

Health Care Utilization for Patients Diagnosed with Seasonal Affective Disorder Comorbid with

Anxiety: Cognitive-Behavioral Therapy or Light Therapy

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University Honors in Psychology

American University Spring 2013

Abstract

This study examined changes in health care use for patients treated with cognitive-behavioral therapy (CBT) or light therapy (LT) for the treatment of seasonal affective disorder (SAD) comorbid with anxiety. The research was conducted on pre-treatment and one-year follow-up participant data in which the participants either received LT treatment or CBT treatment for their SAD. The participant data was gathered from a National Institute of Mental Health (NIMH) funded clinical trial that included 177 participants, 27 who were diagnosed with SAD comorbid with anxiety and 95 who were diagnosed with SAD alone. The study was a 2 x 2 x 2 factorial design with repeated measures on one factor that compared the health services used after being treated with either LT or CBT. It is predicted that the use of CBT for patients would lead to decreased health care usage in the future. This decrease was predicted specifically when comorbidity was present. The results suggested that patient's use of health care services, diagnosed with a comorbid anxiety disorder, decreased significantly after treatment. The results also suggested that CBT is more effective in decreasing health care services, most specifically when comorbidity was present. However, when patients were diagnosed with only SAD, no significant decreases in health care use were found.

Health Care Utilization for Patients Diagnosed With Seasonal Affective Disorder Comorbid With Anxiety: Cognitive-Behavioral Therapy or Light Therapy

The cost of mental illness is a large issue for funders and providers in the mentally ill community; therefore, it is very important for patients to get the best treatment for the money their funders or their health care programs are offering. Seasonal Affective Disorder (SAD) is a subset of Major Depressive Disorder (MDD) that often occurs in the higher latitudes of the United States (Stein, Kuiper, & Shatzberg, 2006). SAD is a form of seasonal depression which occurs in the winter months and which has spontaneous remission in the spring and summer months. SAD has been noted to be diagnosed comorbid with various types of anxiety spectrum disorders (Mineka, Watson, & Clark, 1998). According to the Anxiety and Depression Association of America (2012), major depressive disorder and various types of anxiety disorders are considered some of the most commonly experienced psychological disorders in the United States. These disorders are often treated through cognitive-behavioral therapy (CBT), light therapy (LT), and pharmacological interventions (Butler, Chapman, Forman, & Beck, 2006).

However, because the data used in this present study compares only patients treated with CBT or LT, these treatments will be the primary focus of this paper. SAD is considered by *The Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text revision, American Psychiatric Association, 2000) (DSM-IV-TR) as a subset of MDD, which is recurrent with a seasonal pattern. SAD affects 5% of the population and is characterized by depression in the winter months (Stein et al., 2006). Symptoms last from October through mid-March, with spontaneous remission during the spring and summer (Stein et al., 2006). SAD is more prevalent in higher latitudes such as in New Hampshire (affecting 9.7% of adults) compared to Florida (affecting 1.4%; of adults Stein et al., 2006). The primary cause of SAD is often attributed to a

lack of light exposure during the winter months, which then can disrupt a patient's circadian rhythm or internal clock (Lam & Levitan, 2000). The circadian rhythm theory is why SAD is often treated with bright light exposure (Lam & Levitan, 2000). Bright light exposure, formally called "light therapy" (LT), is a treatment designed to help patients receive the light exposure that the winter months lack due to a lack of sunlight (Lam & Levitan, 2000).

Light therapy has been shown to be effective in the treatment of SAD, with response rates, meaning the likelihood of responding to treatment, up to 75% (Levitt, Lam, & Levitan, 2002). Light therapy also has remission rates of 54-61%, which means the likelihood that a patient will be free of symptoms (Levitt, Lam, & Levitan, 2002). Meaning Light therapy works by a patient placing a light box on a flat surface approximately one meter directly from their eyes (Magnussin & Boivin, 2003). The box then radiates fluorescent or LED light at around 2,000-10,000 lux (Magnussin & Boivin, 2003). The recommended usage of the light box depends on the patient, but averages 30-120 minutes per day for seven days a week (Magnussin & Boivin, 2003). In the present study patients used the *Sunray* © light box, which illuminated approximately 10,000 lux. Patients typically are asked to use the light box for 45 minutes per day, 7 days per week, for a total of 6 weeks.

