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A clinical study on the medhya effect of *Nagbala choorna* in school going children

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ABSTRACT:

Today's pupils are the futures fabrics of the country. Proper investment in them holds the key to the future development of the country. All parents want their kid to reach their full intellectual and creative potential.

There is need for today to implement an applicable and acceptable remedy for all the classes of the society which is affordable and having fewer side effects. *Nagbala* and *Yashtimadhu* both are well known drugs for their *Rasayana* effect. But with reference to their *Medhya* effect particularly in age group of 6 to 10 years children hardly work is found. So in present study, an effort is made to analyze the *Medhya* effect of *Nagbala* and *Yashtimadhu* in School going children.

For this, 120 patients of age group 6 to 10 years of both sexes were randomly selected from school and divided into two groups. *Nagbala choorna* (trial drug) was administered to 60 such children

with counseling. Another set of 60 children was administered with *Yashtimadhu choorna* (control drug) with counseling. All children were healthy and having IQ more than 70, before treatment. IQ is checked on the basis of Good enough draw a person test. Monthly Follow up is taken for 3 months during treatment. The study has proved that Effect of the *Nagbala choorna* and *Yashtimadhu choorna* proved to be statistically significant for Grasping Power (*Dhee*), Retention (*Dhruti*), Enthusiasm (*Utsaha*) and Concentration (*Dharana*) separately.

There is no significant difference between *Nagbala choorna* and *Yashtimadhu choorna* for IQ.

KEYWORDS: *Medhya*, *Nagbala*, *Yashtimadhu*, *Rasayana* drugs, *Rasayana*, Intelligence Quotient (IQ).

INTRODUCTION

The great thing about *Ayurveda* is that it's treatment always yield side benefits,

not side effects. In *Samhitakala*, *Acharya* have given much emphasis to promotion of *Medha*. The drug promoting *Medha* (intellect) are termed as '*Medhya*' drugs. Ayurvedic system of medicine has mentioned as '*Rasayana* Drugs', are primarily claimed as '*Medhya*'. Further there is a special class of some '*Rasayana* drugs' called as '*Medhya Rasayana*' which is supposed to be having specific influence on higher brain functions.

Each day of our life we make deposits in the memory bank of our children. But in case brain does not develop according to the age, the affected person certainly lags far behind in almost all spheres of life. It is easier to build strong children than to repair broken men. Thus the condition is manifested during *Balyavastha*. *Balyavastha* is a period in which all the *Dhatus* are immature and are in the process of maturation i.e. Growth and Development.

An IQ test measures a person's cognitive ability to the population at large. The average IQ is 100, anything above 130 is considered exceptionally smart while a score under 70 is categorized as developmental delays related to intelligence. Intelligence is defined as general cognitive problem solving skill. An Intelligence Quotient, or IQ, is a score derived from one of the several standardized tests designed to assess human intelligence.

The best preparation for tomorrow is doing your best today. For that many parents are ready to purchase supplement for their children to "enhance memory" or as "I.Q. Booster" to prepare them for the exams and competitive world. For that ample of *Medhya* drugs are mentioned in *Ayurveda*. *Kashyapa*

Samhita is one of the most important classical texts as far as *Balaroga* is concerned. Perhaps it is the only source book of *Kaumarbhritya*. *Nagabala* mentioned by *Acharya Kashyapa* for *Medhajana*¹ effect have been tried to study and the effect compared with the *Yashtimadhu* which is mentioned by *acharya charaka* as *Medhya rasayana*².

In the present study a total of 120 children were registered for the trial and were randomly distributed in two groups i.e. Group A and Group B. Of these 60 children in Group A and 60 children in Group B completed the course of treatment. The general observations of total 120 children are plotted in the clinical study. Maximum efforts had been taken to avoid

bias that may creep in this as it is a psychological research work.

AIMS AND OBJECTIVES

Aim: - To study the *Medhya* effect of *Nagbala Choorna* in school going children

Objectives:-

1. To evaluate the efficacy of *Nagbala Choorna* on Academic performance in school going children.
2. To study the concept of *Medha* according to *Ayurveda*.
3. To evaluate the efficacy of *Nagbala Choorna* on IQ of school going children.

MATERIAL AND METHOD

The present study was conducted to examine the *Medhya* effect of *Nagbala choorna* in school going children.

For this study several children were surveyed at Ashta, Sangli, Maharashtra on the basis of Good Enough Draw-A-Person test (DAP). Current Wechsler IQ

classification scale for children and they were short listed according to their I.Q. score above 70. Counseling was held for their parents to get the consent to experiment the drug on their children. After approval, 120 children were selected to carry out the experiment. Further, they were divided into two groups, group A and B consisting of 60 children in each group.

