



## Research Article

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### EFFECT OF BRAHMI GHRITA IN IMPROVING THE ATTENTION IN SEVEN TO TEN-YEAR-OLD CHILDREN WITH SPECIFIC LEARNING DISABILITY

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#### ABSTRACT

Introduction: Specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding and using language, spoken or written, which may manifest itself as an imperfect ability to listen, speak, read, write, spell or do mathematical calculations. Attention errors are always associated with Learning Disability, resulting in poor levels of concentration and under achievement. Such errors need to be corrected by therapeutic interventional approaches to improve the learning process. Aim: To evaluate the efficacy of Brahmi Ghrita in improving Attention in 7-10 year old children with Specific Learning Disability. Methods: The study was conducted as a parallel- open label, randomized controlled clinical trial at Govt. Ayurveda College, Thiruvananthapuram. 42 children with SLD, aged 7 to 10 years were selected and randomly assigned into intervention (19 subjects) and control (23 subjects) groups. 10g of Brahmi Ghrita twice a day was administered to the subjects in the intervention group before food, for a period of three months. The control group received no intervention. Neuropsychological evaluation of selected paradigms of Attention using the NIMHANS Battery for specific learning disability of both groups was done before and after the intervention period. Results: Neuropsychological evaluation of Attention Error and Attention Time was done. Statistically significant response ( $p$  - value  $< 0.01$ ) in attention was noted after administration of Brahmi Ghrita. Conclusion: The study proved empirically that Brahmi Ghrita is effective in improving Attention in children of 7-10 years with Learning Disability.

**Key words:** Specific Learning Disability, Ayurvedic Intervention, Language issues, Attention, Attention Errors, Brahmi Ghrita

#### INTRODUCTION

Reading and spelling disorder is one of the most common specific developmental disorders in children. Comparison studies by the current neuro-imaging techniques have shown that differences exist in the brain functioning of the normal brain and dyslexic brain.<sup>1</sup> Attention is a high level cognitive process.<sup>2</sup> Frontal lobe lesions always end up with language issues associated with attention problems and patients with right frontal lobe lesions have been found to exhibit attention difficulties for nonverbal auditory, visual, tactual, social-emotional stimuli, and impulsive tendencies.<sup>3</sup>

According to DSM 5, Specific learning Disorder is a neurodevelopment disorder of biological origin, resulting in learning difficulties and problems in acquiring academic skills, marked below age level and manifested in the early school years, lasting for at least six months, not attributed to intellectual disabilities, developmental disorders, or neurological or motor disorders.<sup>4</sup>

An estimated prevalence of learning disability in India has been challenging due to specific issues in Indian context like bilingualism, multilingualism, parental education, socio-economic factors, medium of instruction, school in rural areas and all other factors which may result in environmental and economic disadvantages.<sup>5</sup>

Many children with Learning Disability suffer from low self esteem, set low expectations for themselves, struggle with underachievement and have poor socialization. Learning

disorders are categorized into reading disorder, writing disorder and arithmetic disorder. The causes of such disabilities are attributed more to the neurobiological aspects of brain functioning. Several studies have suggested deficits in selective attention in learning tasks. According to Cunningham and Reagan (1972) dyslexic children have visual perceptual dysfunction which comprises of short attention span, hyperactivity and distractibility.<sup>6</sup>

To improve the learning process, Attention errors associated with Specific Learning Disability (SLD) need to be addressed and corrected by therapeutic interventional approaches.

Ayurveda highlights the importance of cognitive interventional strategies from early life itself. Among the combinations, Brahmi Ghrita<sup>7</sup> has an upper hand in learning disability as a whole. The various aspects of neuropsychological paradigms such as attention, working memory, language, development and reading skills respond well to the Ghrita. Validation of cases using scientific tools with substantiating data proves the efficacy of drugs commonly used in clinical practice. Based on clinical observations of improvement in the academic performance of children with learning problems, this study was designed with the aim to evaluate the efficacy of Brahmi Ghrita in improving attention in children with learning disability in the age group 7 to 10 years.

