

The Postpartum Brain

New research casts light on the depression and troubling thoughts many mothers experience after childbirth. And it may help erase some of the stigma they feel.

BY ANNA J. ABRAMSON



Don Baker

WHEN DAWN ROUSE WATCHES THE HOME video of her daughter's third birthday, she sees the familiar details of a child's party: family, friends, cake. But something is painfully wrong with the picture. Dawn appears detached and vacant onscreen, and ultimately she wanders off while the party goes on without her.

That's because for years after her daughter Emily's birth, Dawn struggled with a debilitating depression that kept her from enjoying even the presence of her own little girl. Sometimes she felt sad and distant; at other times she was haunted by anxieties she couldn't control. On one occasion, she remembers pushing Emily's stroller and suddenly thinking, "I could drop her to the bottom of the lake and it would be at least four hours before anyone would know. Then at least I could get four or five hours of solid sleep."

Surveys show that many mothers—even those not diagnosed as depressed—experience similarly disturbing thoughts, images, and fantasies. Research has found that 85 percent of new mothers experience the "baby blues," a passing period

of sadness or irritability. A mother likely has postpartum depression, a serious condition that affects about 15 percent of new mothers, when her depressed mood persists, intrusive thoughts become increasingly distressing or frequent, and other symptoms of major depression arise. Many of these mothers imagine horrifying scenarios involving their newborns and, sometimes, suffer from tremendous guilt and fear as a result. Like Dawn, the vast majority would never act on these frightening impulses. Only exceedingly rare cases, termed postpartum psychosis, lead to actual violence against infants.

Yet despite the prevalence of these thoughts among new parents, mothers rarely feel comfortable enough to discuss them. Instead, afraid or ashamed, they suffer in silence, confused by what's going on in their minds and terrified that it means they're unfit mothers.

New research findings may offer some consolation to these mothers. For the first time ever, scientists are using specialized techniques to examine the postpartum brain. Their findings

Leckman and Swain's research suggests there may be a very fine line between healthy changes in new mothers' brains and changes that can become disruptive.

are honing in on physiological and evolutionary explanations for why so many mothers are prone to intrusive thoughts, and why this normal level of postpartum anxiety might, for mothers like Dawn, escalate into a serious illness. In the process, this and other research could serve as a catalyst for more open discussion and, eventually, a better understanding of postpartum depression.

Scanning the postpartum brain

At Yale University, researchers recently completed a groundbreaking study of new moms and dads. They used functional magnetic resonance imaging (fMRI)—a technique that tracks blood flow and related patterns of activity in the brain—to see which neural circuits became active when healthy parents saw and heard their babies. Prior studies had examined parents' brains as they looked at photos of their babies, finding activity in brain areas associated with pleasure and positive mood. But when parents in the Yale study heard their babies cry, the researchers observed activity in neural networks closely associated with obsessive-compulsive disorder (OCD), as well as in brain areas associated with social emotions such as empathy. Strikingly, it seemed that listening to their babies cry triggered a deeply anxious neural response even in parents who hadn't been diagnosed with a psychological problem.

OCD is a psychiatric condition characterized by highly distressing thoughts (obsessions) and ritualistic behaviors (compulsions). OCD patients experience a heightened sense of anxiety and a corresponding need to compensate for those distressing thoughts with compulsive behavior, which could include incessant hand washing, praying—or constantly checking on a newborn child.

The researchers offer an evolutionary hypothesis for the neural signs of anxiety they saw in these parents. They believe that, after the birth of a child, a period of high alert may have helped parents protect their babies from environmental harm in times when this was a treacherous and all-consuming task. "Those mothers who were more careful with the baby were more likely to have a baby live," and thus pass on this obsessive-compulsive tendency, suggests James Swain, a psychiatrist and neuroscientist who worked on the project.

James Leckman, another investigator on the project and the research director of the Yale Child Study Center, says he's found that a certain level of elevated anxiety and distress is normal in parents. In fact, in an earlier study, he and other researchers found that 30 percent of healthy parents reported having thoughts that they themselves would harm their newborns. In the weeks before delivery, 95 percent of mothers and 80 percent of fathers reported OCD-type

thoughts. In this healthy population, obsessive thoughts are fleeting and only mildly distressing. The Yale researchers hypothesize that the healthy maternal brain is hardwired for a period of "transient OCD."

But, says Swain, once mothers are endowed with this kind of neural "machinery," there's a danger they "could connect up OCD behaviors with irrational things not for survival." In a paper on their research, the Yale scientists write, "Perhaps evolution is not a perfect editor." In other words, sometimes certain behaviors persist beyond the point that they're useful.

Their evolutionary hypothesis suggests it is critical for mothers to respond emotionally to their newborns but, the researchers write, "Too much or too little primary parental preoccupation may be problematic." Some mothers with postpartum depression feel emotionally numb and cannot care for or interact with the newborn. These mothers report a disorienting sense of detachment and apathy. On the other hand, mothers with a more anxious depression feel emotionally charged and cannot inhibit thoughts and impulses concerning the baby's care. And for many mothers, the symptoms of depression and anxiety overlap. The researchers suggest that while very mild OCD might be adaptive in healthy mothers, a lack or an excess of this obsessive emotional vigilance could play a role in postpartum depression and anxiety.

