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MAY 18, 2010**

*“Women and Infants Day Hospital for PPD:
A Mother-Baby Treatment Model”*

*Margaret Howard, PhD
Postpartum Depression Day Hospital
Women and Infants Hospital, Providence RI*

Original contribution

A psychiatric mother-baby day hospital for pregnant and postpartum women

M. Howard¹, C. L. Battle¹, T. Pearlstein¹, and K. Rosene-Montella²

¹ Women and Infants' Hospital and Department of Psychiatry and Human Behavior, Brown Medical School, Providence, RI, U.S.A.

² Department of Medicine, Brown Medical School, Providence, RI, U.S.A.

Received November 22, 2005; accepted April 9, 2006
Published online May 22, 2006 © Springer-Verlag 2006

Summary

Major depression and other psychiatric disorders are common during pregnancy and the postpartum period, yet these disorders remain largely under-diagnosed and under-treated. Developing programs that are uniquely tailored to meet the needs of perinatal psychiatric patients can improve both the quality and acceptability of care. In this report, we describe the development and implementation of a novel mother-baby day hospital service designed to meet the mental health needs of this special population, and present preliminary data regarding treatment acceptability and effectiveness. Our experience using this model of care for the past five years has suggested that specialized units such as this one represent an acceptable, effective, fiscally viable approach to the care of pregnant and postpartum psychiatric patients. Further research is needed to more thoroughly assess the effectiveness of this type of specialized perinatal service.

Keywords: Postpartum depression; pregnancy; perinatal psychiatric disorders; mother-baby units; partial hospital.

Introduction

Women are more likely to suffer from mood disorders during pregnancy and for up to one year postpartum than at any other time in their lives (Kendell et al, 1987). Major depression is indeed the most common postpartum complication women experience, including both physical and psychiatric sequelae, affecting approximately 15 percent of childbearing women (O'Hara et al, 1990). Postpartum depression is known to adversely impact the emotional and cognitive functioning of the developing infant (Murray et al, 1996), interfere with maternal-infant interactions (Herrera et al, 2003), and predict future emotional and behavioral problems in school age children

(Cogill et al, 1986). Depression during pregnancy is also prevalent (Gotlib et al, 1989), and is associated with poor nutrition and use of nicotine, alcohol, and drugs (Zuckerman et al, 1989), negative health behaviors linked to premature delivery and low birth weight.

Despite the growing body of evidence that documents the prevalence of perinatal mood disorders and other psychiatric problems during pregnancy and postpartum, such disorders remain largely under-diagnosed and under-treated (Cox et al, 1982; Whitton et al, 1996). Our culture defines pregnancy and motherhood as a time of fulfillment and joy, leading many women to feel reluctant to disclose symptoms of depression or problems with attachment to their newborn. In addition, many caregivers neglect to screen for depression or other psychiatric problems. In light of the prevalence and debilitating nature of perinatal mental health problems and the difficulty that women have receiving appropriate care, we believe a pressing need exists for innovation in how mental health care services are provided for pregnant and postpartum women. Specialized programs can make treatment more accessible by addressing concerns that lead some women to feel reluctant to seek care, for example separation from infants during the course of treatment. In this paper, we describe a novel mother-baby day hospital program that has been successful in providing psychiatric care for pregnant and postpartum patients for over five years. After presenting a rationale for specialized units to treat pregnant and postpartum women, we detail our program's

development and current structure, and summarize our experiences with developing services for this patient population.

Why develop a specialized service for perinatal women?

The United States (US) has historically lagged behind Great Britain and other developed nations in the recognition and treatment of perinatal psychiatric disorders (Stewart, 1989). Unlike Great Britain and several other developed nations, the US lacks specific laws pertaining to women who commit crimes during the postpartum period (e.g. infanticide). Thus, while reasons for the different approaches to perinatal mental health care are not entirely clear, one could speculate that because women in other countries have historically been more likely to be legally sentenced to psychiatric treatment rather than prison, a greater recognition existed regarding the need for dedicated mother-baby psychiatric units. In recognizing the unique features and debilitating nature of perinatal mental health problems, these countries have therefore implemented specialized approaches to care, most notably by establishing dedicated units serving women with their infant children. Originally pioneered by British psychiatrist T. F. Main in 1948, the practice of joint admission of mothers with infant children was an innovation prompted by concerns about disrupting mother-infant relations during periods of intensive psychiatric treatment (Brockington, 1996). The first joint mother-baby admission occurred in England over 50 years ago, and since that time additional units have opened in Great Britain as well as other developed nations including Australia (Buist et al, 2005), New Zealand (Wilson et al, 2005), the Netherlands (Klompenhouwer & van Hulst, 1991), Germany (Hornstein et al, 2005), France and Belgium (Cazas & Glangeaud-Freudenthal, 2004). There is also anticipated opening of a mother-baby unit in Luxembourg (Cazas & Glangeaud-Freudenthal, 2004).

While the primary rationale for combined mother-baby units has been to promote healthy maternal-child relationships and minimize disruption in breastfeeding, several other clinical and practical benefits are apparent. An important advantage is the ability for clinicians to directly observe interactions between mothers and infants so areas of difficulty can be addressed via supportive guidance and modeling of appropriate infant care. This is particularly useful for some women, for whom the presence of the baby prompts manifestation of clinical symptoms (e.g. heightened anxiety or obsessive thoughts). Mother-baby units can help to minimize the potential for severely

depressed mothers to avoid their infants, and gives highly anxious mothers the opportunity to gain experience allowing others to care for the infant. Another benefit of these specialized units is the opportunity for women to interact with a group of other patients confronting similar concerns. The social support and normalization inherent in this setting can be tremendously helpful to perinatal patients, many of whom feel ashamed, guilty, and reticent to admit to their distress. Finally, on a practical level, mother-baby units allow mothers, who are frequently primary caretakers of infants, to maintain this family role rather than assign it to another family member.

