

## A CLINICAL STUDY TO EVALUATE THE EFFICACY OF YASTIMADHU CHOORNA IN ENHANCEMENT OF IQ IN SCHOOL GOING CHILDREN

Praghosh Mathew<sup>1\*</sup>, Vishnu Damodar<sup>2</sup>, Sharada MK<sup>3</sup>

1. Assistant Professor, Dept. of Kaumarabhrithya, MVR Ayurveda Medical College, Kannur, Kerala, India.
2. Associate Professor, Dept. of Rachana Shareera, PN Panikar Souhruda Ayurveda Medical College, Kanhangad, Kasaragod, Kerala, India.
3. Associate Professor & Head, Dept. of PG studies in Kaumarabhritya, Alva's Ayurveda Medical College, Moodbidri, Karnataka, India.

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### Abstract

Intelligence is a vital essentiality in day today life in its purest and enriched form, especially in children who have to build up their life in an appropriate manner. Individuals with high level of intellectual power are inevitable for the current competitive era. Acharya Charaka highlighted four medhya rasayanas in chikitsa sthana, one among them is Yastimadhu choorna with milk, which is recommended to improve the medhya (IQ). The main aim of this study is to evaluate the efficacy of Yastimadhu choorna in enhancement of IQ in school going children. The study was conducted in a Group of 40 healthy children aged 10-12 years. It was Randomized, Single Centre, Single-blind, Fixed Dose, Parallel Group, and Placebo-Controlled Study. 40 children were selected for the clinical study and assigned into 2 Groups. Yastimadhu choorna with Milk was given to Group A and wheat flour and Milk was given to Group B. It was given for a period of three month. Final review was completed at a gap of 1 month after stopping the treatment for follow up study. IQ assessment was done before the treatment after the treatment and after the follow up. The comparison of two Groups after treatment shows that Yastimadhu choorna was effective compare to the placebo but after follow up effect of Yastimadhu choornain to improve IQ is insignificant. Yastimadhu choorna was safe throughout the course of study and shows significant efficacy in improving IQ at the time of treatment.

**Key words:** School Children; IQ; Yastimadhu choorna; Buddhi; Medha; Smruthi; Memory.

### \*Address for correspondence:

Dr. Praghosh Mathew,  
Assistant Professor, Dept. of Kaumarabhrithya,  
MVR Ayurveda Medical College,  
Kannur, Kerala, India – 670 563  
E-mail: [praghosh.mathew@gmail.com](mailto:praghosh.mathew@gmail.com)

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## INTRODUCTION

Current competitive era demands individual with high level intelligence especially in children, because pace of life got increased and the human beings have become accustomed to a competitive world. The competition spirit is being injected by the society even to the brain of infants and children.

Intelligence is the quality and ability of mind that encompasses many related abilities, such as the capacity to reason, to plan, to solve problems, to think abstractly, to comprehend ideas, to use language, and to learn.<sup>[1]</sup>

When we consider the word Buddhi from our classics, it says that buddhi is a higher mental faculty, i.e. the one which is act as instrument of knowledge, decision maker, discriminating authority etc. However, Buddhi is a higher faculty that acts in sense percepts organized by manas and furnishes intellectual discrimination, determination, reasoning, and will.

In our classics lots of importance has been given for the concept of Medhya rasayana. According to Amarakosha, the word Medha means the ability to have proper correlation and understanding about the knowledge of the existing object,<sup>[2]</sup> means the word medha represent the buddhi itself. Rasayana which help to increase medha, is called as medhya rasayana. Acharya Charaka highlighted four medhya rasayanas in Charaka Samhita, chiktsa sthana.<sup>[3]</sup> One among them is yastimadhu choorna with milk,<sup>[4]</sup> our acharyas had well praised the drug by indicating it to increase medha, smruthi and to boost the individual shruthadhara.<sup>[5]</sup>

To measure the intelligence there are so many methods are available, the most famous of which is the IQ test. Intelligence tests are a standardized assessment procedure for the determination of intellectual ability.<sup>[6]</sup>

The score produced is usually expressed as an intelligence quotient.<sup>[7]</sup> Most tests present a series of different kinds of problem to be solved.

Intelligent quotient (IQ) is an index of intellectual development in childhood and adult life.