The amount of illumination given off by the light box is comparable to the amount of light a person would receive in the early morning hours after sunrise (Terman et al., 1989). Exposure to this type of light typically shows alleviation of SAD symptoms within three to four days of treatment (Terman et al., 1989). Terman et al. (1989) proposed that when light therapy stops, relapse is within three to four days. Therefore, it can be noted that for light therapy to continue to be effective, the patient must constantly use the light box daily during the time they experience SAD (Schwartz, Brown, Wehr, & Rosenthal, 1996). Light therapy also can have

costly negative side effects to patients such as, eyestrain, headaches, and insomnia, but these side effects are experienced by approximately 25% of patients (Terman et al., 1989).

Seasonal affective disorder (SAD) is also commonly treated with cognitive-behavioral therapy (CBT). Aaron Beck founded CBT, a form of psychotherapy, in the 1960's (Wright, 2006). This model of therapy focuses on how negative cognition can affect behavior. The point of this therapy is to help modify a patient's dysfunctional thoughts to help change their behavior (Wright, 2006). CBT is often found to have lower relapse rates than LT (Rohan et al., 2004). According to a clinical trial conducted by Rohan et al. (2004), over 60% of patients had a full relapse after receiving LT the previous winter, whereas no full relapses during the same period occurred for the patients who received CBT in the trial conducted. The use of CBT skills is said to help reduce the risk of the depressed symptoms associated with SAD, which suggests that CBT is a more durable treatment than LT (Rohan et al., 2004).

LT and CBT differ in benefits and differ in cost. According to Hunsley (2002), in the United States, CBT averages around \$90-\$120 per 50-minute individual session. The number of sessions attended tends to span from 6 weeks – 6 months depending on the needs of the patient (Hunsley, 2002). The average light box costs approximately \$400, depending on the strength and quality of the box. CBT has been shown to have a higher success rate than light therapy (Rohan et al., 2004).

SAD has also been linked with anxiety disorders, and given that anxiety affects 18% of the population in the United States, it is important to understand what anxiety is and the different types of anxiety disorders (ADAA, 2012). Anxiety is a physiological and psychological response that the average person experiences in response to certain stimuli in the environment (ADAA,

2012). However, when an individual experiences these symptoms in excess, they are at risk for their anxiety developing as a psychological disorder (ADAA, 2012).

The DSM-IV-TR has categorized excess anxiety in several different disorders: generalized anxiety disorder (GAD), social anxiety or social phobias, post traumatic stress Disorder (PTSD), obsessive-compulsive disorder (OCD), specific phobias, and panic disorders (with or without agoraphobia). However, each of these disorders have common symptoms such as constant unrealistic fears, feelings of dread or impending doom, and overwhelming worry in regards to certain, often neutral, environmental situations (ADAA, 2012). These symptoms are not only psychological but can often cause physiological responses such as perspiration, increased heart rate, heart palpitations, and strong feelings that death is imminent (ADAA, 2012). In this study, all of the anxiety disorders are represented by using “anxiety” to identify the presence of one or more types of anxiety.

There are several theories that pertain to the causation of anxiety disorders. Beck’s (2005) theory suggests that negative cognitive biases towards seemingly neutral stimuli can cause a patient to experience an anxiety disorder. This theory of causation is often why anxiety disorders are treated with CBT (Beck, 2005). This is why the present research predicted that patients diagnosed SAD comorbid with anxiety were expected to use less health care services when treated with CBT. CBT is the form of treatment most often used when treating both SAD and anxiety.

