A study to evaluate the relation between status of jatharagni and shareerika bala

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Abstract:

BACKGROUND
Agni in impartial state is the important factor for maintaining the health, Agni is required for the proper digestion of food and nourishment of the body tissues, so agni can be considered as symbol of life. Bala is the physical and mental strength of individual. Jatharagni is chief among panch bhutagni and sapta dhatvagni. Agnibala & shareerika bala varies in respective rutu as in varsha & greeshma it is avara, in vasanta & sharad is madhyama and in hemanta & shishira is pravara. The last seven days of a previous season and the first seven days of the next season called as rutusandhi. During rutusandhi the nature of dosha, jatharagni & shareerika bala is unstable. So study was undertaken to evaluate the relation between status of Jatharagni and Shareerika bala.

OBJECTIVES
• To establish relationship between Jatharagni & shareerika bala in ritusandhi kala (vasanta-greeshma and sharad-hemanta).
• To evaluate status of Jatharagni in ritusandhi kala viz. Vasanta & Greeshma (Adanakala) and Sharad & Hemanta (Visargakala).
• To evaluate the status of shareerika bala in ritusandhi kala viz. Vasanta & Greeshma (Adanakala) and Sharad & Hemanta (Visargakala).

METHODS
Healthy 150 volunteers were selected for the study in both vasanta-greeshma and sharad-hemanta rutusandhi and jatharagni bala & shareerika bala was assessed.

RESULTS
Results show significant relation between jatharagni bala and shareerika bala in vasanta greeshma & sharad-hemanta rutusandhi.

INTERPRETATION/CONCLUSION
Somers d test & spearman’s correlation test was performed to determine the relation between jatharagni bala and shareerika bala in vasanta greeshma & sharad hemanta rutusandhi. Majority of subjects prevailed with Madhyama jatharagni bala & shareerika bala. It
indicates positive correlation between the jatharagni bala and shareerika bala.

**Keyword:** Jatharagni, Rutusandhi, Shareerika bala.

**Introduction:** The concept of agni in ayurveda is a unique one. In universe all living entities exists life by jatharagni only. There is no life without agni. Jatharagni is responsible for breaking down of macro particles of food in to micro particles which helps in absorption and utilization by the body. The process of digestion takes place in the stomach (amashaya) with the help of jatharagni and leads to bala in the body. Jatharagni is the main agni present in the body which nourishes dhatwagni, bhootagni and maintain the shareerika bala in the body. Jatharagni or pachakagni is the main converting agent, while the other agni’s like dhatwagni & bhootagni always depend on the jatharagni. Agni is the cause of digestion it converts the food into aahara rasa, rasa nourishes the tissues and build the body, without agni the food cannot digest and develop the tissue strength. The jatharagni performs the function of macro digestion its vitiation causesagnimandya and this is the root cause for variety of diseases.

Bala is considered as the physical and mental strength of an individual. The shareerika bala in healthy individuals may vary according to types of agni, prakruthi, kala, rutu etc. Three types of balas i.e sahaja bala, kalaja bala, yuktikruta bala. Among these three types of bala, Yuktikruta bala is attained by practice of proper aahara, vyayama etc.

The factors like Ritu can impact both the Agni as well as Bala in the body. There are six ritus i.e Shishir, Vasanta, Grishma, Varsha, Sharad and Hemanta. The consecutive seasons of Shishir, Vasanta, Grishma comprises Uttarayana. Uttarayana is also known as Adanakala. The seasons of Varsha, Sharad and Hemanta comprises Dakshinayana.(visargakala).

After observing previous research works on the concepts like role of agni in digestion, relation of prakruthi and agni, relation of agni & bala, relation of shareerika bala and kala, effect of aharasevan kala on agni, bala and kostha etc. Till now no much research has been carried out on relation between status of jatharagni and shareerika bala under the objective of rutusandhi kala.