## MATERIALS AND METHODS

Healthy Children aged 10-12 years irrespective of sex; caste, religion, and socio-economical status were selected from the Alva's School, Moodbidri, Karnataka, India. The study was started after obtaining the consent of the patients. The written consent was detailed in the local language and explained orally too regarding the type and course of study. The clinical study was started after the approval of Institutional Ethics Committee.

### Inclusion criteria

Children aged 10-12 yrs irrespective of sex, caste, religion, and socio-economical status and whose IQ score ranged from 70 to 139 were selected.

### Exclusion criteria

Children suffering from any systemic disorders, whose IQ score ranged below 70 and Children aged below 10yrs and above 12 yrs.

### Grouping of Children and Posology

The selected children were randomly divided by applying lottery method into the following two Groups of treatment.

Treatment Group (Group A) - This Group containing 20 children was administered Yastimadhu choorna with milk in the dosage of 300mg in morning before food for a period of three months.

Placebo Group (Group B) - This Group of 20 children was given the placebo made up of fried wheat churna with milk in the dosage of 300mg in morning before food for a period of three months. The selected children were treated with the test drug or placebo for a period of three month One month after stoppage of the treatment; the children were again assessed for follow up study.

### Assessment criteria

The Indian adaptation of Wechsler Intelligence Scale for Children i.e. Malin's intelligence scale for Indian children has been used for the present study and Scores obtained in each item from the score table was considered as the individual criteria. The test contains verbal and performance scale, which further contains 5 sub tests in each of them.<sup>[8]</sup>

### General Description

The original WISC is an individual intelligence test or scale for children from the ages of 5 to 15.11 years.<sup>[9]</sup> The Indian adaptation covers only ten years from 6 to 15.11. The Indian adaptation omits the picture arrangement test in performance scale as it proves too culturally biased both as to content as well as form.

These subtests may be administered in any order convenient for rapport. Only ten tests 5 from each Group are required for completed scoring. In case more or fewer tests are taken appropriate score pro-rating is called for. The verbal Group has an alternate in digit span test in case of spoilage or when the regional vernacular test drops the vocabulary test in upper levels. (Table 1)

### OBSERVATION

In Group A Before treatment(BT) there were no children whose verbal IQ score was below 70 who belonged to Retarded category, 7.5% children belonged to Dull IQ category & 37.5

% children belonged to Average IQ category and 5% children were in the superior IQ category.

In Group B there were no children in both retarded and Superior category. 15% of the children's were in dull category and 35 % of the children's were in Average category. (Table 2)

In Group A before treatment (BT) there were no children belonging to Dull IQ category, 65% children belonged to the Average IQ category & 35% children belonged to the Superior IQ category Group.

In Group B there were no children in dull category 22.5% of the children's were in average category, 25 % in superior and 2.5 % in very superior. (Table 3)

Before treatment, 10% children were in the category of dull IQ score. 60% children were in the category of average IQ score. 30% children were in the category of superior IQ score. (Table 4)

Before treatment, 5% children were in the category of dull IQ score. 85% children were in the category of average IQ score. 10% children were in the category of superior IQ score. (Table 5)

### RESULTS

There was 0.21% improvement in verbal IQ and 8.8% improvement in performance IQ after treatment .The effect of the trial drug was significant with a p value <0.01. (Table 6)

There was 0.20% improvement in verbal IQ and 0.47% improvement in performance IQ during follow-up with a statistical significant P value of <0.02. (Table 7)

The effect of placebo on verbal and performance IQ was statistically insignificant with a P value of <0.25. (Table 8)

**Table 1: Types of verbal and performance IQ Sub test**

Verbal	Performance
General information	Picture completion
General comprehension	Block design
Arithmetic	Object assembly
Similarities	Coding
Digit span	Mazes
Vocabulary	Picture arrangement

**Table 2: Response of children on VERBAL IQ test in Group A and Group B Before treatment**

Category	Score Range	Group A		Group B	
		No	%	No	%
Dull	70-89	3	7.5%	6	15%
Average	90-109	15	37.5%	14	35%
Superior	110-124	2	5%	0	0%

**Table 3: Response of children on PERFORMANCE IQ TEST in Group A and Group B Before treatment**

Category	Score Range	Group A		Group B	
		No	%	No	%
Dull	70-89	0	0	0	0
Average	90-109	13	32.5%	9	22.5%
Superior	110-124	7	17.5%	10	25%
Very superior	125-139	0	0	1	2.5%