Although there are many benefits of joint admission, barriers can limit implementation of such programs. One concern is the possibility of increased health risks to the infant if admitted to a hospital setting (i.e., exposure to infectious disease). Another barrier is the additional space and staffing required for accommodating the care of infants. Finally, an important obstacle is difficulty obtaining approval and financial reimbursement by insurance companies due to lack of familiarity with this approach. To the knowledge of the authors, there are no inpatient mother-baby units in the US, and there is one established mother-baby day hospital program, the one described in the present report. Wisner et al (1996) have articulated the clinical problems and dilemmas that exist because of the lack of mother-baby units. Although mother-baby units are still relatively new and require empirical evaluation, several reports have provided preliminary evidence suggesting that this form of treatment is effective and acceptable to patients (Boath et al, 2003). To begin addressing the mental health needs of perinatal women in the US using this approach, a mother-baby psychiatric day hospital was established under the auspices of a university-affiliated obstetrical hospital in Providence, Rhode Island.

Early program development

Prior to opening the Day Hospital (DH), we embarked upon a process to document the clinical need, practical feasibility, and fiscal viability of the program. The key elements of this process were: 1) identifying a clear rationale; 2) evaluating clinical demand in our area; and 3) assessing feasibility of the DH by consulting with members of local stakeholder groups.

Articulating the program's rationale

In our rationale for the DH, we emphasized three points: First, we stressed that perinatal psychiatric illness is

highly prevalent yet seriously under-treated. Second, we emphasized the known risks to mother, infant, and family associated with depression, the most common perinatal disorder. Third, we reasoned that providing mental health services within an obstetric setting is advantageous given that obstetrician-gynecologists or primary care providers often provide the first or only mental health treatment for many pregnant and postpartum women. By providing psychiatric care within the infrastructure of the obstetrical setting, it would convey to the women who became our patients that their psychiatric treatment was a component of their obstetrical experience (pregnancy and/or childbirth). The actual setting of the Day Hospital program is on the campus of the main obstetrical hospital but in a separate building. Although we originally conceptualized the program as providing care only to postpartum women, we reasoned that serving pregnant women with depression and other mental health problems was also essential given the serious nature of these disorders, and because early treatment during pregnancy could possibly prevent the development of more severe postpartum illnesses. Thus, we defined the program's mission as serving the unique needs of women suffering from depression or other psychiatric disorders during pregnancy or following childbirth, in a supportive and familiar setting, with a commitment to providing integrated care to mothers and their newborn children.

Evaluating clinical demand

Although clinical need for a mother-baby day hospital is likely to exist in many locales, it is only feasible to establish a separate service in locations where the population density provides sufficient and ongoing demand. Hospitals located in rural or small town settings may not have adequate clinical demand to warrant development of a specialized mother-baby unit. In order to demonstrate feasibility in our area, we assessed patient flow at the obstetric hospital where we intended to base our service, and found that there were a sufficiently large number of patients to keep the DH well utilized. Specifically, by extrapolating from conservative prevalence estimates regarding the rates of depression, the most common perinatal mental illness, we estimated that roughly 10% of the 9000 women who delivered their infants at the hospital each year would be likely to meet criteria for admission. In addition, because the hospital had an existing psychiatric consultation-liaison (CL) service, a mechanism was already in place to identify patients in need of care. Moreover, discussions with CL staff revealed that although obstetric patients were often referred to a local psychiatric

day hospital following discharge, patients frequently did not follow through and cited separation from their infants as a reason for non-compliance.

Collaborating with stakeholders

Perhaps most importantly, during the development of program, we consulted with members of local stakeholder groups to discuss the proposed program and clarify its role in relation to existing hospital and community-based services. Without involvement and support of these groups – hospital administrators, representatives from relevant hospital departments, state and private insurers – the program would have been unlikely to become a reality. Over a period of three years, numerous meetings took place to explain the rationale for the DH and share our vision for its implementation; during this time we also gathered suggestions from others to help shape the DH. Because cost is an important consideration for hospital administrators and insurers, we noted during these discussions that psychiatric day hospitalization is recognized as a generally effective approach that is less costly than inpatient treatment (Mazza et al, 2004). Based on data collected from a local psychiatric facility regarding the actual cost of treating postpartum women during a one-year time period, we presented our own calculations estimating that the program would amount to a cost savings of approximately 50% in comparison to traditional inpatient treatment. Ultimately, a culminating meeting was held that included our state's Director of Human Services and the Medical and Executive Directors of all private insurers for the state. At the conclusion of this meeting, state and private insurers expressed philosophical support for the DH, as well as willingness to contract for the delivery of psychiatric services to pregnant and postpartum women. In our negotiations with insurers, we clearly outlined that only the mothers (not their infants) would be considered the insured "patients" and the cost of infant care would be included in the overall fee for the program for postpartum patients. The contractual and philosophical commitment expressed by statewide insurers, as well as the states Director of Human Services, was critical in our developing a thriving, sustainable program.

A description of the DH program

Structure and theoretical orientation

The core elements of the DH program are group psychotherapy, individual psychotherapy, pharmacological intervention (as appropriate), family psychoeducation

and counseling, and observation and support of the mother-infant dyad. Consultation with specialists in nutrition, lactation, health education, and infant development are also available on-site. The program is designed for an average stay of approximately seven days and can accommodate a daily census of up to eight women. It is expected that at the time of discharge, a woman's functional status has improved to the point of readiness for weekly outpatient care along with additional outpatient supports as needed. There are five full-time clinicians and one to two trainees (social work, psychiatry, psychology) at any given time. Clinical staff includes two clinical social workers, one clinical nurse specialist, one psychologist and one psychiatrist. There is also a full-time nursery attendant, receptionist, and office practice manager. Each day begins with a morning psychotherapy group that consists of a review of patients' progress on the previous day's goals and an in-depth discussion of role transitions and interpersonal issues. Individual psychotherapy and medication management appointments follow the morning group. Next, women participate in experiential training in relaxation skills or infant massage, depending on their individual treatment plan. Finally, women participate in the last psychotherapy group of the day, which is more didactic in its orientation and focuses on building specific skills (e.g., communication, anger management). Over the course of the day, considerable flexibility exists so that postpartum women may alternate between keeping their babies with them during treatment sessions, and allowing the nursery attendant to provide infant care. Thus, mothers may care for, and nurse, infants as needed without disrupting their participation in treatment. The theoretical approach utilized at the DH program is largely based upon the cognitive-behavioral therapy (CBT) and interpersonal psychotherapy (IPT) models in light of the documented efficacy of these approaches, in particular the efficacy of IPT in treating postpartum depression (O'Hara et al, 2000). The specific components of IPT that we draw upon most heavily are adjustment to recent role transitions, coping with loss and grief, and addressing interpersonal deficits.

