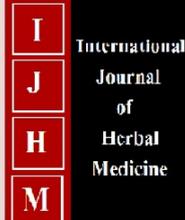




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Clinical study for the evaluation of mental concentration enhancing effects of an ayurveda drug and Panchakarma in children

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Abstract

Poor mental concentration is being identified as one of the important cause of academic under achievement. Ayurveda may prove beneficial in improving mental concentration in a safe and effective way. To provide an update of the practical application of Ayurveda compound *Kalyana leha* and *shirodhara* procedure in management of poor mental concentration in children, a randomized placebo control study was done. Group A with *Kalyana leha* have shown highly significant improvement in IQ level, reaction time and on Wechsler Intelligence Scale For Children (WISC) scale, Group B as placebo group have non-significant improvement in all parameters whereas Group C with *Shirodhara* Procedure was also significant in all parameters but in intergroup comparison Group A was more significant than Group B and C both. Mental concentration can be enhanced effectively with Ayurveda drugs and procedures which can prove to be a key for better school performance among children.

Keywords: Ayurveda, Kalyana leha, mental concentration, Shirodhara

1. Introduction

The proper growth and development of child is based on the main domains like proper nutrition, absence of any of the psychosomatic disease and healthy psychological development [1]. But in developing countries, mental health of a child is not accorded its due importance, which perpetuates the deviant development of many children who otherwise could become useful productive members of society. Memory is the fundamental to learning and learning starts since the day of birth, so childhood is the first period where the effort for the improvement and restoration of memory should start this effort will defiantly oppose the child from becoming academic underachiever [2]. Alternation in memory processing may affect the children in academic and behavioral spheres. In particular children those having short-term-memory deficit may have difficulty in retaining instruction and lessons and may be labeled as poorly motivated or lazy [3, 4]. For all reasons, there is strong need of a safe and effective memory promoting and restorative methods. In perspective of memory and its disorders, there are certain treatment procedures in Ayurveda which are undoubtedly helpful in enhancement and restoration of memory.

2. Aim of study: The present study was undertaken with following aims:

- To enhance the mental performance among children
- To get relief from the problem associated with Poor Mental Concentration.
- To improve school performance by achieving positive impact on memory status of child.

3. Materials and methods

A randomized placebo control study was conducted in a school going children. Selection of cases: Children for the present study were screened out from OPD/IPD of National Institute of Ayurveda, Jaipur

3.1. Age group - Children between 6 to 16 years were considered for study.

3.2. Numbers of cases- 72 children were registered out of which 12 children discontinued the treatment.

3.3. Grouping of patients- Selected children were randomly divided into three groups keeping in mind that all the three groups had children from various grades (classes), schools & economic status for this stratified random sampling method was adopted.

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Group A: This group of 20 children were given the Ayurveda compound *Kalyana Leha* ^[5] Granules

Group B: This group of 20 children were given only placebo

Group C: This group of 20 children were given only *Shirodhara*

3.4. Diagnostic Criteria: Pre-assessment screening of Poor Mental concentration children was done with draw-a-man test and children with IQ of 85 ^[6] and above were included in study.

3.5. Inclusion Criteria

- Children aged 6-16 yrs. of either sex satisfying criteria.
- Children with average/normal IQ level

3.6. Exclusion Criteria

- Children with physical disability
- Children with psychiatric illness.
- Children with gross brain damage causing mental retardation.
- Children with any genetic disorder
- Children able to recall digit span of more than 9 digit.

3.7. Discontinuation criteria

- Any acute or severe illness.
- Parents not willing to continue the treatment

3.8. Assessment criteria

- Wechsler Intelligence Scale For Children ^[7] (WISC)
- Draw-a- Man Test for IQ-assessment ^[8]

3.9. Administration of Tests: The tests were done in a quite & separate room having no pictures on the wall to minimize distractions. A good rapport was established with subjects before starting the test & they were made completely comfortable in order to ensure the proper evaluation of their potential. The tests were administered individually. The test were performed during morning hours, so that the children were not under stress or exhausted. A detailed instruction was given about the tests, so that the child can easily perform the test.

