



Effect Of Blue Colour (Surya Chikitsa) On Anxiety Levels During Middle Childhood In Urban Areas Using Spence Children's Anxiety Scale-Parents

¹Divya Sharma, ²Mrs. Dhruthi S Prasad

¹Student, ²Assistant Professor

¹Department of Psychology,

¹Jain (Deemed-to-be-University), Bengaluru, India

Abstract: Anxiety in children is an increasing concern that impacts their emotional and psychological health. While traditional interventions typically include therapeutic practices and medication, alternative methods like colour therapy and Surya Chikitsa (sunlight therapy) have shown potential in enhancing conventional treatments. This research examines the effectiveness of blue colour therapy and Surya Chikitsa in reducing anxiety in children, offering insights into how they work and their possible advantages.

This study explores the impact of blue colour therapy and Surya Chikitsa on anxiety in children, using the Spence Children's Anxiety Scale-parent to measure outcomes. Data was collected for 33 children aged between 7-13 years across the country. The study's goal is to provide empirical evidence on the effectiveness of these interventions and to investigate their potential as complementary or alternative treatments for childhood anxiety. Through this research, we hope to enhance the understanding and application of holistic therapeutic practices in the field of child mental health.

Index Terms: Blue colour, Surya Chikitsa, Anxiety, Holistic Therapies, Spence Children's Anxiety Scale-parents (SCAS-P)

I. INTRODUCTION

Anxiety disorders among children are on the rise, significantly affecting their academic performance, social interactions, and long-term mental well-being. While conventional treatments such as cognitive-behavioral therapy (CBT) and medications have proven effective, there is a growing interest in non-invasive alternatives like color therapy and Surya Chikitsa (sunlight therapy) to support mental health.

Color therapy, particularly utilizing the color blue, is based on the belief that different colors can influence emotional and mental states. Blue is known for inducing a sense of calmness and relaxation, potentially aiding in alleviating anxiety. Surya Chikitsa, originating from Ayurvedic traditions, harnesses controlled exposure to sunlight to improve both physical and mental health. Research indicates that sunlight plays a crucial role in regulating mood and circadian rhythms, thereby enhancing mental clarity and emotional well-being.

This research study delves into the effects of blue color therapy and Surya Chikitsa on anxiety in children. By employing the Spence Children's Anxiety Scale (SCAS) for evaluation, the aim is to present empirical evidence supporting these holistic approaches as viable treatments for childhood anxiety.

The calming properties of the color blue are often utilized in therapy to reduce stress and induce relaxation. Likewise, Surya Chikitsa underscores the importance of sunlight exposure for overall well-being, influencing aspects such as vitamin D synthesis, immune response, and mental health. Scientific findings highlight

sunlight's role in modulating melatonin and serotonin levels, which in turn uplift mood and regulate sleep patterns.

By combining blue color therapy with sunlight exposure, this study seeks to shed light on non-invasive strategies for managing anxiety in children.

1. Need for the Study

A potential research gap in the field of colour therapy and Surya Chikitsa could be lack of comprehensive studies investigating their efficacy, mechanism of action and clinical application.

While there is some anecdotal evidence and historical usage of therapies in traditional medical systems, there is need for more rigorous scientific research to understand their underlying psychological mechanism.

All studies majorly done in a specific population type that is adults.

2. Statement of Research Problem

Effect of blue colour (Surya Chikitsa) on anxiety levels of children aged between 7 to 13 years in urban areas using Spence children anxiety scale-parents.

3. Research Questions

Does Blue colour therapy and Surya Chikitsa have a significant effect on anxiety levels in children?

4. Objectives

- To study the effect of Blue colour on Anxiety
- To explore potential of Colour Therapy and Surya Chikitsa in reducing Anxiety

II. LITERATURE REVIEW

Azeemi et al. (2018) explore the effects of blue light (453 nm) on reducing anxiety in college students, contributing to the growing field of non-pharmacological mental health treatments. Blue light, known for enhancing alertness and modulating melatonin, has been linked to mood and cognitive improvements. This study builds on past research suggesting light's influence on mental states, with a unique focus on anxiety.

The researchers used controlled exposure to blue light and found significant anxiety reduction in students, supporting blue light's potential as an accessible intervention for stress management in educational settings. This aligns with findings in psychophysiology, pointing to blue light's promise in non-invasive therapies for anxiety.

