

EFFECTIVENESS OF LIGHT THERAPY ON DEPRESSION IN HOSPITALIZED MAJOR DEPRESSIVE PATIENT

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Received: 24 April 2013, Revised and Accepted: 28 April 2013

ABSTRACT

Introduction: The present study was carried out to explore the effectiveness of light therapy to reduce depression among hospitalized Depressive patient.

Methods: Single subject [N=1] experimental design was utilized. Hamilton Rating Scale for Depression was administered to ascertain the level of depression. Light therapy was administered for a period of 7 consecutive days. The level of depression was assessed before and after the administration of light therapy.

Results: The data was analyzed with the appropriate statistical technique. The result revealed that there was significant decrease in the level of depression after light therapy.

Conclusions: This finding indicates that the light therapy has influenced in reducing the level of depression. Hence, light therapy can be adopted as an effective mechanism to treat depression.

Keywords: light therapy, hospitalized major depression, effectiveness, depression

INTRODUCTION

The present investigation was initiated with the objective of examining the effectiveness of light therapy in major depressive patient. Numerous treatment strategies have been utilized for treating depression despite the fact that light therapy is said to be a treatment without side effects. Light therapy is one of the most extensively used non-pharmaceutical treatments for treating depression. Light therapy is so called photo therapy employed for various physical illnesses. Bright light with an appropriate intensity and for a specified duration of time brings a remarkable decrease in the symptoms of depression. Light therapy is described based on the four basic parameters i.e. intensity, wavelength, and duration of daily exposure and timing of light exposure. Intensity is expressed in lux, on analyzing the earlier studies the intensity was used from minimum of less than 500 lux to maximum of 10,000 lux and most of the studies used 2,500 lux. And, in terms of the duration of light therapy was at least of half an hour to maximum of six hours. However, the timing of light therapy was evidenced in many studies indicate morning light exposure is found to be superior than to evening light exposure, [1-8] whereas others have found no difference. [9-13] There is no controlled studies substantiate that the evening light is superior to morning light.

Some neuro chemists argue that a neuro chemical change occurs during light therapy. Bright light with a particular intensity inhibits the secretion of melatonin – a neuro chemical substance produced by the pineal gland. Eventually, the symptoms of sleep wake problems are remarkably reduced, which is also evidenced in depressive patient. The ease of light therapy, lack of serious side effects, cost effectiveness, possibility of out- patient application, not to mention high acceptance of an attractive non-pharmacological treatment demands evaluation in a controlled multi-centre trial in non-seasonal major depression. [14] Though light therapy lacks side effects it is quite uncommon and generally mild. Light therapy underwent patients sometimes complain eye strain, eye dryness, insomnia, headaches and irritability. These side effects could be eliminated by maintaining the distance from the light and reducing the duration of light exposure.

Depression

Major depression is a highly life threatening disease estimated to be the fourth major cause for loss in disability-adjusted life years,[15] and also it is estimated to be the first cause in developed countries in future years. Prevalence rate of depression between the years from 1972 to 1992 have increased from 49.93 to 73.97 cases per 1000 population.[16] Studies done in primary care clinics/center have estimated a prevalence rate of 21-40.45%.[17-20] Studies done in hospitals have shown that 5 to 26.7% of cases attending the psychiatric outpatient clinics have depression.[21-24] About 10% of the American population is affected by depression at any given moment.[25] Worldwide statistics show that 8,50,000 people died due to suicide per annum. [26]

Depressive patients have diversified symptoms such as sleeplessness, loss of appetite, suicidal tendency, and social alienation. It is caused not by a single factor rather it is caused due to biological, genetic, and psychological influences combined with life stresses, disturbances in brain, biochemistry and irregularities in specific brain chemicals. Major depression, is one of the affective disorders and a mood disorder characterized by a sense of inadequacy, despondency, decreased activity, pessimism, anhedonia and sadness. These symptoms severely disrupt and adversely affect one's life, sometimes results in attempt to suicide or suicide and also irritability, insomnia, lethargy, agitation and anxiety often accompany depression. Women are twice as likely as men to suffer from depression. [27] Higher rates of depression in women are associated with both biological and social factors. Depression occurs most frequently in women ages 25 to 44, and peaks during childbearing years. Depressive disorders are a group of conditions delineated and defined as a disturbance of mood that causes significant clinical distress or impairment in functioning [DSM-IV-TR].