To provide scientific data to support classical references/claims. This study was conducted on 150 Healthy volunteers who were selected randomly from Sri Dharmasthala Manjunatheshwara College of Ayurveda, Hassan. In age group 15-45 years irrespective of Gender, caste and religion. The Standard questionnaire was used as Subjective parameter to assess Jatharagni bala by schedule technique; Harvard step test results & heart rate were used as objective parameter to assess Shareerika bala.
**Aims_and_Objects:**

- To establish relationship between Jatharagni & shareerika bala in ritusandhi kala (vasanta- greeshma and sharad hemanta).
- To evaluate status of Jatharagni in ritusandhi kala viz. Vasanta & Greeshma (Adanakala) and Sharad & Hemanta (Visargakala).
- To evaluate the status of shareerika bala in ritusandhi kala viz. Vasanta & Greeshma (Adanakala) and Sharad & Hemanta (Visargakala).

**Materials_and_Methods**

1. Literary work
2. Hindu panchanga 2017
3. W.H.O Health Questionnaire 2.0
4. Agni assessment Questionnaire
5. Harvard step test
6. Stop watch
7. Weather report

**Collection of Materials**
The literary source for the present study was obtained from: Library, S.D.M. College of Ayurveda and Hospital, Hassan, viz Charaka Samhita, Sushruta Samhita, Asthanga sangraha, Asthanga hrudaya with commentary and Bhela Samhita, Hareeta Samhita, Modern books, Websites, Research databases.

**METHODS**

**Assessment of Health Status**

|   | HP | PF | PH | EP | SF | MH | BP | E/F |
|---|----|----|----|----|----|----|----|-----|
| N | 150| 150| 150| 150| 150| 150| 150| 150 |
| Minimum | 67 | 30 | 75 | 50 | 65 | 65 | 92 | 85 |
| Maximum  | 79 | 30 | 75 | 50 | 65 | 65 | 92 | 85 |

**SOURCE OF DATA**
Healthy volunteers were selected from Sri Dharmasthala Manjunatheshwara College of Ayurveda, Hassan. In age group 15-45 years irrespective of Gender, caste and religion.

**COLLECTION OF DATA:**
Healthy 150 volunteers who are full filling the criteria were selected for the study in both vasanta- greeshma and sharad-hemanta ritusandhis and their jatharagni bala & shareerika bala was assessed.

**INCLUSION CRITERIA**
- Healthy 150 volunteers of age between 15 to 45 years irrespective of Gender, caste, religion.

**EXCLUSION CRITERIA**
- Physically challenged & those who are not willing to participate in the study.

**PLAN FOR THE STUDY**
- Health status was assessed by using W.H.O health status questionnaire 2.0
- The standard questionnaire was used to assess status of the Jatharagni bala.
- The shareerika bala was assessed with the help of Harvard step test.
- The relationship between status of jatharagni and shareerika bala was assessed based on results.

**Observation:**
The health status was observed based on 8 criteria’s. For 150 volunteers HP - health perception minimum score was 67 and maximum was 79, PF - physical functioning minimum score was 50 and maximum was 100, PH - role limitations due to physical health minimum score was 75 and maximum was 100, EP - role limitations due to emotional problems minimum & maximum core was 100, SF - social functioning minimum score was 50 and maximum score was 100, MH - mental health (emotional well being) minimum score was 65 and maximum score was 92, BP - bodily pain minimum score was 65 and maximum score was 100 and E/F - energy/fatigue minimum score was 50 and maximum score was 85. No one has shows score below 50 so all volunteers were healthy.

Jatharagni bala wise distribution of subjects

Among the 150 individuals, 33 individuals were pravara jatharagni bala, 114 individuals were madhyama jatharagni bala and 3 individuals had avara jatharagni bala in vasanta greeshma rutusandhi.

Among the 150 individuals, 28 individuals were pravara jatharagni bala, 122 individuals were madhyama jatharagni bala and no individual had avara jatharagni bala in sharad hemanta rutusandhi.

