Udana Vata for Immunity

Sandeep Shah
Consulting Ayurvedic Physician, Panchkarma Ayurveda Clinic, Indore, Madhya Pradesh, India

Correspondence should be addressed to Sandeep Shah, drshahs.co.in@gmail.com

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Abstract The main purpose of this paper was to identify the role of ‘Udana vata’ to increase immunity. The study was divided into Literary Study and Clinical Study. References were studied for different keywords like – Saar, Oja, Bala, Rasayana, Udana vata, etc. So, to prove the concept and for the applied aspect of ‘Udana Vata for Immunity’ a clinical study was performed on patients at OPD level. Patients were selected keeping in view, the ‘desire for maintaining health’ as mentioned in Ayurvedic texts. Selected patients for Rasayana were randomly divided into two groups of 25 patients each. The efficacy of the therapy was assessed on the basis of subjective as well as objective criteria. Traditionally there is no objective assessment criteria is given in texts. Thus, a need aroused to do the same, therefore with the help of modern and traditional knowledge following criteria were developed by me and all patients were examined under following criteria.

1. Saarta scale
2. Bala scale
3. Swara scale
4. Varna scale
5. Smriti scale

An attempt was made to find out the best condition for getting rasayana effects. This study was done only for ‘vata- tapik rasayana’ (In routine life). There was 72 % marked improved in udana vata group vis a vis only 36% marked improvement in control group. Rasayana are best effective in lehiya form. Oja / Immunity can be improved if lehiya form of rasayana is given in Udana kaal and at udana sthana. Udana consideration is important for best rasayana effects.

Keywords Udana vata; Oja; Rasayana; Bala; Saar; Varna; Swara; Smriti

1. Introduction

The unique and foremost aim of Ayurveda is to maintain the health of a healthy individual. We also understand that in a healthy body only, healthy mind and soul can reside.
The main purpose for a human to maintain their health is to attain ‘Moksha’ or Liberation from the Karmic Cycle.

The liberation from the Karmic Cycle can only be possible if one’s life is quite long enough to complete all works assigned to it. We humans along with completing the destined work, create our own new work by expecting from “Kaayik (Physical), Vaachik (Speaking) and Maansik (Mental) Karma (Deeds)”. So, to complete the effect of the works in one lifetime we have to live long enough.

Death is always inevitable, either we can blame to the diseases or the accident for it. We can reduce the chances of early death by reducing the death by diseases. “Rasayana” branch of Ayurveda helps to achieve this goal by increasing Immunity or “Oja”.

Ayurveda aimed to increase Oja by right diet, lifestyle or by natural supplements. The ‘Samhita’ (Classical Texts) has also given lots of formulation to achieve the same.

Immunity plays a vital role for a disease-free society. There are several medicines, food supplements available for immunity enhancement, but most of time we don’t see the desired effects of “Rasayana” as per the ayurvedic texts.

The knowledge in the texts is limitless we don’t understand it is our limit not with ‘The science’.

Considering the fact that Vata is only ‘Doer’ element in the body and out of all vata, Udana is considered as ‘Para’ (Best / Above all). Since Oja is also “Para” in the body it can establish a direct connection with it.

2. Aims and Objectives

(1) To study in detail the principle of ‘Udana Vata’ as described in classical Ayurvedic texts.
(2) To study in detail the concept of Rasayana and Oja.
(3) To study the applied scope of ‘Udana vata Sthana and Udana kaal’, as evidenced in classics with appropriate examples.
(4) To study the effect of ‘Udana vata on Immunity’ based on principles.

Plan of Study

To meet the above said objectives, the study was divided as follows.

(1) Literary Study
(2) Clinical Study
(3) Discussion and Conclusion
(4) Summary

Literary Study

1. Udano naam yat urdwam upeti pawan uttamah [1]
   Vata which have ‘urdhwa gati’ is named as Udana Vata. It is also best in all of the vata types.

2. Udanasya punah sthanam nabhi urah kantha eva cha [2]
   The existence of the Udana vata can be found at navel chest and neck.

3. Urah sthanam udanasya nasa nabhi galansh charet [3]
   Vagbhatt sutra adds nose as additional locations of Udana vata.
4. **Vaak pravratti prayatna oorja bala varna aadi** [4]
   Bodily functions served by *Udana vata* are – speech / voice, making an effort, energy / vigour, strength, complexion, etc.