Almost 1 million people commit suicide due to depression and it is translated to 3000 deaths every day. [28] Depression is the major leading cause of disability for both males and females, the burden of depression in females is 50% higher than males. [29] Depression is more common amongst females than males. This higher rate of

depression among females may be linked to biological, life cycle, hormonal, and psychosocial factors. And also researchers argue hormones directly affect the brain chemistry that controls emotions and mood. [30]

The report on Global Burden of Disease estimates the prevalence of unipolar depressive episodes to be 1.9% for men and 3.2% for women, and the one-year prevalence has been estimated to be 5.8% for men and 9.5% for women. It is estimated that by the year 2020 if current trends for demographic and epidemiological transition continue, the burden of depression will increase to 5.7% of the total burden of disease and it would be the second leading cause of disability-adjusted life years [DALYs], second only to ischemic heart disease. [31] In view of the morbidity, depression as a disorder has always been a focus of attention of researchers in India. Many authors have tried to study its prevalence, nosological issues, and psychosocial risk factors including life events, symptomatology in the cultural context, co-morbidity, psycho-neurobiology, treatment outcome, prevention, disability and burden. Some of the studies have also tried to address various issues in children and elderly. A large population-based study from South India, which screened more than 24,000 subjects in Chennai, reported overall prevalence of depression to be 15.1% after adjusting for age using the 2001 census data. [32]

Generally major depression is treated with pharmacological interventions and psychiatric interventions such as administration of antidepressants, cognitive behavior therapy, family therapy, social support interventions and other therapeutic procedures. Besides light therapy is a non pharmacological intervention observed with remarkable improvement. The efficacy of light therapy is found to be high when administered with other treatment techniques.

Light Therapy and Depression

Initially, light therapy was used for treating seasonal affective disorder and was proved to have clinical treatment effects. [33-36] But, currently it is being used to treat other disorders such as non seasonal disorders. Light therapy is found to be effective for seasonal affective disorders and non seasonal disorders. [37] This was also substantiated in a generally short-term, placebo controlled trials. [3, 38-41] And also it has been found effective in treating depression in other age groups. [42, 39] The mechanism behind the effectiveness of light therapy in treating depression remains unclear. [43] However, many studies indicate that exposure to enough sunlight can be effective in treating depression. [34, 42, 39, 35-36]

Effect of light therapy among hospitalized elderly depressive patients living in subtropical regions indicates the symptoms of depression reduced in experimental group compared to control group. [44] Similarly, the effect of bright light therapy on ante partum depression during pregnancy revealed a statistical significance. [45] Light therapy has widespread application; it has been applied for other conditions and also combined with other treatments yield notable improvement. Bright light therapy with combined therapy revealed significant improvement among 13 female depressed patients with co morbid personality disorder. [46]

An open trial of morning light therapy for ante-partum depression among 16 pregnant patients with major depression showed a significant improvement by 49% and no adverse effects of light therapy was found in pregnancy after three week. [47]

Clinical effects of bright light therapy in comparison to the inactive placebo treatment for non-seasonal depression by meta analysis of twenty studies containing 49 reports revealed most of the studies applied bright light as adjunctive treatment to drug therapy, sleep deprivation, or both. Finally, the reviewers concluded that bright light therapy offers modest through promising anti-depressive efficacy, especially when administered during the first week of treatment, in the morning, and as an adjunctive treatment to sleep deprivation responders. And also they suggested hypomania is the adverse effects of that need to be considered. [48]

