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A Multicenter Retrospective Observational Study to Correlate *Sharir Guna* Computed Through *Nadi Pariksha* (Pulse Diagnosis) Using Electronic *Nadi* (Pulse) Recording Device *Nadi Tarangini* with Trends and Changes in *Rutus* (Seasons) for a Span of One Year in North-Western Zone of India.

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ABSTRACT:

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Background: The theory of *Rutucharya* (seasonal regimen) is described in Ayurveda by *Acharyas* (Ancient sages) according to the climatic changes (seasonal changes), its effect on *Agni* (Digestive fire), *Bala* (Strength), *Tridosha* (*Vata*, *Pitta*, *Kapha*) i.e. 3 humors. *Guna* (*Sharir Guna*, properties) and finally on Body and Mind.

Objectives: In a multi-centric retrospective observational study, we “empirically” studied the correlations between and validating the same with some of the *sharir guna* which reflects in *nadi*, for different *Prakruti* (body constitution) with *rutus* (seasons) as per ayurveda text described to prediction and diagnose signs and symptoms of the diseases.

Materials and methods: We used *Nadi Tarangini* (a commercial wrist nadi recording system) to record nadi of 15,391 subjects across the north-west part of India throughout a span of one year. We further computed five pairs of *guna* (qualities) namely *Guru - Laghu* (Heavy- Light), *Snigdha - Ruksha* (Unctuous- Dryness), *Manda- Tikshna* (Blunt-Sharp), *Sukshma- Sthula* (Subtle-Bulky) and *Mrudu - Kathina*.(Soft-Hard)

Results: For 15,391 subjects, we found significant correlation of the *Guna* flow throughout the span of 1 year captured using *Nadi Tarangini*, matching with the ancient texts such as, *laghu guna* increases from *Varsha rutu*, *ruksha guna* is high in *Greeshma rutu* and *tikshna guna* increases in *Sharad rutu*, correlating well with the electronic *Nadi Tarangini* findings.

Conclusion: We emphasized the data-based evidence, for the first time and importance of *sharir guna* in *Rutucharya* and *nidan of dosha avastha* and *vyadhi* (signs and symptoms of diseases) through *Nadi pariksha*. It will be helpful to avoid lifestyle-oriented disorders and better diagnosis through *nadi pariksha* and also can be validated and used for the purpose of research among the common populations.

Keywords: *Nadi pariksha*, *Nidan*, *Sharir guna*, *Gurvadi guna*, *Rutucharya*, *Nadi Tarangini*



INTRODUCTION

The science of Ayurveda includes the theory of *dravya* (substance), *guna* (qualities) and (action). In which every living and non-living substance (*dravya*), as well as the mind have definite attributes³. These specific attributes or qualities are known as *guna*⁴. The fundamentals of Ayurveda include the *dosha*, *dravya*, *guna*, and *karma*. Each *guna* that has an inheritance with *dravya* is called *Samavaya* (inheritance)⁵. *Dravya* can show its actions only because of *guna*.

Acharya Charak has described twenty *gunas* classified with their specific attributes into groups of 2 with 10 opposite pairs^{6,7}. These *gunas* are present everywhere so we can correlate, make some assumptions and find its effect on *tridosha*, *dhatu* (body tissues), *mala*(excretes) and mind with which we can find a personalized diet and lifestyle regimen specific to each *Prakruti* (Body constitution). Every season is dominated by one of *tridosha*, *Vata*, *Pitta* and *Kapaha* and their properties⁸. According to climatic conditions, *guna* shows accumulation or vitiation of *tridosha* which helps to predict or diagnose the signs and symptoms of diseases.

