Light Therapy: You are my sunshine!

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Introduction

Seasonal affective disorder (SAD) was first described by Rosenthal and colleagues (Rosenthal et al., 1984) and refers to a form of depression most often associated with a lack of daylight exposure occurring from late fall to early spring. Patients with bipolar disorder or recurrent major depression may also be diagnosed with SAD if they have had at least 2 years of seasonal depressive episodes and if such episodes substantially outnumber the episodes of depression not related to seasonal changes (Howland, 2009). According to Johnson (2000) researchers have suggested several hypotheses regarding disturbances in the human circadian rhythm as plausible causes of SAD. Lam et al. (2006) illustrated that the use of artificial bright light (mimicking daylight exposure) was equally effective in the treatment of SAD than treatment with a popular pharmacological agent, fluoxetine. The purpose of this paper is to explore the integrative modality of light therapy (also referred to as phototherapy) specific to the treatment of SAD and incorporated in the practice of advance nursing science. The use of light therapy for the treatment of other behavioral, mood or sleep disturbances and other adjunctive treatments for SAD will be mentioned, however not discussed in great detail.

Miller (2005) reported a SAD incidence of 4% -10% among Americans. Another 7% -11% of Americans suffer from the milder yet clinically significant, sub-syndromal SAD (also known as the winter blues or the winter blahs) and among children age 9 to 19 SAD has a prevalence of 2% - 5.5%. The preferred treatment of SAD is phototherapy. What is light therapy?

Light therapy involves exposure to intense, bright level of light under controlled conditions.
Review of Literature

Introduction

The topic of light therapy as it relates to the treatment of mood, behavioral and sleep disorders was investigated on March 23, 2010 and April 2, 2010. Literature searches were performed using Washburn University Mabee Library online library guides for articles and databases. Initial searches using the ProQuest, SAGE, PubMed/MEDline, Cochrane Library, and CINAHL databases included the key words “mood disorders”, “seasonal affective disorder”, “light therapy”, “photo therapy”, “nurse practitioner”, “advanced nursing practice”, “integrative healing”, “healing therapies” and “alternative medicine”. The majority of results overlapped to some extent and as a matter of convenience most of the articles for the purpose of this paper were retrieved from the CINAHL, PubMed and ProQuest databases. The numbers of results per database, per search term or combination of search terms are reflected in Table 1 (Appendix A).

The author studied 11 articles addressing the use of light therapy in the treatment of seasonal affective disorder, Selection of articles was based on the need to develop an understanding of, (a) the history of SAD as it pertains to when it was first recognized as an affective disorder, (b) the etiology of SAD, including familiarity with the concept of chronobiology, (c) current issues in clinical assessment, diagnosis and management of SAD and, (d) current evidence regarding the efficacy of light treatment for SAD. The author intentionally also selected peer reviewed literature addressing other treatment options or combination treatments and tried to find articles, published opinions and literature on the ethical and legal aspects which may be of concern in the use of this integrative modality.

Critique of Studies

In an article by Shirani and St. Louis (2009) the neurobiology crucial to the understanding of the influence of light therapy on brain function was reviewed. The clinical importance of the biological clock
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(also referred to as the circadian clock or the SCN) in relation to mood and sleep disorders was illustrated through a discussion of the relevant physiologic processes involved in the relationship between chronobiology and the light-dark (LD) cycle. The authors explained how the endogenous circadian period of the biological clock may lack phase synchrony with the surrounding environment resulting in either a phase advance (falling asleep too early and waking up very early) or a phase delay (delayed bedtime and impaired ability to arise early). Not commonly addressed in other publications, this review article did mention the crucial role of the LD cycle and light exposure of the retina on the circadian rhythms of the totally blind population. It noted the high prevalence of non-entrained, free-running circadian rhythms among the blind but clarified that the capacity for entrainment by light remained preserved in certain types of blindness despite the absence of functional retinal rods and cones. The article did not elaborate regarding which types of blindness would be the most or least susceptible to circadian rhythm disturbances. The discussion of the clinical approach to the biologic clock in this article was found to be very informative. It was stated that the main objective of light therapy remains to be the resetting of the circadian clock relative to the LD cycle and/or to influence the amplitude of the circadian rhythm. Following a discussion of the timing of light therapy and the types and dosing of light therapy, the authors concluded the review with a short discussion of the use of light therapy in the treatment of various disorders. Three categories of disorders sensitive to light therapy treatment were cited and in each case the current trends in treatment were briefly discussed and in some cases, supported with clinical research findings. The value of this review article by Shirani and St. Louis (2009) can be rated as high for the purposes of this paper. The impressive list of 123 references indicate a thorough review of literature published over the last four decades resulting in an excellent summation of the current knowledge regarding the use of light therapy to correct or reduce disturbances in the human circadian rhythm.