A randomized controlled trial of bright light therapy on antepartum depression among ten pregnant women with DSM IV criteria of depression were randomly assigned to 5 weeks clinical trials with

either a 7000 lux or 500 lux placebo light box showed the result that throughout the randomized controlled trail, there was a small group advantage of active treatment and no statistical significance obtained whereas a clear treatment effect produced in the longer 10 week trials in terms of active versus placebo light. [45]

Efficacy of light therapy in treating the mood disorders by a systematic review pertaining to the randomized controlled trials on light therapy for mood disorders revealed the severity of symptoms of depression was associated with bright light treatment, and dawn simulation in seasonal affective disorder, and with bright light treatment in non-seasonal depression. Bright light as an adjunct to antidepressant pharmacotherapy for non-seasonal depression was not effective. Other than the empirical studies some of the review also supports the light therapy studies herein attempted. [49]

A systematic review on efficacy of light therapy on non seasonal depression included sixty two reports identified among them 15 met the pre defined inclusion criteria revealed efficacy of light therapy as an adjuvant treatment to antidepressants. And the authors concluded that Overall, bright light therapy is an excellent candidate for inclusion into the therapeutic inventory available for the treatment of nonseasonal depression today, as adjuvant therapy to antidepressant medication. [50]

Bright light or imipramine for treating inpatient suffering from non seasonal major depressive disorder by including 34 in-patients with DSM III-R criteria were included for the study revealed there was a significant improvement in the group received light therapy and imipramine. [51]

This has been proved with a variety of psychological and physical illnesses such as seasonal depression, non-seasonal depression, major depression, ante-partum and post partum depression, anoxia nervosa and bulimia, premenstrual dysphoric disorder, attention deficit and hyperactivity disorder and sleep wake problems etc. Hence, the present piece of clinical trial will ensure the further researchers in carrying out noteworthy studies and clinicians to accomplish evidence based practices and to enhance the knowledge in the utilization of light therapy. Further, such a major life threatening disorder could be treated in a multidisciplinary approach whereas the study, herein conducted was an experimental one with a single intervention.

METHODS

The methodology herein employed to achieve the objectives of the present study was experimental in nature. To carry out the study approval from the institutional ethical committee was obtained. The study was conducted in the female psychiatric ward of Coimbatore Medical College Hospital, Coimbatore, Tamil Nadu, India.

Research Design

Single subject Experimental [N=1] A-B-A design was employed.

Sample

During the study period a single subject was hospitalized, due to the availability of the sample, convenience of the researcher and based on the criteria of sample selection, a female participant aged 39 years was included for the study. Her educational qualification was 10th grade. And there was no evidence found regarding the previous personal and family history of medical and mental illness.

Inclusion criteria

The inclusion criteria for the subject was
Client who met the DSM IV criteria for depression
Client who is newly diagnosed with depression

Exclusion criteria

The exclusion criteria for the subject was
Client with co-morbid psychiatric illness
Client with visual disturbances
Client who is not willing to participate

One female participant who met the inclusion criteria was selected for the study. Informed consent was obtained from the patient and caregivers.

Measuring Instrument

Hamilton Rating Scale for Depression [52] was administered to assess the level of depression in each assessment phase. The Scale is a 21 item self reported inventory with the scoring ranged from 0 to 53.

The Hamilton Rating Scale for Depression: The Hamilton Rating Scale for Depression. [52] The scale contains 21 items of which only 17 are used to give a total score of severity. The items are concerned with symptoms of illness and not with traits of personality. The four items are excluded because they occur too infrequently. The questions are divided into 2 groups-Specific Symptoms and Somatic Symptoms. Specific symptoms measure the following aspects i.e depressed mood, guilt, suicide, insomnia – initial, middle, delayed, work and interests, retardation, agitation and anxiety. Under somatic symptoms the following aspects are measured. They are gastrointestinal, general, genital symptoms, hypochondriasis, loss of insight, loss of weight, diurnal variation, depersonalization and derealisation, paranoid symptoms, obsessional symptoms, helplessness, hopelessness and worthlessness.