Every entity of the universe is formed with the combination of *Panchmahabhuta* (five basic elements in this universe): Pruthvi (earth), *Aap* (water), *Tejas* (fire), *Vayu* (air) and *Aakash* (ether)^{9,10}. Each *dosha* has a specific correlation with these five elements. In other words, every entity, living or nonliving, organic or inorganic is *panchabhautik* and has properties of the *tridoshas*. It is said that *kapha* is creator, *pitta* is transformer and *vata* is destructor in nature. The body consists of *tridosha*, *Saptadhatu* (seven tissues) and *Trimala* (three excretes)¹¹. And they have their traits/qualities which show particular actions and effects on human beings according to *Prakruti*, age, seasons, geographical areas, food, etc.

Effects of rutu on dosha: There are six seasons mentioned in Ayurveda text which starts from the month of *Chaitra* and ends on *Falgun*. The 6 seasons are *Shishir*, *Vasant*, *Greeshma*, *Varsha*, *Sharad*, and *Hemant* (Winter, Spring, Summer, Rainy, Autumn, Early winter¹². Every season is dominated by some *dosha* and its properties. *Vata* *dosha* accumulates in *Vasant rutu* and aggregates in *Greeshma* and *Varsha rutu*¹³, *Pitta* *dosha* accumulates in *Varsha rutu* and aggravates in *Sharad rutu*¹⁴ and *Kapha* *dosha* accumulates in *Shishir* and *Hemant rutu* and aggravates in *Vasant rutu*¹⁵. In this paper, we study the observation of *sharir gunas* with respect to the *rutus/seasons* and lifestyle

suggestions given.

Rutucharya (Seasonal Regime): We eat, exercise or sleep every day according to our likings and habits. However, ayurveda specifies *Rutucharya* and *dinacharya* (daily regimen) considering the effects of *rutu*, month, time on our body and to make sure the food is digested in the most efficient way for the full nourishment of body and mind and to balance *tridosha*. The whole year is divided into *aadaan kaal* (a period which takes away body energy/strength) and *visarga kaal* (a period which provides energy/strength to the body)¹⁶.

In *aadaan kaal* (comprising *Shishir*, *Vasant*, and *Greeshma* *rutu*), the sun is very strong, it absorbs all moisture from the earth. So the *tikshna* (sharp), *ushna* (hot), and *ruksha* (dry) *gunas* increase in our body. Also, *sharir bala* reduces gradually. *Kapha* melts with heat in the *Vasant* and its agreevation shows *guru*, *mru*, *snigdha* (heavy, soft, unctuous) *nadi*. In *Greeshma*, with dryness in nature, *vata* accumulation starts showing *rukshata* in *nadi*. *Vasant* is the time when *kapha* symptoms like asthma, diabetes, allergic rhinitis, obesity, PCOS, recurrent cold and cough are observed the most^{14,17} and should get treated with medicines and *vamana panchakarma* (Emesis). Dryness of *vata* is more in *Greeshma rutu*¹⁸, which gives a prediction of *vata* complaints like joint pain, arthritis, dry skin, freckles, etc. This is the time to early diagnosis and treat the complaints before they fully change to disease form.

On the contrary, *Visarg kaal* (comprising *Varsha*, *Sharad*, *Hemant* *rutu*) is predominant of the moon and so *manda* and *Sheeta guna*(cold), *Snigdha guna* (moist/ unctuous), *Guru guna* (heaviness) finds in our body. We get energy from nature which in general increases our *Jatharagni* (digestive fire) and *Bala* (strength) too^{19,20}. In *Varsha rutu*, *Pitta* accumulation starts and peaks in *Sharad rutu*, showing *Tikshna* *nadi*. In *Hemant* and *Shishir*, *Kapha* accumulation starts by showing the *Guru*, *Sthula*, *Snigdha* *nadi*.