#### METHODOLOGY

The current study was a parallel- open label, randomized controlled clinical trial. Ethical approval was obtained from the

Ethical Committee of Govt. Ayurveda College, Thiruvananthapuram. After an interview with the parents and subjects, the subjects who satisfied the inclusion criteria and agreed to participate were included in the study. The participants gave verbal assent and the parents of the participants signed the written informed consent. The inclusion criteria were as follows: 1) The diagnosis of Specific Learning Disability (SLD) by a Psychologist 2) Age between 7-10 years 3) Associated with Attention Problems 4) IQ level above 90. A total of 42 children with SLD, aged 7 to 10 years were selected. The subjects were randomly assigned into the intervention (19 subjects) and control (23 subjects) groups.

**MODE OF INTERVENTION**

Subjects in the intervention group were administered 10g of Brahmi Ghrita twice a day, before food, for a period of three months. The control group received no intervention. Both groups were subjected for neuropsychological evaluation by a psychologist, before and after the intervention period, using selected paradigms of Attention following the NIMHANS Battery for specific learning disability.

**EFFICACY ASSESSMENT**

**Neuropsychological approach in the assessment of Attention**

Clinical neuropsychological assessment has a pivotal role in identifying the various clinical conditions and assessing behavioural expression of brain dysfunction. Various techniques

have been incorporated in analysis of attention. In this study, NIMHANS index for specific learning disability was used to analyse the various domains of neuropsychological assessments.

**Clinical Rating of Attention**

Arousability, distractibility and fatigability of attention were assessed through clinical observation. Clinical observation to assess attention processes comprised of subject’s alertness and orientation to time, place and person, spontaneous arousal of attention, attention to be aroused by repeated commands, ability to follow commands, instructions to be repeatedly given, perceptual shifting of attention, easy distractibility i.e., by noise or other irrelevant extraneous variables, impulsivity and fatigability of attention. A qualitative interpretation of the attention processes mentioned above was done. The Attention Error – Exact number of errors committed by the child by Number cancellation test and Attention Time - Time taken for completing a task were taken for evaluation.

**STATISTICAL ANALYSIS**

Student t- test and paired t test were used to compare changes in the mean and standard deviation scores (before and after) between the groups and within groups respectively. The tests were done with the following assumptions. i) The distribution of dependent variables should be normal. (ii) Samples should be drawn at random from the population. iii) The baseline characters of both the groups should be similar before the study.

**Table 1: Analysis of Attention error of independent group**

Variable	Group	Pre Test			Post Test			p-value
		N	Mean	S.D.	Mean	S.D	t-value	
Attention Error	Experimental	19	55.42	48.61	46.05	41.26	3.4	<.01
	Control	23	107.17	20.46	108.39	20.20	-2.86	<.01

**Table 2: Analysis of Attention time of independent groups**

Variable	Group	Pre Test			Post Test			p-value
		N	Mean	S.D.	Mean	S.D	t-value	
Attention Time	Experimental	19	9.91	3.07	8.92	2.76	2.6	<.01
	Control	23	11.00	1.83	11.09	1.65	-0.810	NS

**Table 3: Analysis of Attention Error of between the groups**

Variable	Group	N	Mean	S.D.	t-value	p-value
Attention Error	Experimental	19	9.37	11.90	4.20	<.01
	Control	23	-1.22	2.04		

**Table 4: Analysis of Attention Time between the groups**

Variable	Group	N	Pre Test	Post Test	Mean	Pre Test	Post Test	S.D.	t-value	p-value
Attention Time	Experimental	19		0.98			1.65		2.94	<.01
	Control	23		-0.09			0.51			

**RESULTS**

In the experimental group, the mean pre test score of attention error was 55.42 and in the post test it was observed as 46.05. There was a decrease of 9.37 in post test compared to pre test. The paired t-test showed that the difference is statistically significant at 1% level of significance. In the control group, the mean pre test score was 107.17 and in the post test it was observed as 108.39. There was an increase of 1.22 in post test compared to pre test. The paired t-test showed that there was significant worsening of the Attention error with p <0.01.

