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A Clinical Study on the Efficacy of *Yastimadhu Churna* on Attention Deficit Hyperactivity Disorder (ADHD) in School-Going Children

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ABSTRACT

ADHD is a disease of *Manas* and *Manovahi Srotasa*. It is estimated that about 50 million people have either moderate or severe forms of psychiatric disorders in India. Being a commonest neurobehavioral disorder of childhood, Attention deficit hyperactivity disorder comprises perhaps 50% of referrals to child neurologists, behavioural pediatricians and child psychiatrists. Psycho stimulant drugs that are being used for the treatment are not fully safe as they can cause various unacceptable side effects and also they have potential for abuse and addiction. In *Ayurvedic* texts various drugs are described for treatments of various psychological and psychosomatic problems. As the prevalence and ill effects of this disease is high and there is lack of effective medications. Keeping this in consideration single drug *yashtimadhu* has been taken for the present study.

KEYWORDS

Manovaha srotas, Attention deficit hyperactivity disorder, Psychological, Yashtimadhu

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INTRODUCTION

Ayurveda, an eternal science of healthy living treasures, is one of the world's oldest and most complete systems of natural healing which offers comprehensive and holistic treatment for various diseases. The importance of childhood has also been emphasized in the ancient science literature. Every incidence in the childhood has an influence on the adult life. A healthy childhood is therefore mandatory for expecting a healthy adulthood. *Ayurveda* considers the *Pragyaparadha* (volitional transgression) as the main causative factor in psychological diseases. The activities of an individual having deranged understanding (*Dhi*), will (*Dhriti*) or memory (*Smriti*) is known as volitional transgression (*Pragyaparaadha*). In *Ayurvedic* texts various drugs are described for treatments of various psychological and psychosomatic problems. Collectively these drugs are called as "*Medhya dravyas*". *Acharya Charaka* has mentioned the four famous *Medhya rasayana* drugs namely, *Mandukaparni* (Centella asiatica), *Yashtimadhu* (Glycerrhiza glabra), *Guduchi* (Tinospora cordifolia) *Shankhapushpi* (Convolvulus plauricaulis) in *Rasayan Chikitsadhyaya- Tritiya Pada*[1]. These drugs have been proved to be useful in various conditions affecting the psyche in adults as well as children. For the present study single drug *Yashtimadhu* has been taken. According to Diagnostic and statistical manual – IV ADHD is characterized by poor impulse control, decreased self inhibitory capacity, motor over activity and motor restlessness[2].It is a chronic condition resulting from a persisting dysfunction within the CNS and is not related to gender, level of intelligence, or cultural environment (Acc. to American Academy of Pediatrics)[3].The mean worldwide prevalence is between 5.29% and 7.1% in children and adolescents (<18 years)[4].The prevalence in India among primary school children was found to be 11.32%. It is present higher among the males (66.7%) as compared to that of females (33.3%). The prevalence among lower socioeconomic group was found to be 16.33% and that among middle socio-economic group was 6.84% and highest in the age group 9 and 10[5].There is no direct description of any disorder such as Attention deficit hyperactivity disorder in our classical texts, but description of abnormal behavior are found scattered.

AIMS AND OBJECTIVES

To analyze the prevalence of ADHD in school going children.

To study the efficacy of *Yastimadhu Churna* in management of ADHD.

MATERIALS AND METHODS

Selection of the patients For the present study patients were selected from OPD of Department of *Kaumarabhritya*, R.G.G.P.G.Ayu.Hospital, Paprola and schools surrounding sub- division of Baijnath, Distt. Kangra, Himachal Pradesh.

Inclusion criteria

Patient between 6 to 16 years of age. Children with poor ability to attend the task, motor over activity, impulsivity, having difficult time remaining in their seats in school, easily distracted, difficulty for awaiting their turn, impulsively blurt out answers to questions, rapidly shifts from one uncompleted activity to another as per as IAP norms will be included.

Exclusion criteria

- Children not fulfilling the DSM- IV criteria.
- Children with mental retardation, low IQ level, any hepatic, renal, cardiac
- diseases, genetic disorders, physical disability and other behavior disorder like ODD (Oppositional defiant disorder).
- Children below or above the mentioned age group.

