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Applied Study of *Rasa* and *Raktasarata* w.s.r. to Intelligent
Quotient: A Survey

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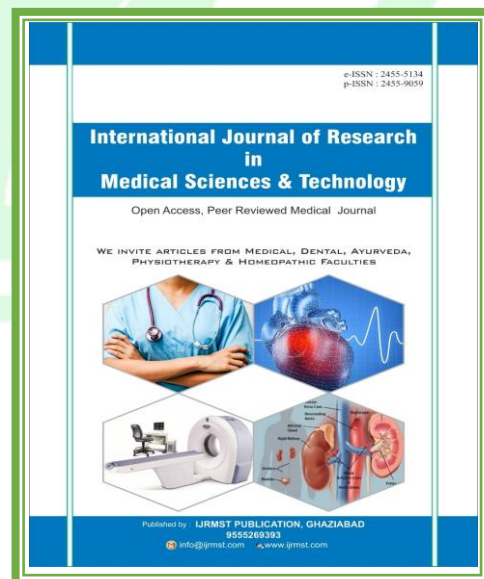
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ABSTRACT

Background: Dhatu Sarata is defined as the supreme quality & functional aspect of Dhatu. ⁽²⁾ Chakrapani described it as "*Vishuddhatara Dhatu*," which means the finest, purest & excellent state of *Dhatu*. It is the actual test to measure an individual's strength (physical and mental). On the other hand, Intelligence is a feature that is defined to describe a person's cognitive abilities concerning their *Sarata*. **Aim:** The Present study primarily deals with intelligence quotient (IQ) & its correlation with Dhatu *Sarata* through questionnaires & assessments with special reference to *Rasa* and *Rakta Sarata*. **Material & methods:** The present survey(Observational) study was conducted on apparently healthy individuals randomly selected from O.P.D/I.P.D. of Pt. Khushilal Sharma Government (Autonomous) Ayurvedic College and Institute, Bhopal (Madhya Pradesh), including students and staff of the college and people living in the surrounding areas. All the volunteers who have *Rasa* or *Rakta Sarata* evaluated by Ayursoft software were further assessed for IQ with the help of the Wechsler Adult intelligence scale online test with 20 questions. A non-parametric test (Spearman Correlation) was used to explore the correlation between the two variables, i.e., *Rasa Sarta* & IQ and *Rakta Sarta* & IQ, as at least one of the variables. **Result & observations:** Out of 300 individuals, a total of 290 persons were found to be of *Rasa Sara* and *Rakta Sara*. There was a moderate correlation between *Rasa Sarata* & IQ, while *Rakta Sarta* and IQ showed a strong positive correlation. These positive findings obtained through this study validate the classical reference about the clinical manifestation of *Rasa* & *Rakta Dhatusarata*. **Conclusion:** Furthermore study can be carried out to find out its relationship with recent laboratory parameters. All remaining *Dhatu Sarata* can also be studied & compared with IQ level.

Keywords: *Rasa, Rakta, Sarata*, Intelligent, Quotient, Correlation, Survey, Study, Spearman Correlation.

INTRODUCTION

All the seven dhatus perform the same set of functions in every individual, but the worth & profusion of these functions may vary from individual to individual. It is decided by the excellent state of these Dhatus, which is nothing but the *Dhatu Sarata* [1,2].

The *Sara* is considered an important concept of *Ayurveda*, which is responsible for assessing strength (*Bala*) and stability (*Sthiratva*). It is the important component of *Dashvidha Pariskahana* [3,4]. The concept of *Sara* is a good mirror to assess the properties and function of *Dhatus*. *Sara* is one among *Dashavidha Pareeksha*, which is done to understand the life span degree of strength a person possesses and

rule out morbidity. *Sara* means the excellence and the purity of the virtuous state of *Dhatu* and mind. By assessing *Sara*, one can identify the present status of health. Although every individual's body is composed of seven *Dhatu*s (elementary tissues), it is found that persons differ very much at the *Dhatu Sarata* because all the seven *Dhatu*s of the body go through certain changes during *Paka* (metabolism). The *Sarabhaga* (valuable part) and *Kittabhaga* (waste part) are produced during *Paka*. The ratio of this *Paka* and its products (*Sarabhaga* and *Kittabhaga*) are not the same in every person; thus, the body, composed of seven *Dhatu*s, differs from one another at the level of *Dhatu Sara*. *Sarata* depends upon the predominance of that *Dhatu* in *Bija*, *Anuvamsikata*, *Matri- Pitrija Ahar Vihara*, *Matri Ahar Vihara* regular and during pregnancy, *Ahar Vihara* of that particular individual during his lifespan, etc. Embracing the physical characteristics, *Sara Pareeksha* also imparts a clear vision about an individual's mental abilities or intellectual properties. Among the eight *Sara* persons, the *Rasa Sara* persons are characterized by having *Buddhi*, i.e., good intellect and other physical and psychological characteristics. The *Rakta Sara* persons have *Medha* (intelligence), including different features. *Mamsa Sarata* indicates strong *Dhriti* and knowledge,

while the *Majja* of best quality strengthened learning and understanding. *Ojas* has a direct relationship with all the faculties of *Buddhi*.

