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How Light Makes Pregnancy Brighter**  
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## Perinatal Depression: How Light Makes Pregnancy Brighter

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Pregnancy and the postpartum period represent a particularly sensitive time in a woman's life. Despite social expectations that motherhood should be a time of joy and happiness, pregnancy is frequently accompanied by physical and psychological complications. Many women experience depression during the perinatal period. Indeed, maternal mental health is considered a major public health concern by the World Health Organization<sup>[1]</sup>. Early recognition and treatment of perinatal depression (PND) are of primary importance.

However, conventional therapeutic strategies present clinical challenges related, for example, to concerns about the safety profile of antidepressant medications and their lower acceptance by pregnant women, or to the limited availability and expense of psychotherapy. By contrast, bright light therapy (BLT), which has been established over the last four decades as an effective treatment for seasonal and non-seasonal depression<sup>[2]</sup>, is receiving growing attention from clinicians as easy, affordable, and safe.

## MOOD DISORDER DURING THE PERIPARTUM

Over 25% of perinatal women report depressive symptoms<sup>[3]</sup>, and it has been estimated that about 12% meet the diagnostic criteria for PND<sup>[4]</sup>. According to current psychiatric diagnostic guidelines<sup>[5]</sup>, PND is defined as a major depressive disorder with onset during pregnancy or within 4 weeks after delivery, thus combining the previous categorization of antenatal and postnatal (or postpartum) depression.

However, most experts regard any depressive episode up to one year after delivery as PND. In fact, while hormonal changes are more likely to emerge immediately after delivery, numerous psychosocial stressors also emerge in the first 12 months postpartum, which contribute to the onset or recurrence of depression<sup>[3]</sup>.

Several factors are likely involved as causes of PND. A complex interaction between genetic, neuroendocrine, psychological, environmental, and sociodemographic factors can explain why PND affects women of all races, cultural backgrounds, and economic statuses<sup>[6]</sup>. While some may be more sensitive to fluctuations in reproductive hormone levels during the perinatal period, others may have an earlier underlying mood disorder that has not previously been recognized.

Untreated PND can be associated with severe consequences for mothers, their children, and families<sup>[7]</sup>. These include a higher incidence of gestational complications (preeclampsia, placental abnormalities, delayed fetal development, preterm delivery, and spontaneous abortion), as well as adverse effects on the baby at birth and throughout infancy (low weight, lower Apgar score, behavioral disturbances, and sleep)<sup>[8]</sup>.

During the postpartum period, PND affects the relationship between mothers and their newborns, leading, for example, to failure or shortened duration of breastfeeding and lack of interest in the child, with poor maternal bonding and interaction<sup>[7]</sup>.

Ultimately, PND negatively impacts maternal quality of life, intimate relationships, and the mental health of fathers<sup>[9]</sup>. The most dramatic consequences of severe, untreated PND include the ideation of self-harm or harm to the infant and, at worst, of suicide or infanticide. Suicides of women in the first year postpartum are the second-leading cause of death in this period<sup>[10]</sup>, accounting for 20% of deaths and up to 20% of additional maternal mortality<sup>[6]</sup>.





## WHEN TO SEEK HELP

Many women in the first weeks after giving birth experience “postpartum blues” or “baby blues”, terms used to indicate a temporary psychological state of fluctuating mood, tearfulness, fatigue, and labile emotions, such as irritability or anxiety <sup>[8]</sup>. This affects up to 80% of new mothers and is thought to be mainly due to regulatory hormonal changes that occur as early as the first few days after delivery and are short-lived, generally resolving within 10-14 days <sup>[9]</sup>. By contrast, PND lasts longer than two weeks, has a more severe impact on women’s quality of life, and presents with the same main symptoms of major depression. These include persistent low or “empty” mood, lack of energy, reduced interest in daily activities, poor concentration, sleep problems,

appetite/weight changes, feelings of worthlessness, guilt, hopelessness, and suicidal thoughts <sup>[7]</sup>. Moreover, a range of additional symptoms focused on the experience of motherhood or on the infant contribute to the diagnosis, including no attachment or interest in the baby, recurrent doubts about offering adequate care, and uncontrollable thoughts about harming oneself or the baby. This is not a situation suitable for self-diagnosis. Only a healthcare professional can objectively determine whether the symptoms are due to PND or something else. It is therefore imperative for women who experience any of these symptoms to seek help and medical attention <sup>[11]</sup>.