Azeemi and Raza (2000) critically examine chromotherapy, the use of color in healing, and its scientific development. The study reviews chromotherapy's historical roots, tracing its use in various cultures and its gradual acceptance within alternative medicine. The authors assess existing scientific literature, analyzing biological and psychological responses to color, and the mechanisms proposed for color's therapeutic effects.

Their analysis points out the limitations of past studies, often lacking rigorous scientific methodology, yet acknowledges emerging evidence that certain wavelengths can influence physiological and psychological states. This work situates chromotherapy within evidence-based alternative medicine, suggesting that although more robust research is needed, color therapy holds potential as a complementary approach in health care.

Gomes and Preto (2015) examine the dual effects of blue light, highlighting both its benefits and risks. Blue light is known for enhancing alertness, mood, and cognitive performance, especially beneficial in managing circadian rhythms. However, the study also discusses potential adverse effects, including eye strain, sleep disturbances, and long-term retinal damage from prolonged exposure, particularly through digital screens.

The authors review a range of studies that illustrate blue light's positive impact on well-being alongside evidence linking it to health concerns, especially with increased screen time in modern lifestyles. Gomes and Preto emphasize the need for balanced exposure to harness blue light's benefits while minimizing its risks.

Kishan, Saklecha, and Savaliya (2022) investigate the impact of chromotherapy on reducing anxiety in patients undergoing endodontic (root canal) treatment. The study reflects growing interest in non-invasive methods to alleviate dental anxiety, which is common and often complicates treatment.

Through a randomized clinical approach, the authors find that specific color exposures can significantly lower anxiety levels, enhancing patient comfort and cooperation. This research adds to the evidence supporting chromotherapy's calming effects in medical settings, suggesting it as a viable, complementary tool for improving patient experiences during potentially stressful procedures.

Mohanty, Barreto, and Das (2022) examine Surya Chikitsa, a traditional sun-based therapy, analyzing its health benefits through an evidence-based approach. The study reviews the therapeutic role of sunlight exposure in improving various physiological functions, such as enhancing vitamin D synthesis, boosting immunity, and regulating mood.

The authors highlight that while Surya Chikitsa has long been practiced in traditional medicine, recent scientific findings validate sunlight's positive impact on physical and mental health. This research supports the potential of sunlight therapy as a complementary health practice, calling for more rigorous studies to substantiate its clinical benefits.

Samuel et al. (2022) investigate coloring therapy as a therapeutic intervention for patients with generalized anxiety disorder (GAD). The study reviews the calming effects of structured coloring activities, particularly in reducing symptoms of anxiety and promoting mental relaxation.

The authors examine prior research on art-based therapies and explore how engaging in focused, repetitive coloring can help manage stress and anxiety by redirecting attention away from anxious thoughts. Findings suggest that coloring therapy is an accessible, effective, and non-invasive intervention for GAD, supporting its potential use as a complementary treatment in mental health care.

Takemura et al. (2021) study the impact of green color exposure on stress, anxiety, and pain in dental patients undergoing sedation with intravenous cannulation. The study builds on existing evidence that specific colors, such as green, may have calming and analgesic effects in medical settings.

Their findings indicate that exposure to green significantly reduces patient-reported stress and anxiety levels, and may also decrease pain perception during procedures. This research supports the therapeutic potential of color exposure as a simple, non-invasive strategy to enhance patient comfort, particularly in settings that involve mild sedation and invasive procedures.

Wang et al. (2023) investigate the relationship between sunlight exposure and mental health in a unique population with limited access to natural light due to work conditions. The study highlights the critical role of sunlight in regulating mood and psychological well-being, particularly focusing on its effects on mental health indicators such as anxiety and depression.

Through empirical analysis, the authors find a significant association between reduced sunlight exposure and poorer mental health outcomes in this specific population. The research underscores the importance of addressing sunlight deficiency in occupational settings and advocates for interventions that promote light exposure as a means to enhance mental health, particularly for individuals in environments with limited natural light.

III. RESEARCH METHODOLOGY

Methodology in research refers to the structured approach used to plan, carry out, and analyze a study. It includes the research design, which lays out the overall strategy and framework for the study, specifying what data will be collected, how it will be analyzed, and how the findings will be interpreted. This involves choosing suitable methods for data collection, such as surveys, experiments, interviews, or observations, depending on whether the research is quantitative or qualitative. Data analysis techniques are then employed to process and interpret the collected data, ensuring that the findings are meaningful and valid. Sampling methods are also a vital part, as they dictate how participants or data points are chosen, affecting the study's reliability and generalizability. Furthermore, ethical considerations are essential to the methodology, ensuring that research is conducted responsibly with regard to participants' rights and welfare. Overall, methodology

acts as the blueprint for conducting research, guiding every aspect of the study to ensure it is rigorous, credible, and valuable.

