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A SURVEY STUDY TO EVALUATE THE RELATIONSHIP OF *DEHA-MANASA PRAKRITI* WITH IQ AND CLINICAL STUDY TO SEE THE EFFECT OF MADHUYASTI *CHURNA* AS *MEDHYA* RASYANA IN LOW IQ PATIENT.

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ABSTRACT
Tridosha i.e. *Vata*, *Pitta* and *Kapha* are responsible for the origin of body and also regularize its physiology. *Prakriti* or body constitution is a particular state of *doshas*, commencing during the process of fertilization, generated by its own predominant causative factors and unharmful to the individuals. *Prakriti* or the constitution of an individual along with other important aspects also determines the *Medha* of an individual. *Medha* has a great role in prevention of diseases and maintenance of good health. *Dhee*, *Dhriti* and *Smriti* are functional units of the *Medha* which are correlated with power of perception, retention and retrieval respectively in modern psychology. In *Ayurvedic Samhitas*, *Rasayana* therapies have been advocated for the improvement of *Medha*. All the *Rasayana* drugs are supposed to improve mental faculties in addition to their beneficial effects on the body. However, *Medhya Rasayana* has specific effects on the mental performance. The same have been assessed in the present study on the objective parameters with help of JALOTA TEST and an attempt has been made to study its relation to *Deha Prakriti* or the body constitution. In the present research work, *Churna* of *Yashtimadhu* (*Glycyrrhiza glabra*) has been taken as the trial drug to study its *Medhya* effect on low IQ subjects.

KEYWORDS: I.Q., *Deha-Manasa Prakriti*, *Yashtimadhu*, *Medhya*, *Rasayana.*

INTRODUCTION
Ayurveda, the science of life, deals not only with physical ailments but psychological- emotional predicament as well. Psychological ailments are alleviated by *Satvajaya Chikitsa* along with *Yuktivaypashriya Chikitsa*. Psychological disorders include disarray of *Buddhi* and/or *Smriti*. The reference regarding the concepts of *Buddhi* and *Smriti* in *Ayurveda* are highly blended thoughts of ancient Indian philosophies i.e. *Darshana*.[1]

Buddhi or Intelligent Quotient (IQ) of a human being depends on the time of conception, physical and mental health of mother, good quality of sperm and ovum etc. IQ reflects the basic intelligence or *Buddhi Kshamta* and corresponds to the age of the person because *Buddhi Kshamta* of adolescent cannot be compared with that of an infant. It is an inherit character but may differ because of nature of delivery, trauma during delivery, nutrition of mother during pregnancy etc.

Prana Vayu which is principally located in the head[2] is one of the most important component which control intellectual functions and is responsible for perfect realization of sense objects. So, the *Prana Vayu* is closely related to IQ. *Udaan Vayu* initiates vocal sound, enthusiasm and memory[3] whereas *Pitta* facilitates acquisition of skills and knowledge, perception of visual objects, encouragement and confidence.[4]

In the present competitive era parents force their children into various professional fields without knowing their interest or aptitude. With the help of IQ test and *Prakriti* analysis we can help and inculcate self-confidence in children so as to produce professionals with acumen.

Knowledge of IQ and *Prakriti* analysis should be mandatory at high school level to help students at the very initial level of their professional life. IQ is a score derived from several standardized tests to access the intelligence of an individual.

MATERIAL AND METHODS
In the present study the survey of 500 students (aged 16-20 years) was done from various government schools and colleges. Their IQ and *Prakriti* analysis was done

and then they were categorized in four groups containing each 50 students for present study.
1) Group 1- *Yogic* exercise for improving concentration.
2) Group 2- *Yogic* exercises and counselling.
3) Group 3- Placebo and counselling.
4) Group 4- *Medhya Rasayana* and counselling.

Maximum effort was taken to avoid the bias that may creep in this, as it is psychological research work.

The present study is an effort to develop a standard *Ayurvedic* line of treatment of psychosomatic disorder and also to analyse the clinical and demographic profile of *Medhya Rasayana*.