## BRIGHT LIGHT THERAPY FOR PERINATAL DEPRESSION: HOW EFFECTIVE IS IT? HOW DOES IT WORK?

The intrinsic property of light to enhance mood states has been known since ancient times <sup>[12]</sup>. The research advances in chronobiology in recent decades have led to the scientific validation of bright light therapy (BLT) as a chronotherapeutic tool. This has encouraged its implementation in clinical practice, thus far most prominently for mood disorders.

Since the description of the first case series in 1984 BLT has been established as the first-line treatment for seasonal affective disorder (SAD) <sup>[13]</sup>. In more recent years, a growing scientific literature and several meta-analyses of randomized trials have shown that BLT is superior to placebo and well tolerated, not only in seasonal depression but also in moderate to severe non-seasonal unipolar depression, with results equal to those using selective serotonin reuptake inhibitors (SSRIs) <sup>[14,15]</sup>.

BLT offers a suitable treatment for PND: it is inexpensive, home-based, and has been confirmed in a wide range of controlled clinical trials for depressive disorders. Important for perinatal women is its favorable safety profile relative to antidepressant drugs (AD) <sup>[14]</sup> which has led many to refuse AD out of concern for the developing fetus or newborn.

Their concern extends into the postpartum period, due to the possible risks of the passage of drug metabolites into breast milk, and the desire of many mothers not to give up breastfeeding, an important step for bonding with the child. On the other hand, psychotherapy is also an effective medication-free treatment for PND <sup>[16]</sup>; however, logistical and economic barriers can make it unattractive for most women with PND.



Beyond its practical advantages, BLT for PND is supported by research on the pathophysiology of depression related to the effects of light on mood and associated brain circuitry. During the perinatal period, women tend to reduce their level of physical activity and time spent outdoors, particularly due to mobility problems in late gestation and care of the newborn at home after delivery <sup>[17]</sup>. PND might be associated with reduced daylight exposure, which can be counteracted with enhanced artificial indoor lighting.

Circadian sleep-wake disruption and chronic circadian misalignment — a mismatch between the internal circadian timing system and the 24-hour environmental cycles — are commonly observed in psychiatric and neurodegenerative diseases and can be treated using BLT, with improvements in sleep quality, mood, alertness, and cognitive performance. Women with PND may experience circadian misalignment and the antidepressant effects of BLT may be related to the resynchronization of circadian rhythms <sup>[18]</sup>.



PND may be associated with dysregulation of brain serotonin levels, which has been attributed to alterations in tryptophan (a precursor of serotonin synthesis), estrogen, and hypothalamic-pituitary-adrenal (HPA) axis activity [19, 20, 21]. The mood-lowering effect of tryptophan depletion in healthy women can be blocked by exposure to bright light, but not dim light [22]. BLT might therefore improve the regulation of the serotonergic system in women with PND.



Considering that, for example, in the US it has been estimated that nearly 85% of women with PND remain untreated [23], there is a distinct need to increase access to treatment by adopting interventions that are affordable, easy to use, and at least as effective as traditional pharmacologic approaches. To this aim, BLT for treating antenatal, postnatal, or perinatal depression has been studied in several clinical trials, with overall positive results [24]. Specifically, all studies showed that morning bright light between 7,000-10,000 lux, for 3 to 6 weeks, can improve mood rating scores on various psychiatric scales [24]. However, except for one placebo-controlled study [25] women who received dimmer light of 100-600 lux showed similar benefits [26, 27, 28]. Thus, the antidepressant effect of placebo dim light remains unclear. Indeed, illuminance levels as low as 100 lux have been capable of phase-shifting human circadian rhythms [29], indicating an active circadian effect separate from inactive placebo controls.

By contrast, two randomized controlled trials conducted by Basel researchers [30, 31] using even lower light intensities as placebos — 70 and 19 lux, respectively — showed significantly greater improvement in the BLT group. The most recent study [31] also found that the positive effect of BLT was sustained over several weeks after treatment completion.

