EDITORIAL

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Nutritional Interventions for Treatment of Seasonal Affective Disorder

Lawrence A. Palinkas

School of Social Work, University of Southern California, Los Angeles, CA, USA

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Correspondence
Lawrence A. Palinkas, Ph.D., School of Social Work, University of Southern California, 669 West 34th Street, Los Angeles, CA 90089, USA.
Tel.: 213-740-3990;
Fax: 213-740-0789;
E-mail: palinkas@usc.edu

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Between 0.4% [1] and 2.9% [2] of adults living in the United States and Canada are believed to meet the DSM criteria for seasonal affective disorder (SAD), a recurrent depressive disorder that most experience during the fall/winter with spontaneous remission during the spring/summer. As many of 12.5% experience a subsyndromal variant of this condition which, while not rising to the level of a DSM diagnosis, nevertheless may benefit from treatment [3]. Evidence-based treatments for SAD include light therapy and antidepressant medication. Exposure to bright light is almost three times more likely to achieve clinically significant reduction in symptoms and response and remission rates compared to placebo conditions [4]. Fluoxetine and other antidepressants have been shown to be as effective as light therapy in reducing depression scores and in response and remission rates [5]. A form of cognitive behavioral therapy, tailored specifically for patients with SAD, has also been shown to be effective in achieving symptom remission, especially when combined with light therapy [6].

Nevertheless, there are several reasons for developing supplementary or alternative treatments for SAD. First, only 53% of patients with SAD exhibit symptom remission with light therapy [7]. Further, not all SAD patients adhere to light therapy clinical practice guidelines due to the considerable time commitment required and reported side effects [6]. Similarly, not all patients with SAD and other depressive disorders adhere to treatment with antidepressant medication due to discomfort with side effects, cost of treatment, and barriers to access to care [8]. Further, the etiology of SAD has not been clearly established. The occurrence of the disorder primarily, but not exclusively, during the winter months, increased prevalence with higher latitudes, and responsiveness to light therapy and melatonin consumption all suggest a disruption of internal circadian rhythms relative to the external clock [9]. However, not all studies have found evidence for circadian dysregulation or association of therapeutic response with circadian phase-shift in patients with SAD [5]. The circadian rhythm hypothesis is clearly inadequate to account for all episodes of SAD.

There is a need for further investigation of the effects of carbohydrate consumption as an alternative treatment for seasonal affective disorder

The paper in this issue by Mischoulon et al. [10] addresses an alternative explanation for SAD known as the monoamine hypothesis. Studies have shown a clear seasonal variation in brain and peripheral serotonin in healthy people [11]. Serotonin dysregulation has been linked to other forms of depressive disorder [12], and tryptophan depletion has been shown to reverse the antidepressant effects of light therapy in SAD patients [13]. The studies reported by Mischoulon et al. are exploratory in nature and focused more on evaluating the feasibility of using a carbohydrate-rich nutritional intervention. As the authors admit, both studies reported in this paper were clearly lacking in sufficient statistical power to rule out the possibility of a Type II error. Nevertheless, both the carbohydrate rich beverage and the placebo beverage produced a significant reduction in depressive symptoms as assessed by the Hamilton depression rating scale

(HAM-D-28). Moreover, both produced response rates ranging from 50% to 76% and remission rates ranging from 38% to 71%, both were well tolerated and adhered to, and both produced similar gains in weight.

The most likely explanation for the results reported in this study is that an improvement of symptoms was likely to occur with any intervention due to a placebo effect. The amount of carbohydrates in the active beverage was based on previous research by the authors demonstrating its efficacy in women with premenstrual syndrome, but it is not entirely clear why the amount of carbohydrate contained in the beverage (40 g) should be sufficient to address the seasonal imbalance in serotonin metabolism. However, as the authors note, the response rate even in the control condition was notably higher than response rates reported for placebo conditions in other randomized controlled trials. This suggests the possibility that the two treatment conditions were more alike than they were dissimilar. The absence of a dose–response relationship may indicate a threshold effect such that even small amounts of carbohydrates may produce a reduction of symptoms and the actual carbohydrate consumption threshold for replacement of serotonin may be much lower than the 40 g in the active beverage.

The absence of a significant difference between the two treatment conditions in any of the measured outcomes may also reflect limitations with the monoamine hypothesis itself and its ability to account for all episodes of SAD. Two alternative explanations for SAD include the depletion or dysregulation of catecholamines, which has also been shown to reverse the effects of light therapy in SAD patients [14], and the depletion or dysregulation of thyroid hormones in SAD patients [15]. Both catecholamines and thyroid hormones exhibit seasonal variation in healthy adults [16,17]. The carbohydrate craving characteristics of SAD patients is also consistent with clinical hypothyroidism [18]. Reduced levels of TSH have been found in SAD patients undergoing treatment with light therapy [19], and administration of low doses of thyroxine has been shown to reverse depressive symptoms in healthy subjects exposed to prolonged darkness during the austral winter in Antarctica [20].

In summary, the results presented by Mischoulon et al. are promising but inconclusive. They point to an improvement in symptoms after consumption of a carbohydrate-rich beverage, but one that is no greater than a control condition that, theoretically, should have dampened the effect on serotonin synthesis of a much smaller amount of carbohydrates. Nevertheless, they also point to the need for further investigation of the effects of carbohydrate consumption as an alternative treatment for SAD and a more detailed examination of the implications of the effectiveness or lack thereof of using carbohydrate replacement to ease the debilitating effects of this seasonal disorder. Such research may also provide us with greater insight on the cause, course, and consequences of the seasonal pattern of carbohydrate cravings and its relationship with depressed mood.

Conflicts of Interest

The authors declare no conflict of interests.

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