To describe in simple terms, the prominent *guna* in various *rutu* are:

1. *Aadan kaal* (*Shishir*, *Vasant*, *Greeshma*): *Ushna*, *tikshna*, *ruksha*, *laghu*
2. *Visarga kaal* (*Varsha*, *Sharad*, *Hemant*): *Sheeta*, *guru*, *manda*, *mru*, *snigdha*, *sthula*

And the prominent *guna* in various *dosha* are:

- *Vata*: *Ruksha*, *laghu*, *sheeta*, *khara*, *sukshma*, *chala*²²

- *Pitta: Snigdha, tikshna, ushna, laghu, visram, saram, dravya*²³
- *Kapha: Guru, manda, sheeta, snigdha, shlakshna, sandra, mrudu, sthira*²⁴

Properties of guna: There are a total of 40 *gunas* or qualities. Out of which 20 *gunas* are *sharir or gurvadi gunas*²⁵. They are in 10 pairs, one opposite to the other. Every *guna* stays with *dravya* and shows its action and effect. The 10 pairs are: *guru - laghu, sheeta - ushna, snigdha - ruksha, manda - tikshna, sthira - sara, mrudu - kathina, vishad- pichchil, shlakshna - khara, sthula-sukshma and sandra- drava*. In this paper, we have explained the *guna* which are computed in the report card of *Nadi Tarangini*^{1,2}. The below explanation and definitions of *Gurvadi guna* are given through Commentary in *Ayurveda Rasayana of Ashtang Hrudaya* by Hemadri²⁶.

Guru - Laghu guna:

Guru is the heavy *guna*, and contributes to gravity. It is the property of *kapha dosha*. It nourishes the body tissues, gives energy. It is predominant of *aap* (water) and *pruthvi* (earth) elements. *Sheeta* *guna* of *Hemant* and *Shishir* *rutu* blocks the *agni* inside and enhances the digestive fire. As *kapha* accumulates in *Vasant rutu*, *guru guna* finds it in *nadi*. It nourishes the *mansa* (muscle) and *meda dhatu* (Fatty tissues) or body tissues. In the imbalanced state, it gives heaviness to the body and *doshas*, and results in weak digestion or *agnimandya*.

Laghu guna gives lightness to body tissues and *dosha*. *Tejas* *vayu* and *Aakash mahabhuta* are present in *laghu*. It increases *vata* and decreases *kapha*. *Laghu* is the property of *vata and pitta* *dosha*. It enhances the meaning of *deepan* (enhances digestive fire). It easily digests the food and toxins/ *pachana*. *Laghu guna* is more common in *Greeshma* and *Varsha rutu* but the *jala mahabhuta* decreases its effect on *laghu guna* by decreasing the *agni*. In the imbalanced state, *laghu guna* does weight loss, tissue loss leading to abnormal loss of *mansa and meda*. It does the *mala kshaya* (Decreases feces formation), *mutra shoshana* (Less formation of urine) and *vatasanga* (Bloating)..

Snigdha - Ruksha guna:

Snigdha guna is the predominant *jala mahabhuta*. *Snigdha* forms the oiliness, softness of *dosha, dhatu and mala*. *Snigdha* is the *guna of kapha and pitta*. In the *visarg* *kaal*,

the Sun is on the lower side and the *sheeta, manda, snigdha guna* of the moon are predominant. In *Sharad, Hemant and Shishir rutu*, the *snigdha guna* is more in nature which gives us *bala*, strong *agni*. We could see and feel the *snigdhatu* through our *netra and twak dnyanendriya* (eyes and skin). *Snigdhatu* settles *vata and pitta (shaman)* and increases *kapha (vrudhi)*. *Snigdha guna* does *bruhana* i.e. it nourishes 7 *dhatu* or tissues, enhances *bala* (strength) and *varna prasadan* (glowing skin). *Snigdha guna* provides oiliness to 3 *malas* too, it relieves constipation, bloating and painful micturition. *Snigdhatu* enhances the quality and longevity of life, provides energy, strength to all *indriyas* (sensory and motor organs) and relieves diseases. When imbalanced, it shows *pitta prakop* (provokes *Pitta*) and *kapha sanchay* (accumulation of *kapha*).