Shareerika bala wise distribution of subjects

Among the 150 individuals, 33 individuals were pravara jatharagni bala, 114 individuals were madhyama jatharagni bala and 3 individuals had avara jatharagni bala in vasanta greeshma rutusandhi.

Among the 150 individuals, 28 individuals were pravara jatharagni bala, 122 individuals were madhyama jatharagni bala and no individual had avara jatharagni bala in sharad hemanta rutusandhi.
Among the 150 individuals, 51 individuals were *pravara*, 82 were *madhyama* and 17 were *avara* *Shareerika bala* in *vasanta greeshma rutusandhi.*

**Harvard Step Test Exercise Time Seconds. First/Second/Third pulse count and score wise Descriptive distribution of subjects in Vasanta Greeshma Rutusandhi and Sharad Hemanta Rutusandhi**

| Harvar d Step Test | Vasanta Greeshma Rutusandhi | Sharad Hemanta Rutusandhi |
|--------------------|-----------------------------|---------------------------|
| Time Exercise Seconds | Minimum | Maximum | Mean | Std. Deviation | Minimum | Maximum | Mean | Std. Deviation |
| 120 | 316 | 277.57 | 44.816 | 140 | 310 | 283.96 | 32.949 |
| First Pulse Count | 50 | 88 | 70.35 | 7.361 | 51 | 88 | 72.21 | 6.632 |
| Second Pulse Count | 35 | 80 | 63.23 | 7.201 | 48 | 78 | 65.18 | 5.539 |
| Third Pulse Count | 33 | 75 | 57.37 | 7.747 | 41 | 73 | 59.12 | 5.671 |
| Score | 150 | 31.57 | 108.69 | 73.139 | 12.5076 | 72.3785 | 9.04117 |

The 150 individuals performed minimum 120 seconds of Harvard step test and maximum was 316 seconds, first pulse count minimum was 50 and maximum was 88, second pulse count minimum was 35 and maximum was 80, third pulse count minimum was 33 and maximum was 75 and Harvard step test score minimum was 31.57 and maximum was 108.69 in *vasanta greeshma rutusandhi.*

The 150 individuals performed minimum 140 seconds of Harvard step test and maximum was 310 seconds, first pulse count minimum was 51 and maximum was 88, second pulse count minimum was 48 and maximum was 78, third pulse count minimum was 41 and maximum was 73 and Harvard step test score minimum was 36.45 and maximum was 102.73 in *sharad hemanta rutusandhi.*
**Result:**

Relation between Jatharagni Bala & Shareerika Bala In Vasanta Grishma Rutusandhi by somer’s d test.

| Parameter                        | Somers' d Value | Std. Error | Approx. T | Significance Value | Interpretation |
|----------------------------------|-----------------|------------|-----------|--------------------|----------------|
| Jatharagni Bala Result VGR Dependent | .237            | .063       | 3.701     | .000               | p<0.05         |
| Shareerika Bala VGR Dependent    | .363            | .089       | 3.701     | .000               | p<0.05         |

Somers d test was performed to determine the association between the *jatharagni bala* and *Shareerika bala* among 150 healthy volunteers in *vasanta greeshma rutusandhi*. It was observed that there was positive correlation between the *jatharagni bala* and *Shareerika bala* which was statistically significant at the somer’s d value .237 and .363 which is having significance at p value <0.000 and p value <0.000 level in *vasanta greeshma rutusandhi*.

Relation between Jatharagni Bala & Shareerika Bala In Vasanta Grishma Rutusandhi by Spearman Correlation Test.

| Parameter                        | Spearman Correlation Value | Std. Error | Approx. T | Significance Value | Interpretation |
|----------------------------------|----------------------------|------------|-----------|--------------------|----------------|
| Jatharagni Bala Result VGR Vs Shareerika Bala VGR Dependent | .305                       | .076       | 3.896     | .000              | p<0.05         |

Spearman’s rank- order correlation test was performed to determine the relationship between the *jatharagni bala* and *Shareerrika bala* among 150 healthy volunteers in *vasanta greeshma rutusandhi kala*. It was observed that there was a positive correlation between the *jatharagni bala* and *Shareerika bala*, which was statistically significant at the Spearman correlation value .305 which is having significance at p value <0.000 level in *vasanta greeshma rutusandhi*.