Ruta Nonacs, a psychiatrist at the Women's Mental Health Clinic at Massachusetts General Hospital, says the Yale study's findings resonate with her clinical experience. "Both depressed and nondepressed mothers have a heightened sense of vigilance, the tendency to obsess, but then you have this proportion of women who go way beyond," she says. "There's no squelch mechanism. Those impulses just go on and on."

Katherine Stone, who was diagnosed with postpartum OCD after giving birth to her son, was one of those mothers who didn't have that squelch mechanism. "I was supercharged—hypervigilant," she says. "I kept having thoughts about dropping him down the stairs, drowning him. You get to this point where you don't trust yourself because the self you knew would never have that thought. It's a vicious cycle."

Leckman and Swain's findings add to a substantial body of research that has uncovered specific biological mechanisms associated with parental care and postpartum depression. Leckman says that postpartum depression likely has a genetic basis. In fact, research has already identified 10 distinct genes associated with parental behavior. In "gene knockout" studies of rodents, he says, researchers have removed entire genes associated with maternal care; in some studies, those rodents responded by ignoring their pups or losing the aggressiveness needed to defend



Claudio Calligaris

Dawn Rouse struggled with depression in the years after her daughter's birth. She's now pursuing a Ph.D. in child development and has become committed to raising public awareness on postpartum illness.

them. In humans, Leckman explains, the issue is not a complete absence of certain genes, but may instead involve genetic variations that influence maternal behavior.

Nonacs also suggests that some cases of postpartum depression may be linked to changes in women's hormone levels after they give birth, particularly in mothers who are already vulnerable to depression. These women might have prolonged hormonal imbalances after childbirth, causing them to respond with excessive emotion to stressful events. For instance, following a distressing incident, they might experience a rapidly beating heart or intense concentration, but then lack the hormonal responses to crank these physiological changes back down to normal levels. As a result, they find themselves in a perpetual state of high arousal.

Social factors probably exacerbate these biological underpinnings of postpartum illness. Prolonged sleep deprivation, for example, is a known risk factor for psychiatric illness and may help explain why, for many mothers, the onset of postpartum depression is gradual rather than sudden. Sandra Poulin, a mother in Dallas, Texas, says she was overjoyed after the birth of her daughter. But as months passed without sleep, she found herself becoming more and more depressed. "I couldn't move—I was just lead. I was exhausted to the core."

Lifting the silence

New studies on the biology of postpartum illness may help remove some of the stigma and silence surrounding depression after childbirth. Combined with the statistics on the prevalence of postpartum depression, the Yale study's results indicate that a considerable number of new mothers experience some sadness or anxiety in addition to the often-reported elation or fulfillment of having a child. Indeed, Leckman and Swain's research suggests there may be a very fine line between natural, even healthy changes in new mothers' brains and changes that can become disruptive and dysfunctional. This finding could help bolster advocates' efforts to open up public discussion about the complexities and difficulties associated with early parenting.

These advocates claim that contemporary public discourse emphasizes the joys of motherhood while downplaying the natural anxieties that come with it. Jane Honikmann, the founder and former president of Postpartum Support International, an organization that promotes research, advocacy, and support groups for postpartum depression, calls this "the myth of motherhood and the fantasy of fatherhood." The skewed representation of what it's like to be a new parent leaves some women feeling that they are bad mothers. "Nobody talks about it," says Sandra Poulin, "they're frightened to death."

Katherine Stone says she lived in fear that her son would be taken from her if she disclosed what was going through her mind. "I didn't tell a soul," she says.

Stone believes silence takes its toll on mothers like her, who feel they have no choice but to remain quiet. Social norms dictate that mothers be "supreme and wonderful, and sacrifice," she says. If they suffer from negative thoughts about their child, she adds, they fear how they'll be perceived by others. "You're like a defective woman. You don't work properly."

The scientists at Yale say it might help new parents to know that having disturbing thoughts does not mean they are bad parents. By showing the complexities of postpartum illness—that even the healthy maternal brain is wired for a certain level of anxiety—the Yale research might help remove some of the stigma around those willing to speak up about what they've been through, and encourage others to seek help.

For women who do seek help, common methods of treatment include psychotherapy and postpartum support groups, as well as antidepressant medication. Some mothers benefit from the aid of "postpartum doulas"—helpers who come into the home to assist with both the new mother and child's health and well-being. Mothers also say that the support of family and friends and the chance to catch up on sleep help alleviate the exhaustion and sense of isolation that can worsen the illness.

