The gloom of winter, more often a literary theme than a medical topic, is a biological reality for an estimated 10 million Americans who suffer from seasonal affective disorder (SAD). For some, however, the depression ushered in by the dark days of winter can be treated simply and with rapid results with 30 minutes to two hours of bright-light therapy per day for a few weeks.

Recently, the possible causes of and treatments for SAD were explored at a National Institute of Mental Health (NIMH) press briefing and in the Dec. 8, 1993, issue of JAMA. At the press briefing, a panel of experts discussed the symptoms of SAD, its effects on 35 million Americans (10 million with SAD and 25 million with subsyndromal SAD or "winter blues") and the available treatments. Among the experts were Alan I. Leshner, Ph.D., deputy director of NIMH; Norman E. Rosenthal, M.D., chief of the section on environmental psychiatry, NIMH's Clinical Psychobiology Branch; and M. Lawrence Nicodemus, meteorologist, U.S. Department of Commerce's National Climatic Data Center.

NIMH conducted the briefing to focus attention on SAD's widespread prevalence and to encourage the medical community to take the disorder seriously and to recognize its scientific credibility. "SAD is real and treatable," explained Leshner, who cited the JAMA article as a "milestone of recognition."

SAD has come to light as a widespread form of severe depression largely because of the efforts of Rosenthal, a psychiatrist, director of light therapy studies at NIMH and author of the JAMA article. Rosenthal, a native South African who came to NIMH as a researcher in the late 1970s, wrote Winter Blues, in which he chronicles for patients the discovery, diagnosis and treatment of SAD. SAD is a clinical illness characterized by periods of depression that begin in October and subside in April. SAD symptoms in adults include lethargy, fatigue, ravenous appetite, weight gain, carbohydrate craving, withdrawal from relationships, inability to concentrate or focus, problems at work, anxiety and despair. Diagnosis is based on seasonality of symptoms determined in a patient history. Most (75 percent to 80 percent) of SAD sufferers are women, for whom the illness typically begins in the third decade of life. SAD also has been observed in children, who may exhibit signs of irritability, difficulty getting out of bed and problems in school, particularly during the fall and winter. The prevalence of SAD in the United States has been found to increase with increasing latitude and has been estimated to range from 1.4 percent in Florida to 9.7 percent in New Hampshire.

While climate, season and weather have historically been known to affect mood, only within the last decade have scientists documented and measured this effect, according to Nicodemus. In addition to latitude, storm patterns and cloud cover contribute to winter dreariness and exacerbate SAD in some parts of the country, particularly the Great Lakes region. People living in the Southeast and Southwest have twice as much sunshine in winter as people in Northern states, he said. The threshold of light that elicits depression varies for individuals, Rosenthal said. One person may develop SAD in Maryland but not in Florida. Another may become depressed in Maine but not in Maryland.

A female SAD patient who attended the NIMH meeting told Psychiatric Times of her 10-year use of light therapy and her sensitivity to light variation. Although aware of her vulnerability, she apparently enjoyed testing her limits. With a sense of humor, she told of her cruises to see the Arctic's midnight sun and to the tip of South America during the Southern Hemisphere's winter. During the trips she recorded a mood log that revealed her rapid mood swings as the cruise ships' routes created dramatic seasonal changes. Treatment Approaches

Treatement is based on the interaction of light with the eyes, not the skin, Rosenthal said. Imagining light during meditation has no effect. Light therapy regulates brain chemistry by controlling the
levels of the neurotransmitter serotonin and the hormone melatonin, Rosenthal believes. While serotonin regulation may be abnormal, its abnormality seems to be a decreased responsiveness to light that can be corrected with more light, said Rosenthal. The light effect is probably transmitted via the nerve tract that connects the retina to the hypothalamus' suprachiasmatic nuclei, considered the body's biological clock. He hypothesizes that SAD patients, with a couple of weeks of insufficient light, produce inadequate serotonin, which leads to their depression. Light therapy increases serotonin production.