This present research used previously collected, de-identified data collected from a clinical trial by Department of Psychology at the University of Vermont. This NIMH-funded clinical trial was based on patients who were treated for SAD with either LT or CBT. The patients were randomly assigned to treatment with either LT or CBT. This research included pre-

treatment and one-year follow-up health care information about patients with SAD, with or without comorbidity. All of the data was obtained by Kelly Rohan Ph.D. who conducted research on treatments of SAD with LT and CBT at the University of Vermont. This project was also inspired and aided by thesis research conducted by Lana Wald M.A., a Ph.D. student at American University, who is currently conducting her thesis on a cost- benefit analysis of LT versus CBT for SAD. Lana Wald works in the Program Evaluation Research Lab under the supervision of Brian T. Yates Ph.D., a professor at American University, who also created the questionnaires used in the study.

The point of this study was to determine whether CBT or LT would lower health care utilization for patients diagnosed with SAD, and for patients diagnosed with SAD comorbid with anxiety. I predicted that CBT would be more beneficial than LT for patients with SAD and SAD comorbid with anxiety, meaning patients would benefit by their health care utilization being decreased as a result of CBT. This type of therapy was predicted to be a more beneficial method when treating SAD in the presence of anxiety as a moderator because CBT would lead to the reduction of SAD and anxiety symptoms. CBT was predicted to reduce these symptoms more so than LT would because CBT is a form of treatment that is proposed to have more long-term effectiveness than LT (Rohan et al., 2004). This reduction in symptoms was predicted to lead to the reduction of the use of health care services. I proposed that SAD comorbid with anxiety will cause LT to become less beneficial because LT is a type of therapy that is not typically used to treat anxiety (ADAA, 2012). One could be treated for SAD comorbid with anxiety with LT, however this treatment might not be as effective as CBT. In summary, CBT will be the more long-term and sustainable method of treatment, especially in the presence of comorbidity because CBT is predicted to provide long-term coping mechanisms for patients that LT does not

provide. As displayed in Figure 1, the pre-treatment health care utilization was predicted for all categories to begin with high numbers, but treatments with CBT, with and without comorbidity, were predicted to lead to less health care utilization in the one-year follow-up treatments. The graph in Figure 1 illustrates how LT was predicted to be overall less effective in all areas, regardless of the presence of comorbidity.

In this study the number of average use of health care services was analyzed, but no monetary costs were focused on. This study examined the average number of health care services used and it was predicted that if the use of health care services decrease then the cost of services will also decrease and client earnings will increase. These predictions are the reason why much of this study focuses and discusses cost, even though no costs are actually reported.

Method

Participants

The study consisted of 177 people who participated in a clinical trial conducted by Kelly Rohan Ph.D., in the Psychology Department at the University of Vermont, based on the treatment of SAD with LT or CBT. However, in this five-year study only 122 participants had completed both sets of assessment regarding health care utilization prior to treatment and 1-year following treatment. Therefore, only 122 participants were included in this present research. Participants were split into two groups: one group consisted of 95 participants solely diagnosed with SAD; the other group consists of 27 participants diagnosed with SAD comorbid with an anxiety disorder (see Table 1). All of the diagnoses were formally assigned by a clinical psychologist with over ten years of experience, and psychology graduate students also aided in this process. The types of anxiety disorders included in this research consisted of GAD, specific phobias, PTSD, social phobia, panic disorder with or without agoraphobia, and OCD. However,

instead of defining each anxiety disorder separately, the anxiety moderator was defined generally.

The diagnosis group was determined and the participants were randomly assigned to two more groups, as seen in Table 1. Approximately 60 of the participants were treated with LT (13 with comorbidity present and 47 with comorbidity absent). The remaining 62 participants were treated with CBT (14 with comorbidity present and 48 with comorbidity absent). Each of the participant's health care usage was obtained from self-report questionnaires filled out by the participants just prior to treatment and one year following the treatment (see Table 1).