1. Hypotheses

Blue Colour Therapy and Surya Chikitsa can significantly reduce Anxiety levels in children.

2. Independent Variable

Exposure to Blue light and Sunlight.

3. Dependent Variable

Anxiety levels in children.

4. Sample

The sample for the study were school going Children's, including both girls and boys. The sample group consisted of children between ages 7-13 years. The subjects were selected through convenient sampling from various parts of India. The total number of participants were 33 in number and their participation was completely voluntary.

5. Research Design

Research design is a detailed plan that outlines how a research study will be carried out, acting as a guide for the entire process. It starts with defining the study's purpose and objectives, which aids in selecting the right methods and procedures. The design specifies the type of study—whether it is exploratory, descriptive, analytical, or experimental—and determines if the research will be qualitative, quantitative, or mixed-methods. It includes information on sampling methods, detailing how participants or data sources will be chosen and the size of the sample. Furthermore, the design outlines the methods and tools for data collection, such as surveys or interviews, and includes a strategy for analyzing the data to address the research questions. The design also encompasses the timeline and resources required, including funding and personnel, while addressing ethical considerations to ensure informed consent, confidentiality, and participant safety. In summary, research design guarantees that the study is methodologically sound and structured to yield valid and reliable results.

For this study Experimental research design was conducted to understand the effect of Blue Colour and Surya Chikitsa on the anxiety levels of children. The data was collected from the parents before and after the experiment.

6. Sample Design

For this study children of age group 7-13 years were chosen, to address the anxiety issues in this particular age group. As mentioned above, a total 33 participants were selected from all over the country, through convenient sampling techniques. Various inclusion criteria were used:

6.1 Inclusion Criteria

- Boys and girls going to school were included in the study.
- Boys and girls of the age 7-13 years were selected.

6.2 Exclusion Criteria

There are several factors which can affect the results of the study, these factors were ruled out.

- Boys and girls on medicines were not included.

7. Materials Used

In this study an experiment was performed on the children. Materials like a Blue Cellophane sheet were used to ensure the exposure to blue colour and natural sunlight was used to ensure exposure to the Surya Kiran.

For collection of data **Spence Anxiety Scale-Parents** was used.

The Spence Anxiety Scale (SAS) is a tool used to assess anxiety symptoms in children and adolescents, focusing on identifying different types of anxiety disorders. It includes various versions tailored for specific age groups:

- Spence Children's Anxiety Scale (SCAS): Intended for children aged 7-13.
- Spence Children's Anxiety Scale - Parent Version (SCAS-P): Allows parents to report on their child's anxiety symptoms.
- Spence Children's Anxiety Scale - Self-Report Version (SCAS-SR): Designed for children to fill out independently.

7.1 Components of the Spence Anxiety Scale

The Spence Anxiety Scale is organized to evaluate anxiety across multiple dimensions, reflecting various anxiety disorders. The main areas typically assessed include:

- Generalized Anxiety: Concerns and tension regarding different aspects of life.
- Separation Anxiety: Intense fear or anxiety associated with being away from home or loved ones.
- Social Anxiety: Apprehension about social situations and interactions.
- Panic Attack Symptoms: Indicators related to panic attacks, including physical sensations of panic.
- Obsessive-Compulsive Symptoms: Persistent, intrusive thoughts and compulsive actions.
- Physical Injury Fears: Anxiety related to the possibility of physical harm or injury.

7.2 Administration and Scoring

Format: The scale is generally a self-report questionnaire for children, along with a parent-report version for caregivers. It includes several items that evaluate the frequency and intensity of anxiety symptoms.

Scoring: Each item is rated on a Likert scale (e.g., "Never," "Sometimes," "Often," "Always"), indicating how frequently the child experiences the specified anxiety symptoms. The overall score and scores for each subscale can help determine the severity and specific areas of anxiety.

The total score is calculated by adding up the responses from all items, with higher scores indicating greater levels of anxiety. Subscale scores can be derived to gain insight into the child's specific anxiety symptoms. Cut-off scores help identify clinically significant anxiety levels, which is essential for diagnosis and treatment planning.

7.3 SCAS for parents

The SCAS for parents is intended to assess a child's anxiety through the eyes of a parent or guardian. It features a series of questions that address various anxiety symptoms and behaviors that the parent has noticed in their child over a specific timeframe, usually the past week.