Fatigue, weight gain, slow thinking and sleep disturbances are some of the symptoms described as part of the subthreshold depression phenomenon addressed in an article by Brown and Shirley (2005). The focus of this article was on exploring the prevalence of clinically significant forms of subthreshold depression and introducing a new intervention program aiming to improve the mood and energy levels of
women affected by it. In this article, the authors (Brown and Shirley) cited research by Brown, Goldstein-Shirley, Robinson & Casey (2001) which indicated that a program of carefully selected and implemented lifestyle interventions could provide relief for women afflicted by subthreshold depressive symptoms. The group of researchers (Brown et al., 2001) tested their proposed LEVITY (Light, exercise, vitamin intervention therapy) program in a randomized clinical trial involving 112 participants over an 8 week period. Findings as summarized by Brown and Shirley (2005) indicated that women (treatment group) who participated in the LEVITY program experienced a significant decrease in depressive symptoms and an improved mood, self-esteem and general well-being compared to those in the control group. Although subjects in this study did not receive light therapy using a therapeutic device such as a light box or dawn simulator, the researchers considered the light exposure received during 20 minutes of walking during daylight hours as adequate to be considered as part of the treatment. Women in the control group were discouraged from spending time outdoors during the 8 weeks trial period. When considering the usefulness of this research and the knowledge gained from it for the purpose of this paper, the author regards this as a contribution to the knowledge base of nursing illustrating the value of combining different treatment modalities and options in addressing patients' needs and concerns. It supports the concepts of holism deeply embedded in the philosophy of nursing by suggesting that the patient may benefit most from a combination of treatments and healthy lifestyle choices sustained over a longer period of time as opposed to a single, time-limited treatment. Because this study did not intend to specifically investigate the benefit of light therapy alone in patients with subthreshold depression, the lack of more aggressive light expose intervention cannot be considered a downfall. However, for the advancement of knowledge regarding holistic therapies in the treatment of depressive disorders, the inclusion of actual light therapy treatment in this study might have increased the usefulness of the research. The author is of the opinion that a follow-up or repeat study of the LEVITY program, with perhaps more distinction between the treatment and control interventions would be of great interest.