Intelligence has been narrowly defined as acquiring knowledge and understanding and used in different novel situations. This ability or capacity enables the individual to deal with real situations and profit intellectually from sensory experience. In contrast, an intelligence quotient or IQ is a measure of relative intelligence determined by some standardized tests. The modern-day "IQ" test measures various verbal, mathematical, spatial, memory, and reasoning abilities.

An intelligence quotient or IQ is a score derived from several standardized tests designed to assess intelligence [5]. We can consider IQ a symbol of intelligence or memory power in the present era. The modern-day "IQ" test measures various verbal, mathematical, spatial, memory, and reasoning abilities. The test is then 'pre-tested' on a group of people representative of the wider population. Then it's graded so that most people will get an IQ between 90-110 [6].

RATIONALE OF THE STUDY

The *Samhitas* description of *Sarata* is mentioned in detail, but their assessment tools/objective parameters have not been

revealed hence establishing parameters is the prime aim of the study [7]. Genetic factors highly influence Sarata or the excellent qualities of the body's tissue. Which one inherits from father & mother? It is possible to enhance the *Sarata* or excellence of Dhatus in fetus right from intrauterine life, before birth, or even before conception. Also, the Assessment of *Sarata* enables the professionals to provide vocational counseling to that individual considering his interest in work & also his mental, physical abilities to cope with the demands of work patterns [8].

Ayurveda is an applied science and well-time-tested therapeutics. However, there is still a requirement of trials to prove certain principles which is also a need today to make the *Ayurveda* more acceptable globally. The Current study is a novel effort to pursue the same aim.

Aim:-

The prime aim of the present study is to establish a relationship between *Rasa* & *Rakta Sarata* with Intelligence Quotient.

Objectives:-

1. To develop more clear vision on *Dhatu Sara* especially on *Rasa* and *Rakta Sarata*.
2. To validate the classical reference of the clinical manifestation of

Rasa & *Rakta Sarata* associated with *Medha* based on contemporary parameters, i.e., IQ.

MATERIAL & METHODS

Study Type: Observational Study

Study Design: Survey

Source of collection:

The present survey study was conducted on apparently healthy individuals randomly selected from O.P.D/I.P.D. of Pt. Khushilal Sharma Government (Autonomous) Ayurvedic College and Institute, Bhopal (Madhya Pradesh), including students and staff of the college and people living in the surrounding areas.

Sample size: 300

Duration of Study: 18 months

Sampling method- *Rasa* and *Rakta Sara* participants will be selected through a simple random sampling method via Ayusoft software.

Participants

The present survey study was conducted on apparently healthy individuals randomly selected from O.P.D/I.P.D. of Pt. Khushilal Sharma Government (Autonomous) Ayurvedic College and Institute, Bhopal (Madhya Pradesh), including students and staff of the college and people living in the surrounding areas. Earlier it was decided to conduct the

survey study on 1000 persons. However, due to the COVID-19 pandemic, the number was reduced to 600. Therefore, 600 individuals were registered and assessed for *Dhatu Sarta* through software viz. 'Ayursoft' based proforma [9].

Out of 300 individuals, 290 persons were of Rasa Sara and Rakta Sara. They were further assessed for the IQ levels through the Wechsler Intelligence scale with the help of an available online questionnaire.

Inclusion Criteria

1. Healthy individuals of either sex between 18 to 30 years of age.
2. Persons willing to participate in the study are ready to sign the consent form.

Exclusion Criteria

1. Individuals below or above the mentioned age group.
2. A person with severe or chronic diseases.
3. A person with any stress or cognition deformity, neurological disorders such as Cerebral Palsy, Autism, Down Syndrome, Attention Deficit Hyperactivity Disorder, mental retardation, or suffering from psychological illness.

4. A person who is taking or undergoing any long-term medicines.
5. Pregnant or lactating women.
6. Individuals not willing to participate in the study

ETHICS & DISSEMINATION

The study was initiated after obtaining approval from Institutional Ethics Committee, Pt. Khushilal Sharma Government (Autonomous) Ayurvedic College and Institute, Bhopal (Madhya Pradesh), India, with Ref. No. K1sgaci/IEC/2019/21, dated 28/07/2019.