Relation between Jatharagni Bala & Shareerika Bala In Sharad Hemanta Rutusandhi by somer’s d test.

| Parameter                        | Somers' d Value | Std. Error | Approx. T | Significance Value | Interpretation |
|----------------------------------|-----------------|------------|-----------|--------------------|----------------|
| Jatharagni Bala SHR Dependent    | .213            | .067       | 3.087     | .002               | p<0.05         |
| Shareerika Bala SHR Dependent    | .344            | .102       | 3.087     | .002               | p<0.05         |
Somers d test was performed to determine the association between the jatharagni bala and Shareerika bala among 150 healthy volunteers in sharad hemanta rutusandhi. It was observed that there was positive correlation between the jatharagni bala and Shareerika bala which was statistically significant at the somer d value .213 and .344 which is having significance at p value <0.002 and p value <0.002 level in sharad hemanta rutusandhi.

Relations between Jatharagni Bala & Shareerika Bala in Sharad Hemanta Rutusandhi by Spearman Correlation Test.

| Parameter                        | Spearman Correlation Value | Std. Error<sup>a</sup> | Approx. T<sup>b</sup> | Significance Value. | Interpretation 
|----------------------------------|-----------------------------|-------------------------|----------------------|---------------------|------------------------
| Jatharagni Bala SHR Vs Shareerika Bala SHR Dependent | .279                        | .083                    | 3.540                | .001<sup>c</sup>    | p<0.05                 |

Spearman’s rank- order correlation test was performed to determine the relationship between the jatharagni bala and Shareerika bala among 150 healthy volunteers in sharad hemanta rutusandhi kala. It was observed that there was a positive correlation between the jatharagni bala and Shareerika bala, which was statistically significant at the Spearman correlation value .279 which is having significance at p value <0.000 level in sharad hemanta rutusandhi.

Discussion:

The health status was observed based on 8 criteria’s. For 150 volunteers HP- health perception minimum score was 67 and maximum was 79, PF- physical functioning minimum score was 50 and maximum was 100, PH- role limitations due to physical health minimum score was 75 and maximum was 100, EP- role limitations due to emotional problems minimum &s maximum core was 100, SF- social functioning minimum score was 50 and maximum score was 100, MH- mental health (emotional well being) minimum score was 65 and maximum score was 92, BP- bodily pain minimum score was 65 and maximum score was 100 and E/F- energy/fatigue minimum score was 50 and maximum score was 85. No one has shows score below 50 so all volunteers were healthy.

Among the 150 individuals, 33 individuals were pravara jatharagni bala, 114 individuals were madhyama jatharagni bala and 3 individuals had avara jatharagni bala in vasanta greeshma rutusandhi. In vasanta greeshma rutusandhi there is kapha is in negative tendency i.e from prakopa avastha to prashama avastha so there is improvement of jatharagni bala but at the same time there is initial stage of vata sanchaya , due to climatic and environmental changes thus there is also having chances for jatharagni vishamata because of this above results shows 22% pravara and madhyama 76% and avara 2% frequency for jatharagni bala.

Among the 150 individuals, 28 individuals were pravara jatharagni bala, 122 individuals were madhyama jatharagni bala and no individual had avara jatharagni bala in sharad hemanta rutusandhi. In sharad hemanta...
rutusandhi there is pitta in negative tendency so there is blockade to dissipation of body heat which increases the digestive power in strong men but there is also initial stage of kapha sanchaya, due to climatic and environmental changes there may be fluctuations in the status of jatharagni occurs so the above results shows 18.7% pravara and madhyama 81.3% and avara 0% frequency for jatharagni bala.

