



EVALUATION OF GUDUCHI-APAMARGADIRASAYANA ON IQ OF SCHOOL GOING CHILDREN OF AGE 8- 12 YEARS

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ABSTRACT

Introduction: Today is the era of global competition which starts from the very beginning of the childhood. Childhood is the phase in which the child's grasping power and retention power progresses to reach an optimum level. Foundation of an intelligent citizen is laid during this phase of life. *Medha* is a specific intellectual ability of an individual, responsible for encoding and retaining a large amount of knowledge. *Medhya rasayanas* are said to be promote these most needful abilities in early childhood. Hence in search of safe and effective drug for promoting *Medha*. The present trial was planned to evaluate the role of *Guduchi-Apamargadi Rasayana* on IQ level of school going children of age 8-12years.

Material and methods: Study design- Interventional pre- post test without control. Participants- 30 apparently healthy children (8-12 years age), of either sex having IQ level between 80 to110. Intervention- Dose of the trial drug was calculated by Young's formula and it was 4.8gms, 5.4gms, 6.0gms and 6.6gms for children of age 8yrs, 9yrs, 10yrs and 11 yrs respectively. Dry powder of *Guduchi-Apamargadi Rasayana* was given in two divided doses with *ghrita* before food. Intervention period- 3 months. Outcome measure- IQ level.

Results: Statistically highly significant results were observed in Total IQ, Verbal IQ and Performance IQ.

Conclusion: *Guduchi-Apamargadi Rasayana* increases IQ level of school going children of age 8-12 years.

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INTRODUCTION

Today is the era of global competition and this competition starts from the very beginning of the childhood of every individual. Even to get admission in Nursery or K.G. in a reputed school, the child as well as his parents has to go through various examinations. The ability to remember the things that have been learnt, known or read, with such alertness or sharpness and the ability to use his knowledge at the right time and at the right place is the only key to achieve success in every step. Thus, in such conditions the person's grasping power and retention power is of prime importance. The grasping capacity is also of prime importance because only properly grasped information can be further retained well and only well retained knowledge can be retrieved by *Smruti*. Childhood or *balyawastha* is the period in which all the *dhatu*s are immature & are in the process of maturation i.e. growth & development. Middle childhood is the age in which four dimension of development

(cognitive, social, emotional, and moral) are going to takes place. The elementary school years are the years 8-12 in child's life are actually action packed. They are filled with the both motion and emotion as the child confronts the diverse demands of school, and entry into a rule bound society. The early childhood is the phase in which the child's grasping power and retention power progresses to reach an optimum level and hence he perceives and retains unknown words, skilled processes etc. So, it can be said that the foundation of an intelligent citizen is laid during this phase of his life. This is the stage of great concern. The *samskaras* done during this phase of life will leave a permanent imprint and shows its effect during the whole life of the person. So for the present study this particular age group is selected.

Now a day's parents are very conscious about intellectual power of their child & are always in search of so called memory booster. In market limited range of drugs are available and which again having serious side effects. In such situation *Medhya Rasayana* may become drug of choice. *Guduchi-Apamargadi Rasayana* is one of the *Medhya Rasayanas* mentioned in *Chakradatta*² and *Bhaishajya*

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Evaluation of Guduchi-Apamargadirasayana on Iq of School Going Children of Age 8- 12 Years

Ratnavali³ which is combination of 8 herbal drugs. *Phalasaruti* of this combination is mentioned as, one can remember thousands of *shlokas* after taking it only for three days. All ingredients of the formulation are botanically identified, easily available, cost effective, and safe in children.

Therefore the present trial was planned to evaluate the role of *Guduchi-Apamargadi Rasayana* on IQ of school going children of age 8-12 years.

Aims and objectives

To evaluate efficacy of *Guduchi-Apamargadi Rasayana* on IQ of school going children of age 8-12 years.

MATERIALS AND METHODS

Study Design-Interventional pre – post test without control.

Study Population- 30 consenting apparently healthy volunteers of 8-12 years of either sex were enrolled for this trial after screening them as per the inclusion criteria.

Study Period-18 months

Inclusion criteria

- Volunteers will be selected irrespective of gender, caste, religion and economic status
- Volunteers with IQ level above 80 and below 110

Exclusion criteria

- Children with any severe systemic disease
- Children with any neurological problem like mental retardation, autism, ADHD etc.

Assessment criteria

Objective parameters

IQ test using Malin's Intelligence Scale for Indian Children (MISIC- Indian adaptation of WISC)

Volunteers discontinuation / withdrawal criteria

- Any Adverse/ Serious adverse event is encountered, where continuation of study poses medical risk to the Volunteer.
- Volunteers not complying with the protocol.
- Volunteers not turning up for assessment in time.
- Volunteers expressing desire to withdraw.

