



AN OPEN LABELLED CLINICAL TRAIL TO EVALUATE THE EFFECT OF *KUSHMANDA GHRITA* ON SPECIFIC LEARNING DISORDERS IN SCHOOL CHILDREN

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ABSTRACT:

Specific learning disorder, as the name implies, is diagnosed when there are specific deficits in an individual's ability to perceive or process information efficiently and accurately. This neurodevelopmental disorder first manifests during the years of formal schooling and is characterized by persistent and impairing difficulties with learning foundational academic skills in reading, writing, and/or math. **Objective:** To evaluate the effect of *Kushmanda Ghrita* in reducing the clinical symptoms of specific learning disorders. **Methodology:** Interventional non-randomized open labelled single group study with pre-test and post-test design. A minimum of 20 children suffering from Specific Learning Disorders were selected from the OPD of Sri Dharmasthala Manjunatheshwara Ayurveda Hospital, Kuthpady, Udipi after fulfilling the inclusion and diagnostic criteria. The selected children were administered with 12ml of *Kushmanda Ghrita* in morning hours with milk before food for a period of 3 months. Outcome was assessed before and after intervention using NIMHANS SLD battery and Jadata Rating scale. Statistical analysis was done using Wilcoxon signed rank test. **Result:** *Kushmanda Ghrita* provides statistically high significant improvement with P value <0.001 in most of the *Jadata* rating scale and in SLD battery which involved in the *Jadata*/Specific Learning Disorders of children. **Conclusion:** The overall inference is that *Medhya* property of *Kushmanda Ghrita* has effective role in improving the learning capability of children.

Key words: *Jadata*, Specific Learning Disorders, *Kushmanda Ghrita*, *Medhya Rasayana*.

INTRODUCTION

Specific learning disorder is a neurodevelopmental disorder with a biological origin that is the basis for abnormalities at a cognitive level that are associated with the behavioural signs of the disorder. It disrupts the normal pattern of learning academic skills; it is not simply a consequence of lack of opportunity of learning or inadequate instructions. These clinical symptoms may be observed, probed by means of clinical interview, or ascertained from school reports, rating scales, or descriptions in previous educational or psychological assessments. The learning difficulties are persistent, not transitory. In children and adolescents, persistent is defined as restricted progress in learning [i.e., no evidence that the individual is catching up with classmates] for at least 6 months despite the provision of extra help at home or school.¹

Jadata refers to senseless, unintelligent and idiotic.² It is also mentioned that *Jadata* occurs due to *Pranavruta samana*³ and apart from this while mentioning 20 *Kaphaja Nanatmaja vikara*, symptoms like *Trupti* (early satiety), *Tandra* (Drowsiness), *Nidra adhikya* (Excessive sleep), *Guru gatrata* (heaviness of body) and *Alasya* (Laziness) are mentioned. These symptoms are related to increase in *Tamo guna*, which are also explained under the name of *Jadata*. The child develops *Jadata* from the very early age, it disturbs the *manasika avastha* of the child to a great extent as it lacks behind in every academics when compared to other children of the same age group.

In this study, *Kushmanda Ghrita* has been chosen for intervention purpose. *Ghrita* is considered as *Medhya* by almost all acharyas.⁴ It has *Madhura rasa*, *Sheeta virya*, *Madhura vipaka* and is said to be *Tridosha shamaka*. *Kushmanda* is mentioned as one of the *Medhya* drug.^{5,6,7,8} Further, *rasayana* drugs acts by enhancing the digestion and metabolism, the nutritional quality of *Rasa*, micro-circulation of nutrient materials to the different basic body tissues.

Objectives:

To evaluate the effect of *Kushmanda Ghrita* in reducing the clinical symptoms of specific learning disorders.

Materials and Methods

A minimum of 20 children suffering from Specific Learning Disorders were selected from the OPD of Sri Dharmasthala Manjunatheshwara Ayurveda Hospital, Kuthpady, Udupi after fulfilling the inclusion and diagnostic criteria.

Study Design

It was an open labelled clinical study with pre-test and post-test design wherein minimum of 20 children suffering from Specific Learning Disorders were selected, the parameters were scored and analysed statistically.

Intervention:

Children were administered with 12ml *Kushmanda Ghrita* in morning hours with Milk before food.