Rukshata means dryness. It is the property of *vata dosha*. It is predominant in *vayu mahabhuta*. *Ruksha guna* increases in *Greeshma and Varsha rutu*, showing *rukshata in nadi*. The imbalance in *rukshata* typically shows loss of appetite, dry and dull skin, joint pain, irritability, bloating, constipation, *daurbalya*, etc.

Manda - Tikshna guna:

Manda guna means dullness, slow. It is *pruthvi and aap mahabhuta* predominant. It settles *vata and pitta* and increases *kapha*. *Mand guna* increases in *Hemant, Shishir* and *Vasant rutu*. It nourishes the *dhatu* specially *mansa and meda*. In the imbalanced state, it hampers the function of 3 *malas* leading to constipation, dribbling micturition and bloating, less sweating.

Tikshna guna has the sharpness quality with penetrating action. It is the *agni mahabhuta* predominant *guna of pitta dosha*. In the month of *Varsha rutu*, *pitta sanchay* (accumulation of *Pitta*) starts, *Sharad is pitta prakop kaal* (*pitta* provokes) in which *tikshna guna of pitta* and sun are on the higher side. In *Sharad rutu*, *tikshna guna* is on the top. *Tikshnata* does fast and intense work in body tissues, *dosha and malas*. It settles *vata*, detoxifies *kapha* and increases *pitta (vata shaman, kapha shodhana and pittakara)*. High *tikshanta of pitta dosha* leads to many *pitta* related symptoms like *amlapitta* (hyperacidity), *ardhavabhedaka, suryavarta* (migraine), *Balanash, daurbalya* (general debility), *ojonash* (loss of life), *daha* (burning). When imbalanced, it does the scraping action of *mansa and meda dhatu*. The hyper state of it is the breaking of body tissue or *dhatu* leading to loss of health and life.

Mrudu - Kathina guna:

Mrudu is the softness of *dosha, dhatu and mala*. It moistens the tissues and *dosha*. It is *aap* and *aakash mahabhuta* predominant. It settles *vata and pitta* and increases *kapha*. *Mrudu guna* increases in Vasant and Varsha rutu as it is *aap mahabhuta* predominant. *Mrudu guna* in nadi indicates a healthy state. In the imbalanced state, it gets moistened (*klinnata*) and provoked, showing *pratishyaya* (cold), *kaas* (Coughing), *ang gaurav* (Heaviness in body), *hrullas* (Nausea), *chardi* (vomiting) in *Vasant rutu*. In *Varsha rutu*, *sandhi graha* (osteoarthritis), *shwas* (asthma), *kasa* (coughing), etc are observed.

Kathina guna is hard quality and it is *Pruthvi mahabhuta* predominant. It settles *kapha dosha*. It binds and toughens the *dosha*. It is hard to keep in touch when felt in *nadi*. *Kathina guna* prominently denotes the *asthi vikruti* (bone deformity), *jeerna vyadhi* (chronic diseases) in the imbalanced state.

Sthula - Sukshma guna:

Sthula is the predominant *Pruthvi mahabhuta*. It blocks the *Srotas* (Organ systems). It settles *vata dosha* and provokes *kapha*. *Sthula* results in heaviness in the body, which denotes *kapha vrudhi, aam* (toxins)*vrudhi, meda vrudhi*. *Sthulata in nadi* denotes *dosha* being filled in *srotas*, obstructed pathology with *aam*. It hampers the *dhatu poshan* and excess *dhatu poshan* of similar *guna of dhatu* like *mansa, meda, and asthi*.

Sukshma guna is deeply situated, hard to locate but can be felt in *nadi*. It is *agni, vayu and aakash mahabhuta* predominant. It aggravates *vata and settles kapha*. When imbalanced, it destroys the *dhatu, bala*. It aggravates in *Varsha and Sharad rutu* and less in *Hemant, Shishir and Vasant*. *Sukshma guna* indicated *dhatu nash*, chronicity of diseases, less strength of body, osteoporosis, osteoarthritis, etc.

