



STUDY TO ASSESS THE RELATION OF PHYSICAL FITNESS WITH *DHATU SAARATA* USING AYUSOFT- SOFTWARE

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ABSTRACT *Saara* is the essence of all *dhatu*. *Saara* has been mentioned as “*Visdhudhadharo dhatu*” by Acharya chakrapani ie, it is the most excellent or purified part of *dhatu*. *Dhatu saarata* is a quality assessment of seven *dhatu*s. Examination of *dhatu saarata* is done at physiological and psychological level. They are grouped into *Pravara*, *Madhyama*, *Avara saarata* types. These classification determine the *bala* of a person.

Bala is the vital force which makes a person to perform both physical and psychological tasks effectively. *Bala* is assessed using *vyayama sakti* as per *anumana pramana*. Practically *vyayama sakti* can be assessed by using tests like Harvard step test, Explosive power test. Thus the relationship between *dhatu saarata* and *vyayama sakti* is assessed.

KEYWORDS : *Dhatu saarata*, *Bala*, Harvard step test, Explosive power test.

INTRODUCTION

Dhatu are the physiological entity of the body that promotes the growth of *sareera* and supports everything in the living body¹. Nutritive elements of food are acted on by *jatharagni*, *bhutagni* and *dhatvagni* before they are converted to *dhatu*. Normal functioning of all *doshas*, *agnis* and *dhatu* maintains the body in equilibrium.

The description of *saara pariksha* is a special feature of *Ayurveda*. The complete healthy state of *dhatu* is represented by *saarata*. As roots of tree are very important for its maintenance, stability and growth similarly, *Dosha*, *Dhatu* and *Mala* are very important for maintaining human body. Well-nourished *dhatu*s give strength to maintain health and immunity. The strength of body and mind can be evaluated by *dhatu saarata*. *Dhatu saarata* is qualitative, quantitative and functional assessment of *dhatu*s. *Saara* has been mentioned as “*Visdhudhadharo dhatu*” by Acharya chakrapani². It is established that the person differs from each other at the level of the purest form of *dhatu*s. Hence individuals on the basis of *sara* have been classified into various categories depending on the predominance of particular *dhatu* in the body. *Dhatu saarata* is described with respect to *sapta dhatu* viz. *rasa*, *rakta*, *mamsa*, *medas*, *asthi*, *majja*, *sukra* and *sattva* i.e. *ASHTAVIDHA SAARATA*³. Kashyapa has mentioned *Ojo saara* also⁴. *Dhatusaarata* or Tissue excellence is a quality assessment of these *dhatu*s.

Saara pariksha serves as an important diagnostic tool and is one among the ten types of method of examinations under *dasavidha pariksha* as mentioned by *Charaka acharya*⁵. *Charaka* has emphasized that sometimes the physician may take a wrong decision only by seeing the body of the patient such as strong because of being corpulent⁶. Thus it becomes evident of the fact that inherent power of a person cannot be assessed by bulk and size of the body but it is only judged by the *saara* examination. It is the reflection of *dhatu saara* in the form of structure and functions.

Thus one should examine the individual in respect to *saara* or excellence of his *dhatu*. The individuals on the basis of their *saara* qualities have been classified into *Pravara*, *Madhyama* and *Avara saarata* types. Though *saara pareeksha* mentioned in *dasavidha pareeksha* points towards the *bala* of an individual, another method for the assessment of *baala* i.e. assessing *vyayama sakti* (*balam vyayamasakthya*...) also is mentioned among *dasavidha pareeksha*⁷. i.e. *Bala* can be assessed by *anumana pramana*⁸. Here, *bala* is the vital force which makes a person to perform physical tasks effectively.

Physical fitness is one of the key factors which defines the total efficiency of a person. Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure. The person should be examined with reference to his capacity for exercise which is determined by one's ability to perform work. Therefore this study will estimate *bala* in subjects and study *dhatu saarata* using ayu-soft software, standard *saara pareeksha* proforma produced by C Dac pune and find out the relation between them.

MATERIALS AND METHODS

Study design

This was an observational study random sampling technique was used for selecting samples. Total 30 subjects of age between 25 to 35 years were selected for this study at GAVC Kannur. Study was conducted for a period of 1 month. Approval was taken from institutional ethical committee. Informed written consent was taken from the study subjects.