3.10. Drug: An Ayurvedic compound drug named as *Kalyanakleha* (KL1) was selected for the present study. Since

Poor Mental Concentration is basically concerned with the brain or with *mana* and *buddhi* in Ayurvedic perspective, the selection of the study drug was based on the classical references indicating their *medhya* effect ^[9] and various clinical and experimental studies conducted previously giving evidence of their effect on the cognitive function of brain.

Table 1: Contents of *Kalyan Leha* Granules

S. No.	Drug	Proportion
1.	<i>Haridra (Curcuma longa)</i>	1Part
2.	<i>Vacha (Acorus calamus)</i>	1Part
3.	<i>Kusth (Saussurea lappa)</i>	1Part
4.	<i>Pippali (Piper longum)</i>	1Part
5.	<i>Vishvabhesaja (Zingiber officinale)</i>	1Part
6.	<i>Ajaji (Cuminum cyminum)</i>	1Part
7.	<i>Ajamoda (Carum roxburghianum)</i>	1Part
8.	<i>Yashtimadhu (Glycyrrhiza glabra)</i>	1Part
9.	<i>Saindhav lavan (Rock salt)</i>	1Part

The powder of dried herbs were taken in proper quantity and were processed in the pharmacy of National Institute of Ayurveda, Jaipur and was converted into granule form in order to enhance its palatability of easy administration in children.

3.11. Dose & Duration: Doses were according to the body weight of the child (3g/kg/day) in 2 divided doses with milk for 2 months. Children were called for follow up every fortnightly.

3.12. Placebo: The placebo for the study was also in the form of granules with the same color and texture as study drug (Granules KL2) containing starch and sugar. Doses were similar to that of study drug.

3.13. Shirodhara: In this process, the milk was poured over the forehead of patients in the form of a regular stream from a specific height of about 8 cms in a fixed fashion of oscillatory movements i.e. to & fro movement of milk stream over the forehead of the patients for 30-45 minutes daily for 2 weeks.

4. Observations: Major observational findings have been described in the following table ^[Table 2]

Table 2: Major Observational findings in the study (n=60)

Age wise incidence					
6-9	9-12		12-16		
18	27		15		
Frequency Distribution According to Sex					
Male		Female			
32		28			
Frequency Distribution According to Socio-economic Status					
Higher	Middle Higher	Middle	Lower Middle	Lower	
8	1	14	28	9	
Frequency Distribution According to Sleep Pattern					
Less (<6 hrs.)	Moderate (6-8 hrs.)	Proper (8-10 hrs. without awakenings)	Excessive (>10 hrs.)	Distributed >2 awakenings during sleep.	Delayed (difficulty in initiation sleep)
17	13	13	9	6	2
Frequency Distribution According to IQ level					
85-95	95-105	105-115	115-125	125-135	
30	12	8	6	4	
Frequency Distribution of Breakfast					
Regular		Irregular			
24		36			
Frequency Distribution of Family Involvement in their child's study					
Present		Absent			
24		36			
Frequency Distribution: Incidence of Psychological Problem					
Fear	Shy	Aggression	Others	No Problem	
3	4	4	3	46	

Abv: Hrs.: Hours; IQ: Intelligence Quotient

5. Results: All the groups were having Non significant difference before treatment in all assessment criteria. Further

assessment was done at the end of the trial using student 't' test by a software IBM SSPS statistics version 21.

Table 3: Showing Improvement in IQ level in all groups after treatment

Changes in IQ level					
Groups	S.D.	S.E.	't' value	'p' value	Remark
Group A	3.427	0.7664	4.175	0.0005	HS
Group B	1.210	0.2705	0.3697	0.7157	IS
Group C	2.090	0.4674	3.210	0.0046	S

Intergroup comparison for change in IQ level has shown very significant improvement in Group A over Group B and C ($p < 0.01$ and $p < 0.05$) respectively, Group C also have shown significant improvement over Group B. In Change in Reaction

time Group A and Group C have non-significant difference but both Group A and Group C have significant improvement over Group B ($p < 0.05$).

