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CLINICAL TRIAL TO EVALUATE THE EFFICACY OF SHATAVARI CHOORNA IN THE ENHANCEMENT OF COGNITIVE FUNCTIONS IN QSCHOOL GOING CHILDREN

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ABSTRACT

Open labeled randomized clinical trial. Healthy school going children in the age of 8 years fulfilling the inclusion criteria were recruited and allocated into two groups after assessing their cognitive function using MISIC scale. In experimental group subject received 3 grams of shatavarichoorna in 2 divided dose along with madhu and ghrita, before food twice a day (morning , evening) . Delayed experimental group were not given any drug during the trial, which formed the basis for comparison of the effect with study group. Cognitive function assessment done after the completion of trial and 1 month after the trial.After completion of the trial delayed experimental group also given with shatavarichoornam and madhu for a period of 1 month.Repeated measures of Anova is used for statistical analysis. This trial has shown significant improvement of cognitive functions in experimental group. Experimental group shown significant improvement in cognitive function(p < 0.001) when compared to non significant change in control group. Study report suggested that – Shatavarichoorna is having significant effect on performance cognitive function but not in verbal cognitive function. Thus there is significant effect of Shatavarichoorna in the enhancement of cognitive functions.

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INTRODUCTION

Cognitive function refers to a mental process that involved in the acquisition of knowledge, manipulation of information, and reasoning. Cognitive function includes the domains of perception ,memory,learning,attention ,decision making , and language abilities.[1]Excellent cognitive function of a child is a dream of every parent, as they know it is essential to achieve success.

Childhood is an important, critical and sensitive period for cognitive development. 7-12 years is a period in which brain plasticity increases. The brain plasticity allows an individual to acquire new skills and competences[2,3].Any factor which can enhance brain plasticity may have stronger therapeutic potential in cognitive function i.e.with appropriate measures lower cognitive ability can be increased.

 Medicinal plants are superior gift of nature to human lives.In this era of competition and professionalism there is a tremendous urge to explore medicinal plants globally for improving the cognitive functions owing to their safety, efficacy and affordability. So it is worthwhile to explore the utility of herbal medicine for enhancing   the cognitive function.

The plant Asparagus racemosus Linn.is known in Ayurveda as *Shatavari*belongs to Asparagaceae family. This plantis a common and easily available herb with its use in various healthy and diseased conditions. It is used as a treatment for galactogogue,aphrodisiac,gastric ulcer etc.AcharyaKasyapa , the father of ancient pediatricsmentioned the usage of *shatavari* with *madhu* and *grita* to boost up cognitive function*(Medha*) in *lehanaadhyaya* of Kashyapa samhita[4].   Further in *shatavarishatapushpakalpamadhyaya*of same treatise hehas highlighted the use of this drug as *smritimedha mathikari*[5]– i.e., enhancement of memory , intelligence and thinking. The reference of *Shatavari*as *Medha* is available in both *KaiyadevaNighantu* and *Bhavaprakasha Nighantu*[6,7].

These references taken into consideration to revalidate the cognitive enhancing actionof *shatavari*. This study is an initiation, designed to find out aaffordable ,effective herbal

medicine to enhance the cognitive function of the child ,thereby promoting a successful life ahead.

The study is entitled as :

Clinical trial to evaluate the efficacy of Shatavarichoorna in the enhancement of cognitive functions in school going children.

OBJECTIVE OF THE STUDY

To evaluate the efficacy of *Shatavarichoorna*in the enhancement of cognitive function in school going children.

HYPOTHESIS

H_0 - There is no significant effect of *ShatavariChoorna*in the enhancement of cognitive functions in school going children.

H_1 - There is significant effect of *ShatavariChoorna* in the enhancement of cognitive functions in school going children**.**

METHODOLOGY

Study design:

open labeled randomized clinical study

Sampling :

Sample consist of 80 students of 8 years old from Terdal area, selected based on inclusion and exclusion criteria. Samples randomly divided into 2 groups i.e. experimental group and delayed experimental group, each consist of 40 participants.

Inclusioncriteria:

Healthy school going children of 8 years old.

IQ score between 70 -139

Irrespective of caste, religion & socio economical status.

Exclusion criteria:

IQ score below 70.

Mental retardation.

Epilepsy

Serious & critical illness.

Measures:

Socio demographical& clinical data sheet.

Malian's intelligence scale for Indian children. (MISIC scale) .

Procedure:

Socio demographical and clinical data were collected from primary care givers of the students.

Next to that Malin's intelligence scale for Indian children (MISIC scale) is administered on children.