**The New York Times** TUESDAY, NOVEMBER 28, 2000

VITAL SIGNS  
ERIC NAGOURNEY

MENTAL HEALTH

## Light Regimen for Pregnancy Depression

For some pregnant women, depression does not always wait to be postpartum. Depression can come at any point in a woman's pregnancy, and if it does, she and her doctor can be in a quandary over whether to try antidepressants.

Now researchers believe they may have found a way to help these women without exposing them and their fetuses to drugs. Turning to a technique sometimes used to help people with seasonal affective disorder, the gloom that can settle in as fall comes and the days grow shorter, the doctors have been trying light therapy on their patients.

The preliminary results are promising, said the researchers, who are engaged in a cooperative study involving Yale, Columbia and Case Western.

Participants in the study are given portable light boxes and asked to sit in front of them for one hour daily. The light is believed to help increase levels of serotonin, the mood-regulating hormone, in the brain. Studies of most antidepressants have not

shown them to harm fetuses, the researchers said. But the drugs can cause unpleasant side effects, making light therapy more attractive, if it is proved effective. And, taking drugs known to affect the central nervous system during a time when a fetus's brain is developing may also be of concern, the researchers said.



Stuart Goldenberg

Following this publicity in 2000, the first open trial (2002) and randomized trial (2004) of bright light therapy for antepartum depression appeared in the *American Journal of Psychiatry* and *Journal of Clinical Psychiatry*. [26]



## IN A NUTSHELL: WHAT PATIENTS AND DOCTORS NEED TO KNOW

Evidence has been rapidly accumulating for the efficacy of BLT in women suffering from depression during the perinatal period. Data available so far confirm the antidepressant effects of BLT in this sensitive population, and its safety, high tolerability, and acceptance have been verified.

BLT is distinguished as an affordable treatment that can be easily used at home. When there is only partial improvement, it can also be combined with other strategies, including pharmacological treatment [12]. Light — whether natural daylight or emitted by a light box — is a powerful chronotherapeutic that exerts its effects by modulating physiological functions of our body. Since BLT can have beneficial

effects equal to conventional antidepressants, but as with drugs it must be dosed appropriately and taken at the most appropriate time of day based on one's own circadian rhythm (see the online circadian rhythm assessment from the Center for Environmental Therapeutics (CET) with recommendations for treatment timing).



Screening pregnant and post-partum women for PND is important and should be initiated during early pregnancy by every OB/GYN service. Women should be instructed to regularly screen their mood throughout the perinatal period using simple validated diagnostic scales, such as the Edinburgh Postnatal Depression Scale (EPDS).

When they show symptoms of PND they should promptly seek or be referred to healthcare providers. Information about the importance and benefits of light therapy during the peripartum, based on the patient's circadian rhythm profile or chronotype, should be included in educational packages that women receive when they attend their routine medical visits.

In addition, the CET provides comprehensive resources tailored both for practitioners and patients about how and when to use light as a therapy. Additional large-scale clinical trials and comprehensive literature reviews and meta-analyses are warranted to further clarify evidence for the efficacy of light therapy in PND.

Based on the risk-benefit ratio derived from current data, there is no reason not to include BLT as a part of the therapeutic toolkit of any clinician treating women with PND, alongside antidepressants and psychotherapy. BLT for PND can, in fact, substantially reduce both the burden of illness and the associated healthcare costs related to PND for both mothers and their families.





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## About us

The Center for Environmental Therapeutics is a 501(c)(3) nonprofit based in New York, founded in 1994 in response to international interest in new environmental therapies – drug-free ways to improve mood sleep, and energy. We are leaders in the research and development of light therapies as counterparts to conventional medications. Our program serves health care providers, the consumer public, and industry. CET is made up of a multidisciplinary team of eminent researchers and clinicians committed to pooling their efforts toward the development of effective environmental therapies. We host a popular website, [cet.org](http://cet.org), with educational material for the general public and clinicians; online, personalized self-assessments of depressive disorders, symptom severity, and circadian rhythm status; and an extensive question library based on inquiries from the public, which offers guidance from academic and clinical experts.

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