AIMS AND OBJECTIVES

- To explore the classical texts for description and assessment of *Deha Prakriti*.
- To explore the classical texts for description of *Rasayana* and its usefulness in promoting positive health.
- To evaluate the clinical effect of *Medhya Rasayana* i.e. *Yashtimadhu* in relation to *Deha Prakriti*.
- To assess the IQ of individual on basis of JALOTA TEST.
- To study whether the drug is effective in relieving symptoms in patients with low IQ.
- To assess the effect of *Yogic* exercises, *Medhya Rasayana* and counseling on IQ of individual.
- To provide a cheap and side effect liberated standard herbal formulation.

The volunteers for this study were selected from schools and colleges in vicinity of Government Ayurvedic College and Hospital, Patiala, Punjab and their *Deha Prakriti* was evaluated on the basis of a comprehensive proforma. IQ was assessed on the basis of an objective criterion JALOTA TEST.

Inclusion Criteria

1. Patients willing to participate in the trial.
2. Age between 16-20 years, irrespective of sex, education and socio-economic status.
3. Healthy volunteers who wished to improve their IQ.
4. Uncomplicated cases of memory disorder.
5. Only those volunteers have been included who have fulfilled the objective criteria of diagnosis.

Exclusion Criteria

1. Patients unwilling to participate in the trial.
2. Patients presenting with complications like, CVA, mental retardation or psychoneurosis etc.
3. If the condition of a patient deteriorate during the trial.

Consent of Patient

All the volunteers selected for the trial were explained the nature of study and their consent was obtained on the proforma before inclusion in the study.

Trial Group

Total 200 volunteers were selected for the present study that fulfilled the criteria and consented for the study. All the selected volunteers were studied under four groups and the *Churna* of *Yashtimadhu* was given to all the volunteers in a dose of 3gm bd with cow's milk for two months.

Duration of Trial – Duration of the trial was 60 days.

Preparation of Drug- The drug (dry roots) was collected and made in *Churna* form in Daksh Herbal Products, Parwanoo, Himachal Pradesh and small packages of 90gms were made.

Assessment Parameters- The efficacy of the medicine given was assessed on the basis of the following criteria:
1. Improvement in general condition was assessed by improvement in subjective symptoms.
2. Improvement in total score was assessed by 'IQ TEST Scale'.

Grading of Symptoms

(1) Sleep Pattern

G_0	7-9 hours sound sleep
G_1	7-9 hours sleep but disturbed
G_2	4-6 hours disturbed sleep
G_3	Less than 4 hours sleep which leads to impairment of daytime functioning
G_4	No sleep

(2) Headache

G_0	No headache
G_1	Episodic mild headache
G_2	Continuous mild headache, but doesn't interfere in daily routine work
G_3	Episodic severe headache
G_4	Continuous severe headache, leads to impairment of daily routine work

(3) Mood

G_0	Changes in circumstances which really affect the life in one or the other way.
G_1	Changes immediately with every minor event which do not affect the life indeed.
G_2	Frequent changes without any reason.
G_3	Always depressive/anxious.
G_4	Opposite moods (e.g. sad during happy events).

(4) Irritability

G_0	No irritability
G_1	Irritation in some specific conditions like noise, crowd etc.
G_2	Episodes of irritability at least 2 times daily at some specific moments
G_3	Episodes of irritability at least 3-6 times daily at some specific moment
G_4	Unexplained irritation in any circumstances at any moment

(5) Interest in activities other than daily necessary routine

G_0	Takes interest in all types of normal activities
G_1	Takes interest in some specific activities only e.g. watching T.V. but not going for a walk
G_2	Sometimes exhibit normal and sometimes abnormal interest
G_3	Rarely takes interest
G_4	Not at all interested

(6) Temperament

G_0	Good tempered
G_1	Fluctuating temperament (sometimes good, sometimes hot)
G_2	Hot tempered
G_3	Very hot tempered

(7) Difficulty in daily routine as a result of memory related problems

G_0	Not at all
G_1	A bit but it doesn't affect an overall daily schedule
G_2	Affects daily routine mildly
G_3	Affects daily routine moderately
G_4	Affects daily routine severely

Total Effect of Therapy

The total effect of the therapy was assessed on the basis of relief over the pre-trial values, both in grades as well as in percentage in subjective symptoms and percent improvement in IQ test scale'. Biochemical and routine blood test reports of pre-trial and post trial period were analyzed to see effects of the therapy on blood biochemistry and haemogram.