Based up on inclusion and exclusion criteria 80 students of 8 years old were selected and randomly allocated into two groups i.e. experimental group (study group) and delayed experimental group (wait list control group)

Each group contains 40 participant.

Consent from the parents obtained for participating in the study after explaining about the course of the study in detail.

Experimental group subjects were received 3 gram of GMP certified *shatavarichoorna* with *madhu*and *ghrita* in two divided dose, before food in morning and evening for a period of 1 month.

Delayed experimental group were not given any drug during the trial, which formed the basis for comparison of the effect with study group (wait list control group).

After 1 month duration post cognitive function assessment done in both groups using Malin's intelligence scale for Indian children (MISIC Scale) and score recorded.

Follow up cognitive function assessment done after a period of 1 month in both groups using the same scale.

After completion of trial delayed experimental group (wait list control group) were given with 3 gram of *Shatavarichoornam* with *madhu*and *ghrita* in two divided dose ,before food in morning and evening for a period of 1 month.

All the procedure followed ethical norms.

7. OBSERVATIONS AND RESULT

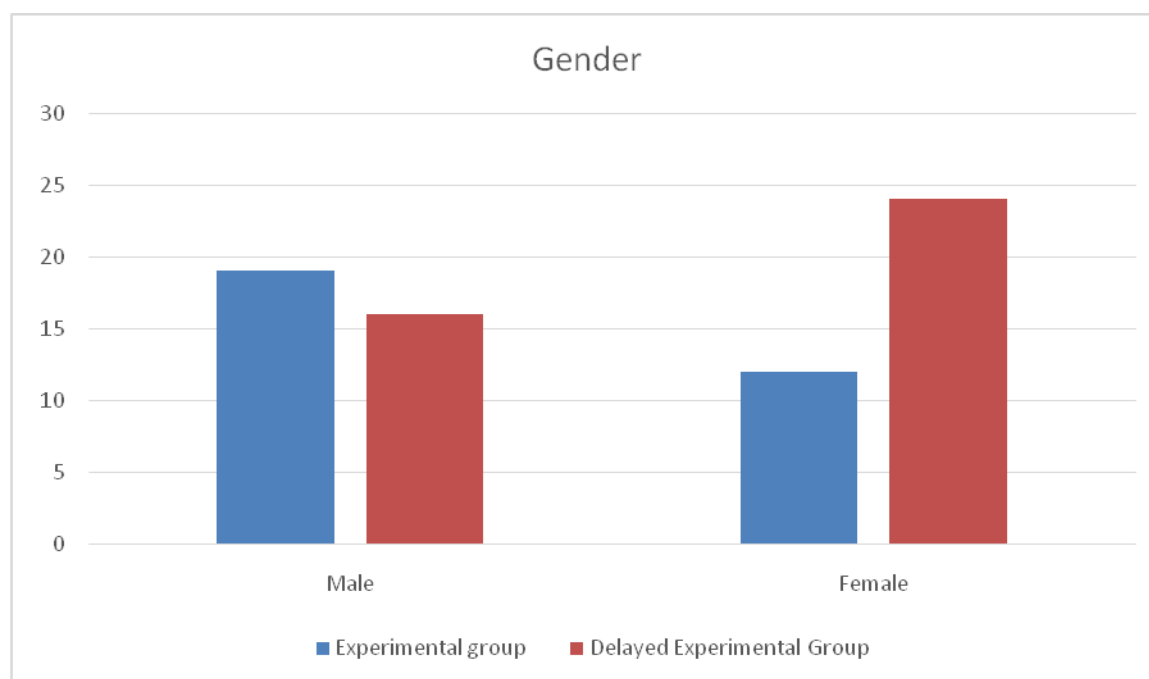### Table 1– Distribution of sample and dropout

Group	Number of case	Dropout	Remaining cases
Experimental group	40	8	32
Delayed Experimental group	40	0	40
Total	80	8	72

In present study, total 80 children were registered based on inclusion criteria. 40 children in experimental group and 40 children in delayed experimental group. 8 drop out occurred in experimental group during the trial and delayed experimental group remained same throughout the trial.

Table 2- Gender wise distribution of the sample

Gender	Experimental group		Delayed experimental group		Chi - square
	F	%	F	%	11.689
Male	19	59.3	16	40	
Female	13	40.6	24	60	

Table-2 show the gender wise distribution of the table. In experimental group 19(59.3%) children were malesand 13 (40.6%) were females. In delayed experimental group 13 (40%) were males and 24 (60%) were females. There is no any significant difference observed in gender wise distribution of sample (chi square value =11.689).