Participants (148 female, 29 male) were 93% (165) Caucasian, 2% (3) Hispanic, 3% (5) Native American, 1% (2) African American and 1% (2) Asian. Mean age was 44 years (range: 26-63).

Treatments

The two types of treatments used on the participants in this data were CBT and LT. The CBT sessions were held in groups of 4-8 participants. There was a total of 12 sessions each session lasted 90 minutes. CBT was free for participants, because a Ph.D. student as a training exercise conducted it. The sessions were held twice a week, on Monday's and Wednesdays, for 6 consecutive weeks.

The LT group used a light box, which cost \$349.00, but the participants used the light box for free because the box was funded by the clinical trial. The light box was instructed to be used 7 days a week for 30 minutes a day to start. If this dose did not get a response in first few days of treatment the patients were instructed to increase their usage in 15-minute increments. However, the average time usage of the light box was 45 minutes per day according to patient self-report. The patients were instructed used to the box daily for six weeks. The light box provided 10,000 lux of illumination.

Measures

The data were collected at two different times via self-report questionnaires. The data collected were prior to treatment and 52 weeks from the end of treatment. The participants reported the use of health care services before, during, and after either LT or CBT. However, this research focuses solely on the pre-treatment and 1-year follow-up assessments.

Procedure

Prior to treatment patients were asked to complete Beck Depression Inventories (BDI-2) to assess their level of SAD, which was considered a dependent measure unlikely to be reactive. Also, prior to the pre-treatment assessment, a licensed psychologist formally diagnosed patients with any comorbid illnesses.

A repeated measures analysis of variance (ANOVA) was conducted to determine how the average number of visits to the emergency room (ER), hospital, and physician offices changed between the 12 months preceding treatment and the 12 months after treatment ended. A total sum of these services was calculated and an average sum of health care services was used to do this analysis. Change in use of individual health care services (e.g., hospital visits) was examined for patients in different treatments with Mann-Whitney *U* tests because histograms indicated that the use of individual health services was not distributed normally.

Results**Health Care Use and Time**

The average total use of health care services was distributed normally, according to various histograms. The means in Table 2, graphed in Figure 1, suggest that health care use was increased during the pre-treatment assessment, but then decreased in the 1-year follow-up

assessment. This can be seen through a significant linear interaction between treatment from a repeated measures ANOVA within-subjects contrasts suggests, $F(1, 118) = 21.25, p < .001$.

Health Care Use and Comorbidity

Health care services reduced overall with time but decreased more so for the participants who were diagnosed with SAD comorbid with anxiety as seen through a significant interaction, $F(1,118) = 4.80, p = .03$. In the CBT group, with and without anxiety, there is more of a decrease than in the LT. This suggests that CBT may lead to decreased health care services usage, especially for patients diagnosed with SAD and anxiety.

Figure 2 also suggests that patients with a comorbid diagnosis had higher health care services pre-treatment than did patients with no comorbid diagnosis, whether assigned to either the LT or CBT conditions. This indicates that the participants who had a dual diagnosis used more health care services, but this health care use decreased after treatment with LT and CBT more so than the non-comorbid diagnoses. This suggests that treatment in general can lower total health care services for patients with SAD comorbid with anxiety.

Health Care Use and Program

The within-subjects interaction between time and program led to non-significant findings which suggests that both LT and CBT programs do not significantly decrease health care services. Also, the triple interaction between time, comorbidity, and program was not significant.

Individual Health Care Services

Various histograms displayed a non-normal distribution for the utilization of individual health care services; therefore non-parametric Mann-Whitney U tests were used to measure the differences in services usage for emergency room (ER) services usage, hospital services usage, and doctors services usage. No significant changes were found over time with ER services,

hospital services, and physician services between comorbid and not comorbid, $p > .05$. Meaning the distribution of services is the same across all categories of comorbidity. No significant changes were also found over time with ER services, hospital services, and physician services between LT and CBT.