Trial drug *Yastimadhu Churna*

Name	Botanical name	Family	Part used
Yastimadhu	*Glycyrrhiza glabra* Linn.	Fabaceae	Root

This drug reference has been mentioned in *charak samhita, chikitsa sthana.*[6]

Diagnosis of Patients

The patients were diagnosed on the basis of DSM-IV criteria and Wechsler intelligence scale. Detailed evaluation of patients was done on the basis of specially prepared proforma comprising the demographic data and clinical profile including all the signs and symptoms based on textual description. Patients fulfilling the diagnostic criteria were included in the present study. In this study 16 patients were given the trial drug *Yashtimadhu Churna* with milk. 13 patients completed the trial and 3 patients were dropped out.

Follow-up schedule

All patients were called for follow up after every 15 days.

The obtained results were measured according to the grades given below:

Complete Remission100% relief, Marked Improvement ≥75% relief, Moderate Improvement 50 % to 75 % relief, Mild Improvement 25 % to 50 % relief, unchanged <25 % or No relief

RESULTS

Inattention

Effect of therapy on Subjective Criteria

Table 1 In criteria "Fails to give close attention to details or makes careless Mistakes in school work or other activities

	Mean score						
	BT	AT					
13	2.692	2.308	14.26	0.385	0.506	0.140	<0.05

Table 1 The percentage relief was 14.26%, which was statistically significant (p<0.05).

Table 2 In criteria "Difficulty in sustaining attention in tasks or play activities"

	Mean score						
	BT	AT					
13	2.615	1.923	26.46	0.480	0.133	5.196	<0.001

Table 2 The percentage relief was 26.46% which was statistically highly significant (p<0.001).

Table 3 Criteria "Does not seem to listen to what is being said to him/her"

	Mean score						
	BT	AT					
N			% change	SD#	SE#	T	P
13	2.615	2.308	11.77	0.480	0.133	2.309	<0.05

Table 3 The percentage relief was 11.77% which was statistically significant (p<0.05).

Table 4 In criteria "Does not follow through, on instructions and fails to duties at the work place"

	Mean score						
N	BT	AT	% change	SD#	SE#	T	P
13	2.615	2.231	14.72	0.506	0.140	2.739	<0.05

Table 4 The percentage relief was 14.72% which was statistically Significant (p<0.05).

Table 5 In criteria "Difficult in organizing tasks and activities"

	Mean score						
N	BT	AT	% change	SD#	SE#	t	P
13	2.538	2.231	12.13	0.480	0.133	2.309	<0.05

Table 5 The percentage relief was 12.13% which was statistically significant (p<0.05).

Table 6 In criteria "Avoids, expresses reluctance about or has difficulties in tasks that require sustained mental effort"

	Mean score						
	BT	AT					
N			% change	SD#	SE#	t	P
13	2.833	2.500	11.75	0.516	0.211	1.581	>0.05

Table 6 The percentage relief was 11.75% which was statistically insignificant (p>0.05).

Table 7 In criteria "Uses the things necessary to the tasks or activities"

	Mean score						
	BT	AT					
6	2.667	2.167	18.74	0.548	0.224	2.236	>0.05

Table 7 The percentage relief was 18.74% which was statistically insignificant (p>0.05).

Hyperactivity

Table 8 In criteria "Fidgets with hands to feet or squirms in his/her seat"

	Mean score						
	BT	AT					
N			% change	SD#	SE#	t	P
7	2.714	2.286	15.80	0.535	0.202	2.121	>0.05

Table 8 The percentage relief was 15.80% which was statistically Insignificant (p>0.05).

Table 9 In criteria "Leaves seats in classroom or in other situations in which Remaining seated is expected"

	Mean score

	BT	AT					
7	2.571	2.143	16.45	0.535	0.202	2.12	>0.05

Table 9 The percentage relief was 16.45% which was statistically insignificant (p>0.05).

Table 10 I n criteria "Runs about, or climbs excessively, in situations where it is inappropriate.

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**„t"**	**„p'**
I	7	2.857	2.286	19.98	0.535	0.202	2.282	<0.05

Table 10 The p e r c e n t a g e r e l i e f w a s 1 9 . 9 8 % w h i c h w a s Statistically significant (p<0.05).

Table 11 I n criteria "Has difficulty in playing or engaging in leisure activities quietly"

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**„t"**	**„p'**
I	7	2.857	2.571	10.01	0.488	0.184	1.549	>0.05

Table 11 The percentage relief was 10.01% which was statistically insignificant (p>0.05).

Table 12 In criteria "Is always „on the go" acts as if „driven by a motor"

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**„t"**	**„p'**
I	7	2.571	2.286	11.12	0.488	0.184	1.549	>0.05

Table 12 The percentage relief was 11.12% which was statistically Insignificant (p>0.05).