Among the 150 individuals, 51 individuals were pravara, 82 were madhyama and 17 were avara shareerika bala in vasanta greeshma rutusandhi. In vasanta greeshma rutusandhi there is kapha is in negative tendency i.e from prakopa avastha to prashama avastha so there is improvement of jatharagni bala but at the same time there is initial stage of vata sanchaya due to climatic and environmental changes thus there is also having chances for jatharagni vishamata because of this above results shows 34% pravara and madhyama 54.7% and avara 11.3% frequency for shareerika bala.

Among the 150 individuals, 36 individuals were pravara, 100 were madhyama and 14 were avara shareerika bala in sharad hemanta rutusandhi. In sharad hemanta rutusandhi there is pitta is in negative tendency so there is blockade to dissipation of body heat which increases the digestive power in strong men but there is also initial stage of kapha sanchaya, due to climatic and environmental changes there may be fluctuations in the status of jatharagni occurs so the above results shows 24% pravara and madhyama 66.7% and avara 9.3% frequency for shareerika bala.

Harvard step test maximum time period for exercise is 5 minutes or till the exhaustion among the 150 individuals most them performed near 5 min in both rutusandhi, most of them were not habituated for alcohols/ smoking which results in good physical fitness. The compounding factors also plays roles like subjects emotional state, time of the day, time since subject last meal, test environment, subjects prior test knowledge, accuracy of measurement.

This exercise increases the rate at which energy is needed from food. This increases the need for both food and oxygen in the body. Thus the pulse rate and breathing rate increase with this exercise. Pulse is just an indication of heart rate as arteries expand each time the ventricles pump blood out the heart. Heart speeds up to pump extra food and oxygen to the muscles. Breathing speeds up to get more oxygen and get rid of more carbon dioxide. The time which it takes for pulse and breathing rate to return normal is a recovery period.

Climatic and environmental of vasanta-greeshma & sharad-hemanta rutusandhi changes might have impact over readings of Harvard step test.

Somers d test was performed to determine the association between the jatharagni bala and shareerika bala among 150 healthy volunteers in vasanta greeshma rutusandhi. It was observed that there was positive correlation between the jatharagni bala and shareerika bala which was statistically significant at the somers d value .237 and .363 which is having significance at p value <0.000 and p value <0.000 level in vasanta greeshma rutusandhi.

Somers d test was performed to determine the association between the jatharagni bala and shareerika bala among 150 healthy volunteers in sharad hemanta rutusandhi. It was observed that there was positive correlation between the jatharagni bala and shareerika bala which was statistically significant at the somers d value .213 and .344 which is having significance at p value <0.002 and p value <0.002 level in sharad hemanta rutusandhi.
Spearman’s rank-order correlation test was performed to determine the relationship between the jatharagni bala and shareerika bala among 150 healthy volunteers in vasanta greeshma rutusandhi kala. It was observed that there was a positive correlation between the jatharagni bala and shareerika bala, which was statistically significant at the Spearman correlation value .305 which is having significance at p value <0.000 level in vasanta greeshma rutusandhi.

Spearman’s rank-order correlation test was performed to determine the relationship between the jatharagni bala and shareerika bala among 150 healthy volunteers in sharad hemanta rutusandhi kala. It was observed that there was a positive correlation between the jatharagni bala and shareerika bala, which was statistically significant at the Spearman correlation value .279 which is having significance at p value <0.000 level in sharad hemanta rutusandhi.

**Conclusion:**

- Vasanta-Greeshma ritusandhi had majority of subjects with madhyama jatharagni bala & shareerika bala. There was positive relationship between Jatharagni bala and Shareerika bala.

- Sharad-hemanta ritusandhi had majority of subjects with madhyama jatharagni bala & shareerika bala. There was positive relationship between Jatharagni bala and Shareerika bala.

- There is significant relation between Madhyama Jatharagni Bala and Madhyama Shareerika bala in both vasanta-greeshma & sharad-hemanta Ritusandhi.

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**Ethical committee permissions details:**
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