5. **Vaak pravratti prayatna oorja bala varna smriti Kriya** [5]
   Initiation of speech, effort, enthusiasm, strength, colour, complexion and memory are the functions of *Udana vata*.

6. **Swasthasya ojas karam yattu tad vrishyam tad rasayanam** [6]
   Generally, those which brings health and increases ‘Oja’ is known as *Rasayana*.

7. Charka explains that *oja* is “**Sarva dhatu saar rupam**” [7]"  

8. **Ojah saar yukta** [8]
   Kashyap goes on straight to say that *oja* means *saar*.

9. **Saaro bale sthiransh cha** [9]
   According to amarkosha, *Saar* is the stable strength in a body.

10. According to Dalhana *bala* is - “**Hridi stitha ojah**” [10]"

11. While studying the sequence of chapters in Charka Samhita following points are understood as follows [11] –
   
   a. First chapter of *Indriya Sthana* is ‘Varna Swar Indriya’
   b. *Varna* being the work of ‘*Agni*’
   c. *Svara* being work of ‘*Vayu*’
   d. *Agni* and *Vayu* always remain - hand in hand, means where ever there will be *agni* there will be *vayu*.
   e. *Mrityu* happens only when ‘*Jathar Agni*’ ceases.
   f. Over here, *varna* and *swara* being the function of *Udana vata*, it means that *Udana vata* is functions are being ‘First symptom of death’.
   g. *Rasayana* is the only choice when a patient shows ‘*Arista*’ or *Oja* depletion.

12. While studying the chapter 17 of Charka Samhita following observation were made [12] –
   
   a. Diseases discussed in the chapter is “**Kasa Swasa Hikka**”
   b. All these diseases are *Prana nashini & Aashukari* in nature.
   c. Either one of these is present at death moment
   d. *Udana vata* is responsible for these diseases.
   e. *Rasayana* is the only choice in untreatable diseases.

13. **Udana vikrutau punah sayam ashanatam purva kayasya cha bala** dhanarth [13]
    In Astang Sangrah, Vagbhat clearly says that *udana vata kala* is for providing ‘*bala*’.

14. **Prakritastu balam sleshma…sa chaiva ojah smritah kayesa cha** [14]
    According to Charka – *Prakrit* / *Natural Kapha or Sleshma* is *bala* and *oja*.
    In the context here it is referring to “*Avalambak Kapha*” in natural state.
15. **Urahstha sa viryen trikasya anna viryen cha sah hridayasya cha sleshma sthanam tatrastha eva udaka karmanam avalambanaad avalambak iti uchyate** [15]
   Avalambak kapha while staying at “Urah” Sthana, because of its virya nourishes trik and nourishes Hridaya (seat of Oja) with aahar rasa. It also nourishes other four locations of sleshma with the help of ‘Udaka Karma’.

16. **Deergha ayu smriti medha aarogyam tarunam vayah. Prabhava varna swara deha indriya bala param. Vaak siddhi pranatim kaanti labhate na rasayanat** [16]
   Functions of Rasayana are – longevity, memory, intelligence, immunity, youthfulness, excellent lustre, complexion and voice. Optimum physical and mental strength.

17. **Rasayana formulations** [17]
   After analysing all of the rasayana formulations from Charka Samhita it was observed that –
   
   a. Every formulation was mixed either with dahi (curd)/ ghee/ madhu (Honey)/ tila (sesame seeds)/ sharkara (sugar).
   b. Even ‘Amalaki churna Rasayana’ – should be mixed with ghee/ madhu/ sharkara to make a lehiya (Lickable) form.
   c. Lehiya form is best for Avalabak kapha. Since both works on common area.

**Clinical Study**

As the definition of Research is either to invent something new or to throw light on old facts & principles which are traditionally proved as truth first by challenging them then critically re-examining & then either accepted or rejected on the basis of evidences found.

So, to prove the concept and for the applied aspect of ‘Udana Vata for Immunity’ a clinical study was performed on patients.

**3. Materials & Methods**

All the patients were selected for the present study by keeping in view, the ‘desire for maintaining health’ as mentioned in Ayurvedic texts irrespective of age, sex, religion and economical status. All the patients were treated at OPD level.