Procedure for referral, admission, and discharge

Women are referred to the DH from a variety of sources, including obstetricians, nurse midwives, primary care providers, pediatricians, other mental health providers, self-referrals, and third-party providers. Many referrals come from the affiliated outpatient behavioral health service and inpatient psychiatric CL service at the hospital.

When a woman is referred, she is evaluated within 72 hours by a member of the DH treatment team to determine whether the program is appropriate. Evaluation consists of a semi-structured clinical assessment and administration of the Edinburgh Postnatal Depression Scale (EPDS; Cox et al, 1987), the Postpartum Bonding Instrument (Brockington et al, 2001) and a demographic questionnaire. Women who pose imminent danger to themselves, their infants, or others, or women who are floridly psychotic, are transferred to an inpatient facility. Women who do not pose an imminent threat but whose functioning is severely compromised are admitted to the DH; these women typically begin the program immediately following evaluation, or the next morning. Women who are symptomatic but functioning reasonably well, have good attachment to their infants, and are free of severe neurovegetative symptoms are referred to an appropriate outpatient provider. Women with active substance abuse either begin treatment initially at the DH and are later referred for specialized treatment, or are referred directly to our hospital's intensive outpatient program designed for pregnant or postpartum substance-abusing women.

After discharge from the DH, women begin individually tailored follow-up plans that are set-up prior to her actual discharge. Outpatient treatment plans are designed to address the uniquely identified clinical needs of each woman and are likely to include individual psychotherapy, couples or family psychotherapy, group therapy and pharmacotherapy. Emphasis is placed upon referring women to providers in the community who are experienced in treating pregnant and lactating women. In addition, patients may attend a 6-week aftercare psychotherapy group offered at the DH designed to provide support as well as reinforce new skills acquired by graduates of the program. Most graduates of the DH program attend this group weekly along with their weekly individual treatment.

Current status, effectiveness, and acceptability of the program

To date, the DH Program has treated over 1400 perinatal women. These patients are racially, ethnically, and financially diverse. Approximately two thirds of women treated in the DH are postpartum and the remainder, pregnant. While major depression represents the primary diagnosis for which women seek treatment, women with a variety of other disorders (e.g., panic disorder, adjustment disorders, PTSD) are also treated. A description of the presenting characteristics of patients seen at both the

DH and an affiliated outpatient service has been previously reported (Battle et al, 2006).

The effectiveness of the DH has not been formally assessed via a randomized controlled trial. However, to provide a preliminary indication of effectiveness, for an earlier study (Battle et al, 2006) we obtained approval from the hospital's Institutional Review Board (IRB) to analyze pre- and post-treatment depression symptom scores collected from a subset of women who were treated at the DH between 2001–2002. The EPDS (Cox et al, 1987) is a widely used self-report scale validated as a method to assess depressive symptoms not only during the postpartum period, but also during pregnancy (Murray & Cox, 1990). Respondents indicate the extent to which they agree with 10 statements, such as “*I have been so unhappy that I have been crying*” and “*I have blamed myself unnecessarily when things went wrong.*” This measure is routinely administered at treatment intake, and at treatment discharge, when possible. The standard cut-off point used to indicate possible major depression is ≥ 13 . We examined the EPDS scores obtained at treatment intake and treatment discharge within a sample of 81 pregnant and postpartum DH patients seen during 2001–2002 who had both pre-treatment and post-treatment EPDS scores available. In this sample of women, significant reductions in depressive symptoms were observed. Specifically, on average, patients' depression scores dropped from 20.9 (± 4.9) points at intake, to an average score of 12.0 (± 5.2) points at discharge, representing a statistically significant mean reduction in symptoms ($t(80) = 13.2, p < 0.001$). In addition, we used Jacobson et al's (1991) method for evaluating the clinical significance of treatment change, a procedure recently applied to the EPDS by Matthey (2004). This approach classifies individuals into one of four categories: (1) *recovered*, defined as a reliable change of 4 or more points in which the EPDS score is in the depressed range (>13) at pre-treatment and <12 at post-treatment; (2) *improved (but not recovered)*, defined as a reliable change of 4 or more points in which the EPDS score is reduced yet still in the depressed range (>13) at post-treatment; (3) *deteriorated*, defined as a reliable change of 4 or more points in the EPDS score became more elevated over the course of treatment; (4) *no reliable change*, defined as a change in EPDS score less than 4 points over the course of treatment. Comparing their pre-vs. post-treatment depressive symptom levels, we determined that 53.2% of the patients in this sample (42/79) would be categorized as *recovered*, 25.3% (20/79) would be classified as *improved (but not recov-*

ered), and 21.5% (17/79) as experiencing *no reliable change*. No patients in this sample showed evidence of clinical deterioration. Although we cannot be certain that patients' improvement is attributable to DH treatment, the fact that the majority of women in this sample showed clinically significant improvement is encouraging.