Graph two showing gender wise distribution of the sample

Table 3-Religion wise distribution of sample

Variable		Experimental group		Delayed-experimental Group		Chi-square
		F	%	F	%	
Religion	Hindu	19	59.3	28	70.	
	Jain /Christian	0	0	0	0	3.48
	Muslims	13	40.62	12	30	

Table-3 sow the religion wise distributions of the table .In experimental group 19(59.3 %) children were Hindu13 (40.6%) were Muslims. In delayed experimental group 28 (70 %)Hindu and 12(30%)were Muslims, and there is no Jain and Christin were included in the present study. There is no significance differences in religion in present sample (chi-squire =3.48)
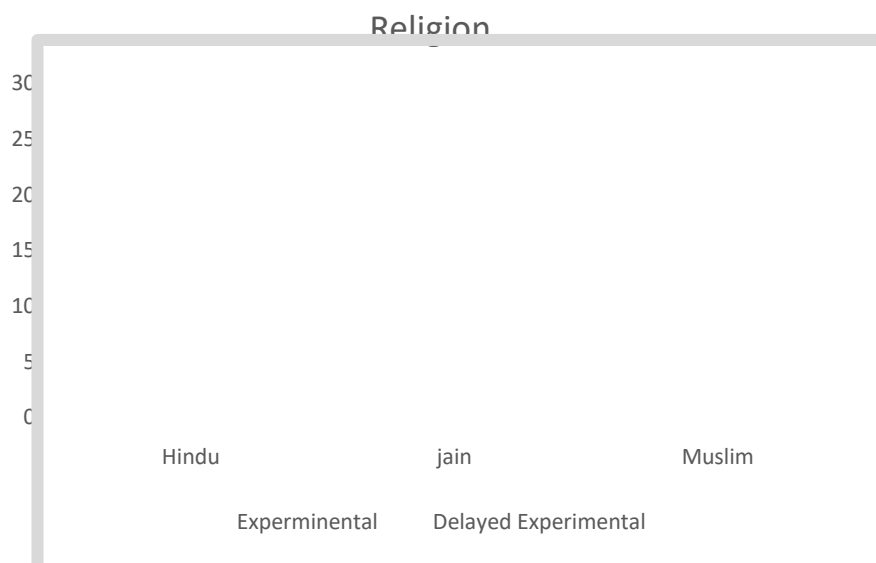

Graph 3 Shows the Religion wise distribution of sample

Table 4 – distribution of sample based on socio economical status

SES	Experimental group		Delayed experimental groups		Chi – square
	F	%	F	%	
Upper class	3	9.37	0	0	5.741
Upper-middle class	5	15.62	3	7.5	
Lower -middle	20	62.5	23	57.5	
Upper-lower	4	12.5	14	35	
Lower-class	0	0	0	0	

Table-4 show the distribution of the sample based on socio-economic status. In experimental group 13 (59.3 %) children were upper class, 5 (15.62%) were upper-middle

class, 20 (62.5%) were lower-middle class and 4 (12.5%)were upper-lower class. In the delayed-experimental group, none of the children belonged to the upper class, 3 (7.5%) were upper-middle class, 23(57.5%) were lower-middle class and14(35) were upper-lower class, and none of the children's in both groups belongs to lower class. There is no significant difference in socio economic status of the samples (5.741)
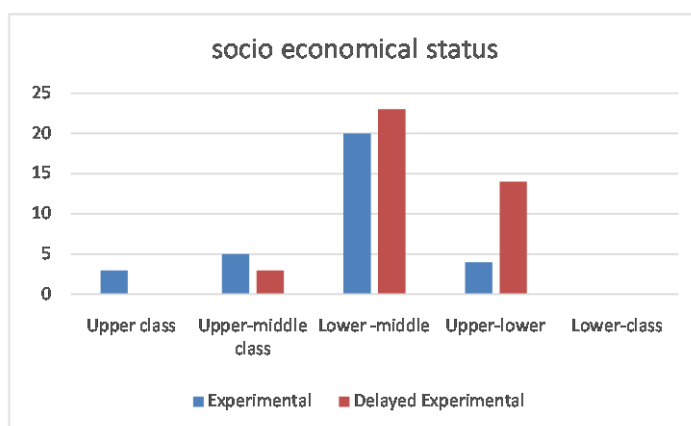

Graph 4- Shows the distribution of the sample based on socio-economic status

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Table 5- Antenatal health status of mothers in participants