Inclusion Criteria

- Apparently healthy subjects
- Sex: irrespective of gender
- Age: between 25 to 35 years

Exclusion Criteria

- Pregnancy
- Subjects with severe respiratory and cardiovascular system illness
- Diabetes mellitus
- Those who practice regular exercise for 20 minutes.

Assessment criteria

For assessing *dhatu saarata*, standard *saara pareeksha* proforma prepared by ayusoft software C dac pune, has been used. C dac software provide *Saara* and *Asaara* features as bar diagrams for each *dhatu*s separately. Few tissues could be in excellent status whereas others may be in a suboptimal status. When *saarata* features are above 75 % it will be considered as *pravara* tissue quality, when between 75 % and 25% as *madhyama* tissue quality and when below 25 % ie, *Asaara* features more than 75% considered as *Avara* tissue quality. Thus subjects has been grouped into *Pravara*, *Madhyama* and *Avara saarata* types.

Study tool

The tool for the assessment of status of *dhatu saarata* was done with a validated computer assisted questionnaire software Ayu-soft developed by C- Dac Pune, Department of information technology MCIT, India. There are mainly 4 types of application in the software for various purposes viz. *Vaidya sanmitra*, *Ayur vidyaana*, *Anveshaka*, *Shabdha Nidhi*. Questionnaire for *dhatu saarata* assessment is based on the classical guidelines regarding *saara* assessment. Questions are based on general physical attributes and psychological attributes commencing from general body characteristics. There are 38 main questionnaires which is comprising a total of 165 sub questions. There are *saara* and *asaara* signs in the list. Any of the *saara* or *asaara* signs can be selected if it is predefined, where multiple selections can also be done.

Harvard step test

The subject was made to do steps up and down on a platform in a cycle of 2 seconds. The height of the platform was about 40 cm. The rate of 30 steps/min was sustained for 5 min or until exhaustion. When the subject was able to perform the test for 5 minutes and more than 5 minutes, then that was included under fitness index long form. If the

subject was not able to perform the test for 5 minutes fitness index short form was used for assessing the physical fitness.

Physical efficiency index was calculated with the following formula,

$$\text{Pei Long Form} = \frac{\text{Duration of exercise in seconds} \times 100}{2 \times (A+B+C)}$$

$$\text{Pei Short Form} = \frac{\text{Duration of exercise in seconds} \times 100}{5.5 \times (A)}$$

Where, A = Pulse of 1 to 1.5 minutes during recovery.
 B = Pulse of 2 to 2.5 minutes during recovery.
 C = Pulse of 3 to 3.5 minutes during recovery.

Table 1; Grading of fitness according to index:

Fitness index	grading
<54	poor
55- 64	Below average
65-79	average
80- 89	good
> 90	excellent

Table 2; Fitness index (short form) score:

Fitness index	grading
<49	poor
50-80	average
>81	good

In the present study the subjects belonged to the age group 25- 35 years were participated who were college students. Since the prevalence of Harvard step test among college students were not known this pilot study shows most of the students participated had less scoring. So the scoring was modified as follows:

Table 3

grading	Fitness index	
1	<30	poor
2	30-49	average
3	50-59	Below average
4	60-69	good
5	>70	Excellent

Explosive power test

The subject was made to stand next to a wall with a chalk in hand. A mark was made on the wall by reaching up with his hand closest to the wall while the feet was kept flat on the floor. By bending his knees at right angles, the subject was made to jump as high as possible to make another mark. The distance between the two marks were measured. This was repeated for 3 times and the best score of the 3 trials was taken.

Formula for calculating actual jump height

- Actual jump height = maximum jump height – maximum height attainable

Table 4; Grading of explosive power:

males	females
Excellent >= 39	Excellent >=31
Average 38 -20	Average 30 -15
Poor < 20	Below average < 15

OBSERVATION AND ANALYSIS

Out of the 30 subjects 10 each were having pravara saara, madhyama saara and avara saara type.

