinical symptoms in high-risk children. *Acta Psychiatr Scand* 63:95-109.
28. Wan MW, Abel KM & Green J (2008) The transmission of risk to children from mothers with schizophrenia: a developmental psychopathology model. *Clin Psychol Rev* 28:613-637.
29. Whitmore J, Heron J & Wainscott G (2011) Predictors of parenting concern in a mother and baby unit over a 10-year period. *Int J Soc Psychiatry* 57(5):455-61..
30. Wisner KL, Sit DK, Hanusa BH, Moses-Kolko EL, Bogen DL, Hunker DF, Perel JM, Jones-Ivy S, Bodnar LM, Singer LT (2009) Major depression and antidepressant treatment: impact on pregnancy and neonatal outcomes. *Am J Psychiatry* 166:557-566.

TABLE 1: Parents' characteristics and mother-child separation rate at discharge (N=1018)

Variables	N (%)	Separation N (%)
Woman's age at admission (years)		
< 25	144 (14)	37 (26)
25-35	617 (61)	78 (13)
> 35	257 (25)	136 (14)
Marital status		
married or cohabiting	651 (64)	51 (8)
other or unknown	367 (36)	100 (27)
Women's occupational status		
Working or in training	275 (27)	17 (6)
receiving unemployment benefits	133 (13)	15 (11)
receiving disability payments	151 (15)	56 (37)
on sick leave from work	173 (17)	9 (5)
not in labor force	126 (12)	10 (8)
other (state allowance,...) or missing	160 (16)	44 (28)
Social class (higher of the two parents)		
professional, intermediate	382 (38)	18 (5)
clerical or sales	299 (29)	31 (10)
workers, artisans, or farmers, or no known profession	337 (33)	102 (30)
missing		
Women's mental illness		
psychotic affective disorders	217 (21)	22 (10)
depressive episode or recurrent depressive disorder	183 (18)	10 (5)
schizophrenia or other non-affective psychotic disorder	142 (14)	43 (30)
acute or transient psychotic disorders	45 (4)	4 (9)
disorder of adult personality and behavior	134 (13)	32 (24)
neurotic or other mood disorders	150 (15)	5 (3)
other diseases or disorders or missing	147 (15)	35 (24)
Foster care in women's childhood		
No foster care	579 (57)	75 (13)
placed in institution, in foster family or adopted	153 (15)	48 (31)
placed with grandparents or another family member	111 (11)	12 (11)
missing, or unknown	175 (17)	16 (9)

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Women's relationship with close others

good with partner, own mother, and other confidants	302 (30)	15 (5)
good with one or two of; partner, own mother, or confidant	510 (50)	71 (14)
no good relationship with any of the three others	206 (20)	65 (32)

Partner's mental and behavioral disorders*

no psychiatric disorder	491 (48)	27 (6)
bipolar or depressive disorders	43 (4)	2 (5)
schizophrenia or other psychotic disorders	29 (3)	11 (38)
behavioral disorders	74 (7)	22 (30)
other disorders	84 (8)	18 (21)
unknown or missing	297 (30)	71 (24)

Neonatal complications

complications	348 (34)	87 (25)
no known complication	670 (66)	64 (10)

- * if no partner, child's father

TABLE 2: Logistic regression model for mother-child separation at discharge (N=1018)

Variables	Crude odds ratio (CI)	Adjusted odds ratio (CI)*	p
Woman's age at admission (years)			0,49
< 25	1	1	
25-35	0.4 (0.3-0.7)	0.7 (0.4-1.3)	
> 35	0.5 (0.3-0.8)	0.7 (0.4-1.4)	
Marital status			0,59
married or cohabiting	1	1	
other or unknown	4.4 (3.1-6.4)	1.1 (0.7-1.9)	
Women's occupational status			0,0024
Working or in training	1	1	
receiving unemployment benefits	1,9 (0,9-4.0)	0.8 (0.3-1.8)	
receiving disability payments	9.0 (5.0-16,2)	2.5 (1.2-5.2)	
on sick leave from work	0,8 (0,4-1,9)	0.8 (0.3-1.9)	
not in labor force	1,3 (0,6-2.9)	0.9 (0.4-2.2)	
other (state allowance,...) and missing	5,8 (3,2-10,5)	1.7 (0.8-3.6)	
Social class (higher of the two parents)			0,0022
professional, intermediate	1	1	
clerical or sales	2.3 (1.3-4.3)	1.3 (0.7-2.6)	
workers, artisan, farmer, no known profession or missing	8.8 (5.2-14.9)	2.7 (1.4-5.1)	
Women's mental illness			0,0141
psychotic affective disorder	1	1	
depressive episode or recurrent depressive disorder	0.5 (0.2-1.1)	0.7 (0.3-1.6)	
schizophrenia or other non-affective psychotic disorder	3.9 (2.2-6.8)	2.2 (1.1-4.3)	
acute or transient psychotic disorder	0.9 (0.3-2.6)	1.4 (0.4-4.8)	
disorder of adult personality and behavior	2.8 (1.5-5.0)	1.5 (0.7-3.0)	
neurotic or other mood disorder	0.3 (0.1-0.8)	1,4 (0.1-1.2)	
other diseases or disorders and missing	2.8 (1.5-5.0)	1.3 (0.6-2.5)	
Foster care in women's childhood			0,29
No foster care	1	1	
placed in institution, in foster family or adopted	3.1 (2.02-4.67)	1.3 (0.8-2.2)	
placed with grandparents or another family member	0.8 (0.4-1.6)	0.6 (0.3-1.4)	
missing, or unknown	0.7 (0.4-1.2)	0.8 (0.4-1.5)	

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Women's relationship with close others			0,02
good with partner, own mother, and close confidant	1	1	
good with one or two of: partner, own mother or close confidant	3.1 (1.7-5.5)	1.4 (0.7-2.7)	
no good relationships	8.8 (4.9-16.0)	2.5 (1.2-5.1)	
Partner's mental or behavioral disorders**			0,0012
no psychiatric disorder	1	1	
bipolar or depressive disorders	0.8 (0.2-3.7)	0.8 (0.2-3.9)	
schizophrenia or other psychotic disorders	10.5 (4.5-24.4)	4.5 (1.7-12.4)	
behavioral disorders	7.3 (3.9-13.7)	3.8 (1.8-8.1)	
other disorders	4.7 (2.4-8.6)	1.6 (0.8-3.3)	
unknown or missing	5.4 (3.4-8.64)	2.6 (1.5-4.7)	
Neonatal complications			<0,0001
no known complication	1	1	
complications	3.2 (2.2-4.5)	2.9 (1.8-4.6)	

. * *adjusted for country and baby's age at admission*

** *if no partner, child's father*

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