**Criteria for Selection**

- Patients who came for maintaining their health were chosen.
- Patients were examined to rule out any possible major disease.

**Management of the Patients**

All the selected patients for Rasayana were randomly divided into the following two groups of 25 patients each.

1. **Management group** *(Udana Vata group)*

Patients of this group were given ‘Chyavanprash’ under following conditions –

- **Dose** - 10 grams every day once.
- **Anupana** - None.
- **Kala** - Udana kala i.e. evening post meal.
- **Duration** - 30 days.
Patients were also advised not to eat thereafter until complete digestion (samayak pachan lakshana was observed). All of the patients were also advised to follow a healthy lifestyle and diet for 30 days

(2) Control Group (Non - udana vata group)

Patients of this group were given same rasayana. The dose, anupana, duration and even food and lifestyle were kept the same as that of the Management Group. Only criteria changed was ‘Kala’. In this group the chyavanprash rasyana was given in any other kala but not in udana kala, i.e. except after evening post meal.

Criteria of Assessment

For assessing the changes, OPD patients were examined weekly. The suitable scoring method for the symptoms and objectives signs were recorded. The efficacy of the therapy was assessed on the basis of subjective as well as objective criteria.

Subjective Criteria

Most of the symptoms & signs of Benefits from Rasayana, described in Ayurveda, are subjective in nature. Therefore, individual feeling of wellness was also considered when assessment was done objectively.

The assessment was done before starting the treatment and after 30 days of rasayana.

Objective Criteria

Traditionally there is no objective assessment criteria is given in texts. Thus, a need aroused to do the same for present times, therefore with the help of modern and traditional knowledge following criteria were developed by me and all patients were examined under following criteria.

i. Saarta
ii. Bala
iii. Swara
iv. Varna
v. Smrīti

SAARTA [18]

For each dhatu saarta is calculated as percentage.

- If it is 30 % or less it will in asaar category.
- If between 30 % to 60 % it will be in Madhyama saar category.
- If it is 70 % or above it will be in Pravar saar category.

| Asaar | Madhyama saar | Pravar saar |
|-------|---------------|-------------|
| Saar Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Final assessment | 27 (54 %) | 14 (28 %) | 09 (18 %) |
**BALA** [19]

*Bala or strength was assessed by 'METS' (Treadmill test)*

- METS value of less than 3 is *avar/a* least bala
- METS value between 4 to 6 is *madhyama* / moderate bala
- METS value of above 7 is *Pravar bala*.

| METS Scale | Avar bala | Madhyama bala | Pravar bala |
|------------|-----------|---------------|-------------|
| Final assessment | 20 (40%) | 17 (34%) | 13 (26%) |

**SWARA (VAAK PRAVRITTI)** [20]

*Swara and ‘Shruti scale’ was devised to assess the patients’ voice quality.*

- ‘Sa’ taken as 100 Hz for convenience.
- Those who were able to produce ‘Sa’ ‘Re’ were classified as *avar vaak pravritti*.
- Those who were able to produce ‘Sa’ ‘Re’ ‘Ga’ ‘Ma’ were classified as *madhyama vaak pravritti*.
- Those who were able to produce ‘Sa’ ‘Re’ ‘Ga’ ‘Ma’ ‘Pa’ ‘Dha’ ‘Ni’ were classified as *Pravar vaak pravritti*.
- Patients were examined by mobile app for the frequencies.

| Pitch | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------|---|---|---|---|---|---|---|
| Swara | Sadja (Sa) | Rshabha (Re) | Gandhara (Ga) | Madhyama (Ma) | Pañchama (Pa) | Dhaivata (Dha) | Nishada (Ni) |
| Ref. Frequency (Hz) | 100 | 112.5 | 125 | 133.33 | 150 | 166.66 | 187.5 |
| Ratio | 1/1 | 9/8 | 5/4 | 4/3 | 3/2 | 5/3 | 15/8 |
| Shruti** (Hz) | 261 | 294 | 327 | 348 | 392 | 436 | 490 |
| Final assessment | | | | | | | |
| *avar vaak pravritti 32 (64%)* | | | | | | | |
| *Madhyama vaak pravritti 15 (30%)* | | | | | | | |
| *Pravar vaak pravritti 03 (06 %)* | | | | | | | |