Focusing on the role of the advance practice nurse in the diagnosis and management of seasonal affective disorder (SAD), Johnson (2000) authored an article describing the need for clinicians to
appropriately identify and correlate the symptoms of SAD in their patient’s spectrum of concerns thereby ensuring proper diagnosis and the selection of suitable treatment interventions. A concise account of the incidence and etiology of SAD is presented with a short discussion of the different hypotheses suggested by various researchers. A thorough discussion of the assessment criteria and tools available for the diagnoses of SAD is presented. In evaluating the use of the Seasonal Pattern Assessment Questionnaire (SPAQ) Johnson states that the SPAQ successfully differentiates among healthy individuals, patients with bipolar affective disorder and SAD patients for sensitivity to seasonal change. Another tool, the Global Seasonality Score (GSS) groups respondents into categories of SAD, sub-SAD and normal (no SAD) and actually measures the degree of change in sleep length, social activity, mood, weight, appetite and energy level (Johnson, 2000). Johnson’s review of the usefulness of these tools and her mention of the concerns regarding the validity and reliability of these instruments are considered most helpful. When discussing the use of phototherapy (light therapy) in the treatment of SAD, Johnson (2000) gives a comprehensive account of the current trends in treatment but asserts that there are a lack of consensus regarding the specific recommendations as far as intensity, duration, spectral qualities, timing and anatomical route of administration. Adverse effects of phototherapy are also addressed in this article and Johnson (2000) gives a summarized account of the current evidence available to support the judicial use or contra-indications to the use of phototherapy. Some suggestions to increase the safety of phototherapy is offered along with guidelines for individualized treatment options. Additional usefulness of Johnson’s publication stems from the short discussion regarding third-party reimbursement of phototherapy. Most valuable is the reminder that skillful documentation of a thorough clinical evaluation may aide in the procurement of third-party reimbursement for phototherapy apparatus. As a nurse practitioner, Johnson successfully presents the significant role of nurse practitioners in the diagnosis and management of SAD.

It is evident that advance practice nurses need to familiarize themselves with the

**Conclusion**
Consensus exist that SAD presents itself as a syndrome of symptoms including low (but not necessarily depressed) mood, social withdrawal, hypersomnia, increased food cravings (especially for carbohydrates), weight gain and poor concentration (especially in the afternoon). Light therapy is widely accepted as a treatment modality for SAD with great but still somewhat undiscovered potential. Shirani and St. Louis (2009, p. 160) states that “given the widespread influences of light upon circadian brain functions, the spectrum of clinical disorders in which light therapy can be considered is likely to expand.” The same authors however indicate that large, randomized controlled clinical trials will be necessary to enhance our knowledge of the potential responses to light therapy and to clarify treatment protocols (Shirani & St. Louis, 2009). Additionally longitudinal clinical trials are needed to clarify efficacy and long term safety of light therapy.

**Theoretical Framework**

The use of bright light therapy for the treatment of mood disorders such as SAD appears to be best supported by Leddy’s Human Energy Model. This model views the person as a unitary, self-organized energy field that is sensitive to and always interacting with the environmental energy fields (Leddy, 2006). The effects of light pattern changes on the circadian rhythm in individuals with SAD indicate that human beings are sensitive to the environment, to changes in environmental energy fields and constantly try to self-organize themselves by shifting and adjusting the circadian rhythm by sleeping more or less, or at different times, depending on the input from the environment. Leddy’s model views the environment as a “dynamic, ordered, connected web in continuous transformation of energy, matter and information with the human being” (Leddy, 2006, p. 86). The inherent order in the universe, the day-night cycle and seasonal changes, influences human behavior and mood thus illustrating the concept of connectedness.
between person and environment. Through the use of technology and modern utilities (heating and light for instance) humans have succeeded in gaining limited control over environmental factors such as daily and seasonal light pattern changes. Yet such control, in a significant number of cases, encumbers personal wellbeing when reduced exposure to adequate bright light (due to shift changes, working environments and less time spent outdoors) results in mood disturbances such as SAD.

