Light Therapy for Bi-Polar Patients

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Abstract

The development of light therapy in psychiatry is closely intertwined with the original description of the syndrome of seasonal affective disorder. Two decades ago, Rosenthal and colleagues described a series of patients with histories of recurrent depressions that developed in the fall or winter and spontaneously remitted during the following spring or summer. Their initial report also included preliminary findings indicating that bright artificial light, administered in a manner that would in essence extend the photoperiod, was more effective than dim light in treating seasonal affective disorder. The article presented an underlying hypothesis about the pathophysiology of the syndrome (i.e., depressogenic effects of melatonin), which in turn shaped the selection of treatment parameters: the intensity, duration, and timing of bright light exposure were designed to suppress the release of melatonin and lengthen the photoperiod.

Introduction

Bipolar disorder (formerly called manic-depressive illness or manic depression) is a mental disorder that causes unusual shifts in mood, energy, activity levels, concentration, and the ability to carry out day-to-day tasks.

There are three types of bipolar disorder. All three types involve clear changes in mood, energy, and activity levels. These moods range from periods of extremely “up,” elated, irritable, or energized behavior (known as manic episodes) to very “down,” sad, indifferent, or hopeless periods (known as depressive episodes). Less severe manic periods are known as hypomanic episodes.

- **Bipolar I Disorder—** defined by manic episodes that last at least 7 days, or by manic symptoms that are so severe that the person needs immediate hospital care. Usually, depressive episodes occur as well, typically lasting at least 2 weeks. Episodes of depression with mixed features (having depressive symptoms and manic symptoms at the same time) are also possible.
- **Bipolar II Disorder—** defined by a pattern of depressive episodes and hypomanic episodes, but not the full-blown manic episodes that are typical of Bipolar I Disorder.
- **Cyclothymic Disorder (also called Cyclothymia)—** defined by periods of hypomanic symptoms as well as periods of depressive symptoms lasting for at least 2 years (1 year

in children and adolescents). However, the symptoms do not meet the diagnostic requirements for a hypomanic episode and a depressive episode.

Sometimes a person might experience symptoms of bipolar disorder that do not match the three categories listed above, which is referred to as “other specified and unspecified bipolar and related disorders.”

Bipolar disorder is typically diagnosed during late adolescence (teen years) or early adulthood. Occasionally, bipolar symptoms can appear in children. Bipolar disorder can also first appear during a woman’s pregnancy or following childbirth. Although the symptoms may vary over time, bipolar disorder usually requires lifelong treatment. Following a prescribed treatment plan can help people manage their symptoms and improve their quality of life. (NIMH, n.d.)

Recent evidence suggest that light therapy can be a meaningful way to minimize the symptoms in patients mostly affected by this disorder. In a way this can be classified as a seasonal affective disorder or SAD in minor terms. Light Therapy, also called phototherapy, it generally works well for SAD. You sit in front of a special box or lamp that gives out up to 10,000 lux of fluorescent light -- more than 20 times brighter than most indoor light. Researchers think the light helps your brain make more serotonin, a hormone that affects your mood. You’ll sit 12-18 inches in front of the light for 30 minutes or more a day. The light must enter your pupils for it to work, but you do not need to stare at it directly. (Light Therapy – Topic Overview, n.d.)

Research Topic

Both seasonal affective disorder and bright light therapy quickly captured considerable attention, both in the scientific community and with the general public. Several research groups launched clinical trial programs, and soon this experimental treatment was extended to other conditions, including nonseasonal mood disorders, Alzheimer’s disease, circadian-related sleep disorders and jet lag, eating disorders, and other behavioral syndromes . An international organization (the Society for Light Treatment and Biological Rhythms) was created, and several journals that emphasized phototherapy and biological rhythms emerged. Despite the growth in clinical and research programs, there remained an absence of recognition and support for light therapy within many segments of the psychiatric treatment community. Most insurers do not offer reimbursement for this treatment, most residency training programs do not provide clinical training in phototherapy, and there is a sense that “the biological psychiatry establishment has regarded light therapy with a certain disdain and relegated it to the edge of the paradigm” (Pjrek, et al., 2004) (Pjrek, et al., 2004)

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Discussion

In our literature review, we found that most of the published research reports on the effects of light therapy in mood disorders did not meet recognized criteria for rigorous clinical trial design. There are several potential explanations for this observation. First, there are inherent challenges in creating an acceptable placebo (or even an active control) condition for light therapy. While it is relatively easy to create a placebo pill or capsule that is identical in appearance to an active medication formulation, it is more difficult to "blind" a subject when broad-spectrum intense white light is the active experimental intervention. The pharmaceutical industry, which has considerable resources devoted to research and development activities, funds much of the clinical trial research for potential new antidepressant pharmacotherapies. In contrast, there has not been a similarly endowed industry nor as sizable a market in place to support the development and testing of light therapy treatments. The history of the development of light therapy, which is inextricably interwoven with the development of the concept of seasonal affective disorder, not surprisingly was dominated in its early stages by a series of relatively small, investigator-initiated pilot projects. These researchers did not have access to resources of the magnitude of those available when pharmaceutical companies seek recognition by the U.S. Food and Drug Administration of the safety and efficacy of a new medication. Unfortunately, a consensus about standard approaches to study design issues (such as lux parameters for the active treatment, duration of an adequate light therapy trial, and characteristics of placebo control conditions) was not established in the early years of light therapy research. In too many cases, high standards of research design (such as random assignment to treatment conditions, adequate reporting of results statistics) were not followed. Not surprisingly, these conditions produced inconsistencies in the research literature. We found substantial variability in the selection of study groups and in the doses of both the active and control interventions for those trials meeting our selection criteria.