Group A- Children were treated with Nagbala choorna whereas,

Group B- Children were treated with Yashtimadhu choorna.

During dosage, monthly follow up from teachers and parents was recorded. Follow up is tabulated in case report form of every individual. This was observed over a time period of 3 months. Statistical analysis was carried out to check the improvement due to corresponding drug. Improvement was compared to check the significance in both groups.

Inclusion Criteria

1. Healthy school going children with age group of 6 to 10 years.
2. Healthy school going children with average and below average school performance.

3. Children with the IQ above 70 will be incorporated in the study

Exclusion Criteria

1. Children below 6 years and above 10 years, Children having IQ level below 70.
2. Children with acute and chronic systemic infectious diseases such as renal diseases, heart related problems, juvenile diabetes mellitus ,etc
3. Congenital disorders, Mental retardation, cerebral palsy, Blood dyscrasis on long term immunosuppressant, Hepatic dysfunction, Protein Energy Mal-nutrition.
4. Psychiatric disorders, Inborn error of metabolism, Endocrinal disorders.
5. Progressive and non progressive neuromuscular disorders.

Treatment schedule:

As per the inclusion criteria, after an initial assessment, selected children were distributed equally on random basis in to trial and control groups. Both groups were received their corresponding drug for a period of 3 months.

Table No.1 -Schedule of treatment and dosage

Groups	Trial Group	Control Group
No. of children	60	60
Age	6 to 10 years	6 to 10 years
Drug administered	Nagbala choorna	Yashtimadhu choorna
Dose	Age wise according to Acharya Sharangdhar As per this approximate dose for, 6 to 7years children=6 gms/day 7 to 8 years children=7	Age wise according to Acharya Sharangdhar As per this approximate dose for, 6 to 7years children=6 gms/day 7 to 8 years children=7 gms/day

	gms/day 8 to 9 years children=8 gms/day 9 to 10 years children=9 gms/day	8 to 9years children=8 gms/day 9 to 10years children=9 gms/day
Anupan	Madhu and Ghrita in unequal quantity	Madhu and Ghrita in unequal quantity
Sevan Kala	Pratah	Pratah
Rout of Administration	Oral route	Oral route
Duration	3 month	3 month
Follow up	per 1 month	per 1 month

Dose of trial drug and control drug was adjusted as per age of the children as mentioned in Sharangdhar Samhita i.e.

“बालस्य प्रथमे मासि देया भेषजरक्तिका । अवलेहीकृतैकैव क्षीरक्षौद्रसिताघृतैः ॥
वर्धयेत्तवदेकैकां यावद्भवति वत्सरः । माषैवृद्धिस्तदूर्ध्वं
स्यद्यावत्षोडशवत्सरः ।
ततः स्थिरा भवेत्तवद्यावद्वर्षाणि सप्ततिः ॥”³
(शा.पू. ६/१४-१५)
(1 masha ~

= 1 gram)

Table No.2-Gradation of subjective criteria's

Criteria's for Assessment

The subjective and objective criteria's of pre and post treatment were compared for assessment of the result. Then all the result analyzed statistically.

A) Subjective criteria –

The subjective criteria's were assessed as per the information given by parents/guardian/teachers/by self.

Sr No	Status	Grade 1	Grade 2	Grade 3	B.T	F.W. after 1M	F.W. after 2M	F.W. after 3 M
1.	Grasping Power (Dhee)	Excellent	Good	Poor				
2.	Retention (Dhruti)	Excellent	Good	Poor				
3.	Recalling ability (Smriti)	Excellent	Good	Poor				
4.	Attention (Dakshata)	Always	Many times	Some times				
5.	Activity (Cheshta)	Very active	Moderate active	Lethargic				
6.	Enthusiasm (Utsaha)	Excellent	Good	Poor				
7.	Concentration(Dharana)	Excellent	Good	Poor				

B.T.-Before treatment; F.W.-

Follow Up; M-Month

B) Objective criteria –

1. Academic performance in school was assessed on the basis of progress records.

Table No.3-Gradation of objective criteria i.e. academic performance

Grade	Assessment result	Academic performance (Improvement in percentage)
Grade 1	No improvement	0 to 1.99 %
Grade 2	Mild improvement	2 % to 3.99 %
Grade 3	Moderate improvement	4 % to 5.99 %
Grade 4	Markedly improvement	6 % to 7.99 %
Grade 5	Significantly improvement	8% and more than 8%

2. Assessment of Manas Bhavas (Dhee Dhruti ,Smriti) was done as per Anuman gamya Parikshya Bhavas mentioned by acharya charak i.e.