**VARNA / COMPLEXION / SKIN TONE** [21]

- *Prakrit varna* – Skin tone when the skin is healthy.
- *Vikrit varna* – when skin shows signs of diseases.
  - *Neel* – as in argyria / or lack of oxygen /heart diseases
  - *Shyaav* – as in cyanosis / hematoma
  - *Tamra* – as in rakta dusti / Rosacea / Dermatitis
  - *Harita* – as Kamala / Microcytic Hypochromic anaemia
  - *Shukla* – as in switra / leukoderma
SMRITI / MEMORY [22]

Initial capacity of memorising number of decimal places of ‘π’ was taken as base score. After the completion of the Rasayana therapy a new set of π numbers were provided of the same length and patients were asked to memorise further than that.

- If the person was able to memorise maximum up to 30 decimal places then he was labelled as ‘Alpa Smriti’ person
- If the person was able to memorise maximum from 31 up to 60 decimal places then he was labelled as ‘Madhyama Smriti’ person
- If the person was able to memorise maximum from 61 up to 100 decimal places then he was labelled as ‘Uttama Smriti’ person

| Smriti Scale | Alpa Smriti | Madhyam Smriti | Uttama Smriti |
|--------------|-------------|----------------|---------------|
| Number of decimal places | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Number of patients | 48 (96%) | 2 (4%) | 0 (0%) |

4. Observations

**Table 1: Age wise Distribution of 50 Patients**

| Age group | UV 25 | NUV 25 | Total 50 | % |
|-----------|-------|--------|----------|---|
| Baal      | 0     | 0      | 0        | 0 |
| Madhyama  | 20    | 22     | 42       | 84|
| Vriddha   | 5     | 3      | 8        | 16|

**Table 2: Deha Prakriti DISTRIBUTION OF 50 PATIENTS**

| Deha Prakriti | Udana Vata 25 | Non Udana Vata 25 | Total 50 | % |
|---------------|---------------|-------------------|----------|---|
| Vata          | 15            | 14                | 29       | 58|
| Pitta         | 8             | 10                | 18       | 36|
| Kapha         | 2             | 1                 | 3        | 6 |
**Table 3: Manas Prakriti DISTRIBUTION OF 50 PATIENTS**

| Prakriti | UV  | NUV | Total | %  |
|----------|-----|-----|-------|----|
| Saatvik  | 5   | 5   | 10    | 20 |
| Rajasik  | 12  | 13  | 25    | 50 |
| Tamasik  | 8   | 7   | 15    | 30 |

**Table 4: Satva DISTRIBUTION OF 50 PATIENTS**

| Pravara | UV  | NUV | Total | %  |
|---------|-----|-----|-------|----|
| Pravara | 7   | 6   | 13    | 26 |
| Madhyam | 8   | 10  | 18    | 36 |
| Avara   | 10  | 9   | 19    | 38 |

**Table 5: Sex wise DISTRIBUTION OF 50 PATIENTS**

| Sex      | UV  | NUV | Total | %  |
|----------|-----|-----|-------|----|
| Male     | 7   | 5   | 12    | 24 |
| Female   | 18  | 20  | 38    | 76 |
| Other    | 0   | 0   | 0     | 0  |

**Table 6: Socio – Economic status wise DISTRIBUTION OF 50 PATIENTS**

| Socio – economic status | UV  | NUV | Total | %  |
|-------------------------|-----|-----|-------|----|
| Lower                   | 8   | 8   | 16    | 32 |
| Middle                  | 11  | 10  | 21    | 42 |
| Upper                   | 7   | 8   | 15    | 30 |

**Table 7: Education wise DISTRIBUTION OF 50 PATIENTS**

| Education | UV  | NUV | Total | %  |
|-----------|-----|-----|-------|----|
| Illiterate| 6   | 7   | 13    | 26 |
| SSC       | 3   | 1   | 4     | 8  |
| HSC       | 7   | 8   | 15    | 30 |

**Table 8: Saar wise DISTRIBUTION OF 50 PATIENTS**

| Saar      | UV  | NUV | Total | %  |
|-----------|-----|-----|-------|----|
| Asaar     | 12  | 15  | 27    | 54 |
| Madhyama  | 8   | 6   | 14    | 28 |
| Sarva     | 5   | 4   | 9     | 18 |
Table 9: Bala wise DISTRIBUTION OF 50 PATIENTS

| Bala    | UV 25 | NUV 25 | Total 50 | %   |
|---------|-------|--------|----------|-----|
| Avara   | 12    | 8      | 20       | 40  |
| Madhyama| 4     | 13     | 17       | 34  |
| Pravar  | 9     | 4      | 13       | 26  |