The scale includes items pertaining to different anxiety disorders, such as generalized anxiety disorder, social anxiety, separation anxiety, obsessive-compulsive disorder, and panic disorder. Parents are asked to evaluate how frequently their child displays each behavior or symptom on a scale that typically ranges from "never" to "always." The answers are then scored to indicate the severity of the child's anxiety.

The SCAS is beneficial because it offers insight into the child's anxiety from an outside perspective, which can enhance self-reports from the child and provide a more thorough understanding of their emotional well-being. It is commonly utilized in both clinical and research environments to screen for anxiety disorders, monitor changes in anxiety symptoms over time, and assess the effectiveness of treatments.

7.4 Reliability and Validity

Reliability: The SCAS-P shows strong internal consistency and test-retest reliability, ensuring it yields stable and consistent results over time. Validity: The scale exhibits good construct validity, showing a strong correlation with other anxiety measures and clinical assessments of anxiety disorders.

8. Statistical Tool

For this study we have two sets of data, i.e., one before experiment and one after experiment, paired t-test is the most suitable hypothesis testing method. For this, we need to calculate differences for each participant. If D_i is the difference of i th participant between pre-experiment and post-experiment SCAS-P score,

$$\bar{D} = \frac{\sum_{i=1}^n D_i}{n} \quad (1.1)$$

Where $\bar{D}$ is the mean of all the differences

$$v_D = \frac{\sum_{i=1}^n (D_i - \bar{D})^2}{n-1} \quad (1.2)$$

Where v_D is the variance of all the differences

$$s_D = \sqrt{v_D} \quad (1.3)$$

Where s_D is the standard deviation of all differences

$$t_{\text{statistic}} = \frac{\bar{D}}{\frac{s_D}{\sqrt{n}}} \quad (1.4)$$

Where $t_{\text{statistic}}$ is value assuming population data follows t-distribution

$$p_{\text{value}} = 2 \times (1 - T.DIST(|t_{\text{statistic}}|, n-1, \text{true})) \quad (1.5)$$

Where p_{value} is probability that the alternative hypothesis is incorrect

IV. PROCEDURE

1. Participant selection:

33 children were selected on the basis of convenient sampling from different parts of the country. The participation was completely voluntary and consent was obtained from the parents.

2. Selection of statistical questionnaire to measure anxiety scale:

For collection of data on anxiety levels, the scale chosen was Spence anxiety Scale parent's version. This scale provides reliable results. Here the questionnaire is answered by parents about their child. Total 39 questions are present which have 4 options each. (Never, Sometimes, Often, Always)

3. Creation of online survey:

The SCAS was converted into online survey forms (Google forms) for ease of data collection through digital mode. In the survey there were 39 questions and additional questions seeking permission for the experiment and addressing their queries. The survey form had a short brief about the experiment.

4. Pre-Assessment of Anxiety levels:

According to the preliminary questionnaire data, base reading was created on anxiety levels of children.

5. Briefing about the experiment:

All the parents who agreed or showed interest in the study were contacted and given details of the experiment, and consent was taken.

6. Permission to perform experiment:

After getting consent from the parents, they were provided materials (Blue Cellophane sheet) which had to be used.

7. Execution of the experiment:

Parents were explained about the procedure, they had to put a blue cellophane sheet on the window of the child's room where he/she can get sunlight through the sheet every day for at least 30 mins, for the next 21 days.

8. Midpoint check-in:

Once the setup was done and experiment started, after the end of each week a short review was taken from parents, to understand the progress and their concerns.

9. Post-experimental assessment of anxiety levels:

After 21 days parents were shared another survey form of the same scale to get post experimental anxiety level data. And were asked to remove the sheet from the window.

10. Data analysis:

Both pre and post-experimental data were now compared to formulate the inference of the research.

11. Interpretation of result:

After comparison of the data results were interpreted which are mentioned in the next chapter of this project.

V. RESULTS AND DISCUSSIONS

1. RESULT



chart 1: shows scas score of children before and after experiment.

In this Chart SCAS score represents the anxiety levels of children and the line diagram shows pre and post-experiment change in the anxiety levels in the sample child.

Here the blue colour line shows pre experiment scores and the red line shows post experiment scores.

On X axis SCAS score are represented and on Y axis children are represented.