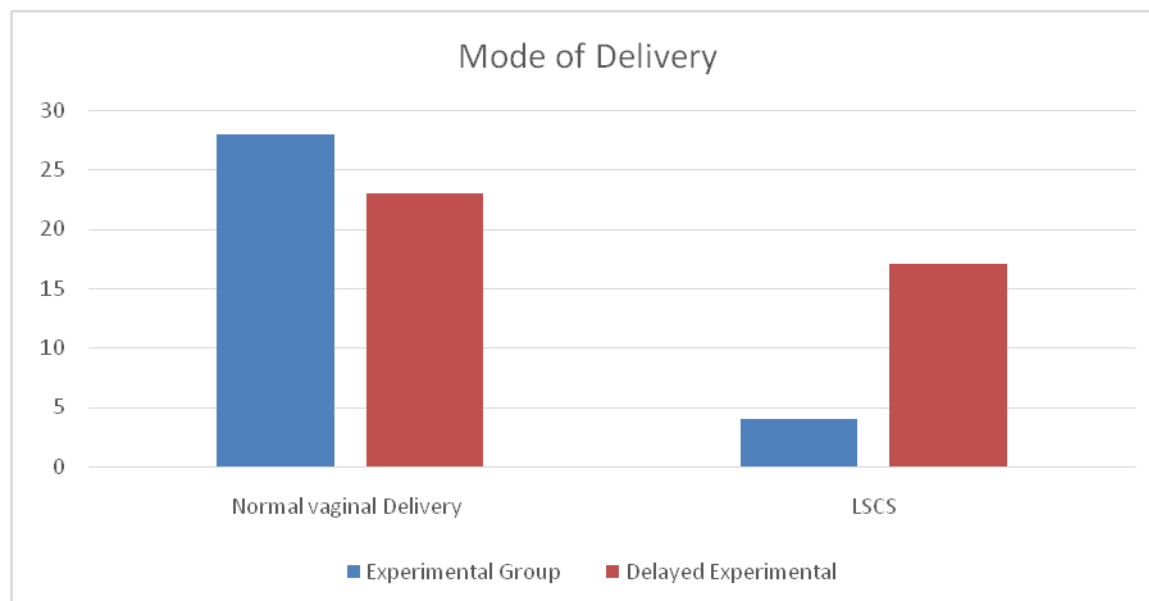| Regular antenatal check up done	Experimental group		Delayed experimental group		Chi –square
	F	%	F	%	2.985
Yes	32	100	40	100	
NO	0	0	0	0	

From the table it is clear that all the participant's mothers underwent regular antenatal check up

Table 6 - Distribution of sample based on mode of delivery

Variable		Experimental group		Delayed-experimental Group		Chi-square
		F	%	F	%	
Mode of delivery	Normal Vaginal	28	87.5	23	57.5	3.71
	LSCS	4	12.5	17	42.5	

Table-6 Shows Distribution of sample based on mode of delivery. In experimental group 28 (87.5 %) children were normal vaginal delivery and 4 (12.5 %) were LSCS. In delayed experimental group 23 (57.5 %) were normal vaginal delivery and 17 (42.5 %) L.S.C.S.

There is no any significant difference observed in mode of delivery sample (chi square value =3.71).

Graph-6 Shows the Distribution of sample based on mode of delivery

Table 7- Distribution of sample based on gestational age

Variable		Experimental group		Delayed-experimental Group		Chi-square
		F	%	F	%	
Term	Pre-term	7	93.7	11	85	2.64
	Full -term	25	6.25	29	15	

Majority of the participants were term babies, and minimum were preterm. In experimental group 25 were in term gestational age category and 7 were preterm category. In delayed experimental group 11were preterm babies and 29 were post term babies.

Table 8 - Distribution of sample based on feeding

Variable		Experimental group		Delayed-experimental Group		Chi-square
		F	%	F	%	
Feeding	Breast feeding	30	93.7	34	85	2.64
	Formulated feeding	2	6.25	6	15	