❖ Consent of the person

The Written and informed consent of the person was taken before the study.

RECRUITMENT, DATA COLLECTION, DATA EXTRACTION, MANAGEMENT, AND STATISTICAL METHODS

Individuals fulfilling the inclusion criteria were evaluated in detail for the *Dhatu Sarta* through software viz. 'Ayursoft' based proforma. For each characteristic feature of *Rasa Sarta* and *Rakta Sarta*, grading was done accordingly. Based on these grading, scores were allotted for each characteristic. And on this basis, total scores were calculated, and the subjects were divided into three categories: *Pravar*

Sara, Madhyam Sara, Avar Sara. Questionnaires of the survey proforma were split into many parts like history taking, physical examination, psychological assessment, etc. These study parameters were based on *Sara Lakshanas* described in the various *Samhitas* done on through software, namely 'Ayursoft.'

Those who were found to be having *Rasa Sarta* and *Rakta Sarta* were then assessed for the IQ level through the Wechsler Intelligence scale with the help of an available online questionnaire. Normal healthy individuals were taken in the study to standardize *Rasa* and *Rakta Sarta*. A proforma was designed to fill the details, including the subjective assessment parameters (made based on 'Ayursoft' software) and online assessment of IQ through the Wechsler Intelligence scale and other detailed examining parameters. The evaluation was done based on Dhatu Sarata Score identified by Ayursoft Software & IQ assessment obtained by Wechsler Adult intelligence scale online test done in *Rasa* and *Rakta Sara* Persons. In this online test, there was a 20 questions format from different fields viz. the Verbal Comprehension Index, Perceptual Reasoning Index, Working Memory Index, and Processing Speed Index (standard scores: mean=100, standard deviation=15). To gain maximum marks or IQ, the person

had to solve those questions in minimum time and correct answers. After submitting the last 20 no. The question they got their IQ. Subjects were then categorized based on types of **IQ Score** as mentioned in table no 1.

STATISTICAL ANALYSIS OF RESULTS

The results obtained on different variables were analyzed using the standard statistical methods. Spearman correlation coefficient $r(\rho)$ was used to assess the co-relation between Dhatu *Sarta*, especially *Rasa* & *Rakta Sarata*, and IQ levels.

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Where

ρ = Spearman's rank Correlation coefficient

d_i = Difference between the two ranks of each observation

n = number of observations

RESULTS & OBSERVATIONS

- The present study reveals that maximum persons were in the age group of 26-30 years and were male

and of Hindu religion and belonged to the higher middle-class family.

- Maximum persons were found with *Rakta Sara* 154 (25.6%), followed by *Rasa Sara* 136 (22.6%), then with *Mansa Sara* 90 (15%), then *Asthi Sara* 65 (10.8 %), then *Majja Sara* 62(10.3%) then *Medo Sara* 58(15.19%), and 35 (5.8%) were of *Shukra Sara*.
- Maximum no. of *Rasa Sara* individuals, i.e., 58 (42.65%) obtained marks between 81-90 % in secondary school examination and maximum *Rakta Sara* individuals, i.e., 62 (40.26%) obtained marks between 71-80% in secondary school examination.
- Maximum no. of individuals were graduate and had normal emotional state behaved good with strangers, and showed a good attitude in strange and unknown places
- Maximum no. of individuals were taking a mixed diet where *Madhura rasa* predominance was found in diet maximum *Rasa Sara* individuals, and *Amla Rasa* predominance was found in the diet of maximum *Rakta Sara* individuals.
- 68 (50%) individuals of *Rasa Sarta* were of *Kapha-Vataj prakriti* and 48 (35.29%) were *Pitta-Kaphja Prakriti* and only 20 (14.70%) were of *Vata-*

Pittaja Prakriti whereas 84 (54.55%) individuals of *Rakta Sarta* were of *Pitta-Kaphja prakriti* and 60 (38.96%) were *Vata-Pittaja Prakriti* and only 10 (6.49%) were of *Kapha-Vataj Prakriti*.