Cultural, Legal and Ethical Issues

The use of light therapy has not been marked by a great number of ethical concerns yet the use of this modality in patients with visual disturbances, blindness and increased risk for diseases affecting the eyes may pose significant ethical concerns. According to Sliney ("Light therapies for depression", 2009) a major concern with the use of light therapy is the unknown susceptibility of some individuals to acquire severe retinal damage when exposed to bright light (especially ultraviolet and infrared wavelengths) at high intensity or for prolonged periods of time. Because the exact risk is not known and cannot be determined in advance, the dilemma arising is whether the treatment of conditions such as SAD, subthreshold depression and sleep disturbances with light therapy, a proven effective method, should supersede the concern of potentially causing retinal damage in susceptible individuals. Providers managing their patients’ SAD with the use of light therapy however are recommending the use of broad-spectrum white light from fluorescent lamps with filters to reduce ultraviolet and infrared wavelengths (Shirani & St. Louis, 2009). Excluding patients with known retinal pathology and those using photosensitizing medications as well as preventing excessive exposure will enhance the safe use of light therapy (Shirani & St. Louis, 2009).
Stemming from these ethical concerns is the potential for legal action taken in the event that an individual does present with visual compromise following the use of light therapy. To complicate matters further, since the exact impact of bright light treatment on retinal cells cannot be measured the potential exist that a patient might take legal action against a provider citing the use of light therapy as the cause of blindness or visual imparity when in fact, the patient might have sustained retinal damage due to other causes. It is therefore vital to carefully instruct the patient in the safe use of the light box device and obtain a baseline ophthalmologic evaluation prior to the start of light therapy followed by periodical re-assessments of ocular health by a licensed professional. Patients should also receive information and counseling enabling them to recognize the side effects of light therapy overdose and encouraging them to promptly report this to the managing provider. Accurate documentation of assessment findings, risk reduction strategies, informed consent, patient education and any actions taken to minimize the risk of treatment for the patient is of absolute importance and may aide in resolving any legal disputes.

As with all nursing interventions and holistic, individualized practice principles, the cultural background of each potential light therapy client should be carefully considered. Some cultures may impose limitations on the amount and timing of light exposure which may influence adherence to a plan of treatment or religious practices, such as prayer at sunrise, noon-day and sunset, may indirectly impact on the patient’s ability to adhere to a treatment schedule. The advance practice nurse should include an assessment of cultural factors in the complete initial assessment of the patient and periodically check for the existence of less obvious cultural influences which might impact upon the success of the treatment. Research has linked the incidence of SAD with the physical location of a patient in terms of global latitude (Miller, 2005). Cultural communities living at the extreme latitudes may exhibit a significant prevalence
of SAD but in addition to this, may also demonstrate better coping skills and a higher level of acceptance of alternative/complimentary healing therapies such as light therapy.  

**Incorporation into Advanced Nursing Practice**

The incorporation of the use of light therapy for the treatment of SAD as well as other mood, behavior and sleep disturbances into advance practice nursing is highly feasible. The availability of published literature such as the practice recommendations for diagnosis and management of SAD by a nurse practitioner (Johnson, 2000) and clinical research findings on the efficacy of treatments and therapeutic intervention programs (Brown & Shirley, 2005) attest to the appropriateness of advance practice nursing involvement in the use of light therapy and associated integrative practices. In accordance with the basic philosophy of nursing as a caring profession which considers the human as a whole and which endeavors to promote health throughout the lifespan, the use of light therapy fits into the spectrum of modalities and approaches available to nurse practitioners to facilitate health promotion through healthy lifestyle changes. The use of light therapy by the advance practice nurse does not appear to have any limitations. Functioning within a collaborative relationship with other qualified health professionals, including those specialized and licensed in holistic or complementary healing therapies will not only enhance safety and appropriate use but also greatly benefit the clients who may choose this modality as part of their wellness plan. The consideration and use of this modality can also benefit nursing as a profession as it will solidify the resolve to treat patients as individuals as holistic beings within the environment where they live. The expansion of knowledge through research and clinical trials and justifying the role of the advance practice nurse in the delivery of complete health care, including alternative or complimentary therapies, will ultimately add to the body of nursing knowledge and evidence. International collaboration
in the field of light therapy is a great and already emerging opportunity. SAD has been linked to global latitude and with more individuals moving away from their county or origin and living in environments vastly different from what they were used to, the patterns of prevalence are bound to shift. Nurses in different countries can share their knowledge regarding the management of SAD to benefit the wellness of individuals on a global scale.
References


Appendix A

Table 1

*Investigation of Literature using Database Searches*

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<th>ProQuest</th>
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*Note.* All searches were limited to English language and scholarly journals/peer reviewed. CINAHL queries were expanded to search within the full text of articles and ProQuest queries were performed searching citation and document text.