In a recent article in the *Journal of Biological Psychiatry*, Rosenthal and his coworkers documented an exaggerated behavioral response in SAD patients administered an experimental serotonin agonist (m-CPP). SAD patients had increased activation and euphoria. This also correlated with SAD patients' reported activation following a high-carbohydrate meal. In contrast, control subjects report feeling sedated. The "aberrant response may reflect serotoninergic dysregulation...and may reflect a behavioral attempt to normalize this putative serotoninergic abnormality," Rosenthal and coauthors wrote. **Case Study**

In the *JAMA* article, Rosenthal described the case study of a 39-year-old novelist who presented in October complaining of increasing fatigue and severe "writer's block." She had gained 2.25 kg and had difficulty avoiding desserts and high-calorie snacks. The results of her physical examination and routine blood tests were all normal. The patient was diagnosed as suffering from SAD, and light treatment was initiated. Using a 10,000-lux light box slanted toward her face for a half hour each morning with instructions to face the box and glance at it periodically without staring, the patient reported in one week that she felt "more energetic and cheerful." She did, however, complain of continued difficulty waking up on time in the morning.

The patient was then instructed to set a bright bedside lamp on a timer to go on two hours before she was due to arise and to begin a regular exercise program, which involved walking outdoors at lunch time.

Studies by Michael Terman, Ph.D., director of the Winter Depression Program at Columbia Presbyterian Medical Center in New York and David H. Avery, M.D., associate professor of psychiatry and behavioral sciences at the University of Washington Harborview Medical Center in Seattle, also have contributed to knowledge about SAD. Avery has shown that simulation of dawn may have an antidepressant effect on the sleeping patient; he hypothesizes that the simulated dawn's light penetrates sleepers' eyelids, acting on the brain to reverse symptoms of depression.

According to Terman, recent studies have shown that the light should be intense to be effective, but that a full spectrum of light is not necessary. Now, the therapy may use ordinary fluorescent light bulbs with an intensity of 10,000 lux, about 10 to 20 times as bright as ordinary indoor light.

A new study from Switzerland showed that light therapy can be used effectively at any time during the day, Rosenthal pointed out. A variety of commercial lighting devices, including a head-mounted light that shines on the face, lights that automatically simulate dawn, and fluorescent light boxes are currently offered. Light therapy devices are also being reimbursed by some insurers, Rosenthal said. He estimates that approximately 10,000 SAD patients are currently being treated with light therapy, which represents approximately one out of 1,000 patients with the problem.

Rosenthal suggested that while the treatment is not dangerous and may seem a benign aspect of normal life, people with severe depression should consult a mental health professional to diagnose their problem and monitor therapy. Rosenthal also said that between 10 percent and 35 percent of depressed patients may have SAD and that physicians should ask about the possible seasonal variation in patients' depression.

Furthermore, a new German study has reported that patients with nonseasonal depression also are helped by light therapy. In the study presented at a recent meeting, Siegfried Kasper, M.D., found that depressed patients who failed to respond to fluoxetine (Prozac) had an enhanced response to the drug combined with light therapy for five weeks. Light therapy is also being investigated in other psychiatric problems such as eating disorders and obsessive-compulsive disorder, Rosenthal said. In contrast to patients with severe depression, Americans with the less severe subsyndromal SAD might consider lighting up their day to relieve their sadness, said Rosenthal, who has self-treated himself with light therapy for years.

In the *JAMA* article, Rosenthal added that while treatment with bright environmental light is generally a first-line therapeutic approach, other treatments including anti-depressants, stress management, exercise and psychotherapy may be useful as well.

"If light therapy is unsuccessful in alleviating a SAD patient's depressive symptoms or is unacceptable for some other reason, it would be reasonable to try a selective serotonin reuptake inhibitor, such as fluoxetine, sertraline (Zoloft) or paroxetine (Paxil)," Rosenthal said.
Drawing parallels to the natural seasonal changes in animal behavior and biology, such as hibernation, Rosenthal speculates that depression in winter may be due to the resistance to a natural inclination to hibernate. While most people can override the seasonal decrease in light because of their exposure to artificial light, people with SAD have a higher requirement threshold, he speculated. "We're closer biologically to our animal brethren than we are qualitatively different," he said.

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