- The 66 individuals (48.53%) of *Rasa Sarta* were of *Tamasika Prakriti*, while 62 (45.59%) were of *Rajasika Prakriti* and 08 (5.88%) individuals were of *Satvika Prakriti* whereas 86 individuals (55.84%) of *Rakta Sarta* were of *Rajasika Prakriti*, while 58 (37.66%) were of *Tamasika Prakriti* and 10 (6.49%) individuals were of *Satvika Prakriti*.
- Maximum individuals, i.e., 66 (48.53%) of *Rasa Sarta* in the present study had *Madhyama Satmya* while 42 (30.88%) individuals were of *Pravara Satmya* and 28(20.59%) were of *Avara Satmya*. In contrast, maximum individuals, i.e., 78 (50.65%) of *Rakta Sarta* in the present study had *Madhyama Satmya* while 52 (33.77%) individuals were of *Pravara Satmya* and 24(15.58%) were of *Avara Satmya*.
- Maximum individuals, i.e., 66 (48.53%) of *Rasa Sarta*, were *Madhyam Sattva* while 42(30.88%) were *Pravara Sattva*. Only 28 (20.89%) individuals were of *Heen Sattva*, whereas maximum individuals,

i.e., 78 (50.65%) of *Rakta Sarta*, were of *Madhyam Sattva* while 52(33.77%) were of *Pravara Sattva* and only 24 (15.58%) individuals were of *Heen Sattva*.

- The majority of the individuals, i.e., 70 (51.47%) of *Rasa Sarata*, had *Pravara Ahara Shakti*. In comparison, 44(32.35%) individuals had *Madhyam Aahar Shakti*, and 28 individuals (20.59%) had *Avara ahara shakti*. In contrast, the majority of the individuals, i.e., 76 (49.35%) of *Rakta Sarata* had *Pravara Ahara Shakti*, while 54(35.06%) individuals had *Madhyam Aahar Shakti* and 24 individuals (15.58%) had *Avara ahara shakti*.
- The 51.47% individuals of *Rasa Sarta* had *Pravara Vyayama shakti*. In comparison, 44 (32.35%) had *Madhyam vyayaam shakti* and 28 (20.59%) individuals had *Avar vyayama shakti*, whereas 76 individuals (i.e., 49.35%) of *Rakta Sarta* had *Pravara vyayama shakti*, while 54 (35.06%) had *Madhyam vyayaam shakti* and 24 (15.58%) individuals had *Avar vyayama shakti*.
- The present survey study reveals that maximum individuals 120 (88.23%) of *Rasa Sarta* were found in the *Pravara Rasa Sarta* category

followed by ten subjects (7.35%) in *Madhyam Rasa Sarta* and 4.41% found to have *Avara Rasa Sara*. In contrast, maximum individuals 77 (50%) of *Rakta Sarta* were found in the *Madhyam Rakta Sarta* category followed by 69 subjects, i.e., 44.80% in *Pravara Rakta Sarta* only 5.19% were found to have *Avara Rakta Sara*.

- Maximum 69 (50.74%) individuals of *Rasa Sarta* had IQ level between 116-130 group, i.e., above average, followed by 45 individuals (33.09%) having IQ level Between 86-115 and 18 (13.24%) were found to have IQ level between 131-145 and 04 individuals (2.94%) were found to have IQ level between 70-85 whereas maximum 76 (49.35%) individuals of *Rakta Sara* had IQ level between 116-130 group, i.e., above average, followed by 40 individuals (25.97%) having IQ level Between 86-115 and 32 (20.78%) were found to have IQ level between 131-145 and 06 individuals (3.9%) were found to have IQ level between 70-85.
- A non-parametric test (Spearman Correlation) was used to explore the correlation between the two variables, i.e., *Rasa Sarta* and IQ, as at least one variable was not normally distributed. An observational comparison of *Rasa*

Sarta and IQ, it was found a moderate positive correlation was, and this correlation was statistically significant, as Spearman correlation coefficient $r = 0.450$ with 95% confidence interval 0.1102 to 0.4689 and the P-value is less than 0.001, showing a substantial relationship between *Rasa Sarta* and IQ.

- A non-parametric test (Spearman Correlation) was used to explore the correlation between the two variables, i.e., *Rakta Sarta* and IQ. An observational comparison of *Rakta Sarta* and IQ, it was found a strong positive correlation, and this correlation was statistically significant, as Spearman correlation coefficient $r = 0.710$ with 95% confidence interval 0.1201 to 0.8423 and P-value is less than 0.001, showing a substantial relationship between *Rakta Sarta* and IQ.

DISCUSSION

Dhatu Sarata is one of the important parameters for assessing the strength of an individual[10]. *Dhatu Sara Parikshana* is nothing but the thorough examination of an individual concerning the excellence of his dhatus [11]. It is coined with different terms such as Tissue quality, Tissue vitality, and Stamina by Prof. R.H. Singh,

K. N. Udupa & Ranjeet Rai Desai, respectively [12].

Our ancient acharyas vividly detailed assessment of *Dhatu Sarata* based on several characteristic physical and psychosomatic features. However, it is important to do such an assessment based on objective parameters rather than subjective ones to make them globally acceptable. The current study is entirely planned based on the same aim. Among the various types of *Dhatu Sarata*, a classical text of Ayurveda shows that person with *Rasa* or *Rakta Sarata* are assumed to have good intellectual power. The present study is planned to validate the same things based on the objective parameter, i.e., intelligence quotient in contemporary science.