30 samples from the experimental group and 34 from the delayed experimental group were exclusively fed with breast milk and 2 from the experimental group and 6 from the delayed experimental group were done with formulated feeding.
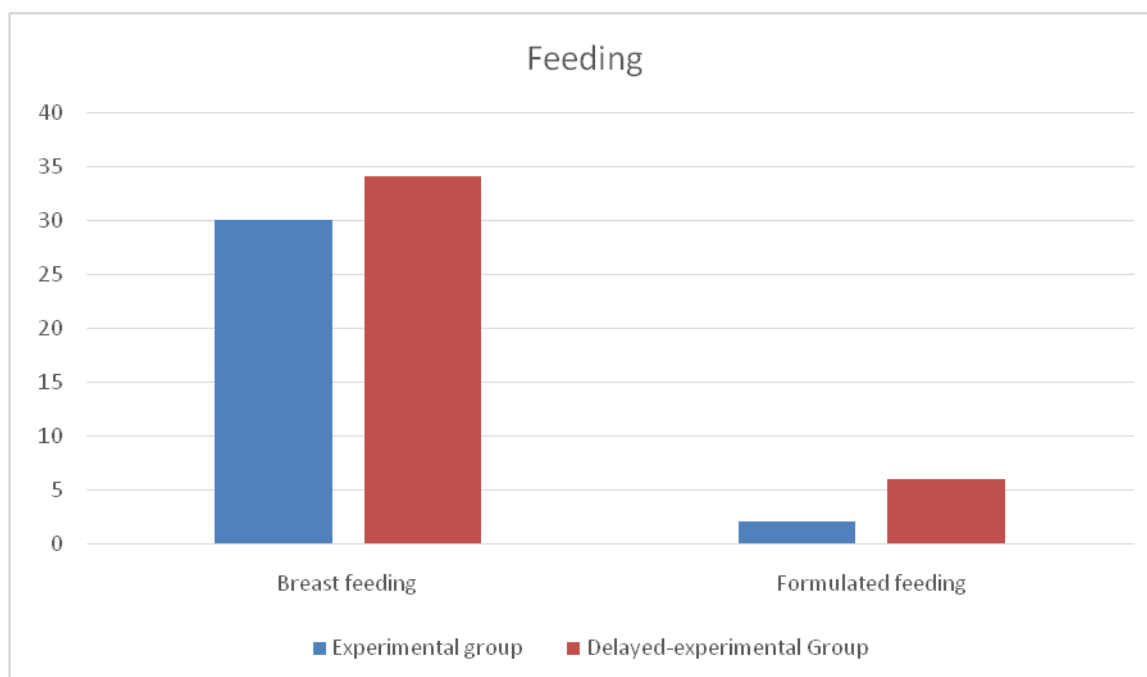

Table 9- Distribution of sample according to immunization received

Immunization received	Experimental group		Delayed experiment al group		Chi-square
	F	%	F	%	2.985
Yes	32	100	40	100	
NO	0	0	0	0	

All children for the trial received immunization

Table 10- Distribution of sample according to developmental milestone

Developmental milestone	Experimental group		Delayed experimental group		Chi –square
					2.985
Age appropriate and normal	32	100	40	100	
Delayed	0	0	0	0	

Appropriate to age all children attained normal developmental milestones

Table 11–Effect of Shatavarichoornam in Cognitive functions -Experimental Group.

Variable		N	Mean	Standard Deviation	F-Value
Cognitive function (IQ)	Pre-test	32	91.80	2.554	82.46*
	Post-Test	32	96.400	4.056	
	Follow up	32	96.700	4.103	
Verbal Intelligence quotient(VIQ)	Pre-test	32	95.10	5.861	121.32
	Post-Test	32	96.80	5.580	
	Follow up	32	97.10	5.462	
Performance Intelligence quotient (PIQ)	Pre-test	32	88.50	3.955	66.484*
	Post-Test	32	95.70	5.185	
	Follow up	32	95.80	5.393	

Significant level at $\leq 0.001^*$

The table is showing the effectiveness of shatavarichoornam in cognitive function (IQ), verbal cognitive function (VIQ) and performance cognitive function of experimental group In cognitive function experimental group got the mean of 91.80 in pre test , 96.400 in post

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test , and 96.700 in follow up with the standard deviation of 2.554, 4.056 & 4.103 respectively with the significance of 8.246 (p =0.001 level).

Experimental group scored the mean of 95.10 in pre test, 96.80 in post test and 97.10 in follow up with the standard deviation of 5.861, 5.580& 5.462 respectively in verbal intelligence quotient (VIQ), but not having any significance.

In performance intelligence quotient, the experimental group scored the mean of 88.50, 95.70. And 95.80 with the standard deviation of 3.955, 5.185 &5.393 and having the significance of 66.484 (p =0.001 level)

Table 12- Effect of Shatavarichoornam in Verbal subtype of Cognitive function-Experimental Group.