Scoring: It has a 3 grade, items and 5 grade items. For items with 3 grade it is a 3 point scale-absent-0, doubtful-1, present-2. For items with 5 levels the last level is split into 3 grades of mild-2, moderate-3 and severe- 4.

Reliability and Validity: Validity of the scale has been compared with clinical "global judgment". The inter rater reliability was 0.88 and therefore this sets an upper limit to validity measured in this way. Reliability for the total score ranges from 0.87 to 0.95. Reliability for individual items ranges from 0.45 to 0.78.

Design

Single Subject Experimental [N=1] [A-B-A] design was employed to evaluate the effectiveness of light therapy. To ascertain the consistency of depression level, three consecutive assessments were made with equal time interval of 30 minutes prior to the initiation of light therapy. Followed by these assessment phase, light therapy was administered for 30 minutes. Subsequent to this interventional phase, the level of depression was assessed to ensure the efficacy of the intervention with the equivalent time interval of 30 minutes.

Intervention

Prior to initiate the light therapy, benefits of the interventional procedure was evidently elucidated and informed consent was obtained from the client's caregivers. The client was seated comfortably and the bright white light with the intensity of 10000 lux was fixed in a 30 degree angle and one feet distance from the client's face. Followed by this the client was instructed to keep open the eyes and see the light and not to stare or close. This procedure was continued for 30 minutes per day for 7 consecutive days. During this period of intervention, administration of antidepressants, psychiatric and allied interventions were completely restricted.

Statistical analysis

To identify the effectiveness of light therapy, ongoing assessment was performed and the collected data on each day compared before and after light therapy. Further, the mean comparison was made between the level of depression on the first day and the last day of intervention. Paired "t" test was employed to analyze the data with 5% significance level.

RESULTS

Table 1 indicates the Mood pattern, sleep pattern, Appetite, Grooming, Psychomotor activity, Suicidal ideation and Somatic Symptoms of the patient during the course of intervention.

TABLE 1: ONGOING ASSESSMENT OF DEPRESSIVE SYMPTOMS

AREA OF ASSESSMENT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Mood	Depressed	Depressed	Depressed	Depressed	Normal	Normal	Pleasant
Sleep Pattern	Slept only for ½ an hour	Slept only for ½ an hour	Slept only for ½ an hour	Slept for 2 hours	Slept for 2 hours	Slept for an hour	Slept for 4 hours
Appetite	Anorexia. Consumed one meal / day with compulsion	Anorexia. Consumed one meal / day with compulsion	Consumed One meal per day with compulsion	Consumed 2 meals per day with compulsion			
Grooming	Shabbily groomed	Shabbily groomed	Shabbily groomed	Shabbily groomed	Shabbily groomed	Well groomed	Well groomed
Psychomotor activity	Increased Psychomotor activity	Slight restlessness	Normal	Normal	Normal	Normal	Normal
Suicidal ideation	Present	Present	Present	Present	Absent	Absent	Absent
Somatic symptoms	Head ache, palpitation, indigestion present	Head ache, palpitation, indigestion present	Head ache, indigestion present	Head ache, indigestion present	Mild head ache, indigestion	Mild head ache, indigestion	Mild head ache, indigestion

TABLE 2 : Level of Depression before and after Light Therapy

	Mean	S.D.	Mean %	Mean Difference	't'
Before therapy	23.57	8.55	44.47		
After therapy	22.71	8.11	42.85	0.86	3.445*

*Significant at 0.05 level

Table 1 depicts the mean difference in the level of depression between before and after light therapy. The table clearly shows the mean value of depression significantly reduced after light therapy.

The t value is significant at 0.05 level. Hence, the hypothesis "There is a significant decrease in the level of depression after light therapy" is accepted.