"मेधा ग्रहणेन् । धृतिम् अलौल्येन् । स्मृति स्मरणेन् ।"
(च.सं.वि.४/८)

For that story was told to children. And a questionnaire of 15 questions was given to each of them. Response was assessed as follows-

Table No.4-Gradation of objective criteria i.e. Manas Bhavas

Grade	Assessment result	Correct answers of questions given by children
Grade 1	No improvement	1 to 3 answers
Grade 2	Mild improvement	4 to 6 answers
Grade 3	Moderate improvement	7 to 9 answers
Grade 4	Markedly improvement	10 to 12 answers
Grade 5	Significantly improvement	13 to 15 answers

3. GOOD ENOUGH 'DRAW-A-PERSON' TEST has been used to assess the mental age of children.

For that each child should be provided with a pencil and test paper. Children are advice to make a picture of a whole man. There is no time limit for the test, but children take upto 10 minutes for the drawing. IQ was calculated with help of

$$\frac{\text{Assessing IQ formula}}{\text{Mental Age}} \times 100 =$$

Chronological AgeAssessment criteria for improvement in IQ was-

Table No.5-Gradation of objective criteria i.e. IQ

Grade	Assessment result	Improvement in IQ score by
Grade 1	No improvement	0
Grade 2	Mild improvement	1
Grade 3	Moderate improvement	2

Grade 4	Markedly improvement	3
Grade 5	Significantly improvement	More than 3

Previously, increment in I.Q. score by 0, 1, 2, 3 and >3 was treated as grade 1, grade 2, grade 3, grade 4 and grade 5 respectively. But, mathematically minimum improvement in I.Q. score for 6 years was observed to be 4.16.

So, the below data has been calibrated to Grade 1 for no improvement in I.Q. Grade 2 for improvement in I.Q. by 4.16 for 6 years, 3.58 for 7 years, 3.13 for 8 years, 2.78 for 9 years and 2.50 for 10 years. Similarly, corresponding grades have been listed in below table for grade 3, grade 4 and grade 5 for assessment criteria.

Table No.6-Grade calibration of I.Q. score

Age in Years	Grade calibration of I.Q. score				
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
6 years	0	4.16	8.33	12.50	16.66
7 years	0	3.58	7.14	10.71	14.28
8 years	0	3.13	6.25	9.38	12.50
9 years	0	2.78	5.55	8.33	11.11
10 years	0	2.50	5	7.5	10

CONCLUSION

The effect of *Nagbala choorna* (Group A) is not significant than *Yashtimadhu choorna* (Group B) for Grasping Power (*Dhee*), Retention (*Dhruti*), Enthusiasm (*Utsaha*) and Concentration (*Dharana*).

The effect of *Nagbala choorna* (Group A) is not significant than *Yashtimadhu choorna* (Group B) for criteria – Manas Bhava, and Academic performance.

There is no significant difference between *Nagbala choorna* (Group A) and *Yashtimadhu choorna* (Group B) for IQ.

Table no. 7 – Overall effect of therapy for Subjective criteria on 120 school going children

Result	Group A		Group B	
	Number of children	%	Number of children	%
Significantly Improvement (75 – 100 %)	0	0.00%	0	0.00%
Markedly improvement (50 – 74.99 %)	1	1.67%	4	6.67%
Moderate improvement (25 – 49.99 %)	38	63.33%	36	60.00%
Mild improvement (0.1 to 24.99 %)	13	21.67%	14	23.33%
No improvement (0 %)	8	13.33%	5	8.33%

In Group A of Nagbala choorna out of 60 children, Significant improved (75 to 100 %) was not seen in any children, Markedly improvement (50 to 74.99 %) was noted in 1 child i.e. 1.67 %, Moderate improvement (25 to 49.99 %) was reported in 38 children i.e. 63.33 %, Mild improvement (0.1 to 24.99 %) was reported in 13 children i.e. 21.67 %, and No improvement (0 %) was seen in 8 children i.e. 13.33 %.

In Group B of Yashtimadhu choorna out of 60 children, Significant improved (75 to 100 %) was not seen in

any children, Markedly improvement (50 to 74.99 %) was noted in 4 children i.e. 6.67 %, Moderate improvement (25 to 49.99 %) was reported in 36 children i.e. 60 %, Mild improvement (0.1 to 24.99 %) was reported in 14 children i.e. 23.33 %, and No improvement (0 %) was seen in 5 children i.e. 8.33 %.