Verbal subtypes cognitive function		N	Mean	Standard Deviation	F-Value
Information	Pre-test	32	93.60	8.317	118.32
	Post-Test	32	94.80	8.074	
	Follow up	32	94.80	8.074	
General Comprehension	Pre-test	32	92.70	7.332	109.46
	Post-Test	32	93.70	7.332	
	Follow up	32	93.70	7.332	
Digit Span	Pre-test	32	92.40	7.264	97.680
	Post-Test	32	94.30	7.457	
	Follow up	32	94.30	7.457	
Analogue & Similarities	Pre-test	32	90.70	9.305	109.246
	Post-Test	32	90.50	8.670	
	Follow up	32	91.10	8.670	
Arithmetic	Pre-test	32	92.10	8.915	103.257

	Post-Test	32	92.20	8.780	
	Follow up	32	92.20	8.780	
Vocabulary	**Pre –test**	32	94.30	7.858	92.346
	Post – test	32	94.90	6.800	
	Follow up	32	94.90	6.800	

Table 13- Effect Shatavarichoornam in Performancesubtype of Cognitive function - Experimental Group

Performance subtype cognitive function		N	Mean	Standard Deviation	F-Value
Block design	Pre-test	32	89.00	5.204	135.115*
	Post-Test	32	97.40	6.71	
	Follow up	32	98.50	6.11	
Coding	Pre-test	32	88.70	6.026	88.394*
	Post-Test	32	95.00	3.843	
	Follow up	32	94.90	94.90	
Picture Completion	Pre-test	32	87.00	4.543	62.866*
	Post-Test	32	95.00	3.280	
	Follow up	32	95.03	5.291	
Object assembly	Pre-test	32	86.33	4.303	66.866*
	Post-Test	32	94.00	9.842	
	Follow up	32	94.44	8.073	
Mazes	Pre-test	32	88.90	4.991	60.511*
	Post-Test	32	96.00	5.359	
	Follow up	32	96.00	5.359	

Significant level at ≤0.001*

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In block design scored the mean of 89 in pretest , 97.40 in posttest, 98.50 in follow up with the standard deviation of 5.204,6.71 & 6.11 respectively with the significance of 135.115. In coding obtained mean score of 88.70, 95.00, 94.90 in pre , post and follow up respectively with the standard deviation of 6.026 in pretest, 3.843 in posttest, 94.90 in follow up with the significance of 88.394.

87,95 & 95.03 were the mean obtained for picture completion with the standard deviation of 4.543,3.280 &5.291 respectively in pre, post and follow up test with the significance of 62.866.

In object assembly scored the mean of 86.33 in pretest, 94.00 in posttest, 94.44 in follow up with the standard deviation of 4.303,9.842 and 8.073 respectively with the significance of 66.866.

In mazes sub test scored the mean of 88.90,96 &96 with the standard deviation of 4.991, 5.359 & 5.359 in pretest ,posttest and follow up respectively with the significance of 60.511.P value = 0.001 level

 So the results are highly significant in the experimental group with p value (0.001)

Table 14- cognitive functions assessment result in delayed experimental group

		N	Mean	Standard Deviation	F-Value
Intelligence quotient	Pre-test	40	90.30	5.808	106.237
	Post-Test	40	90.20	5.580	
	Follow up	40	90.20	5.580	
Verbal Intelligence quotient(VIQ)	Pre-test	40	93.30	7.633	109.836
	Post-Test	40	93.50	7.292	
	Follow up	40	93.50	7.292	
Performance intelligence quotient (PIQ)	Pre –test	40	88.50	9.086	97.356
	Post –test	40	86.90	9.086	
	Follow up	40	86.90	10.079	

From table it is clear that results are insignificant in the delayed experimental group. In cognitive function delayed experimental group got the mean of 90.30 in pretest, 90.20 in posttest,and 90.20in follow up with the standard deviation of 5.808.5.580 &5.580 respectively. In verbal cognitive function scored the mean of 93.30 in pretest, 93.50 inposttest and 93.50 in follow up with the standard deviation of 7.633, 7.292&7.292 respectively. 88.50, 86.90 and 86.90 were the mean obtained in performance intelligent quotient with the standard deviation of 9.086,9.086 and 10.079 respectively in pre, post and follow up section.

Table 15- Verbal subtype cognitive functions assessment result in delayed experimental group

Verbal subtypes cognitive function		N	Mean	Standard Deviation	F-Value
Information	Pre-test	40	94.60	8.317	121.32
	Post-Test	40	94.80	8.074	
	Follow up	40	94.80	8.074	
General Comprehension	Pre-test	40	93.70	7.332	99.46
	Post-Test	40	93.70	7.332	
	Follow up	40	93.70	7.332	
Digit Span	Pre-test	40	94.40	7.264	97.680
	Post-Test	40	94.30	7.457	
	Follow up	40	94.30	7.457	
Analogue & Similarities	Pre-test	40	90.70	9.305	108.257
	Post-Test	40	91.10	8.670	
	Follow up	40	91.10	8.670	
Arithmetic	Pre-test	40	92.10	8.915	106.237