Trial drug

Guduchi- apamargadi rasayana is the combination of 8 drugs in equal proportion. (Table no.1)

Table no-1 Ingredients of GuduchiApamargadiRasayana

Sanskrit name	Latin name	Quantity
<i>Guduchi</i>	<i>Tinosporacordifolia</i> Linn	1 part
<i>Apamarga</i>	<i>Achyranthesaspera</i> Linn	1 part
<i>Vidanga</i>	<i>Embelinaribes</i> Burm	1 part
<i>Shankhapushpi</i>	<i>Convolvulus pluricaulis</i> chois	1 part
<i>Vacha</i>	<i>Acoruscalamus</i> Linn	1 part
<i>Abhaya</i>	<i>Terminaliachebula</i> Retz	1 part
<i>Kushtha</i>	<i>Saussurealappa</i> (Falc.) Lipsch	1 part
<i>Shatavari</i>	<i>Asparagus racemosus</i> Willd	1 part

Dose, Duration & Administration

Drug dose was determined by using Young's standard formula-

Child dose=age of child/20 ×adult dose

Adult dose of *choorma* is one *karsh* i.e.12gm approx. so average does calculated as follows,

Table no 2 Age wise does of trial drug

Completed age in years	Formula	Final does in grams
8	8/20×12	4.8
9	9/20×12	5.4
10	10/20×12	6.0
11	11/20×12	6.6

This final does was divided in two doses and given twice daily before food with *grita* for 3 months. Dose of *ghrita* - equal to dose of *choorma*-as *anuktamaan* is mentioned by *sharagdhara*.

Rout of administration- Oral

Duration- 3 months

Criteria of Assessment

IQ of volunteer was assessed on the 0th and 90th (last) day of the treatment and on 135th day after treatment as follow up.

Observations

IQ of the volunteers were assessed and recorded before treatment, at the end of the treatment and on 135th day after treatment. The values are given in [Table no. 3].

Table no 3 Observations of the change in IQ

Sr. No.	Verbal IQ			Performance IQ			Total IQ		
	B.T.	A.T.	F.U.	B.T.	A.T.	F.U.	B.T.	A.T.	F.U.
1	97.8	106.4	108.6	102	109.4	110.6	99.9	107.9	109.6
2	100	107.6	110	110.4	119.8	120.4	105.2	113.7	115.2
3	107	112	114.4	99.6	105.6	110.6	103.3	108.8	112.5
4	95.6	103	104	99.8	104.6	107.2	97.7	103.8	105.6
5	110.2	114.8	117.2	109.6	115.2	116.2	109.9	115	116.7
6	113.8	121.2	122.8	105.2	110	112.4	109.5	115.6	117.6
7	86.8	97.6	103.6	92.6	98.4	100.8	89.7	98	102.2
8	85.8	95.6	100	88.6	95.6	98	87.2	95.6	99
9	92.2	102.4	107.4	91.4	98.8	102.6	91.8	100.6	105
10	91.2	101.2	105	94	102.8	105.8	92.6	102	105.4
11	96.2	105.2	110	90.8	96.8	99.6	93.5	101	104.8
12	80.6	91.2	96.4	80.4	86	89.2	80.5	88.6	92.8
13	103.4	111.8	115.2	109.6	117.2	119	106.5	114.5	117.1
14	102.2	110.8	115.2	108.6	116.6	120.2	105.4	113.7	117.7
15	106	115.2	117	91.4	99.6	102.8	98.7	107.4	109.9
16	82	92.2	96.2	85.4	94.8	97.4	83.7	93.5	96.8
17	85.8	96	99.2	87.2	96.8	99.8	86.5	96.4	99.5
18	92.2	100.2	101.6	88	97.8	100.4	90.1	99	101
19	95	104.2	106.6	93.8	101.4	104	94.4	102.8	105.3
20	81.2	89.4	94	80.6	88.8	92	80.9	89.1	93
21	99.8	108	111	101	107.6	109.4	100.4	107.8	110.2
22	95.2	104.6	106.4	99.6	105.2	107.8	97.4	104.9	107.1
23	78.8	87.2	89.8	85.4	91.8	93.6	82.1	89.5	91.7
24	96.8	105	106.2	87.2	93.2	95.8	92	99.1	101
25	91.2	99.4	101.4	94.8	101.6	102.8	93	100.5	102.1
26	109	116	118.8	101.2	107	108.8	105.1	111.5	113.8
27	93.2	100	103.6	87.2	93.2	95.4	90.2	96.6	99.5
28	86.4	92.8	97.6	80	86.2	88.4	83.2	89.5	93
29	101	108.8	111.4	100.6	107	109.2	100.8	107.9	110.3
30	91.2	100.8	102.4	90.8	97.2	99.4	91	99	100.9

[B.T- Before treatment, A.T.- After treatment, F.U.-Follow up]

RESULTS

The recorded values were subjected to statistical analysis for their significance and results. Statistical analysis was conducted by Graph pad prism-6 software. For obtaining results in individual group (before and after treatment) paired 't' test was applied. Obtained results are given in [Table no. 4], [Table no. 5] and [Table no.6]

Total IQ

Table no 4 Analysis of effect on Total IQ score

IQ	Mean	SD	Paired Differences		% of increase in Mean	't' value	'p' value	R
			Pair	Mean				
BT	94.74	8.625	AT-BT	7.70	8.24	35.11	<0.001	H.S.
FU	105.2	7.851	FU-BT	10.47	11.22	33.85	<0.001	H.S.