Table 10: Swara wise DISTRIBUTION OF 50 PATIENTS

| Swara   | UV | NUV | Total 50 | %   |
|---------|----|-----|----------|-----|
| Avara   | 15 | 17  | 32       | 64  |
| Madhyama| 9  | 6   | 15       | 30  |
| Pravar  | 1  | 2   | 3        | 06  |

Table 11: Varna wise DISTRIBUTION OF 50 PATIENTS

| Varna   | UV 25 | NUV 25 | Total 50 | %   |
|---------|-------|--------|----------|-----|
| Prakrit | 15    | 13     | 28       | 56  |
| Vikrit  | 10    | 12     | 22       | 44  |

Table 12: Smriti wise DISTRIBUTION OF 50 PATIENTS

| Smriti | UV | NUV | Total | %   |
|--------|----|-----|-------|-----|
| Alpa   | 24 | 24  | 48    | 96  |
| Madhyam| 1  | 1   | 2     | 4   |
| Uttam  | 0  | 0   | 0     | 0   |

Assessment Parameter

- Marked Improved – if patients improved 2 levels. (e.g. from avar to pravar)
- Moderately Improved - if patient improved to next higher level. (e.g. from avar to madhyam)
- Improved – if only slight change, but patient remains in same level. (e.g. from madhyam to madhyam but still slight improvement)
- Unchanged – when there is no change in pre and post rasayana.

5. Results

Results are tabulated considering the maximum change obtained in which parameter.

Udana Vata group (25)

| Parameter | Marked Improved 18 (72 %) | Moderately Improved 4 (16 %) | Improved 3 (12 %) | Unchanged 0 (0 %) |
|-----------|----------------------------|------------------------------|-------------------|-------------------|
| Saar      | 8                          | 2                            | 1                 | 0                 |
| Bala      | 4                          | 1                            | 1                 | 0                 |
Non - Udana Vata Group (25)

| Parameter | Marked Improved | Moderately Improved | Improved | Unchanged |
|-----------|-----------------|---------------------|----------|-----------|
| Swara     | 9 (36 %)        | 5 (20 %)            | 7 (28 %) | 4 (16 %)  |
| Varna     | 4               | 2                   | 2        | 0         |
| Smriti    | 1               | 2                   | 2        | 1         |

6. Discussion

This is the most important part of any research work. It comprises the discussion of important points from Conceptual Study as well as the results obtained from Applied Study. Discussion is nothing but the logical reasoning of observations. If all the points are discussed with proper reasoning then they help to draw proper conclusions. It is a bridge which connects the findings with conclusions. Only a properly done discussion can fulfil the purpose of research work i.e. to draw some conclusion from the findings and results. Therefore, discussion is the main substratum of any type of research work.
Though the number of patients was very less but an attempt was made to find out the best condition for giving rasayana effects.

This study was done only for vata-tapik rasayana (in routine life) give rasayana in udana kaal only. If kuti praveshik (Special life for rasayan) is needed than only best to give in abhakta kaal.

Medhya rasayana were only which udana vata were not in lehiya form but were in the sanchar areas of the.

Further extensive studies should be carried out with more detailed parameter for analysis of minor details.

7. Conclusion

Conclusions are the essence of whole study. In Ancient Research Methodology it is described as "Nigamana". In the discussion part of the study, the work is discussed on the basis of concepts, supported by data and logical reasoning. The conclusions drawn from the scientific discussion are as follows:

1. Rasayana are best effective in lehiya form.
2. Immunity can be improved if rasayana is given in udana vata sthana.
3. Oja can be improved if lehiya form of rasayana is given at Udana kaal in udana sthana.
4. Udana consideration is important for best rasayana effects.

References

[1] Shastri Kaviraja Ambikadutta ed, Susruta Samhita (Sans), Part 1, 11th ed, Nidana, Vata Vyadhi Nidan, 1/14, Chaukhambha Sanskrit Sansthan, Varanasi, 1997, pg.229.