MATERIALS AND METHODS:

In this paper, we have studied the variations of *guna* in different *rutu* throughout a year.

Study design: Multi-centric retrospective observational study

Study sample area: North - west of India

Sample size: 15,391

Table 1: Sample size wrt Age group

Year of data collection: January - December (2018)

Research methodology:

Figure 1. Steps involved in our research methodology for each of our subjects of the study.

Research Tools and Techniques:

1. *Prakruti* Questionnaire
2. Health and disease related Questionnaire
3. Informed consent form
4. *Nadi Tarangini- nadi* capturing device

Details of each of the above steps are explained below in this section. We used *Nadi Tarangini*^[1,2] in our study which records *tridosha (VPK)* pulse pressure waves of every subject in real time and saves them for further analysis. It uses hardware comprising three pressure sensors to record the pulse on the wrist at *vata, pitta and kapha* locations; mimicking the way an ayurvedic *vaidya* (doctor) feels *nadi* manually. *Nadi Tarangini's* methodology is shown in figure 2.

The product *Nadi Tarangini* has been in the market since early 2017, which is used in ayurvedic clinics, hospitals, colleges and camps. We studied the *nadi* data and reports collected on the server throughout a complete year to showcase, for the first time, how electronic *Nadi* computation and Artificial Intelligence or data science can significantly co-relate with *gunas* described in ancient texts about methods of *Rutucharya*. This also proves that ancient methods have a scientific basis and the observations in the texts mentioned hold truth till date.

In this study, we observed data of 15,391 subjects collected on the centralized server by various ayurvedic doctors at their clinics, hospitals, colleges or camps across India throughout a year. These are different subjects of different geographical areas, ages, genders, cultures, *Prakruti* across India. The criteria for the selection of the subjects were as follows:

Inclusion Criteria:

- Subjects of age from 18 years and above
- Both male and female
- Individuals as well as individuals with minor and major health symptoms

Exclusion Criteria:

- Hospitalized patients with life support
- Psychotic patients on medicines
- Pregnant and lactating women
- Patients on corticosteroid medications

- Individuals on sleep medication
- Those with chronic debilitating disorders

For every subject, the *Prakruti* was computed using a questionnaire-based method. Accordingly, out of the total 15,391 subjects, 4,068 subjects were of *vata Prakruti*, 9,283 subjects were of *pitta Prakruti* and 2,040 subjects were of *kapha Prakruti*. After *Prakruti*, every subject's minimal medical information was noted down (height, weight, age, gender and symptoms) and also nadi data was recorded for 1 minute using *Nadi Tarangini*, as shown in Figure 2. The data at each of the VPK locations is saved on the server. Typical nadi data is shown in Figure 3.

From the stored *nadi* data at the server, the 10 *nadi gunas* of each subject were computed²⁶. The output was calibrated for nadi gunas with the help of associated ayurvedic vaidyas. Based on the calibration, each subject's *gunas* were assigned a value between 0% (lowest) to 100% (highest), where value between 0% to 30% indicates low, between 40% to 60% indicates normal and value between 70% to 100% indicates high.

RESULTS AND DISCUSSION:

In this section, we discuss the results we observed in the *guna* parameter in all 15,391 subjects when studied throughout the year in the following manner. Table 2: Sample size w.r.t. *Prakruti*

In every month, for every *guna*, the average value was computed considering all the subjects of that month. And then these average values were plotted along the 12 months throughout one year as given in Table 3. The trends of the *guna* can be observed in Figure 4 and Table 4. Note that the trends of their respective opposite *guna* will be exactly opposite.