Statistical Analysis

The data collected for all the sub-tests of memory scale were statistically analyzed. The memory scores before and after the trials were compared by the Student 't' test at 5% and 1% levels of significance for testing the improvement. The results were expressed in terms of total memory score of individual volunteers, mean score as well as the total score of the IQ. Based on the significance of the estimates of the 't' values in the results obtained, the discussions were done.

Assessment of Results

The results obtained were statistically analyzed and their categorization done in the following four groups:

Criteria for Categorization

A difference in improvement in terms of total IQ and other subjective symptoms was recorded as follows:

1. **Highly Improved**
   - Improvement in total IQ > 10 and in grade difference more than 1.
   - Relief in subjective symptoms up to grade 0.
2. **Improved**
   - Improvement in total IQ between 6 and 10(Marks) and grade difference 1.
   - Relief in subjective symptoms up to grades 1.
3. **Moderate Improved**
   - Improvement in total IQ between 1 and 5.
4. **Not Improved**
   - No changes seen in both symptoms and IQ test.

OBSERVATION AND RESULTS

In the present study, a total of 500 volunteers participated. Among all these only 200 individuals were enrolled for clinical study. They were made into four groups of 50 individuals each.

The general observations of the volunteers are presented through the following tables:-

Table1 -Type of delivery

S.No	Type of delivery	No. of Subjects	Percentage
1	Normal	250	50%
2	CS.	240	48%
3	Forceps	10	2%

250(50%) Volunteers were Normal delivered, (240) i.e. 48% were having CS and 2% having Forceps delivery.

Table2 - History of neonatal disease

S.No	History of neonatal disease	No. of Subjects	Percentage
1	Present	50	10%
2	Absent	450	90%

Neonatal diseases present in (50) i.e. 10% and absent in (450) i.e. 90%.

Table3 -Gestational age wise distribution

S.No	Gestational age	No. of Subjects	Percentage
1	Pre term	100	20%
2	Full term	385	77%
3	Post term	15	3%

Gestational age wise- No. of volunteers who were preterm (100) i.e. 20%, fullterm (385) i.e. 77% and post term (15) i.e.3%.

Table4 -Cry at birth wise distribution

S.No	Cry at birth	No. of Subjects	Percentage
1	Immediate	300	60%
2	Delayed	200	40%

Cry at birth shows -300(60%) were cried immediately and 200(40%) were cried delayed.

Table5 -History of trauma wise distribution

S.No	History of trauma	No. of Subjects	Percentage
1	Present	10	2%
2	Absent	490	98%

98% (490) were not having history of trauma and 2% (10) were having history of trauma.

Table6 -Growth and development wise distribution

S.No	Growth and development	No. of Subjects	Percentage
1	Proper	300	60%
2	Improper	200	40%

The growth and development wise distribution shows that 300 (60%) have proper growth and 200(40%) have improper.

Table7 -Family history wise distribution

S.No	Family history	No. of Subjects	Percentage
1	Present	100	20%
2	Not present	400	80%

Family history wise distribution shows that 80% (400) are not having low IQ while 100 (20%) are having low I.Q. in their family.

Table8 -*Manas Prakriti* wise distribution

S.No	*Manas Prakriti*	No. of Subjects	Percentage
1	*Satva*	0	0%
2	*Rajas*	350	70%
3	*Tamas*	150	30%

Manas Prakriti wise distribution shows nobody had *Satva*, 70% (350) having *Rajas* and 30% (150) having *Tamas Prakriti*.

Table9 -*Satva* wise distribution

S.No	*Satva*	No. of Subjects	Percentage
1	*PrAvara*	50	10%
2	*Madhyama*	350	70%
3	*Avara*	100	20%

Satva Wise distribution shows that 10% (50) having *PrAvara*, 70% (350) having *Madhyama* and 20% (100) having *Avara Satva*.