[2] Dr. Tripathi Brahmanand, Dr Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa, Vata Vyadhi Chikitsa, 28/7, Chaukhambha Surbharati Prakashan, Varanasi, 1999, pg.934.

[3] Taradutta panta ed, Astanga Hridayam (sans), 4th ed, Sutra, Doshabhediya, 12/5, Chaukhambha Sanskrit Series, Varanasi, pg.86.

[4] Dr. Tripathi Brahmanand, Dr Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa, Vata Vyadhi Chikitsa, 28/7, Chaukhambha Surbharati Prakashan, Varanasi, 1999, pg.934.

[5] Taradutta panta ed, Astanga Hridayam (sans), 4th ed, Sutra, Doshabhediya, 12/6, Chaukhambha Sanskrit Series, Varanasi, pg.86

[6] Dr. Tripathi Brahmanand, Dr Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa, Rasayana, 1/1/5, Chaukhambha Surbharati Prakashan, Varanasi, 1999, pg.04.

[7] Dr. Tripathi Brahmanand, Dr Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa, Grahani, 15/3, Chaukhambha Surbharati Prakashan, Varanasi, 1999, pg.550.

[8] Satyapala bhisagacharya ed, Kashyap Samhita (sans), 9th ed, Sutra, Lakshana 28, Chaukhambha Sanskrit Sansthan, Varanasi, 2004, pg. 54
[9] Definition from Amarkosha.

[10] Dalhan commentary on Sushruta Samhita (Sans), Part 2, Uttar Tantra, 41/19.

[11] Dr. Tripathi Brahmanand, Dr. Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chaukhambha Surbharati Prakashan, Varanasi, 1999.

[12] Dr. Tripathi Brahmanand, Dr. Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa 17, Hokka Swasha Chikitsa, Chaukhambha Surbharati Prakashan, Varanasi, 1999.

[13] Lalchandra Shastri ed, Astanga Sangraha (sans), Vol.1, 4th ed, Sutra, Bhesaj Vicharniya, 23/16, Sri Baidyanath Ayurveda Bhavan Ltd., 1996, pg. 683.

[14] Dr. Tripathi Brahmanand, Dr. Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa 17, Hokka Swasha Chikitsa, Chaukhambha Surbharati Prakashan, Varanasi, 1999.

[15] Lalchandra Shastri ed, Astanga Sangraha (sans), Vol.1, 4th ed, Sutra, Dosha bhediya, 20/6, Sri Baidyanath Ayurveda Bhavan Ltd., 1996, pg. 616.

[16] Dr. Tripathi Brahmanand, Dr. Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa, Rasayana, 1/1, Chaukhambha Surbharati Prakashan, Varanasi, 1999.

[17] Dr. Tripathi Brahmanand, Dr. Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 2, 6th ed, Chikitsa, Rasayana, 1/1, Chaukhambha Surbharati Prakashan, Varanasi, 1999.

[18] Saarta Scale – created & derived from - Dr. Tripathi Brahmanand, Dr. Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 1, 7th ed, Vimana, 8/102, Chaukhambha Surbharati Prakashan, Varanasi, 2000. pg.763.

[19] Bala Scale created & derived from - Dr. Tripathi Brahmanand, Dr Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 1, 7th ed, Vimana, 8/121, Chaukhambha Surbharati Prakashan, Varanasi, 2000. pg.771.

i) M. Jette. K. Sidney. G. Blumchen - Metabolic Equivalents (METS) in Exercise Testing, Exercise Prescription, and Evaluation of Functional Capacity, Clin. Cardiol. 13, 1990. pg.555-565.

[20] Shruti (Music) - Wikipedia, Wikimedia Foundation, 27 June 2017, en.wikipedia.org/wiki/Shruti_(music)

[21] Varna Scale created and derived from - Dr. Tripathi Brahmanand, Dr Prabhakar J. Deshpande ed, Charaka Samhita of Agnivesa, (sans), Vol 1, 7th ed, Indriya, 1/8 - 10, Chaukhambha Surbharati Prakashan, Varanasi, 2000. pg.989-990.

[22] Smriti Scale created based upon - Raz A, Packard MG, Alexander GM, et al. A slice of pi: an exploratory neuroimaging study of digit encoding and retrieval in a superior memorist. Neurocase. 2009; 15(5) pg.361-372.