Table no. 8 – Overall effect of therapy on 120 school going children according to Academic performance (improvement in percentage)

Result	Group A		Group B	
	Number of children	%	Number of children	%
Significantly Improvement (≥ 8 %)	7	11.67%	18	30.00%
Markedly improvement (6 – 7.99 %)	2	3.33%	10	16.67%
Moderate improvement (4 – 5.99 %)	10	16.67%	6	10.00%
Mild improvement (2 – 3.99 %)	18	30.00%	13	21.67%
No improvement (0 – 1.99 %)	23	38.33%	13	21.67%

In Group A of Nagbala choorna out of 60 children, Significantly improved (≥ 8 %) was seen in 7 children i.e. 11.67, Markedly improvement (6 – 7.99 %) was noted in 2 children i.e. 3.33 %, Moderate improvement (4 – 5.99 %) was reported in 10 children i.e. 16.67 %, Mild improvement (2 – 3.99 %) was reported in 18 children i.e. 30 %, and No improvement (0 – 1.99 %) was seen in 23 children i.e. 38.33 %.

In Group B of Yashtimadhu choorna out of 60 children, Significantly improved (≥ 8 %) was seen in 18 children i.e. 30 %, Markedly improvement (6 – 7.99 %) was noted in 10 children i.e. 16.67 %, Moderate improvement (4 – 5.99 %) was reported in 6 children i.e. 10 %, Mild improvement (2 – 3.99 %) was reported in 13 children i.e. 21.67 %, and No improvement (0 – 1.99 %) was seen in another 13 children i.e. 21.67 %.

Table no. 9 – Overall effect of therapy on 120 school going children according to Manas Bhava (correct answer given by children)

Result	Group A		Group B	
	Number of children	%	Number of children	%
Significantly Improvement (13 to 15)	7	11.67%	7	11.67%

Markedly improvement (10 to 12)	17	28.33%	27	45.00%
Moderate improvement (7 to 9)	34	56.67%	25	41.67%
Mild improvement (4 to 6)	2	3.33%	1	1.67%
No improvement (1 to 3)	0	0.00%	0	0.00%

In Group A of Nagbala choorna out of 60 children, Significantly improvement (13 to 15 correct answers) was given by 7 children i.e. 11.67%, Markedly improvement (10 to 12 correct answers) was given by 17 children i.e. 28.33 %, Moderate improvement (7 to 9 correct answers) was given by 34 children i.e. 56.67 %, Mild improvement (4 to 6 correct answers) was given by 2 children i.e. 3.33%.

In Group B of Yashtimadhu choorna out of 60 children, Significantly improvement (13 to 15 correct answers) was given by 7 children i.e. 11.67%, Markedly improvement (10 to 12 correct answers) was given by 27 children i.e. 45 %, Moderate improvement (7 to 9 correct answers) was given by 25 children i.e. 41.67 %, Mild improvement (4 to 6 correct answers) was given by only 1 child i.e. 1.67 %.

Table no. 10 – Overall effect of therapy on 120 school going children according to I.Q.

Result	Group A		Group B	
	Number of children	%	Number of children	%
Significantly Improvement (improvement in IQ by more than 3)	0	0.00%	0	0.00%
Markedly improvement (improvement in IQ by 3)	3	5.00%	8	13.33%
Moderate improvement (improvement in IQ by 2)	31	51.67%	38	63.33%
Mild improvement (improvement in IQ by 1)	26	43.33%	14	23.33%
No improvement (improvement in IQ by 0)	0	0.00%	0	0.00%

In Group A of Nagbala choorna out of 60 children, Markedly improvement (improvement in IQ by 3) was seen in 3 children i.e. 5 %, Moderate improvement (improvement in IQ by 2) was seen in 31 children i.e. 51.67 %, Mild improvement (improvement in IQ by 1) was seen in 26 children i.e. 43.33 %.

In Group B of Yashtimadhu choorna out of 60 children, Markedly improvement (improvement in IQ by 3) was seen in 8 children i.e. 13.33 %, Moderate improvement (improvement in IQ by 2) was seen in 38 children i.e. 63.33 %, Mild improvement (improvement in IQ by 1) was seen in 14 children i.e. 23.33 %.