Table10 -Symptomatology at time of registration in survey

S.No	Symptoms	No. of subjects	Percentage
1	Disturbed sleep pattern	292	58.4%
2	Abnormal temperament	335	66.4%
3	Abnormal mood	200	40%
4	Difficulty in daily work	200	40%
5	Headache	320	64%
6	Irritable	300	60%
7	Lack of interest	250	50%

RESULTS

Group 1(marks) - Effect on IQ

$\bar{x}$	SD	SE	t	p
3.24	3.85	0.54	6	<.001

In the above table no after statistical calculation the value of t is 6 which is greater than table value of t at the level of p<0.001.therefore the results are highly significant.

Group 1(grade)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
0.46	0.51	0.07	6.57	<.001

In the above Table it is seen that after statistical calculations the value of t is 6.57 which is greater the table value of t at the level of p<0.001 therefore the results are highly significant.

Group 2 (marks)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
5.22	6.54	0.92	5.67	<.001

The statistical value of t is 5.67 which is greater than the table value of t at the level of p<0.001 therefore the results are highly significant.

Group 2 (grade)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
0.64	0.775	0.109	5.871	<.001

The above table shows that statistical value of t is 5.871, which is greater than the table value of t at the level of p<0.001. which is highly significant.

Group 3 (marks)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
3.34	2.74	0.38	8.78	<.001

The above table shows that the statistical value of t is 8.78 which is greater than the table value of t at the level of p<0.001. Therefore the results are highly significant.

Group 3 (Grade)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
0.24	0.42	0.06	5.83	<.001

From above data it was shown that after statistical analysis the value of t is 5.83.which is greater than the table value at the level of p<0.001 therefore the results are highly significant.

Group 4 (Marks)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
3.26	3.52	0.49	6.65	<.001

From above table it was seen that the statistical value of t is 6.65 which is greater than the table value of t at level of p<0.001. that means the results are highly significant.

Group 4 (Grade)-Effect on I.Q

$\bar{x}$	SD	SE	t	p
0.35	0.46	0.24	1.46	>0.10

The above calculation showed that statistical value of t is 1.46 which is lesser than the table value of t at level of p>0.10 so results are insignificant.

Effect on Subjective Symptomatology

Group 1

S.No	Symptoms	Mean grades	Difference	% relief	
		B.T.	A.T.		
1.	Disturbed sleep pattern	1.5	0.7	0.8	53.33
2.	Abnormal temperament	1.8	1	0.8	44.44
3.	Abnormal mood	2.1	1.2	0.9	42.85
4.	Difficulty in daily routine as a result of memory related problems	1.8	1.1	0.7	38.88
5.	Lack of interest in activities other than necessary daily routine	1.6	1	0.6	37.50
6.	Headache	2.1	0.6	1.5	71.42
7.	Easy irritability	1.2	0.6	0.6	50.00

Group 2

S.No	Symptoms	Mean grades	Difference	% relief	
		B.T.	A.T.		
1.	Disturbed sleep pattern	1.8	1	0.8	44.44
2.	Abnormal temperament	2.0	0.8	1.2	60.00
3.	Abnormal mood	2.3	1.4	0.9	39.13
4.	Difficulty in daily routine as a result of memory related problems	1.4	0.5	0.9	64.28
5.	Lack of interest in activities other than necessary daily routine	1.6	1	0.6	37.50
6.	Headache	2.35	1.1	1.25	53.19
7.	Easy irritability	1	0.4	0.6	60.00

Group 3

S.No	Symptoms	Mean grades	Difference	% relief	
		B.T.	A.T.		
1.	Disturbed sleep pattern	2.03	0.76	1.27	62.56
2.	Abnormal temperament	2.1	1.1	1.0	47.61
3.	Abnormal mood	2.0	0.7	1.3	65.00
4.	Difficulty in daily routine as a result of memory related problems	1.8	0.8	1.0	55.55
5.	Lack of interest in activities other than necessary daily routine	2.1	1.0	1.1	52.38
6.	Headache	1.6	0.7	0.9	56.25
7.	Easy irritability	1.4	0.7	0.7	50.00