All of these factors have limited the conclusions that can be drawn from light therapy research. Past efforts to synthesize the available body of literature have been as challenging as the proverbial comparison of apples and oranges. More important, the limitations in much of the literature on light therapy research may have created the unsubstantiated impression that the treatment itself has limitations in terms of its efficacy.

When we analyzed the data from all available randomized, controlled trials that met our a priori standards, we demonstrated a significant reduction in depression symptom severity following bright light therapy in seasonal affective disorder and in nonseasonal depression, as well as a significant effect with dawn simulation in seasonal affective disorder. In other words, when the “noise” from unreliable studies is removed, the effects of light therapy are comparable to those found in many antidepressant pharmacotherapy trials.

Earlier reviews of light therapy yielded similar findings. Pooled data from 14 research groups that collectively studied 332 patients who received bright light therapy for seasonal affective disorder over a 5-year period, and they applied a pooled clustering technique in their analysis. Twenty-nine data sets were included. Unfortunately, the vast majority were not available for inclusion in our current analysis, because they consisted of personal communications, unpublished posters presented at meetings, and book chapters, as well as a few additional reports that did not meet our inclusion criteria. Thus, only two of their 29 data sets overlap with the 20 studies included in our meta-analyses, i.e., two studies found that 2,500-lux light exposure for at least 2 hours/day for 1 week resulted in significantly more remission when administered in the early morning than in the evening or at midday. Treatments at each of these three administration times were significantly more effective than control treatments with dim light. Tam et al. concluded that bright light therapy that utilized at least 2,500-lux white light for 2 hours/day and treatment with 10,000 lux for 30 minutes/day had comparable response rates and that both treatments were efficacious. They noted that more studies were needed before conclusions could be drawn about the efficacy of dawn simulation. They highlighted the methodological limitations of the literature, which included brief treatment periods, small study groups, and lack of replication.

Several caveats and limitations in our review and analyses should be noted. First, we limited our focus to *efficacy* and did not study the other key feature of all treatments, *safety.* Very few reports of the controlled studies contained data on side effects or toxicity. Several side effects of bright light therapy have been described elsewhere, including headache, eye strain, nausea, and agitation . To our knowledge, there have been no reports to date of retinal toxicity in association with bright light treatment, and a 5-year follow-up study showed no adverse ocular effects . However,

some psychotropic medications may increase photosensitivity, and further study of potential adverse effects of combined pharmacotherapy and light therapy is indicated. Light therapy, like other antidepressants, may be associated with a switch to hypomania or mania in vulnerable bipolar patients . Other rare potential side effects from bright light treatment may emerge only after the treatment has become more widely applied. Thus, any potential recommendation of light therapy for mood disorders, based on findings of efficacy in our meta-analyses, must be tempered by the acknowledgment that safety must also be considered. This important aspect of light therapy merits careful examination with additional long-term follow-up studies.

Another limitation in this study, as described in our methods section, is that we restricted our analyses to studies of a relatively homogeneous, clearly defined population (i.e., nongeriatric adult patients). There are published reports of light therapy for seasonal affective disorder in children and for mood disorders in the elderly . These important patient populations merit separate consideration, and there is a need for a larger evidence base in these areas. An additional potential application of light therapy lies in the treatment of depression during pregnancy and in the postpartum period, when safe and effective alternatives to pharmacotherapy without potential toxicity for the fetus or newborn would be clearly desirable . It should be noted that all of the studies of dawn simulation in our meta-analysis came from a single research group, and confirmation of their findings by others at different locations would be especially important in determining the generalizability of their results. Finally, by setting a reasonably high standard for study inclusion in our meta-analysis, we excluded many of the published reports in this area. One could argue, as Smith et al.did in another context, that many small, “imperfect” studies can “converge on a true conclusion.” However, we agree with those who believe that meta-analyses based on flawed studies are not useful and that some bodies of data are inadequate for supporting a proper meta-analysis.

This study suggests that certain types of light therapy are effective in the treatment of seasonal affective disorder and other forms of depression. Much of the available literature is limited in terms of study design, and additional randomized, controlled trials with appropriate numbers of subjects are needed. Remaining questions of efficacy, safety, optimum dose, and the proper place of light therapy in the psychiatrist’s toolbox may be answered only after investigators in the field define and consistently adhere to standard approaches to essential components, such as definitions of acceptable parameters for active treatment and control conditions.

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