But advocates also say that the medical system needs to do a better job appealing to mothers and training health professionals to recognize signs of depression. Sandra Poulin of Texas says that current efforts to reach mothers have the timing all wrong. Some hospitals give out packets on postpartum depression, but in the excitement and disorientation of new motherhood, she says, that information usually ends up in the trash. It is after several months of sleep deprivation that such information would be more useful, according to Poulin. She says she would like to see the routine "well-baby" visits reconceptualized and renamed "well-baby, well-mommy visits."

Poulin also wishes that all pediatric offices had the Postpartum Support International's poster hanging directly above the infant scale. The poster reads, "Depression is the #1 Complication of Childbirth." That poster—with information on how to get help—could save lives, she says. Indeed, some anthropological studies have found that in cultures that provide extensive postpartum support, there are lower rates of depression among new mothers.

Steps toward reform

New Jersey set a national precedent in 2006 by approving a law that makes screening for postpartum depression mandatory. The driving

force behind the law was New Jersey's then-first lady, Mary Jo Codey, who had suffered from postpartum depression herself. She decided to come forward with her experience in the hopes of effecting positive change for others. Legislators and advocates in a number of states are now pushing for similar reforms aimed at education, screening, and prevention.

Swain says the Yale study may serve as a first step toward understanding the differences between healthy mothers and those with an illness—and eventually improving treatments for those mothers who need it. He and Leckman caution, though, that it is too soon to say for certain what OCD circuits will look like in mothers with a postpartum illness. The next phase of Swain's research will involve scanning the brains of depressed mothers immediately after childbirth, then again after they receive different forms of treatment. Together, the studies of healthy mothers and of mothers with an illness will help researchers construct a more precise neurological picture of the postpartum brain.

Swain hopes that one day brain imaging on mothers will help them get preemptive treatment. "A lot of this is about prevention," he says, "about knowing who gets better. Then we can hopefully start to sort this out and say, 'Chances are, you'll benefit from this kind of therapy.' It would be great if we could do such a brain scan and tell someone that they are at risk long before they've even noticed [symptoms of depression]."

Better treatment of mothers has direct implications for infants and children, as well. Research has consistently shown that children of chronically depressed mothers have greater emotional and cognitive difficulties as they grow up. But the outlook for these children isn't bleak at all if their mothers receive treatment. A recent Columbia University study found that the children of depressed mothers showed significant improvements in mental health when their mothers were treated with antidepressants.

"Mothers getting treatment helps kids go on to live healthy, happy lives," says Ruta Nonacs of Massachusetts General Hospital. She adds that treatment for mothers is only one part of what children and families need. "There are many things that make kids resilient, like having other care providers who are not depressed—a husband, extended family."

Perhaps some of the greatest advocates and resources for these families are those mothers who have recovered and gone on to tell their stories. After years of suffering, Dawn Rouse saw a therapist who described some of the biochemical mechanisms involved in postpartum depression. As she listened, Dawn suddenly realized, "Oh my God, I am not an evil, horrible mother." She started taking medication but then learned therapeutic strategies so that she was eventually

able to cope without it. Her relationship with now-nine-year-old Emily has been transformed. Finally, she says, "I am finding joy in my daughter."

Dawn's recovery inspired her to speak out about her experience. She started a popular blog called "I'm doing the best I can," and is now pursuing a Ph.D. in child development. She's become committed both to raising public awareness on postpartum illness and to broaching the topic among her own circle of friends.

"I tell them, 'I am the girlfriend you can call. I will not judge you. I will be your venting space. When your baby has woken up and your husband is snoring or you hate your baby—you can call me.'"

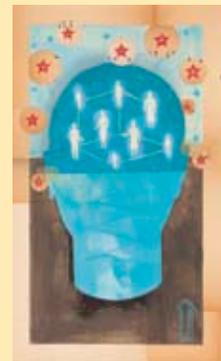
Anna J. Abramson is the staff writer for the Russell Sage Foundation and a former *Greater Good* editorial assistant.

“Mothers getting treatment helps kids go on to live healthy, happy lives.”

Greater Good magazine is published by the Greater Good Science Center (GGSC), a non-profit organization based at the University of California, Berkeley. The GGSC promotes the study and development of human happiness, compassion, and altruism. No other center in the country has the same commitment to both sponsoring cutting edge research and helping people apply it to their lives.

Contribute to the Greater Good!

The GGSC is funded exclusively by private donations, not the university. Subscriptions cover only a small portion of our costs. To sustain the work of our center and magazine, we need your support!



Leigh Wells

Here are some ways you can help:

- 1) If you received this magazine as a gift, "pay it forward" by sending someone else a gift subscription through shop.greatergoodmag.org. **Every subscription makes a difference.**
- 2) Make a donation. You can send a tax-deductible donation in by visiting our website at greatergood.berkeley.edu. If you'd like more information, please contact the GGSC's executive director, Christine Carter (510-642-2451; christinecarter@berkeley.edu).
- 3) Learn more and spread the word. Visit www.greatergoodmag.org to sign up for our email newsletter and send your favorite articles to friends.

Thank you for your support!



Greater Good
SCIENCE CENTER