Group 4

S.No	Symptoms	Mean grades	Difference	% relief	
		B.T.	A.T.		
1.	Disturbed sleep pattern	1.5	0.7	0.8	53.33
2.	Abnormal temperament	1.7	0.9	0.8	47.05
3.	Abnormal mood	1.45	0.75	0.7	47.27
4.	Difficulty in daily routine as a result of memory related problems	1.9	1.3	0.6	31.57
5.	Lack of interest in activities other than necessary daily routine	1.9	1.1	0.8	42.10
6.	Headache	1.95	0.95	1.0	51.28
7.	Easy irritability	2.3	0.6	1.7	73.91

DISCUSSION

Drug- *Yashtimadhu* acts as a memory enhancer due to the following reasons –
Antioxidant and anti inflammatory properties[5], Enhances cerebral circulation[6], Balance blood sugar level to sustain energy[7], Decreases acetyl cholinesterase enzyme activity[8], Nourishes the adrenal gland and nervous system[9], Relieves stress as it stimulates mental functions[10], Helpful in combating short – term memory loss[11], Improves cognitive function[12], Increases the power of concentration.[13]

Clinical Discussion

In the present study, 200 healthy volunteers participated, and completed the trial. Discussions of the findings observed in the present study are as follows;

Type of Delivery: Although maximum no of students (80%) delivered normally but (20%) were delivered through Caesarean section. Because of prolonged labour requiring intervention in form of Caesarean section caused hypoxia which may lead to low IQ.

Neo-Natal Disease-Subjects (90%) had no history of neonatal disease, 10% had these diseases which may hamper the blood supply to the brain affecting the IQ.

Gestational Age-About (77%) of the subjects were full term while around (20%) were pre term. Full term may have good IQ, due to poorly developed brain which may be the cause for low IQ.

Crying-It was seen that majority of students had history of immediate cry (60%) which establishes respiration in the body. Delayed cry may cause asphyxia leading to low IQ.

Trauma-A history of trauma was not present in majority of students (98%). Only (2%) had trauma which may lead to brain damage causing low IQ.

Growth and Development- About (60%) were in good stage of growth and development while (40%) had not delayed growth which may affect the IQ of child.

Family History-Majority of subjects (80%) did not have family history of low IQ. Only (20%) had history of low IQ which may lead to lower IQ because of genetic or chromosomal defect.

Satva-Maximum number of subjects (70%) had *Madhyama Satva*, while (20%) have *Avara Satva*. *Satva* is related to confidence, will power or judgement. *Avara Satva* and *Madhyama Satva* subjects are prone to diseases[14] which is supported in this study.

Sleep-Among all (40%) had disturbed sleep while (60%) had normal sleep. Sleep pattern may affect the IQ.[15]

Symptomatological

Group 1-First group contains *yogic* exercises for trail study. *Yoga* improves the concentration level[16] which ultimately affect the mood, temperament of the individual. *Yoga* helps to reduce the pressure in the arteries which ultimately affects the blood pressure of an individual which leads to reduction of headache. By doing *yogic* exercises daily the concentration power of that individual increases which ultimately helps to improve the day to day activity of that person. *Yoga* helps to make the person healthy not only physically but also mentally, thus improving the temperament and mood. *Yoga* makes the people relax that helps to improve the disturbed sleep pattern.

Group 2- Parents are the basic builder of the child's future and their teachings-training are the back bone of the child's intelligence. Proper child care facilities, spending enough time with little one, educated and intelligent parent were explained in the counselling that how to deal with the psychology of the child. Today parents give less time to their wards so counselling helps to establish the beautiful and strong relationship between parent and their child which ultimately affect the mood temperament and interest in day to day activity of the child. Moreover *Yoga* and *yogic* exercises are also included in that group. By virtue of its spiritual properties, it helps in reduction of various symptoms viz sleep, headache.