Table 4: Showing improvement in WISC scale in all three groups

S.N	WISC IV	Group	SD	P value	Remark	Inter group	P value	Remark
Verbal Comprehension index								
1	Similarities	A	0.6569	<0.001	HS	A & B	<0.01	HS
		B	0.5712	0.0298	S	A & C	>0.05	NS
		C	0.6569	<0.001	HS	B & C	<0.01	HS
2	Vocabulary	A	1.137	0.0034	HS	A & B	<0.01	HS
		B	0.4104	0.0421	S	A & C	>0.05	NS
		C	1.137	0.0034	HS	B & C	<0.05	S
3	Comprehension	A	1.399	0.0193	S	A & B	<0.05	S
		B	0.1846	0.7894	NS	A & C	>0.05	NS
		C	1.399	0.0193	S	B & C	>0.05	NS
Change in Perceptual Reasoning Index								
4	Block Design	A	0.6048	<0.001	HS	A & B	<0.001	HS
		B	0.4894	0.0470	S	A & C	>0.05	NS
		C	0.6048	<0.0001	HS	B & C	<0.001	HS
5	Picture Concept	A	0.6708	<0.0001	HS	A & B	<0.01	HS
		B	0.4472	1.000	NS	A & C	>0.05	NS
		C	0.6708	<0.0001	HS	B & C	<0.01	HS
6	Matrix Reasoning	A	0.9333	0.0057	HS	A & B	<0.01	HS
		B	0.6387	0.0961	NS	A & C	>0.05	NS
		C	0.9333	0.0057	HS	B & C	>0.05	NS
Change in Working Memory Index								
7	Digit Span	A	0.5712	<0.0001	HS	A & B	<0.01	HS
		B	0.4189	0.0519	NS	A & C	>0.05	NS
		C	0.5712	<0.0001	HS	B & C	<0.05	S
8	Letter Number Sequence	A	0.9119	<0.0001	HS	A & B	<0.05	S
		B	0.7255	>0.999	NS	A & C	>0.05	NS
		C	0.09119	<0.0001	HS	B & C	>0.05	NS
Change in Processing Speed Index								
9	Coding	A	0.9515	0.0013	HS	A & B	<0.05	S
		B	0.6048	0.7157	NS	A & C	>0.05	NS
		C	0.9515	0.0013	HS	B & C	<0.05	S
10	Symbol Search	A	0.3712	<0.0001	HS	A & B	<0.05	S
		B	0.4472	0.3239	NS	A & C	>0.05	NS
		C	0.5712	<0.0001	HS	B & C	<0.05	S

6. Discussion: Academic underperformance was found in most of the children. 45% of cases showed poor academic performance and 32% of cases performed average at school. Thus it can be concluded that the academic performance is the most commonly affected areas of child's functioning in the school years having Poor Mental Concentration. Breakfast plays a key role in maintaining good concentration during school time of a child in 60% of cases the incidence of breakfast is irregular which shows breakfast highly affect mental concentration of child in school hours. Studies showed that-Children who skip breakfast are less able to differentiate among visual images, show increased errors, and have slower

memory recall [10].

Children experiencing hunger are more likely to be hyperactive, absent and tardy, in addition to having behaved oral and attention problems more often than other children. Children who are undernourished have poorer cognitive functioning when they miss breakfast. Providing breakfast to students at school improves their concentration, alertness, comprehension, memory, and learning. Involvement of Family and parent affect academic performance very much. Here 40% student had not family support. Study suggests that parental involvement is necessary for better academic performance.

Kalyana leha have shown promising results in nervous

disorders^[11]. The exact mode of action of the medhya drugs is not very clear, but these drugs ultimately increase the overall cognitive capacity of the brain by any one of these mechanisms i.e. by increasing the perfusion of the brain, by increasing the metabolism in the brain or by improving the chemical imbalances in the brain.

Results have proved that in all parameters both drug and *shirodhara* were effective in alleviating the symptoms of Poor Mental Concentration, but in some condition drug had much greater potential to ameliorate the symptoms rather than the *shirodhara*.

But in the present study combined effect of *kalyana leha* and *shirodhara* was not studied due to limited number of patients and resources. As both have provided improvement in mental concentration in maximum parameters studied hence combined effect of both therapy could more promising than their individual effect.

7. Conclusion: Multimodal approach showed highly significant improvement in Reaction time which directly reflects the efficacy of therapies on attention (concentration) span. Further extensive study is needed to authenticate the result of the current study, with larger samples and precise assessment criteria.

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