Laghuta (dark blue line): *Laghu* is light, movable, and destroys cell tissues. *Laghu* is the property/*guna* of *Vata* and *pitta dosha*. It accumulates in *Greeshma rutu* and aggravates till *Varsha rutu*. Here in our study we have observed that *laghuta* present in *nadi* is low in *Vasant* as *kapha* aggravating and in *Greeshma* as *vata* accumulation starts is medium. *Laghuta* increases in *Varsha* and *Sharad* which is observed on the higher side. In the months of *Hemant* and *Shishir*, *laghuta* starts increasing again to medium level as *vata dosha* aggravates in the body. Here we have validated that *laghuta* is increasing from May to July, stays the same till August. September, October, November and December are on the medium side. Here,

our ancient references mentioned are matches with *Greeshma* and *Hemant* and *Shishir rutu*^{12,19,27,30}(Fig 5) As mentioned in the *Rutucharya*, everyone should follow their daily regimen, food selection and exercise pattern as per the existing *rutu*. Here, as *laghuta* increases from *Greeshma* to *Varsha*, one should have *snigdha*, *laghu aahar*, with *Madhur*, *Amla* (sweet and sour taste), *Sheet* (cold potency) *veerya* and *Drava* (liquid) *aahar*^{29,31}. Also, as *sharir bala* on the lower side should do slow and low pace exercise and *yoga* practices. In *Hemant* and *Shishir* as digestive fire is increasing, everyone should consume *snigdha*, *guru* food ingredients like meat, milk products, pure ghee and warm water. Also can practice heavy exercises and *yoga*. Should practice daily *Abhyanga*(oil body massage), *Udvtan*(Powder massage).³²

Mruduta (red line): *Mruduta* indicates soft touch of nadi. i.e. When we press *mrudu* nadi, it easily gets pressed. *Mrudu* is the *guna* of *Kapha*. From the trends, it can be observed that *mruduta* is low in two *rutus* *Greeshma* and *Hemant*. It increases from *Varsha* to *Sharad* as moisture in the rainy season and *pitta* has *drava* (liquidity) and *sara* (fluidity) *guna*. In *Shishir rutu* as *kapha sanchay* starts the *nadi* becomes more *mrudu*. In our study we have validated that, *mrudu* *guna* of nadi is high at the end of *Varsha*, moderate in *Sharad*, *Shishir* and *Vasant*. This observation matches with *rutu and guna* descriptions from the ancient texts^{19,27}.(Fig 6)

Sukshmata (green line): *Sukshma* nadi is thin and not easily found. It is usually empty and with less *bala*. It is primarily found in the vitiation of *asthi / dhatu*. It is moderate in the first *rutu* of the year, *Shishir* upto *Vasant*. It moves in a negative direction from *Vasant* to *Greeshma rutu*. But it starts increasing from *Varsha* to *Sharad*. Again from *Sharad* starts decreasing and increases in *Hemant*. Ideally *Sukshma* is property of *vata* and *pitta*. It is more in *Varsha* and *Sharad rutu*. *Vata* agreevates in *Varsha* and *Hemant*. The descriptions match with the ancient texts^{12,13} In *Varsha rutu*, one should have *Amla rasa* (sour taste), *snigdha*, *laghu aahar* like *yava*(Barley), *Shali* (Legumes) and easy to digest non vegetarian food like chicken, duck. Consume honey, fermented liquids which are *Arishta kalpana*. Should practice less exercises. Avoid day time sleep. ³⁴ (Fig 7)

Tikshnata (Purple line): *Tikshna* is sharpness and pricking type of *nadi*. It enhances *agni* or digestive fire.

Tikshna is the *Pitta guna*. In our observations, *tikshnata* is increasing at the end of *Varsha rutu* and high in *Sharad rutu*. Ancient text also says that *pitta* accumulation starts in *Varsha* and provokes in *Sharad rutu*. It is moderate from *Hemant and Shishir* shows strong digestive fire/ *Agni*. *Tikshna guna* increases from *Vasant to Greeshma* and from *Varsha to Sharad rutu*, decreases from *Greeshma to Varsha*. In our study we observed that *tikshnata* is high in *Sharad rutu*²⁸. To follow *rutucharya* is the key to healthy life and preventing diseases. As *Sharad rutu* is *pitta* provoking one should follow food and exercise regimen as follows: *Madhur rasa* (sweet taste), *laghu and Sheet guna aahar* to consume. Relax and rejuvenate your body with a cold water tub bath(*Avagah*). Avoid curd, day time sleep and *Guru aahar* (heavy to digest food) like meat. Should do body detoxification *panchakarma, Virechana* (Purgation)and *Rakta mokshana* (Bloodletting).³³(Fig 8)