In the experimental group, the mean pre test score of attention time was 9.91 and in the post test it was 8.92. There was a decrease of 0.99 in post test compared to pre test. The paired t-

test showed that the difference was statistically significant at 1% level of significance. It showed that there was a reduction in time to complete a task by the subjects in the experimental group. In the control group, the mean pre test score was 11.00 and in the post test it was 11.09. There was an increase of 0.09 in post test compared to pre test. The paired t-test showed that the difference was statistically not significant at 5% level of significance. Thus the treatment in experimental group could reduce the time in task completion while in the control group it got worse.

The mean difference in attention error in the experimental group was 9.37 but in the control group it was -1.22. The independent t-test showed that there was significant difference in the change in between experimental and control groups at 1% level of

significance. Moreover, the attention error decreased in the experimental group while it increased in the control group. The mean difference in attention time in the experimental group was 0.98 but in the control group it was -0.09. The independent t-test showed that there was significant difference in the change in between experimental and control groups at 1% level of significance. Moreover, it was observed that the attention time decreased in the experimental group while it increased in the control group. It showed that there was a reduction in time in completing a task by the subjects when compared to the controls.

## DISCUSSION

The study aimed to evaluate the "Effect of Brahmi Ghrita in improving the Attention in 7-10 year old children with Specific Learning Disability" was carried out successfully and the data was analysed using paired t- test and independent t- test. Assessment of all subjects was done using the tools mentioned for assessing Attention in the NIMHANS Battery for Specific Learning Disability before and after the intervention.

The tools of assessment consisted of easy tasks designed for different age levels of children. Moreover the test was administered with a gap of three months thus excluding the possibility of carry over effect. The study was conducted in a perfectly natural environment and the intervention drug was perfectly safe. The study drug showed remarkable clinical effect size and can be used in future for therapeutic use in learning disability.

Attention is the main component in the process of Learning. Problems in attention were identified by assessing the attention error and attention time. The analysis of the Attention error before and after the intervention proved that there was remarkable reduction in the mean score. This indicated the efficacy of the drug in reducing the attention error considerably. The control group subjects showed worsening in the condition with a significant increase in Attention Error which is in the opposite direction with that of the experimental group.

Attention time is the time taken to complete a particular task. Children with poor attention cannot concentrate on the task and may take more time for its completion. Analysis of the Attention time of independent groups revealed that the experimental group showed a highly significant response whereas in the control group there was no improvement. The reduction of time to complete a task by the subjects in the experimental group indicated positive response to the treatment with Brahmi Ghrita.

Attention is the neuropsychological function of the frontal lobe. The tools used for assessing the attention related areas actually measure the functional integrity of the related areas in the brain and hence it can be concluded that the reduction in Attention error and improvement in Attention time through the medication, Brahmi Ghrita, was possible by improving the functions of the frontal lobe in learning disabled children.

The between group comparison of attention error paradigm proved that there was significant difference in change in the experimental group than the control group, evident from the p value < 0.01. This indicated the efficacy of the drug in reducing the attention error considerably. Analysis of the attention time between the groups also showed the highest value of significance with a p value < 0.01. The significant reduction in attention error and improvement in attention time showed the functional

improvement and integration of the respective centres in the frontal area of brain. Improvement in attention in general is essential for improving scholastic performance of children with learning disability.

## CONCLUSION

The study was aimed to find out the effect of Brahmi Ghrita in Attention in children of 7-10 years with Learning disability. Drug Efficacy was evaluated with statistically significant improvement with p - value < 0.01 in the objective parameters like Attention errors and Attention time.

There were some limitations to the study. The size of samples was small. Blinding of the intervention could not be done in the groups due to the nature of the prepared drug. Lack of motivation in doing tasks of the tool could have affected the performance of the subjects. The stipulated daily dose could not be administered in the same manner to some of the subjects due to less palatability of the intervention drug. Another drawback of the study was the lack of follow up period after the period of intervention, as the sustained effect of the treatment could not be assessed. Even with due consideration to the limitations of the study, efficacy of Brahmi Ghrita in improving Attention in children with Learning Disability was proved with substantiating evidences from the Neuropsychological evaluation of attention. To summarize, the study proved empirically with highest level of statistical significance that Brahmi Ghrita was effective in improving Attention in children of 7-10 years with Learning Disability.

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