Table 5; Chi-square test for testing the relation between dhatu saarata and other variables

Variable	Chi-square value	Degrees of freedom	P- value	Inference
Age	15.4	14	0.351	independent
PEI	52	8	0.000	dependent
Explosive power	29.874	4	0.000	dependent

Table 6; Relation between dhatu saarata and physical fitness index

Dhatu saarata	excellent	good	average	Below average	poor	total
pravara	3	7				10

madhyama			8	2		10
avara				4	6	10

Table 7; Relation between dhaatu saarata and explosive power

Dhatu saarata	excellent	good	poor	total
pravara	9	1		10
madyama	2	8		10
avara		4	6	10

RESULT:

A total of 30 subjects between 25 to 35 years of age were assessed for determining physical fitness and dhatu saarata. C dac software provide Saara and Asaara features as bar diagrams for each dhatus separately. Few tissues could be in excellent status whereas others may be in a suboptimal status. When saarata features are above 75 % it will be considered as pravara tissue quality, when between 75 % and 25% as madhyama tissue quality and when below 25 % i.e. , Asaara features more than 75% considered as Avara tissue quality. Thus subjects has been grouped into Pravara, Madhyama and Avara saarata types Since the P-Value is less than the commonly accepted level of 0.05 for physical fitness measuring variables (PEI and Explosive Power). So we reject the null hypothesis at 5% level of significance. Thus, we conclude that dhatu saarata and physical fitness are dependent. i.e., there is a significant relationship between the variables. Since the P-Value is greater than 0.05 for age variable age is independent of dhatu saarata at 5% level of significance.

DISCUSSION

Bala or strength can be assessed by vyayama sakti. Vyayama sakti focuses on the physical strength while saara pareeksha assesses the excellence of tissues that contribute to the physical fitness as well as the psychological attributes. There are many factors that can influence the vyayamasakti or exercise tolerance of an individual. Sarata, prakriti, ahara seela, mental well-being etc. are some among them. Harvard step test and explosive power test are universally accepted objective parameter to access yukthija and kalaja bala (i.e. fitness acquired through practise of exercise, proper diet etc.). Harvard step test and explosive power test showed significant correlation with some dhatu saarata . Acharya charaka and vagbhata mentioned that the main purpose of saara pariksha is to measure the strength of individual. All saara in dominant state is called sarva saara and the individual possess maximum bala. This study also shows the association between physical fitness and dhatu saarata.

CONCLUSION

Physical fitness by Harvard step test and explosive power test has significant co-relation with dhatu saarata. i.e to asthi, mamsa and to some extent with majja, sukra saarata. pravara saara subjects were having more fitness compared to madhyama and avara saara subjects. Statistically significant association was found between dhatu saarata and physical fitness.

REFERENCES

- C Dwarakanatha Introduction to Kayachikitsa, 3rd ed. Varanasi: Chaukambha Orientalia; 1996. Chapter 17.p.376, 377
- Ram Karan Sharma and Vaidya Bhagwan Das. Rogabhishakjitheeyam vimanam. (ed). Agnivesa's Charakasamhita, Reprint edition 2015 ed. Varanasi: Chowkambha Sanskrit series; 2015. Pp. 271
- Karan SR, Bhagwan DY, editors. Charaka Samhita of Agnivesa. Vimana Sthana; Rogabhishitiyam Adhyaya. 1st ed. Vol.2. Ch. 8. Verse 102. Varanasi: Chaukambha Krishnadas Academy; 2008.p.922
- Tiwari PV, Vridha Jivakiyatantira or Kasyap Samhita of Vridha Jivaka, Marica Kasyap, Vatsya, Sutra Sthana; Lakshana Adhyaya. 1st .ed. Ch. 28.Verse 37. Varanasi: Chowkhanbha Vishwabharati Publication; 1996.p.86.
- Ram Karan Sharma and Vaidya Bhagwan Dash. Rogabhishakjitheeyam vimanam. (ed). Agnivesa's Charakasamhita, Reprint edition 2015 ed. Varanasi: Chowkambha Sanskrit series; 2015. Pp. 270
- Ram Karan Sharma and Vaidya Bhagwan Dash . Rogabhishakjitheeyam vimanam. (ed). Agnivesa's Charakasamhita, Reprint edition 2015 ed. Varanasi: Chowkambha Sanskrit series; 2015. Pp. 271
- Ram Karan Sharma and Vaidya Bhagwan Dash. Rogabhishakjitheeyam vimanam. (ed). Agnivesa's Charakasamhita, Reprint edition 2015 ed. Varanasi: Chowkambha Sanskrit series; 2015. Pp. 271
- Ram Karan Sharma and Vaidya Bhagwan Dash. Rogabhishakjitheeyam vimanam. (ed). Agnivesa's Charakasamhita, Reprint edition 2015 ed. Varanasi: Chowkambha Sanskrit series; 2015. Pp. 271