Discussion

In this research information about the amount of health care services used by patients was collected for patients diagnosed with SAD and SAD comorbid with anxiety treated with LT or CBT. This information was collected for two time periods: 12 months preceding treatment and 12 months following treatment. The results revealed that during the year following LT or CBT, use of health care services decrease. However, this decrease over time was only significant for patients who had been diagnosed with a comorbid anxiety disorder before LT or CBT. Figure 2 suggests that CBT reduces health care use for SAD and SAD comorbid with anxiety more so than LT would. These findings are consistent with my original hypothesis, which proposed that CBT would reduce the use of health care services more so than LT would, most specifically when comorbidity was present. This research is consistent with the study by Rohan et al. (2004), which suggested that CBT was a more durable and effective treatment for SAD. Although my research does not test the alleviation of SAD or anxiety symptoms, it does suggest that patients with SAD and SAD comorbid with anxiety could possibly save more money and time by being treated with CBT because the data suggests that CBT would reduce health care usage.

Limitations

This present research included many unequal population ratios such as gender, comorbidity, and race. Female's outnumbered males in this study by 67%. Perhaps in future study if the gender ratio was more equal results would differ. Furthermore, the comorbidity

categories were also unequal by 55%. Meaning that there were more patients assigned to the SAD group compared to the SAD comorbid with anxiety group. If these groups were more equally distributed more significant or non-significant findings could have occurred. Another limitation occurred in terms of anxiety alleviation. In the beginning participants were given BDI-2 tests to assess their SAD levels, but were not given any anxiety tests to assess their anxiety levels. In the future it would be more beneficial to assess both depression levels and anxiety levels prior to treatment and after treatment in order to determine results a part from health care services use. The race category was also unequally distributed with the vast majority of participants belonging to the Caucasian race. In the future it would be beneficial to determine the results with various types of races in order to assess a more representative sample of the population.

Conclusion and Future Study

It has been determined how much health care use decreases for SAD patients when treated with LT or CBT with comorbidity present or absent. This present research is important because it allows for people with SAD comorbid with anxiety to help determine that CBT could be considered to decreased health care services use more than LT. This can help patients choose the best treatment. However, future studies could include more than health care services use in order to fully discover if CBT is more beneficial than LT in terms of a comorbid diagnosis. For example, future studies could measure the use of health care services and personal cost for patients diagnosed with SAD and SAD comorbid with anxiety treated with LT or CBT. Personal cost meaning, how much money, time, and sacrifice has a patient devoted to their illness in terms of treatment. Which treatment would lead to less personal cost? Further, future research could also include client earnings, meaning would LT or CBT lead to increased client earnings after

treatment? Adding monetary costs, rather than just the average number of health care services used, to future analyses would be highly beneficial for determining how decreased health care use is related to cost. These added future studies could help to further advance the knowledge of whether CBT is more advantageous than LT as this current research suggests in terms of usage and also in terms of monetary values.

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Table 1

2 x 2 x 2 Factorial Design

	Light Therapy: 60 participants	Cog.-Behav. Therapy: 62 participants
	<u>Pre/1yr:</u> 60	<u>Pre/1yr:</u> 62
<u>Diagnosed with SAD only:</u> 95 participants	47 participants	48 participants
<u>Diagnosed SAD comorbid with anxiety:</u> 27 participants	13 participants	14 participants

Table 2

Total Health Care Services Means

		Pre-Tx	1-Year
Light Therapy	No Anxiety	5.27	3.74
	Anxiety	6.84	3.92
Cognitive-Behavioral Therapy	No Anxiety	3.84	2.56
	Anxiety	6.87	1.87