We also assessed the acceptability of the program by analyzing anonymous patient satisfaction data obtained from a subset of DH patients who completed the program. In order to provide an ongoing mechanism evaluate patient satisfaction with the DH program, the DH director and staff developed a brief program evaluation survey composed of forced-choice and open-ended items designed to assess patient satisfaction; the survey is administered within a week of discharge. Because the survey is optional for patients to complete and return, completed satisfaction surveys are not available for all patients who take part in the program. Following IRB approval, we analyzed all responses collected between 2001–2004 and found that patients who returned the survey generally reported a high level of satisfaction with the care received at the DH. Specifically, over 96% of these DH patients stated the program was helpful (364/378 respondents); 99% noted that staff respected their wishes and needs (374/378 respondents); 86% were comfortable with contact made to their family member (267/311 respondents); 97% felt satisfied with care given to their child (223/231 respondents); 92% reported currently using skills learned at the DH (348/377 respondents); finally, 98% stated that would recommend the program to others (367/375 respondents).

Recommendations and conclusion

The mother-baby DH program described in this report has been in existence for over five years and during this time we have been encouraged to see this model of care embraced by patients as well as local medical providers, administrators, and insurers. Since the inception of the program, we have received numerous inquiries from mental health professionals from across the U.S. who are interested in developing specialized services to treat perinatal psychiatric disorders. This has suggested to us that growing interest exists in developing new types of programs for pregnant and postpartum women. While we have been fortunate to establish and sustain a specialized service for perinatal psychiatric disorders, we recognize that not all communities will be able to maintain such a program, even if some clinical need exists. Careful analysis of the clinical demand, current resources, and level of local interest may help determine whether such a program is likely to be successful. To that end, we

recommend collaborating with local hospital administrators, medical directors, and insurance company representatives if attempting to start a specialized perinatal service.

When a separate program is not possible, existing psychiatric services may be able to promote improvements in their care of perinatal patients in other ways, such as by providing educational workshops for mental health providers and community members regarding the prevalence, signs, and symptoms of perinatal disorders; by maintaining up-to-date referral lists of local providers with expertise in providing psychotherapy and pharmacotherapy to these populations; and by informing patients and family members about relevant national advocacy groups (e.g., Depression After Delivery, Postpartum Support International).

The field of psychiatry has demonstrated a growing awareness of women's perinatal mental health needs; accordingly, greater emphasis is now placed upon screening for depression and other disorders among pregnant and postpartum women at routine primary care appointments. Over the past five years, we have found a specialized, mother-baby day hospital service to be a fiscally viable, clinically effective, and acceptable approach in treating pregnant and postpartum psychiatric patients. We are hopeful that future research, in conjunction with innovations in service delivery, will continue to enhance women's psychiatric care during the perinatal period.

Acknowledgements

Preparation of this manuscript was supported in part by National Institute of Mental Health career development award (MH066402) to the second author.

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Correspondence: Margaret Howard, PhD, Day Hospital, Women and Infants' Hospital, 101 Dudley St., Providence, RI 02905, U.S.A; e-mail: Margaret_Howard@brown.edu

OBSTETRICS

Postpartum depression

Teri Pearlstein, MD; Margaret Howard, PhD; Amy Salisbury, PhD; Caron Zlotnick, PhD

We reviewed selected studies about the diagnosis and treatment of postpartum depression (PPD). Despite methodologic limitations, the results of several studies can provide treatment options for women with PPD. Women face difficult dilemmas about the negative effects of untreated psychiatric disorder in the postpartum period vs the risks of exposure to the breastfeeding infant from psychotropic medication. We have included a limited discussion about postpartum blues and postpartum psychosis.

PPD

Postpartum blues

Postpartum blues have been reported to occur in 15-85% of women within the first 10 days after giving birth, with a peak incidence at the fifth day.¹ Common symptoms include mood swings, mild elation, irritability, tearfulness, fatigue, and confusion.^{1,2} Antenatal depression, previous depression not re-

lated to pregnancy, and previous premenstrual dysphoria have been identified as risk factors.¹ No clear biologic measure has been identified to be causative or predictive of postpartum blues. Although postpartum blues is a common and transient postpartum occurrence and generally does not require intervention, its recognition is important because postpartum blues is a risk factor for subsequent PPD.³

From the Department of Psychiatry and Human Behavior (Drs Pearlstein, Howard, and Zlotnick), Day Hospital Program (Dr Howard), Department of Pediatrics and Fetal Behavior Studies, Brown Center for Children (Dr Salisbury), Women's Behavioral Health Program (Dr Zlotnick), The Warren Alpert Medical School of Brown University, Women and Infants Hospital, Providence, RI.

Received Aug. 27, 2008; revised Oct. 30, 2008; accepted Nov. 17, 2008

Reprints: Teri Pearlstein, MD, Associate Professor, Department of Psychiatry and Human Behavior, The Warren Alpert Medical School of Brown University, Director, Women's Behavioral Health Program, Women and Infants Hospital, 101 Dudley St, Providence, RI, 02905. Teri_Pearlstein@brown.edu.

Authorship and contribution to the manuscript is limited to the 4 authors indicated. There was no outside funding or technical assistance with the production of this article.

0002-9378/\$36.00

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doi: 10.1016/j.ajog.2008.11.033

Postpartum depression (PPD) affects up to 15% of mothers. Recent research has identified several psychosocial and biologic risk factors for PPD. The negative short-term and long-term effects on child development are well-established. PPD is under recognized and under treated. The obstetrician and pediatrician can serve important roles in screening for and treating PPD. Treatment options include psychotherapy and antidepressant medication. Obstacles to compliance with treatment recommendations include access to psychotherapists and concerns of breastfeeding mothers about exposure of the infant to antidepressant medication. Further research is needed to examine systematically the short-term and long-term effect of medication exposure through breastmilk on infant and child development.