Table 13 In criteria "Talk excessively"

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**t**	**p**
I	7	2.71	2.42	10.53	0.48	0.18	1.54	<0.0

Table 13 The percentage relief was 10.53% which was statisticallyinsignificant (p<0.001).

Impulsivity

Table 14 In criteria "Blurts out answers to questions before the questions have been completed"

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**t**	**P**
I	7	2.286	2.143	6.2	0.378	0.143	1.000	>0.05

Table 14 The percentage relief was 6.2% which was statistically insignificant (p>0.05).

Table 15 In criteria "Has difficulty in waiting in lines or in games or groupsSituations"

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**t**	**P**
I	7	2.286	2.286	0.000	0.000	0.000	0.000	>0.05

Table 15 The percentage relief was 0.00% which was statistically insignificant (>0.05).

Table 16 In criteria "Interrupts or intrudes on other"

		Mean score						
		BT	AT					
Group	**N**			**% change**	**SD#**	**SE#**	**t**	**P**
I	7	1.857	1.714	8.2	0.378	0.143	1.000	>0.05

Table 16 The percentage relief was 8.2% which was statistically insignificant (p>0.05).

Table 17 *Effect of therapy on Hematological Investigations*

Investigation	**No.**	**Mean score**		**%**	**SD#**	**SE#**	**t**	**p**
		BT	AT	**change**				
Hb%	13	12.35	12.6	2.59	1.40	0.389	-0.84	>0.05
TLC	13	6384	6053	5.18	1152	319.7	1.035	>0.05
DLC								
PolymorphS	13	54.84	56.45	2.93	9.713	2.694	-0.6	>0.05
Lymphocyte	13	34.61	33.66	2.75	8.776	2.434	0.392	>0.05

Monocytes	13	1.36	1.6	17.6	.969	.193	1.23	>0.05
Eosinophill	13	2.64	1.32	50	1.18	.236	5.59	<.001
ESR	13	6.231	8.077	29.2	6.135	1.702	-1.08	>0.05
Biochemistry								
SGOT	13	29	25.84	10.8	10.63	2.950	1.069	>0.05
SGPT	13	32.46	31.30	3.55	12.07	3.349	0.345	>0.05

OVERALL EFFECTS OF THERAPY

Table 18 The result of the therapy was evaluated on the basis of criteria established for the assessment of the result.

Results	*Yashtimadhu Churna*	
	No.of Patients	**%**
Complete Remission	00	00
Markedly Improved	00	00
Moderately Improved	01	7.6
Mildly Improved	09	69.23
No Improvement	03	23.07

Table 18 *Discussion Overall effect of therapy*

Total 13 patients completed the full course of trial. Out of 13 patients, 23.07 % patients showed no improvement, 69.23 % patients were mildly improved, where as 7.6 % patients were moderately improved.

DISCUSSION

The mode of action of a drug depends upon its *Rasa, Guna, Virya, Vipaka or Prabhava*. Present research work was conducted on *Yashtimadhu churna* and *Brahmi churna*. ***Yashtimadhu*** possesses *Madhura Rasa, Guru Snigdha Guna, Sheeta Veerya* and *Madhura Vipaka*[7] which might have caused indriya prasadana and *hridya karma* thus improving the attention and consequently the performance of the child. Also it might have exerted a beneficial effect on *Medha* and hence improved the IQ of the trial patients. Anti inflammatory and anti-oxidant property of *Yashtimadhu* may be favorable to contribute the memory enhancement effect. It is possible that the beneficial effect of learning and memory was due to facilitation of cholinergic transmission. Choline acetyl transferase is an enzyme needed to synthesize acetylcholine. Acetylcholine esterase is an enzyme that inactivates the acetylcholine.[7] Acetylcholine significantly reduces the acetylcholine esterase activity & seems to play an important role in memory[8] and hence improved the performance of the child.

CONCLUSION

Basic knowledge of child psychiatry is essential for timely diagnosis and

management of disorders to improve day to day quality of life of children and also for the correct guidance to the parents. The incidence of psychiatric disorders in children is on a rise and demands more attention. The disease though not mentioned in our classics but can be explained by the basic principles of *Ayurveda*. Various regimes mentioned in the classical texts should be followed before conception, during antenatal period and after child birth to prevent the disease. The outcome of clinical study was significant statistically on subjective as well as objective criteria. Counseling was not used in the study to eliminate its interaction with the mode of action of the drug, but the results of the study clarifies that in clinical practice a combined therapy of the drugs along with non - pharmacological therapy of counseling and cognitive behavioral therapy will ensure a better quality of life in the patients of ADHD.

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