[B.T.- Before treatment, A.T.- After treatment, F.U.-Follow up, SD-Standard deviation, R-Result]

Verbal IQ

Table no 5 Analysis of effect on Verbal IQ score

IQ	N	Mean	SD	Paired Differences		% of increase in Mean	't' value	'p' value	R
				Pair	Mean				
BT	30	94.92	9.223	AT-BT	8.433	9.049	30.43	<0.001	H.S.
FU	30	106.4	7.965	FU-BT	11.51	12.39	26.4	<0.001	H.S.

[B.T.- Before treatment, A.T.- After treatment, F.U.-Follow up, SD-Standard deviation, R-Result]

Performance IQ

Table no 6 Analysis of effect on Performance IQ score

IQ	N	Mean	SD	Paired Differences		% of increase in Mean	't' value	'p' value	R
				Pair	Mean				
BT	30	94.56	8.98	AT-BT	6.973	7.455	26.86	<0.001	H.S.
FU	30	104.0	8.693	FU-BT	9.427	10.1	30.28	<0.001	H.S.

[B.T.- Before treatment, A.T.- After treatment, F.U.-Follow up, SD-Standard deviation, R-Result]

DISCUSSION

As effect of *Guduchi Apamargadi Rsayana* mean value of total IQ increased from 94.74 to 102.4 after treatment, which is statistically highly significant. During follow up Mean value became 105.2 which was also statistically highly significant in comparison with before treatment.

Mean value of the verbal IQ increased from 94.92 to 103.4 after treatment which is statistically highly significant while mean value of performance IQ also increased from 94.56 to 101.5 after treatment which is statistically highly significant. During follow up mean value of verbal IQ and performance IQ increased up to 106.4 and 104 respectively which are statistically highly significant. Increase in mean difference percentage of verbal IQ was 12.39% which is more than increase in mean difference percentage of performance IQ (10.1%), indicating that *Guduchi-Apamargadi Rasayana* have more effect on verbal IQ.

Thus the test drug *Guduchi Apamargadi Rsayana* is effective in increasing total IQ of school going children. Follow up showed that results obtained were sustained.

Probable mode of action

The mode of action of medicinal substances in *Ayurveda* is explained by *Charaka*.^[3] The medicinal substances can act on the basis of their *guna* (*rasa, virya, vipaka, guna*) and their *prabhava*. *Guduchi Apamargadi Rasayana* contains eight drugs viz. *Guduchi, Apamarga, Vidanga, Shankhapushpi, Vacha, Abhaya, Kushta, Shatavari*, in equal quantities.^[4] It was administered orally with ghee as *anupana*.

The *Guduchi Apamargadi Rasayana* is *Tikta-Katurasa* dominant followed by *Madhura-Kashaya rasa*. *Tikta-Katu rasa* by virtue of its *akasha, agni* and *vayu mahabhutas*,^[5] *laghu guna, dipana, pachana* and *sroto visodhana karma* acts as *medhya*. *Tikta rasa* has '*medhya*'^[6] property while *Katu rasa* is *srotoshodhak*^[7] in nature. *Madhura rasa* is said to be '*shad indriya prasadaniya*'^[8] and therefore must have a direct effect over the site of these *indriyas* i.e. *shirah*.

Guduchi Apamargadi Rasayana is *usna virya* predominant and hence probably acts by dispelling the *tamas* and vitiated *kapha* from *hrudaya* and *manovahasrotas*. It may also regulate the functions of *alochaka and sadhaka pitta*, thereby improving the *grahana shakti* and *smruti*. Due to its *usna guna* it also boosts the *pachaka pitta*. Thus the unhampered status of *agni (bhutagni)* takes care of nutrition of the *indriyas*. By virtue of *snigdha* and *guru gunas* it corrects the vitiated *vata*^[9] and also provides *bala* to *indriyas and hrudaya*. *Snigdha and Yogavahi gunas* of *ghrita*^[10] balances *rukshata* and increases potency and permeability i.e. increases bioavailability of the *Guduchi Apamargadi Rasayana*. Hence it reaches in the *sukshma srotasas* in the body and increases the IQ level.

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