	Post-Test	40	92.20	8.780	
	Follow up	40	92.20	8.780	
Vocabulary	Pre-test	40	94.30	7.858	97.356
	Post-Test	40	94.90	6.800	
	Follow up	40	94.90	6.800	

 In information subtype obtained the mean of 94.60 in pretest, 94.80 in posttest and follow up with the standard deviation of 8.317, 8.074 and 8.074 respectively. All 3 assessment of general comprehension scored the mean of 93.70 with the standard deviation of 7.332. In digit span got the mean of 93.70, 94.40 and 94.40 in pre , post and follow up with the standard deviation of 7.264,7.457 and 7.457 respectively. In pretest 90.70 and in post and follow up test 91.10 mean obtained for analogue and similarities subtypes with the standard deviation of 9.305, 8.670, and 8.670 respectively. In arithmetic pretest obtained the mean of 92.10, in post and follow up test 92.20 with the standard deviation of 8.915 in pretest and 8.780 in both post and follow up test.

In vocabulary pretest mean is 94.30 and in post and follow up test 94.90 with the standard deviation of 7.858 in pretest and 6.800 in both post and follow up test.

Thus table shows that delayed experimental group is not having any significance in verbal subtype's cognitive function.

Table 16- Performance subtype cognitive functions assessment result in delayed experimental group

Performance subtype		N	Mean	Standard Deviation	F-Value
Block design	Pre-test	40	88.90	9.231	109.836
	Post-Test	40	88.90	9.231	

	Follow up	40	88.90	9.231	
Coding	Pre-test	40	85.70	9.830	109.836
	Post-Test	40	85.70	9.830	
	Follow up	40	85.70	9.830	
Picture Completion	Pre-test	40	88.00	9.543	121.32
	Post-Test	40	88.00	9.543	
	Follow up	40	88.00	9.543	
Object assembly	Pre-test	40	85.50	9.842	121.32
	Post-Test	40	85.50	9.842	
	Follow up	40	85.50	9.842	
Mazes	Pre-test	40	86.60	10.079	121.32
	Post-Test	40	86.60	10.079	
	Follow up	40	86.60	10.079	

In block design performance subtype got the mean of 88.90 with the standard deviation of 9.231 in pre, post and follow up assessment. In coding scored the mean of 85.70 with the standard deviation of 9.830 in all 3 assessments. Picture completion obtained the mean of 88 and standard deviation of 9.842 in pre, post and follow up evaluation. In object assembly got the mean of 85.50 with the standard deviation of 9.842 in pre, post and follow up test. In mazes scored the mean of 86.60 and standard deviation of 10.079. So it is clear from the table that significant cognitive function rise was not there from beginning of the trial to ending of the trial.

DISCUSSION

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CHOORNA IN THE ENHANCEMENT OF COGNITIVE FUNCTIONS IN SCHOOL GOING CHILDREN

❖ **Discussion on clinical trial**

      Title : Clinical trial to evaluate the efficacy of *Shatavarichoorna* in the enhancement of cognitive function in school going children.

Open labeled randomized clinical trial to evaluate the efficacy of *shatavarichoorna* in the enhancement of cognitive function in school going children conducted in Terdal area of 8 years old 80children. The selected children were randomly divided into experimental and delayed experimental group, each consist of 40 participants. Experimental group were given with GMP certified 3 gram *shatavarichoorna* with *madhu* and *grita* in 2 divided dose morning and evening before food for a period of 1 month. Delayed experimental group were not given anything during the trial. Cognitive function assessment done before the trial.after completion of the trial and 1 month after the trial using Malin's scale for Indian children (MISIC scale) . The scores obtained were statisticallyanalysed (test used : Repeated measures of ANOVA)

Random assignment (randomization) made the experimental group and delayed experimental group similar at the beginning of the experiment. Also it assures that systemic bias does not affect the assignment of subjects to group .

Average dropout rate across all clinical trials totaling about 30 percent. Present study contains 8 dropouts from the experimental group which is negligible.

As it is important to consider the age differences in cognitive abilities, to avoid bias,8 years old school going children were selected for the study.The brain matures and develops very rapidly before the age of 12 years. 7-12 years is a period in which brain plasticity increases. 8 years old children were selected for the study to avoid age related cognitive function bias. As the age advances chances ofbrain plasticity decreases. 8 years children are familiar with school environment, they would be skilled enough to understand and interpret the commands given to them that will help to assess the cognitive function more accurately.