**Table 4: Response of children in Group A on OVERALL IQ SCORE Before treatment**

Category	Score Range	Bt	
		No	%
Dull	70-89	2	10
Average	90-109	12	60%
Superior	110-124	6	30%
Very superior	125-139	0	0

**Table 5: Response of children in Group B ON OVERALL IQ SCORE Before treatment**

Category	Score Range	Bt	
		No	%
Dull	70-89	1	5%
Average	90-109	17	85%
Superior	110-124	2	10%
Very superior	125-139	0	0

**Table 6: Effect of Yastimadhu Choorna on VERBAL and Performance IQ before treatment and after treatment on GROUP A**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AT						
Verbal	98.610	98.820	0.21%	0.4252	0.09512	2.814	P<0.01	S
Performance	106.55	116.85	8.8%	0.5458	0.1220	2.693	P<0.01	S

**Table 7: Effect of Yastimadhu Choorna on VERBAL and Performance IQ Before treatment and After follow on GROUP A**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AFU						
Verbal	98.610	98.810	0.20%	0.3179	0.07108	2.208	P<0.02	S
Performance	106.55	106.05	0.47%	0.8303	0.1857	2.458	P<0.02	S

**Table 8: Effect of Placebo on VERBAL and Performance IQ before treatment and After treatment on children of GROUP B**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AT						
Verbal	93.210	93.415	0.21%	2.713	0.6066	0.3379	P<0.25	NS
Performance	108.55	108.06	0.45%	2.713	0.6067	0.8160	P<0.20	NS

**Table 9: Effect of Placebo on VERBAL and Performance IQ before treatment and after follow-up on children of GROUP B**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AFU						
Verbal	93.210	93.255	0.04%	2.848	0.6367	0.0706	P<0.25	NS
Performance	108.55	108.19	0.33%	3.410	0.7626	0.4787	P<0.25	NS

**Table 10: Effect of Yastimadhu Choorna on overall IQ Before treatment and After treatment on children of GROUP A**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AT						
Over all IQ	102.58	102.83	0.9%	0.296	0.0658	3.870	P<0.001	S

**Table 11: Effect of Yastimadhu Choorna on overall IQ Before treatment and After follow-up on children of GROUP A**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AFU						
Overall IQ	102.58	102.43	0.14%	0.4344	0.4344	1.544	P<0.10	NS

**Table 12: Effect of Placebo on overall IQ Before treatment and after treatment on children of GROUP B**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AT						
Overall IQ	100.88	100.74	0.13%	0.5010	0.1120	1.294	P<0.15	NS

**Table 13: Effect of Placebo on overall IQ Before treatment and After Follow-up on children of GROUP B**

IQ	Mean score		%	SD	SE	T	P	Remarks
	BT	AFU						
Overall IQ	100.88	100.72	0.15%	0.6064	0.1444	1.108	P<0.15	NS

**Table 14: Comparison of results of two Groups on overall IQ score (T- Test) After Treatment & After Follows Up**

Overall IQ	Mean ± SEM		T Value	P Value	Remarks
	Group A	GROUP B			
AT	0.255 ± 0.0874	0.145 ± 0.112	2.815	P<0.005	S
AFU	0.150 ± 0.928	0.160±0.114	0.05825	P<0.25	NS

The effect of the placebo continued to be statistically insignificant on verbal and performance with a P value of <0.25. (Table 9)

The trial drug yastimadhu choorna was highly significant on overall improvement of IQ after treatment with a P value < 0.001. (Table 10)

The trial drug Yastimadhu choorna was not significant during follow-up with insignificant P value of < 0.10. (Table 11)

The effect of placebo was not significant on overall improvement of IQ after treatment with an insignificant P value of < 0.15 (Table 12)

The effect of placebo continued to be insignificant on overall IQ improvement after follow-up with an insignificant P value of < 0.15. (Table 13)

Comparison of two Groups after treatment shows a p value <0.005, which indicate that Yastimadhu choorna was effective compare to the placebo.

Comparison of two Groups after follow up shows a p value <0.25, which indicate that effect of Yastimadhu choorna and placebo were insignificant. (Table 14)

## DISCUSSION

A methodical review on functional aspects of Ayurvedic concepts like buddhi, medha,

smruthi modern topics like intelligence, intelligent quotient, memory their physiological basis and factors affecting them was done. These factors were analyzed consecutively and Grouped into four categories mainly biological, psychological, social, and familial factors.