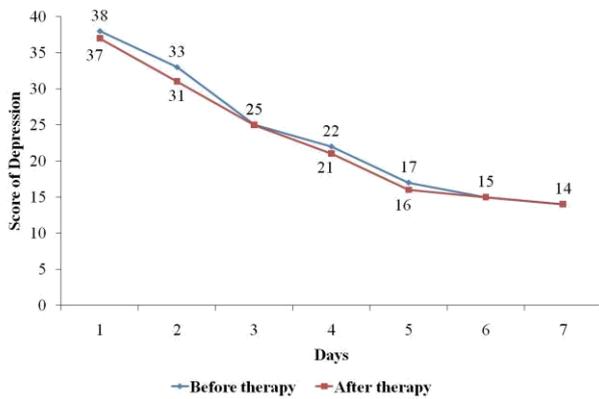


FIG. 1: LEVEL OF DEPRESSION BEFORE AND AFTER LIGHT THERAPY.

FINDINGS RELATED TO LEVEL OF DEPRESSION

TABLE 3: BASELINE DATA BEFORE LIGHT THERAPY

The following table comprises of data collected before the intervention with half an hour interval.

DAYS	BASELINE DATA		
	1	2	3
DAY 1	38	38	37
DAY 2	33	33	33
DAY 3	25	26	25
DAY 4	22	21	21
DAY 5	17	16	15
DAY 6	15	16	16
DAY 7	14	14	14

The above table shows the baseline data of depression during the study period before administering light therapy. Three consecutive assessments were made with equal time interval to ascertain the consistency of depression level before light therapy. The data clearly shows the trend of depression level from the day 1 to day 7 is found to be consistent before light therapy.

TABLE 4: BASELINE DATA AFTER LIGHT THERAPY

The following table indicates the level of depression after 30 minutes interval of light therapy

DAYS	BASELINE DATA
DAY 1	37
DAY 2	31
DAY 3	25
DAY 4	21
DAY 5	16
DAY 6	15
DAY 7	14

The above table reveals that the level of depression decreased after light therapy. From this result it can be interpreted that the light therapy played a vital role in decreasing the level of depression.

DISCUSSION

The present result demonstrates that the light therapy has significantly reduced the symptoms of depression and there was an association between withdrawal of light therapy and depressive symptoms. Similarly, morning light therapy provided antidepressant effect to pregnancy women [47] and light therapy significantly reduced antepartum depression. [45] Another study indicates the symptoms of depression reduced in experimental group compared to control group. [44] Likewise, light therapy with combined therapy revealed significant improvement in depression with co morbid personality disorder. There was a significant improvement after light therapy combined with imipramine. [51] Hence, the present

result is consistent with the previous findings of open trial of morning light therapy for ante-partum depression [47] bright light therapy on antepartum depression among ten pregnant women,[45] light therapy among hospitalized elderly depressive patients living in subtropical [44] and inpatient suffering from non seasonal major depressive disorder.[51] In addition to the support of these study findings some meta- analyses also support the present finding.

Meta-analyses on efficacy of light therapy also strongly supports the present findings. And almost all researchers in the above cited studies suggests bright light therapy will be an adjunct to pharmacotherapy and also they recommend light therapy is an excellent candidate to be included into the therapeutic inventory in the treatment of depression and non seasonal depression. [48-50]

In the present study the efficacy of light therapy was ascertained without the administration of any other psychiatric or allied treatments. Since, the effect of light therapy was stringently monitored in each occasion. And this result herein attained substantiate light therapy can be administered to treat seasonal, non seasonal depressions with or without antidepressants.

The present study comprised only a single participant which limits the generalization both in number and gender. Because of single subject experimental design no control subject comparison was made. Moreover, the study was conducted in only one hospital, in future, researchers may extend the study setting and include more sample of subjects.

From the present investigation we conclude that a course of light therapy of 10,000 lux administered for 30 minutes per day for 7 consecutive days will have a significant impact on depressive symptoms of major depressive client. It is therefore recommended that light therapy can be used to decrease depressive symptoms in major depressive client.

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