Dose was fixed to 3 gram according to age of the child as mentioned by CCRAS in 2 divided dose, i.e. morning and evening before food . Administration of medicine just before the

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intake of food is indicated in children. There will be no regurgitation of medicine as it is covered by food and also medicine will digest fast without hampering the strength of the person.

❖ **Discussion on socio demographical data**

Gender - In a 2005 report, Hyde reviewed 46 different meta analyses on sex difference in cognition , in half of the studies sex differences were small. In another third they were virtually nonexistent. Present study , there is no significant difference observed in Gender wise distribution of the sample.

Religion - Maximum participants were belonged to Hindu religion and remaining from Muslim religion. This data is similar to religious demography of Terdal area[66.4% Hindu , 22.7% Muslim , 10.53% Jain - Religion wise census 2011 Data of Terdal(TMC)].

Socio economical status - parents of children participated for the study was maximum from lower middle class, next to that from upper lower class few belonged to upper middle class and upper class. No children from lower class status participated in this study.

❖ **Discussion on clinical data**

 Cognitive abilities are brain based skills. Brain development start soon after conception and till continues into early adulthood. So antenatal care is essential for better brain function. The mothers of 72 children enrolled in the study underwent for regular antenatal checkup.

Most of the participants born through normal vaginal delivery and few through cesarean section, but no any complication reported during delivery.

The incidence of prematurity and post maturity is not very high in general population. In this trial also maximum participant born term and less preterm and no post term at all. Preterm and post term birth was associated with higher risk of cognitive function impairment. Present study excluded mental retardation category.

Delayed development & growth retardation is having negative impact on cognitive function. All the participants registered for the study has received immunization appropriate to the age also growth and development was found to be proper as per the age.

Both excessive sleep and disturbed sleep pattern have negative effect on cognitive function. All the children of trial were having good sleep.

All these clinical data indicative of good health status of participants.

❖ **Discussion on result**

The study approved alternative hypothesis i.e, there is significant effect of *ShatavariChoorna* in the enhancement of cognitive functions in school going children.

In the present study experimental group showed significant effect on cognitive function and delayed experimental group showed insignificant result, which means *Shatavarichoorna* is having significant effect on enhancement of cognitive function. Study report suggested that –*Shatavarichoorna* is having significant effect on performance cognitive function but not in verbal cognitive function.

The *medhya* effect of drug can be considered as *prabhavajanya* (unthinkable and unimaginable). The action of *medhyadrvya*cannot always attributed to particular quality of the drug.

cognitive function is the functionality of the brain.

Medhyarasayana have the efficiency of transmission of nerve impulses, thereby strengtheningcognition.*Shatavar*i is mastishkabalya in action (neuro protective and acetylcholinesterase activity) .

 Significant Acetylcholinesterase activity of Asparagus racemosus can increase acetylcholine release which facilitate synaptic transmission in brain areas. Thus attributed to enhancement of cognitive function.

Anti-oxidative and neuro protective action of Asparagus racemosus can also contribute the increased cognition skills.

Shatavari is having *sheetaveerya* and *Madura vipaka*, which can help the function of *tarpakakapha*to go on smoothly owing to its constitution that is favorable for *kapha karma*. *kapha* enhances*dharana karma*. The method of testing medha is explained by" *Grahanenaitigranthadidharanena"*– the ability of the person to understand ,grasp, remember and recall the *granthas* after reading.

*Shatavari*is having *tikta ,Madura* or *kashaya Madura rasa*. *Madura rasa* is said to be shat *indriyaprasadana*. *Indriyaprasadanaguna* is helpful in *vishayagrahana* and helps in *Ekagrata*of *manas.*

Based on the entities measured by cognitive function test (IQ test) and improvement in cognitive score , it was understood that improvement in planning, processing speed , judjement and reasoning as improvement in *Grahana* and *Dharanashakti* , improvement in short term visual memory, problem solving skill as improvement in *smriti*, improvement in concentration ,attention power , alertness to visual details, visual motor coordination and visual discrimination as improvement in *Dhriti*.

It is very difficult to conclude the mode of action of *medhyadravya* as the mechanism of *medha*is very complex one and the properties of *medhyadravyas*are not uniform.

CONCLUSION

The present work was undertaken to evaluate the efficacy of Shatavarichoornam in the enhancement of cognitive function in school going children.

The existing study displays that Shatavarichoornam is an outstanding source for natural nootropic (medha). It is having effect on performance cognitive function, but not on verbal cognitive function. This result could be industrialized for enhancing the cognitive function. Regardless of these finding, further investigations will be necessary to illustrate the active nootropic compound.

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