Key words: antidepressant, postnatal depression, postpartum depression, psychotherapy, treatment

lated to pregnancy, and previous premenstrual dysphoria have been identified as risk factors.¹ No clear biologic measure has been identified to be causative or predictive of postpartum blues. Although postpartum blues is a common and transient postpartum occurrence and generally does not require intervention, its recognition is important because postpartum blues is a risk factor for subsequent PPD.³

PPD: diagnosis and epidemiologic factors

PPD is defined strictly in the psychiatric nomenclature as a major depressive disorder (MDD) with a specifier of postpartum onset within 1 month after childbirth.⁴ However, depression in women during the postpartum period may start during pregnancy or may have onset beyond the first postpartum month.⁵ To meet criteria for MDD, depressed mood or loss of interest or pleasure in activities must be present for at least 2 weeks. In addition, symptoms of sleep disturbance, appetite disturbance, loss of energy, feelings of worthlessness or guilt, diminished concentration, and thoughts of suicide may be present.⁴ The diagnosis of PPD is challenging because of changes in sleep patterns, changes in appetite, and excessive fatigue being routine for women after delivery.⁶

The optimal time to screen for PPD is between 2 weeks and 6 months after delivery.⁶ Several self-report measures that are available to screen for PPD include the Edinburgh Postnatal Depression Scale,⁷ which is a validated and widely used 10-item questionnaire. An Edinburgh Postnatal Depression Scale score of ≥ 12 is indicative of probable PPD.⁷ The Postpartum Depression Screening Scale⁸ is another self-report screening measure that is popular with clinicians because of its construct validity and emphasis on clinical domains; however, because of high false-positive rates for PPD, it has been reported to be less accurate than the Edinburgh Postnatal Depression Scale.⁹

A systematic review of studies that diagnosed depression by clinical structured interview reported that the point prevalence of MDD and minor depression ranged from 6.5-12.9% through the first 6 postpartum months, peaking at 2 and 6 months after delivery.⁵ A large cohort study that was conducted in Denmark reported that the first 90 days after delivery represented a time of increased risk of new-onset psychiatric disorder (mostly PPD) in new primiparous mothers, but not in new fathers.¹⁰ Other recent studies document an increased risk of MDD during the postpartum period.^{11,12} The prevalence of PPD varies in

non-Western countries from 0.5–60%; cultural factors can influence the development and reporting of PPD.¹³

Psychosocial risk factors for PPD include MDD during pregnancy, anxiety during pregnancy, previous nonpuerperal MDD, previous premenstrual dysphoria, stressful life events during pregnancy or the early puerperium, poor social support, marital conflict, low income, immigrant status, and young maternal age.^{14,15} A recent study identified previous depression, current depression and anxiety, and low partner support as key risk factors.¹⁶

PPD may be related to a differential sensitivity to hormonal fluctuations. Euthymic women with previous PPD experienced dysphoria after both the addition and withdrawal of supraphysiologic doses of estradiol and progesterone, compared with healthy control subjects.¹⁷ In addition to sensitivity to estrogen and progesterone fluctuations, biologic theories have included fluctuations of other gonadal hormone and neuroactive steroid levels after delivery, altered cytokines and HPA axis hormones, and altered fatty acid, oxytocin, and arginine vasopressin levels.^{18,19} Involvement of the serotonin system has been suggested by reports of altered platelet serotonin transporter binding²⁰ and decreased postsynaptic serotonin-1A receptor binding in the anterior cingulate and mesiotemporal cortices.²¹ A recent study that used a functional magnetic resonance imaging (fMRI) neuropsychologic activation paradigm suggested altered neural processing in women with PPD.²²

Normal fluctuations in hormonal levels during pregnancy and after delivery result in changes in sleep patterns. Declining levels of progesterone in the early postpartum period promote insomnia.²³ In the first postpartum month, decreased sleep efficiency and increased slow wave sleep have been reported.^{23,24} The changes in hormones and sleep during the early postpartum period may contribute major vulnerability to the onset of PPD. A recent study identified difficulty falling asleep in the first 3 months after delivery as a possible risk factor for PPD.²⁵ In addition, infant sleep distur-

bance may be both a risk factor for and an outcome of PPD in the early postpartum period.^{26,27} Studies have suggested that persistent infant and child sleep problems are related to maternal depression.^{28,29} Despite the consistent findings of a relationship between maternal depression and infant and child sleep problems, a causal pathway has not been determined, and few studies have measured infant sleep objectively.

Role of obstetricians and pediatricians

Numerous studies have reported on the low rates of screening, diagnosis, and treatment of perinatal depression in medical settings. Clinician discomfort with psychiatric disorders, time constraints, low belief in maternal mental health having an important effect on child development, and lack of knowledge about resources are some of the barriers to clinician screening for psychiatric disorders in medical settings.^{30–32} However, the postpartum obstetric visit and pediatric well-baby visits are opportunities for the clinician to assess the mother's clinical status.^{31,33} Although women with PPD are often hesitant to divulge their mood and anxiety symptoms to their clinician because of guilt about having symptoms when motherhood is expected to be joyful, there may be indicators that further evaluation is needed. For example, PPD may lead to negative maternal perceptions of infant temperament and behavioral patterns; such complaints should be addressed in the context of the infant's behavior and how well the mother is coping with these difficulties.³⁴ PPD has been associated with frequent nonroutine visits to the pediatrician; such visits and telephone contacts may be warranted but could also be an indicator for further assessment of maternal mood and family functioning.³⁵ Follow-up with the woman who is referred for treatment within the practice or to a mental health clinician reinforces the importance of treatment recommendations.