Figure 1

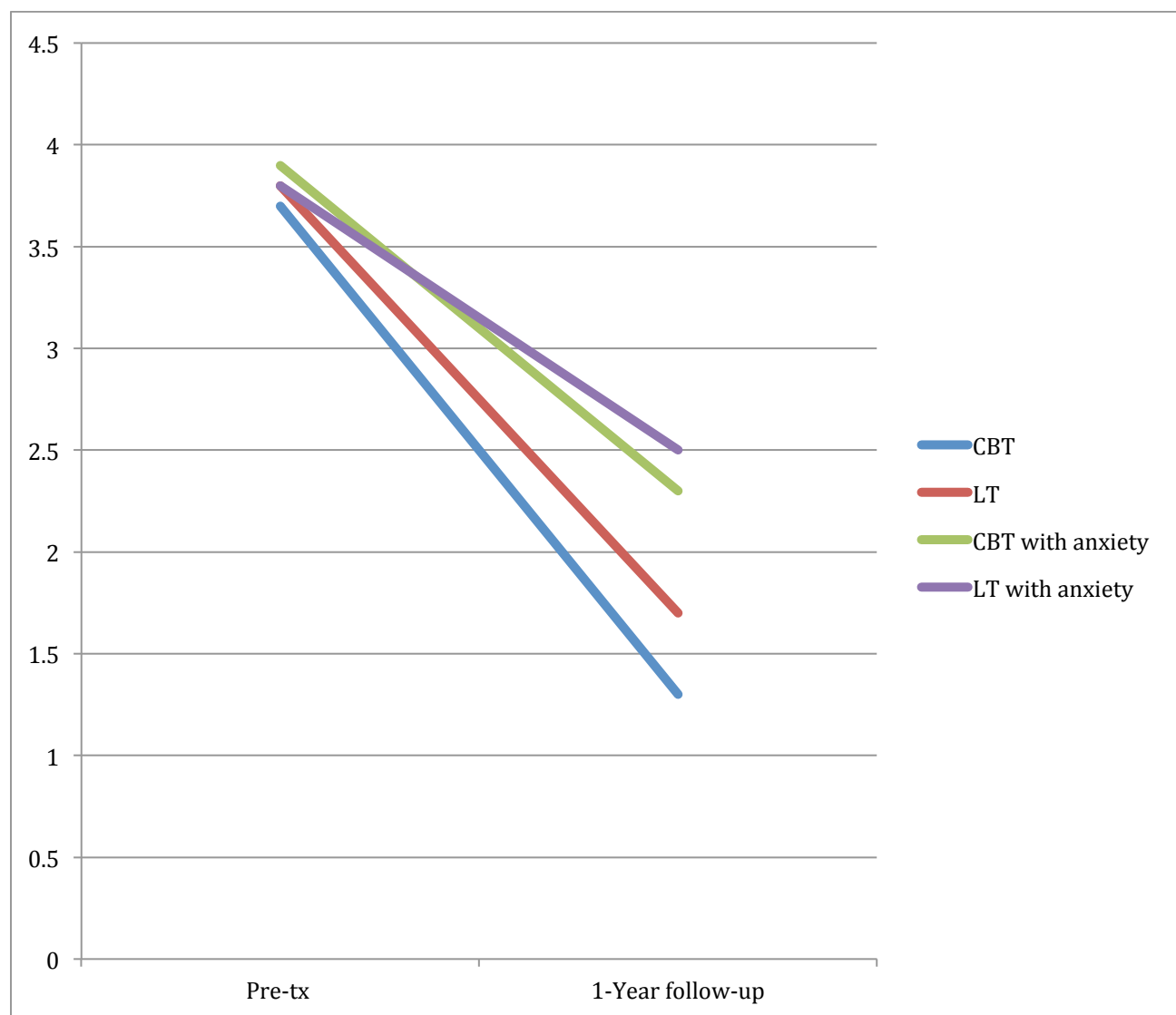
Predictions of Decreased Health Care Services Used

Figure 2

Average Total Health Care Services Used