Follow up: - 3 months

Diagnostic criteria:⁹

A. Difficulties learning and using academic skills, as indicated by the presence of at least one of the following symptoms that have persisted for at least 6 months, despite the provision of interventions that target those difficulties:

1. Inaccurate or slow and effortful word reading (e.g., reads single words aloud incorrectly or slowly and hesitantly, frequently guesses words, has difficulty sounding out words).
2. Difficulty understanding the meaning of what is read (e.g., may read text accurately but not understand the sequence, relationships, inferences, or deeper meanings of what is read).
3. Difficulties with spelling (e.g., may add, omit, or substitute vowels or consonants).
4. Difficulties with written expression (e.g., makes multiple grammatical or punctuation errors within sentences; employs poor paragraph organization; written expression of ideas lacks clarity).
5. Difficulties mastering number sense, number facts, or calculation (e.g., has poor understanding of numbers, their magnitude, and relationships; counts on fingers to add single-digit numbers instead of recalling the math fact as peers do; gets lost in the midst of arithmetic computation and may switch procedures).
6. Difficulties with mathematical reasoning (e.g., has severe difficulty applying mathematical concepts, facts, or procedures to solve quantitative problems).

B. The affected academic skills are substantially and quantifiably below those expected for the individual's chronological age, and cause significant interference with academic or occupational performance, or with activities of daily living, as confirmed by individually administered standardized achievement measures and comprehensive clinical assessment. For individuals age 17 years and older, a documented history of impairing learning difficulties may be substituted for the standardized assessment.

C. The learning difficulties begin during school-age years but may not become fully manifest until the demands for those affected academic skills exceed the individual's limited capacities (e.g., as in timed tests, reading or writing lengthy complex reports for a tight deadline, excessively heavy academic loads).

D. The learning difficulties are not better accounted for by intellectual disabilities, uncorrected visual or auditory acuity, other mental or neurological disorders, psychosocial adversity, lack of proficiency in the language of academic instruction, or inadequate educational instruction.

Inclusion criteria:

- 1) Subjects fulfilling the diagnostic criteria for Specific learning disorders as per DSM-5.
- 2) Children between the age group of 8-12 years.

Exclusion criteria:

- 1) Children with developmental disorders like ADHD, autism and mental retardation.
- 2) Children suffering from any acute, chronic infections, systemic disorders and on treatment for the same.
- 3) Congenital abnormalities, genetic disorders, malnutrition.

Assessment criteria:

- NIMHANS SLD battery.
- Subjective criteria will be scored by standard method and will be assessed before and after treatment.

STATISTICAL ANALYSIS:

Statistical analysis was done by comparing the scores before and after intervention within the group by using Wilcoxon signed rank test.

RESULTS: -

Among 20 subjects taken for the study, there was 9.09% of improvement in Intensity of Verbal Communication, 11.11% in Frequency of Verbal Communication, 19.05% in Intensity of Academic performance, 18.75% in Frequency of Academic performance, 26.92% in intensity of altered orientation, 25% in Frequency of altered orientation, 26.19% in Intensity of Erratic memory, 15.79% in Frequency of Erratic memory, 100% in Intensity of Erratic mood, 24.32% in Frequency of Erratic mood, 100% in Frequency of Drowsiness during school hours.

In the NIMHANS SLD Battery, there was 60.60% of improvement in Attention, 64.51% in Reading, 64.51% in Comprehension, 60.60% in Spelling, 100% in Copying, 53.84% in Written expression, 83.56% in Visual memory, 24.71% in Auditory memory, 64.51% in Graded Arithmetic and 88% in Simple Arithmetic.

Effect of treatment on different parameters were shown in table no: 1

Overall effect of the treatment: -

The overall effect of the treatment is calculated based on the percentage of improvement obtained by comparing the BT and AT scores of parameters of Jadata Rating Scale as well as NIMHANS SLD battery.

Table no:1: Effect of treatment on different parameters

Parameter	Mean			Wilcoxon signed rank test			
	BT	AT	BT-AT	% Of improvement	SD	SE	P value
IVC n=20	1.650	1.800	-0.15	9.09%	BT- 0.489	BT- 0.109	0.250
					AT- 0.410	AT- 0.0918	
FVC n=20	1.350	1.200	-0.15	11.11%	BT- 0.489	BT- 0.109	0.250
					AT- 0.410	AT- 0.0918	
IAP n=20	2.550	0.600	-1.95	76.47%	BT- 0.510	BT- 0.114	<0.001
					AT- 0.503	AT- 0.112	
FAP n=20	2.550	0.600	-1.95	76.47%	BT- 0.503	BT- 0.112	<0.001
					AT- 0.503	AT- 0.112	
IAO n=20	0.950	0.350	-0.6	63.15%	BT- 0.887	BT- 0.198	<0.001
					AT- 0.489	AT- 0.109	
FAO n=20	1.200	0.400	-0.8	66.66%	BT- 0.768	BT- 0.172	<0.001
					AT- 0.503	AT- 0.112	
IEM n=20	1.550	0.550	-1	64.51%	BT- 0.510	BT- 0.114	<0.001
					AT- 0.510	AT- 0.114	