Risks to children of not treating PPD

There is a well-established relationship between untreated maternal depression

and impaired child development.^{36,37} Infant and child outcomes that are associated with PPD include a higher incidence of excessive infant crying or colic, sleep problems, and temperamental difficulties.^{34,38} Infant crying and sleeping problems may increase the risk for new onset PPD but may also be reported more frequently by women with PPD. In a study of > 600 infants, objective evidence of infant regulation difficulties were found as early as 1 month after delivery, with infants of mothers with PPD having poorer self-regulation, more stress signs, and heightened arousal compared with infants of mothers without PPD.³⁹ PPD is associated with negative mother-infant interactions that include maternal withdrawal, disengagement, intrusion, and hostility.^{40,41} Women with PPD may be less likely to initiate or maintain breastfeeding; depressive symptoms commonly precede the early cessation of breastfeeding.^{42,43}

PPD is linked to poor cognitive functioning, behavioral inhibition, and emotional maladjustment in infants and children.^{44–46} Persistent untreated maternal depression is associated with violent behavior and externalizing disorders (eg, conduct disorders)^{47–49} and with psychiatric and medical disorders in adolescence.⁵⁰ The complex relationship between maternal depression and child behavioral-emotional development is not yet understood but is likely to be a multidimensional progression that may onset during pregnancy. Women with PPD often have been depressed during pregnancy,⁵ which is a potential source of exposure or influence on the fetus. The few published studies on the effects of antenatal depression on fetal outcomes have not always used a diagnosis of MDD but have shown that higher levels of self-reported depressive symptoms during pregnancy were related to heightened fetal behavioral and physiologic reactivity.⁵¹ Alterations in fetal neurobehavioral development are likely to influence infant outcomes. The serious negative effects of PPD on the mother, the infant, and the other family members have made the recognition, prevention, and treatment of PPD a current area of

noted public health significance. Recent evidence suggests that successful treatment of PPD may not be sufficient to improve attachment, temperament, and cognitive development in infants and toddlers,^{52,53} which indicates that efforts toward the prevention and treatment of depression during pregnancy and after delivery are critical. Additional focus on mother-infant attachment and the needs of the family are also indicated.

Suicide during the postpartum period

Completed suicide rates are lower during the postpartum period compared with nonpuerperal time periods, although rates in postpartum adolescents are higher than in older postpartum women.⁵⁴ A study of perinatal maternal deaths in the United Kingdom from 1997-1999 reported that suicide was the leading cause of maternal death, was increased in women with psychiatric and substance abuse disorders, and was more likely to be a violent death compared with the suicides of men and nonpuerperal women.⁵⁵ Suicide may also be a leading cause of maternal deaths in Australia.⁵⁶

A study of a United States population sample reported that there was a 3 times greater risk of a suicide attempt and that inpatient psychiatric admissions were increased after fetal death or infant death in the first postpartum year.⁵⁷ In this study, labor and delivery complications, cesarean section, preterm delivery, low birthweight, and congenital malformations were not associated with increased risk of suicide attempts. A review of studies that confirmed that suicide rates are lower during pregnancy and the postpartum period emphasized that perinatal women complete suicide by more violent and lethal means than do women who are not perinatal.⁵⁸ Assessment of suicidality in the perinatal woman should include specific inquiry about depressed mood, substance abuse, previous suicide attempts, current or previous psychiatric illness, previous trauma, current intimate partner violence, and access to firearms.^{58,59}

Postpartum psychosis

Postpartum psychosis occurs in 1 of 500 mothers, with rapid onset in the first 2-4 weeks after delivery.⁶⁰ Postpartum psychosis includes confused thinking, mood swings, delusions, paranoia, disorganized behavior, poor judgment, and impaired functioning.⁶¹ Postpartum psychosis is considered a psychiatric emergency and usually results in inpatient psychiatric hospitalization. Risk factors include a previous episode of postpartum psychosis, previous hospitalization for a manic or psychotic episode, recent discontinuation of mood stabilizers, primiparity, obstetric complications, sleep deprivation, and a family history of bipolar disorder or postpartum psychosis.⁶¹⁻⁶³ Longitudinal studies suggest that most cases of postpartum psychosis are related to bipolar disorder, not schizophrenia.⁶¹

Neonaticide and infanticide

Infanticide is 1 of the most serious risks of postpartum psychosis. The rate of homicide of infants up to 1 year of age is 8 per 100,000 in the United States,⁶⁴ but it is unknown how many women with postpartum psychosis commit infanticide. Symptom exacerbation, command hallucinations, and the stressor of new infant care can increase the risk of infanticide after delivery in a mother with psychosis.⁶⁵ Infanticide may also occur in the context of severe PPD, caused by neglect and abuse, because of the child being unwanted or as revenge against the infant's father.^{65,66} Between 16% and 29% of mothers who kill their children also kill themselves.⁶⁴ *Neonaticide* is defined as killing a newborn infant within 24 hours of birth and is associated with denial of pregnancy, lack of prenatal care, dissociation, depersonalization, and intermittent amnesia of delivery.^{64,67} More study is needed of risk factors for neonaticide and infanticide.⁶⁴ Intrusive thoughts of potential accidental harm occurring to a newborn infant are ubiquitous, and intrusive thoughts of intentionally harming an infant are also common.⁶⁸ It is important to reassure women that intrusive thoughts of harm

to an infant or thoughts of infanticide rarely are acted upon.

Treatment of PPD

Psychotherapy

Interpersonal psychotherapy (IPT), a short-term efficacious treatment for MDD that addresses interpersonal issues (such as role change, the marital relationship, social support, and life stressors) is highly pertinent to the needs of women during the postpartum period.⁶⁹ A randomized controlled trial (RCT) reported that 12 sessions of individual IPT was superior in efficacy to a waitlist control in 120 women with PPD in reducing depression and improving social adjustment.⁷⁰ A smaller RCT in women with PPD also reported that individual IPT was superior to a wait-list condition.⁷¹ Additionally, 2 small open studies of group IPT demonstrated significant reduction of depression in women with PPD.^{72,73}