IQ was assessed with the help of Indian adaptation of Wechsler intelligence scale of children i.e. Malin's intelligence scale for Indian children. Verbal IQ scale measured child's general knowledge, factual knowledge, long term memory, social and practical judgment, short term auditory memory, concentration numerical reasoning, etc. Performance IQ scale measured attention power, alertness to visual details and visual discrimination, visual-motor skills, coordination, short term visual memory, nonverbal intelligence, spatial analysis, grapho-motor planning, fine visual-motor coordination, etc. Entities measured by verbal and performance IQ scale can be considered as functional aspects of Medha and Smruthi. Trends and techniques in modern day clinical researches have been used in applicable places to make the study up to standard more scientifically. It can be concluded that quality of memory depends on the strength of attention, the extent of motivation, the adequacy of processing of the information to be stored, the frequency of exposure and the techniques used to register and to retrieve data. Yastimadhu Choorna was found to be highly effective in improving Verbal IQ (0.21%), Performance IQ (8.8%) and Overall IQ (0.9%) in children of Group A after treatment and the efficacy of medicine was sustained even after follow up period where Verbal IQ showed a improvement of 0.20%, Performance IQ showed a improvement of 0.47% and in Overall IQ there was a improvement of 0.14%. Statistical results on efficacy of Yastimadhu on verbal and performance IQ after treatment showed a p value of <0.01 and overall IQ after treatment showed a p value of <0.02.

Comparison of two Groups after treatment shows a p value <0.005, which indicate that Yastimadhu choorna was effective compare to the placebo. Comparison of two Groups after follow up shows a p value <0.25, which indicate that effect of Yastimadhu choorna and placebo were insignificant.

## CONCLUSION

All the 40 children completed the course of treatment without any drop out. Medication was well tolerated by the children without any untoward reactions. The present study was done on minimum sample size. The efficacy of trial drug Yastimadhu choorna on a larger population will be helpful in standardizing the drug and yield a significant statistical result. Assessment of buddhi, medha & smruthi on standard parameters in Ayurvedic methods would be more helpful to evaluate the efficacy of Ayurvedic drugs or compounds. Evaluating the efficacy of Yastimadhu Choorna on non-schooling children in future, days can be suggested. As the trial drug Yastimadhu choorna showed significant results in enhancing IQ of the normal children, further study is encouraged in the mentally retarded category.

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## REFERENCES

1. Burt C. The Differentiation of Intellectual Ability. The British Journal of Educational Psychology, 1931;13(1):1-15.
2. Amara Sinha. Amarakosha. Harigovinda sastri, editor. 1<sup>st</sup> ed. Varanasi: Chowkhamba Sanskrit Series Office; 1970. 1/5. p.342.
3. Charaka. Charaka Samhita (Chakrapanidatta commentary). Ram Karan Sharma, Bhagawan Dash, editors. 1<sup>st</sup> ed. Varanasi: Chowkhamba Sanskrit Series Office; 1998. Cikitsa Sthana, 1:3/30-32. p. 46.
4. Charaka. Charaka Samhita (Chakrapanidatta commentary). Ram Karan Sharma, Bhagawan Dash, editors. 1<sup>st</sup> ed. Varanasi: Chowkhamba Sanskrit Series Office; 1998. Cikitsa Sthana, 1:3/30-32. p. 46.

5. Vagbhata. Astanga Hrudaya (Arunadatta's Sarvanga sundara commentary). Vaidya H.P, editor. 1<sup>st</sup> ed. Varanasi: Chaukhamba Oreintalia; 1998. p.220
6. Binet A. The development of the Binet-Simon Scale: New methods for the diagnosis of the intellectual level of sub normals. (ES Fite, Trans.) In D". *Readings in the History of Psychology. New York: Appleton-Century-Crofts; 1905. p.503.*
7. Binet A. The development of the Binet-Simon Scale: New methods for the diagnosis of the intellectual level of sub normals. (ES Fite, Trans.) In D". *Readings in the History of Psychology. New York: Appleton-Century-Crofts; 1905. p.503.*
8. Wechsler D. The measurement of adult intelligence. Baltimore: Williams & Wilkins. 1944. ISBN 0195022963.
9. Wechsler D. The measurement of adult intelligence. Baltimore: Williams & Wilkins. 1944. ISBN 0195022963

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