Table 1

Results of Mean, Median, Mode and Standard Deviation of the pre and post-experiment

Statistic	Mean	Median	Mode	Std. Deviation
Pre-Experiment	31.697	30	30	15.697
Post-Experiment	30.848	28	23	15.557

Note. Table-1 Shows the results of Mean, Median, Mode and Standard Deviation of the pre and post-experiment

As Table 1 states, the mean score of Anxiety pre-experiment is 31.697 and post-experiment is 30.848, median score pre-experiment is 30 and post-experiment is 28, mode score pre-experiment is 30 and post-experiment is 23, score for standard deviation pre-experiment is 15.697 and post-experiment is 15.557.

Mean difference = post-experiment mean - pre-experiment mean

$$30.848 - 31.697 = -0.848$$

Therefore the mean difference = -0.848

Std. Deviation of Differences = 1.943

T-statistic (for paired T-test) = -2.508

p-Value = 0.0174

This indicates statistically significant correlation between Reductions in Anxiety levels.

2. DISCUSSION

Purpose of this study as mentioned before is to find whether Blue colour therapy and Surya Chikitsa has any substantial effect in reducing anxiety levels of children. The variables here were Blue light and Sunlight combined together and levels of anxiety in children.

The study aimed at finding effect of Blue Color therapy and Surya Chikitsa combined together to reduce the anxiety levels and with the p-Value = 0.0174, it is substantial that hypothesis of the study Blue Colour Therapy and Surya Chikitsa can significantly reduce Anxiety levels in children has been proven to be true.

Blue colour therapy and Surya Chikitsa present promising alternative and complementary strategies for reducing anxiety in children. While further research is needed to fully understand their long-term effects and optimal implementation, preliminary findings indicate that these therapies can contribute positively to managing anxiety. By incorporating these approaches into broader therapeutic frameworks, caregivers and clinicians may offer children effective tools for improving their emotional well-being and overall quality of life.

3. LIMITATIONS

This study has some limitations:

- The experimental conditions were not controlled.
- Taking the perspective of parents can sometimes manipulate the actual findings.
- The size of the sample may affect the generalizability of the study.

4. RECOMMENDATIONS

For future studies:

- Experiments can be done in a more controlled manner for better understanding of the variables taken into consideration.
- Size of samples taken can be increased to better generalize the results.
- Some factors like, parent's marital status, living with or without siblings can be taken into account, as these can have an impact on anxiety of children.

5. IMPLICATIONS

This study leads to following implications:

- Alternative and complementary healing methods are reliable in reducing anxiety.
- Colour therapy and Surya Chikitsa can be good healing methods, especially for children.

VI. SUMMARY

The study aimed to explore how blue colour therapy and Surya Chikitsa can help reduce anxiety levels in children. Anxiety is a common mental health concern for kids, especially those between the ages of 7 and 13, and it can affect their school performance, social skills, and overall health. While traditional treatments often rely on medication or therapy, this research looks into alternative, non-invasive methods that use colour and sunlight as healing tools.

The main goal of the research was to determine if blue colour therapy and Surya Chikitsa could significantly lower anxiety levels in children. The study proposed that exposure to blue colour and sunlight linked to calmness and tranquility, would result in noticeable decreases in anxiety among the participants.

The study involved 33 children aged 7-13 years, initial assessments of anxiety levels were done using standardized anxiety measurement tools, such as the Spence Children's Anxiety Scale (SCAS) parent's version. Where parents filled an online survey form which have all the questions related to their child, then parents were briefed about the experiment and their consent was taken. After getting consent from parents they were provided with the materials required, and all 33 children were exposed to blue sunlight for 30 minutes daily over next 21 days.

Data on anxiety levels were gathered after the intervention through follow-up assessments from the parents using same measurement tool.

The results indicated a significant decrease in anxiety levels among children who participated in blue colour therapy and Surya Chikitsa.

This study highlights the potential of alternative therapies, such as blue colour therapy and Surya Chikitsa, in addressing childhood anxiety

VII. CONCLUSION

In conclusion, this study provides substantial evidence that Blue Colour Therapy and Surya Chikitsa are effective in reducing anxiety levels in children aged 7-13. The combination of blue light exposure and sunlight proved to be a promising intervention for managing childhood anxiety, as indicated by a significant decrease in Spence Children's Anxiety Scale scores post-experiment. Despite some limitations such as sample size and uncontrolled experimental conditions, the results suggest that these alternative therapies can complement traditional treatments for anxiety. Further research with larger samples and more controlled environments would help solidify these findings and explore their long-term impact on children's mental health.

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