Systematic reviews of treatments for PPD have suggested that individual IPT, cognitive-behavior therapy (CBT), and psychodynamic therapy may be effective psychologic treatments for PPD.⁷⁴ Overall, psychologic treatments for PPD demonstrate moderate effect sizes⁷⁵; antidepressant medications demonstrate larger effect sizes.⁷⁶ Methodologic flaws of studies of psychosocial treatments include small sample sizes, short-term treatments, lack of control groups, poorly defined treatment interventions and outcome measures, lack of partner participation, and lack of assessment of infant outcome.⁷⁴ Although 1 study included partners as 1 component of psychologic treatments,⁷⁷ there has not been systematic study of couples therapy in women with PPD. Initial positive reports that deserve further study include telephone support, lay peer support, individual counseling in the home, nurse-led or health visitor-led support groups, and group therapy led by mental health clinicians.^{74,78} Women with mild PPD may respond to treatment by nonmental health professionals or to individual or group counseling with a mental health professional, although women with more severe PPD may need IPT or CBT to be administered by trained profes-

sionals and/or antidepressant medication.⁷⁸ Women who are breastfeeding may prefer psychotherapy over medication for the treatment of PPD.⁷⁹⁻⁸¹ Barriers to participation in psychotherapy include perceived negative stigma, lack of availability of a trained therapist in IPT or CBT, time commitment, child-care needs, and cost.⁸²

Mother-baby units

The United States has lagged behind Europe and Australia in the recognition and treatment of perinatal psychiatric disorders. The practice of joint admission of mothers and infants was prompted by concerns about disrupting the mother-infant relationship during intensive psychiatric treatment. The first joint mother-baby admission occurred in the United Kingdom 60 years ago, and joint admission now takes place routinely in the United Kingdom, Australia, France, Belgium, Germany, and the Netherlands. Parent-infant units have been established in Australia. The only known current mother-baby unit in the United States is conducted as a psychiatric partial hospital.⁸³ Advantages of mother-baby units include support, absence of breastfeeding disruption or cessation, multidisciplinary treatment of PPD, direct observation of mother-infant interaction, and the promotion and modeling of a healthy maternal-child relationship.

Antidepressant treatment

Four RCTs with antidepressant medication have been conducted in women with PPD; 2 were placebo-controlled, and 2 were active comparator studies. One placebo-controlled RCT compared immediate-release flexible-dosed paroxetine with placebo in 70 women with postpartum onset of MDD.⁸⁴ After 8 weeks of treatment, both groups improved significantly over time, but paroxetine was superior to placebo in terms of remission of depression (remission rates were 37% and 15%, respectively). Approximately 40% of the subjects in this study were breastfeeding, but the effects in infants were not described in the published study.⁸⁴ Another placebo-controlled RCT compared fluoxetine,

placebo, and counseling (based loosely on CBT principles) in 87 women with PPD.⁸⁵ Women were assigned randomly to 12 weeks of fluoxetine 20 mg daily and 6 counseling sessions, fluoxetine 20 mg daily and 1 counseling session, placebo and 6 counseling sessions, or placebo and 1 counseling session. Fluoxetine was significantly superior to placebo in reducing the severity of depressive symptoms. The combination of fluoxetine and 6 sessions of counseling were not superior to either treatment alone. Women who were breastfeeding were excluded from this study; most of the women who were enrolled had mild-to-moderate severity of depressive symptoms.

A comparator RCT randomly assigned 109 women with PPD to sertraline or nortriptyline, both of which were administered in an escalating dose regimen over 8 weeks.⁸⁶ Almost one-half of the subjects remitted by week 8 on either antidepressant. No adverse effects in breastfeeding infants were reported, and infant serum levels were near or below quantifiable levels.⁸⁶ Another comparator RCT compared paroxetine with combined paroxetine/CBT in 35 women with PPD and comorbid anxiety disorders.⁸⁷ Paroxetine was flexibly dosed over 12 weeks, and CBT was provided in 12 individual sessions. Both treatments led to significant improvements on measures of depression, and there were no significant differences between treatments. Approximately one-half of the subjects were breastfeeding, but antidepressant side-effects and serum levels in infants were not reported. The anxiety comorbidity in the latter study and the lack of a placebo control in both of these comparator RCTs limits conclusions about the efficacy of these treatments for PPD. Notably, the remission rate with paroxetine was lower in the paroxetine study that included a placebo control.⁸⁴ Small open trials and case reports have also suggested efficacy of antidepressants for the treatment of PPD.^{82,88}

Additional treatments

Studies have suggested a benefit with infant massage,⁸⁹ exercise,⁹⁰ sleep deprivation,⁹¹ infant sleep intervention,⁹² and electroconvulsive therapy.⁹³ Studies

have reported that postpartum use of estrogen may have a role,^{94,95} although the postpartum use of progesterone has not been promising.⁸² A small study reported that early morning bright light therapy was not more effective than sham dim red light in the reduction of depressive symptoms.⁹⁶ Two recent RCTs failed to demonstrate superior efficacy of omega-3 supplementation, compared with placebo.^{97,98}

Antidepressants and breastfeeding

The breastfeeding woman with PPD must weigh the potential efficacy of antidepressant medication for her depression, the potential risks of exposure of her infant to antidepressant medication through the breastfeeding, and the known negative effects of not treating her depression on child development. Breastfeeding has multiple benefits for a developing infant,⁴² and a woman with PPD may believe that breastfeeding is an important positive experience that she is able to share with her infant in her depressed state. There is a growing observational database of side-effects in infants who are exposed to antidepressants through breast milk, and the choice of medication should be chosen after review of these data.⁹⁹ The Food and Drug Administration has announced that, in the future, medications will be classified by their risk summary, clinical considerations, and data in terms of lactation.¹⁰⁰ Measurement of infant antidepressant serum levels and breast milk analyses are not obtained routinely in clinical care,¹⁰¹ and milk-to-plasma ratios may not be relevant to adverse effects.¹⁰² When an antidepressant is started in the woman after delivery, it is recommended to start with low doses and to titrate the dose up slowly while monitoring the infant for adverse effects.⁸² Possible adverse effects in the breastfeeding infants include irritability, sedation, poor weight gain, or a change in feeding patterns.^{103,104} Adverse events are most likely to occur in newborn infants up to 8 weeks of age, and infants who are born prematurely or with medical problems may be at increased risk.¹⁰³ Infant exposure to antidepressant medication can be minimized by avoiding breastfeeding at the

time of peak antidepressant concentration in the breast milk.¹⁰⁵ If adverse effects in the infant are noted, options include decreasing the dose, changing to partial or full bottlefeeding, or changing the medication. Collaboration between the pediatrician and mental health clinician is important.