Group 3- Placebo group basically helps to understand the psychology of a subject. The subject only mentally feels as if he is taking medication for his ailment instead he is not taking anything. This feeling of taking medicine in his mind provides him relief from his symptoms and improves sleep, temperament, mood and headache of the subject, because these symptoms are directly related to psyche or mind.

Group 4 – Madhuyasti is *Guru* and *Snigdha*[17], increases *Kapha* which nourishes brain, due to *Madhura Rasa*[18] and *Madhura Vipaka* it promotes the formation of *Ojas*[19], thereby facilitating relieving the symptoms of headache and disturbed sleep. Due to its antioxidant property it improves symptoms like irritability, difficulty in daily routine work and lack of interest in activities. Moreover counselling had some role in reliving symptoms related to general behaviour.

Group 1

Marks: After statistical calculation the value of t is 6 which is greater than table value of t at the level of $p<0.001$. therefore the results are highly significant.

Grades: It is seen that after statistical calculations the value of t is 6.57 which is greater the table value of t at the level of $p<0.001$ therefore the results are highly significant.

Yoga helps in improving the capacity of brain regarding its retention level, grasping level, concentration level and power of relaxation. Due to these properties *Yoga* helps in improvement of IQ of individual.

Group 2
Marks: The statistical value of t is 5.67 which is greater than the table value of t at the level of p<0.001. Therefore the results are highly significant.

Grades: Statistical value of t is 5.871, which is greater than the table value of t at the level of p<0.001. which is highly significant.

Counselling makes the parent conscious of his ward and by virtue of this they get acquainted with IQ of child. This information helps them to choose the field for their wards and it can be one way to enhance the IQ of individual, by maintaining the friendly relationship between parent and ward.

Group 3
Marks: The statistical value of t is 8.78 which are greater than the table value of t at the level of p<0.001.Therefore the results are highly significant.

Grades: After statistical analysis the value of t is 5.83.which is greater than the table value at the level of p<0.001 therefore the results are highly significant.

The individuals who are taken in this group had no organic disease and hence given placebo. The parents of subjects of this group were counselled and subjects were given placebo, the results of which were significant. It may be the effect of counselling of parents leading to motivation of the subjects which in turn made them more attentive and yielded significant results.

Group 4
Marks: It was seen that the statistical value of t is 6.65 which is greater than the table value of t at the level of p<0.001. That means the results are highly significant.

Grades: Statistical value of t is 1.46 which is lesser than the table value of t at level of p>0.10 so results are insignificant.

Yastimadhu has cognitive function, it also over comes the mental fatigue, nourishes the adrenal glands which relives the stress it is also helps in combating the short term memory loss and also increasing the power of concentration so it has direct effect on IQ.

CONCLUSION

The following conclusions can be drawn from the present study –

1. Word '*Prakriti*' has several meanings in *Ayurvedic* literature in various contexts. The word *Deha Prakriti* is used to denote the psychophysical phenotype on the principle of '*Tridosha*' in *Ayurveda*.
2. *Prakriti* in some ways correspond to the temperament or personality of a person. The difference lies in consideration of metaphysical factors (*Atma* and *Purvajanamkrit Karma*).
3. *Ayurvedic* physicians have equally emphasized other factors of pre-conception along with hereditary and environmental and comprehensively explained the human personality on spiritual, psychological and physical basis.
4. *Prakriti* or constitution of an individual along with other important aspects also determines the *Medha* of an individual.
5. *Dhee*, *Dhriti* and *Smriti* are functional units of *Medha* which can be correlated with steps in the process of memory perception, retention and retrieval respectively in Modern Psychology.
6. *Medhya Rasayana* have a specific effect on the *Medha* or IQ and related functions of an individual, thus has a definite role as an IQ enhancer drug.
7. *Yashtimadhu* (*Glycyrrhiza glabra*) has a definite role in enhancing IQ which is more significant in *Pitta Kapha*j *Prakriti*.

Suggestions

- The future studies may be done on a large scale to analyse its relation with *Deha Prakriti* and for better assessment of actions and adverse effect of trial drug.
- Combined therapy is advocated for more effective and sustained improvement in memory in a shorter duration of time.

Conflict of Interest- There is no conflict of interest.

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