RESULT:

Effect of the Nagbala choorna (Group A) and Yashtimadhu choorna (Group B) proved to be statistically significant for Grasping Power (Dhee), Retention (Dhruti), Enthusiasm (Utsaha) and Concentration (Dharana) separately.

Both the groups proved to be statistically insignificant for Recalling ability (Smriti), Attention (Dakshata), Activity (Cheshta).

Comparatively effect of Nagbala choorna (Group A) is not significant than Yashtimadhu choorna (Group B) for Grasping Power (Dhee), Retention (Dhruti), Enthusiasm (Utsaha) and Concentration (Dharana).

The effect of Nagbala choorna (Group A) is not significant than Yashtimadhu choorna (Group B) for criteria – Manas Bhava, and Academic performance.

There is no significant difference between Nagbala choorna (Group A) and Yashtimadhu choorna (Group B) for IQ.

DISCUSSION

Nagbala and Yashtimadhu both are well known drugs for their Rasayana effect an ample of works have been carried out and have proved the same world over. But with reference to their Medhya effect particularly in following children hardly work is found. So in present study, an effort is made to analyze the Medhya effect of Nagbala and Yashtimadhu in School going children.

Nagbala is stated as one of the Rasayana in Charaka Samhita. Medha is the function of Pitta. So if Pitta remains in balanced state then the Medha will also remain proper. Nagbala and yashtimadhu were having Madhura rasa dominance. Madhura Rasa is said to be ‘Shadeendriya-prasadaneeya’ and

therefore must have a direct effect over the site of these Indriyas i.e. Siras. On administration with the help of Madhura Rasa, Sheeta Virya and Madhura Vipaka both were expected to pacify the Pitta. The responsible factors of Medha are Guru, Snigdha, Picchila Guna and Madhura Vipaka since it controls the Chala Guna of Vata. Vata is the controller and stimulator of mind. As Medha is closely related to Manas the factor affecting it will also affect Medha. Tikta rasa anuras of yashtimadhu by virtue of its Akasha and Vayu Mahabhutas, Laghu guna, Dipana, Pachana and Stroto Vishodhana karma acts as Medhya.

Acharya Vagbhata (A.hr.su.10/16, A.Sn.su.18/13) also explained Madhya guna of Tikta rasa.

View of modern Science – Glutamic acid in *Grewia hirsute* (Nagbala) is an excitatory neurotransmitter within the central nervous system. Glutamic acid is essentially a fuel for the brain. In addition to providing a direct energy source for the brain to function at a high level, this amino acid stimulates mental alertness and improved memory function. Because of the important role this amino acid has in cognitive function. Glutamic acid will help children with behavioural problems and make it easier for them to concentrate and facilitates a better learning environment.

Also *Glycyrrhiza glabra* (Yashtimadhu) is having anxiolytic, immune-modulator, antioxidant, anti-stress and adaptogenic properties. Anti inflammatory and antioxidant properties of liquorice may be contributing favorable to the memory enhancement effect.

Nagbala and Yashtimadhu both due to their Madhura rasa Madhura Vipaka and

Sheeta Virya do control over Pitta. Medha is related with Pitta's normal function. So they work on Dhee (Grasping power).

Dhruti (Ch.su.18) and Utsaha (Ch.su.12) explained in proper function of Kapha. Nagbala and Yashtimadhu both due to their Madhura Rasa, Sheet Virya and Madhura Vipaka nourish Kapha. Due to proper nourishment of Kapha they accomplish their normal functions. So they improve Dhruti (retention power) and level of Utsaha (enthusiasm) in children.

Sthira guna is defined by Hemadri as- "यस्य धारणे शक्तिः स स्थिरः।" (हेमाद्रि-अ.ह.सू.१/१८)

i.e. it works on Dharana i.e. it stables concentration power.

Sthira guna is one of the properties explained by Acharya Vagbhata (A.hr. su.1/12) in Kapha. Nagbala and Yashtimadhu nourish Kapha. Due to that Sthira guna becomes powerful. So it works on maintaining constancy of Dharana Shakti and Manas Bhavas. Ghrita is Samskaranuvartaniya and Madhu is Yogvahi. So, both are best for anupapana.

Ghrita is Samskaranuvartaniya i.e. it imbibes the quality to the extent. Also it carries active principles of the drug to micro level of the body and increases the

potency of the compound drug. Madhu is Yogvahi i.e. it has a quality of penetration of deepest tissue. Due to its carrying capacity it is considered as best among the vehicles.

Madhu and Ghrita are explained by Acharya Charaka for not to take in equal quantity (Ch.su.26/84-282). If taken they acts as Virudhaaniya.

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