Several reviews of the safety of selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs), and newer antidepressants with breastfeeding have been conducted.^{99,104,106,107} A pooled analysis of antidepressant levels in mother-infant dyads concluded that sertraline, paroxetine, and nortriptyline usually yield undetectable infant serum levels and that elevated infant levels are more likely with fluoxetine and citalopram.¹⁰⁷ Sertraline has been reported to have minimal or no effect on central serotonin transport in the infant.¹⁰⁸ Case reports of adverse effects in breastfeeding infants have been reported with fluoxetine, citalopram, doxepin, bupropion, and nefazodone.^{82,88,101} If after delivery, a woman is euthymic with antidepressant therapy that is known to be associated potentially with mild adverse effects or high infant serum levels, it may be more advisable to monitor the infant carefully rather than to switch the antidepressant.^{82,104} Even if there are no adverse effects and unquantifiable levels in infants, the long-term effects of antidepressant exposure through breast milk on child cognitive, motor, neurologic, and behavioral development are unclear.¹⁰⁹

Other psychotropic medications and breastfeeding

Some women with PPD may be administered an adjunctive benzodiazepine for anxiety or insomnia. Sedation and poor feeding have been reported in breastfeeding infants who are exposed to benzodiazepines, and divided low doses has been advised.¹⁰¹ Other psychotropic medication may be used by breastfeeding women with bipolar or psychotic illness or severe depression. Even though it was reported recently that lithium could be used during breastfeeding with careful infant serum level monitoring,¹¹⁰ lithium generally has not been recom-

mended during breastfeeding because of reports of hypothermia, hypotonia, cyanosis, T-wave inversion, and lethargy reported in infants.^{61,101,111} There is a paucity of data about the safety of the newer antiepileptic drugs and atypical antipsychotics.¹⁰⁵ Valproate and carbamazepine have been used safely during breastfeeding. It was reported recently that infant serum levels of lamotrigine are variable and sometimes high after breastfeeding.¹¹² Preliminary data have suggested that oxcarbazepine, topiramate, gabapentin, and levetiracetam are not associated with adverse effects.^{61,105,111} Sporadic adverse effects have been reported with olanzapine, clozapine, and traditional antipsychotics.¹¹³ Infant monitoring should match the monitoring of potential adverse events that is used in adults.¹⁰⁵ Studies that evaluate the long-term effect on child development after breastfeeding exposure to anxiolytics, mood stabilizers, and antipsychotics are needed.

Treatment dilemmas for women with PPD

It can be argued that the risks of exposure to PPD outweigh at least the short-term risks of infant exposure to antidepressants through breast milk, because the multiple negative effects of untreated PPD on short-term and long-term child development are well-established. In addition to the multiple known benefits for infants with breastfeeding,⁴² a recent large sample study reported that prolonged and exclusive breastfeeding was associated with improved cognitive development in 6-year-old children.¹¹⁴ Women who are breastfeeding may prefer psychotherapy over medication for the treatment of PPD, but it may be less effective than pharmacotherapy for severely depressed women. For these women and for women whose symptoms are unresponsive to nonpharmacologic treatments, the consideration of antidepressant medication may be necessary. All psychotropic medications pass into breast milk, and the potential for infant exposure exists with each medication. Although observational reports suggest a lack of short-term adverse effects in infants with many psychotropic

medications, few studies have examined long-term effects. Discussions of the treatment options with the patient and her partner after delivery must include the patient's personal psychiatric history and previous response to treatment, the risks of no treatment, available data about the safety of medications with breastfeeding, and her individual expectations and treatment preferences.¹⁰³ Time constraints, financial restraints, and perceived cultural dissonance can lead to poor treatment adherence. Even with treatment adherence support in low-income mothers in Chile, the initial benefit of multicomponent care (including psychosocial support and medication) for PPD, compared with usual care, was attenuated after 6 months.¹¹⁵

Comment

Future efforts hopefully will improve the screening and identification of psychiatric disorders in women at their postpartum visit with the obstetrician and at well-baby visits with the pediatrician. Untreated depression and psychotropic medications for the breastfeeding woman each involve exposure of the child to potential short-term and long-term negative effects. Psychotherapy is a treatment option for women with PPD, with IPT being the most validated psychotherapy to be studied to date. Antidepressant medications are also efficacious for PPD. The critical goal of treatment is the resolution of the mother's psychiatric symptoms. Breastfeeding has multiple known benefits for infant development, and a breastfeeding woman with PPD does not need necessarily to decline pharmacotherapy. Sertraline is the first-line antidepressant used in PPD in breastfeeding women because of the paucity of adverse effects that have been reported in breastfeeding infants. Paroxetine or nortriptyline are second-line agents in women who are unable to tolerate or who do not respond to sertraline. Clinicians and patients can monitor current knowledge about breastfeeding and medications through publications¹¹⁶ and websites that update and review published information frequently (such as LactMed on <http://toxnet.nlm.nih.gov>, www.mededppd.org, [APRIL 2009 American Journal of Obstetrics & Gynecology 361](http://www.</p>
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postpartum.net, www.womensmental-health.org, and www.motherrisk.org). Although antidepressants appear to be effective for PPD, there is a need for large placebo-controlled RCTs of antidepressants in women with PPD of a least moderate severity. Breastfeeding women must be included in pharmacotherapy trials, and potential adverse effects in infants must be assessed systematically. Future studies are needed to confirm the efficacy of psychotherapies for PPD, compare antidepressants to psychotherapy, and compare combined psychotherapy/antidepressant treatment to either treatment alone. Further studies of the factors that govern treatment selection and systematic studies of nonpharmacologic and alternative treatments are needed. Longitudinal follow-up studies that will examine the long-term effects of untreated maternal depression and exposure to psychotropic medication on infant and child cognitive, motor, behavioral, and neurologic development are critically needed to help guide women with depression during the postpartum period. ■

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