Wechsler (1944) states that intelligence is an aggregate or global capacity of an individual to act purposefully to think rationally and deal effectively with his environment, and the Intelligence quotient measures it. An intelligence quotient (IQ) is a score derived from a set of standardized tests developed to measure a person's IQ that represents an individual's intellectual potential [8,13].

Inferences obtained from the current study can be justified as follows:

The present survey study reveals that the maximum subjects, i.e., 51.83% with maximum female gender, were found between the age group of 26-30 years, followed by 48.17% in the age group of 20-25 years. It may be due to the majority of the subjects registered to be under graduation students, some were postgraduates, and very few being employed.

The present study's findings showed the predominance of Kapha-Vataj Prakriti in person with Rasa Sarta. At the same time, there was the predominance of Pitta-Kaphja Prakriti in individuals with Rakta Sarta. On the other hand, there was a predominance of *Tamasika Prakriti* in person with Rasa Sarta, while Rajasik Prakriti was predominately in individuals with Rakta Sarta [14,15].

There were maximum individuals with Madhyam Satva and Satmya in subjects recruited in the study.

- ❖ *Rasa Sara* and *Rakta Sara* persons have good emotional immunity and behave well in strange places, attributing to their classical features described in the classical texts[16]. Maximum *Rasa & Rakta Sara* individuals in this study exhibit good emotional status. The reason for this may be because of the fact as *Rasa*

Sara Purushas are endowed with happiness, good fortune, enjoyment, and excitement [17].

- ❖ The observation of good & moderate Interactive behavior was found in subjects with *Rasa & Rakata Sarata*. It may be because the *Rasa Sara* individuals are endowed with happiness, good fortune, enjoyment, intellect, knowledge, and excitement, and thence their behavior with strangers.
- ❖ Most of the *Rasa Sara* individuals have good IQ and showed good academic performance. It may be due to good intellect (*Budhhimatta*) in *Rasa Sara* persons.
- ❖ The correlation between *Rasa Sarta* and IQ showed a moderate positive correlation. It was statistically significant, complementing having *Buddhi*, i.e., good intellect mentioned in the classical text.
- ❖ The observations of the present study reflected that *Rakta Sara Purushas* are gifted with good IQ and had excellent performances in their academics. It proves the excellence of intelligence or *Medhashakti* in *Rakta Sara Purusha*. As a whole, there is no significant difference in learning

between the sexes. Still, it is generally observed that boys are superior in motor activities involving the exercise of strong gross muscles. In contrast, girls excel in the delicate coordination of smaller muscles and strict attention to detail. About verbal learning, girls are superior in word fluency, reasoning, and rote memory and boys in spatial and verbal meanings. Studies in vocational aptitude tests have shown that boys obtain superior scores in mechanical aptitudes and science and mathematics, whereas girls obtain higher scores in clerical aptitude and language skills. In the present study, excellent academic performance in individuals with Raktasara may be due to excellent memory power (*Medha / Budhhimatta*) in *Rakta Sara Purushas*.

- ❖ The correlation between *Rakta Sarta* and IQ showed a strong positive correlation and was statistically significant, complementing the *Medha* (intelligence) mentioned in the classical texts. SHAH J. AN quoted

similar observations *through his* Doctoral thesis done at Parul University [18]. On the other hand, such a strong correlation between *Majja Sarta* and IQ was proved by an experimental study done by Ganeshrao BN et al. [19].

CONCLUSION

The present study concluded a strong positive correlation between *Rakta Sarta* and IQ that supports the classical reference of inborn *Medha* (intelligence power) in persons with *Rakta Sarta*. However, multi-centric studies should validate these relations with large sample size. This study can be used as a model for standardizing other *Saras* and other areas of Ayurveda where an examination is based on subjective parameters. This work has been done by keeping all the cautions of bias in research and inappropriately interpreting concepts. If this study served any guidelines to future research workers, the author would feel her efforts have been productive. All remaining *Dhatusarata* can also be studied & compared with IQ level.

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Tables:

Table no.1: Categories of IQ Score

S.N.	Categories	IQ Score
1	Below Average	70-85
2	Average	86-115
3	Above Average	116-130
4	Gifted	131-145
5	Genius	>145