FEM n=20	2.400	0.450	-1.95	81.25%	BT-	BT-	<0.001
					0.503	0.112	
IEMo n=20	1.000	0.000	-1	100%	AT-	AT-	<0.001
					0.510	0.114	
FEMo n=20	1.400	0.450	-0.95	67.85%	BT-	BT-	<0.001
					0.503	0.112	
FDSH n=20	0.800	0.000	-0.8	100%	AT-	AT-	0.002
					0.894	0.200	
Attention n=20	1.650	0.650	1	60.60%	BT-	BT-	<0.001
					0.489	0.109	
Reading n=20	1.550	0.550	-1	64.51%	AT-	AT-	<0.001
					0.489	0.109	
Comprehension n=20	1.550	0.550	-1	64.51%	BT-	BT-	<0.001
					0.510	0.114	
Spelling n=20	1.550	0.550	-1	64.51%	AT-	AT-	<0.001
					0.510	0.114	
Copying n=20	1.650	0.650	-1	60.60%	BT-	BT-	<0.001
					0.489	0.109	
Copying n=20	0.650	0.000	-0.65	100%	AT-	AT-	<0.001
					0.489	0.109	
Copying n=20	0.650	0.000	-0.65	100%	BT-	BT-	<0.001
					0.489	0.109	
Copying n=20	0.650	0.000	-0.65	100%	AT-	AT-	<0.001
					0.000	0.000	

Written Expression n=20	0.650	0.300	-0.35	53.84%	BT-	BT-	0.094
					0.489	0.109	
Visual Memory n=20	3.650	6.700	-3.05	83.56%	AT-	AT-	<0.001
					0.470	0.105	
Auditory Memory n=20	4.450	3.350	-1.1	24.71%	BT-	BT-	<0.001
					0.510	0.114	
Graded Arithmetic n=20	1.550	0.550	-1	64.51%	AT-	AT-	<0.001
					0.510	0.114	
Simple Arithmetic n=20	0.850	0.1000	-0.75	88%	BT-	BT-	<0.001
					0.489	0.109	
					AT-	AT-	
					0.308	0.0688	

PROBABLE MODE OF ACTION: -

Kushmanda Ghrita contains three ingredients- Kushmanda swarasa, Yashtimadhu Kalka and Go Ghrita. Kushmanda is considered as Medhya by Acarya Sushruta. Due to its Sheeta veerya and Madhura vipaka also it acts as a Medhya. Apart from this, it contains Vitamin -B, a building block, which has direct impact on the energy levels, brain functioning and cell metabolism. It also reduces fatigue and boosts mood. Yashtimadhu as a single drug itself is mentioned under Medhya rasayana with Milk as an adjuvant. Yashtimadhu has Sheeta veerya and Madhura vipaka. Hence, we can conclude that it acts as Medhya. Studies have proven that a chemical extract from the root of Glycyrrhiza glabra named Glabridin reduced the brain cholinesterase activity and appeared to be a promising drug for memory improvement. Go ghrita is mentioned as Medhya in our classics and considered as auspicious. Only ghrita has the capacity to cross the blood brain barrier because of its lipid soluble property hence doing its action. Kushmanda Ghrita, as a formulation is mention in Apasmara adhikara of Bhaishajya Ratnavali. This indicates that Kushmanda Ghrita is a time-tested remedy in Mano Vikara.

CONCLUSION: -

On analysis of features of Jadata i.e., Aacchadayati (Obstruction), Moha(Perplexed),Indriyajadatvam(Hypofunction of sense organs), Nihspandata(No activities) wherein the lakshanas matches with that of Specific Learning Disorders. Hence, it can be concluded that Jadata can be taken as Specific Learning Disorders. In the present study, Jadata was assessed by self-prepared and validated scale for milder form of Mano vibhrama and SLD battery developed by NIMHANS. Kushmanda Ghrita provides a statistically high significant improvement in few of the Mano vibhrama like Intensity of Academic Performance, Frequency of Academic Performance, Intensity of Altered Orientation, Frequency of Altered Orientation, Intensity of Erratic Memory, Frequency of Erratic Memory, Intensity of Erratic Mood and Frequency of Erratic Mood where the P value was found to be <0.001. There was significant improvement in SLD battery too in case of Attention, Reading, Comprehension, Spelling, Copying, Visual Memory, Auditory Memory, Graded Arithmetic and Simple Arithmetic where the P value is <0.001. Study showed positive effect in the management of Jadata/Specific Learning Disorders. Hence the present study substantiates that the administration of Kushmanda Ghrita is effective in managing Jadata.

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