Rukshata (Light blue line): *Rukshata* is dryness, a property of *vata dosha*. *Rukshata* is increasing from *Shishir, Vasant and Greeshma rutu*³⁰. as in *aadan kaal till Varsha*, as the weather is dry and hot. Also, *rukshata* is increasing from *Hemant to Shishir* as cold temperature or *sheet guna* aggravates it. In *Varsha rutu rukshata* lower as humidity or dominance of *aap mahabhuta* settles the *ruksha guna of vata* which is high in *Greeshma*. Here, our findings match *Greeshma, and Hemant, Shishir rutu*^{12,19,27,29, 30} (Fig 9)

CONCLUSION

There are thousands of observations and rules noted down in Ayurveda. It is thus termed as the “science of life”. However, many rules are not followed today by common people, because most rules are not backed by today’s language of data based reasoning. In this study, for the first time, we proved that the rules provided in the traditional texts for *gunas* and its relevance with *Rutucharya* including *dosha avastha* (stages of *dosha* in body) and treatments correlates and can be significantly used for a larger population. The insights and the observations in the study validates the captured data by correlating the trends observed with respect to particular *Gunas* in a span of 1 year. *Aadan kaal* is predominant of *ushna, tikshna, ruksha and mrudu*. *Visarga kaal* is *sheeta, guru, manda, snigdha* predominant.

This is the first study of this kind, and in the future, we will further study for healthy people of different *Prakruti*, of different age groups and also of other geographical regions

of India and the world to see whether it matches with the rules books of the local cuisine.

Thus the conducted study being first of its kind can be a future platform or medium for further studies to be carried out among different population groups with different *Prakruti*, age, geographical locations, food patterns, climate change in India and abroad to map significant correlations with the ancient texts, data science techniques to help predict & diagnose the future of human health, balance & stability.

UNIQUENESS AND INNOVATION OF THE STUDY: This is our innovative work, in which, we did the evidence based empirical study to observe the correlations between the ancient way of achieving balance in body and mind through *Rutucharya* (seasonal regimen), states of *tridosha* (three humors) and today’s language of data-based statistics; and show through observations that *Rutucharya* and *tridosha, gunas* has a scientific basis.have a significant and scientific correlations.

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REFERENCES

- 1 A. Joshi, *Nadi Tarangini: a pulse based diagnostic system*. In 29th Annual International Conference of the IEEE EMBS, pages 2207-2210, 2007
- 2.Joshi A Acquisition and Quantitative Analysis of the Arterial Pulse. Ph.D Thesis
<https://dspace.ncl.res.in/xmlui/bitstream/handle/20.500.12252/3794/TH1863.pdf?sequence=1&isAllowed>
- 3.Tripathi B, Editor, *Charaka Samhita of Agnivesha, Sutrasthana, Chapter 1, Verse 48, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; pp.18.*
- 4.Tripathi B, Editor, *Charaka Samhita of Agnivesha, Sutrasthana, Chapter 1, Verse 51, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.22.*

5. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 1, Verse 51, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.23.
6. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 1, Verse 49-1, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.19.
7. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 1, verse no.18, Pune, Proficient publishing house, 2009, p. 3
8. Garde GK translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 12, verse no. 24, Pune, Proficient publishing house, 2009, p. 56
9. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 26, Verse 10, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.469
10. Drushtarth Ashtang Sangraha, Sutra sthan, Vd. P.G. Athavale, 8th edition, Drushtarthmala Publications, Nagpur, Sutra sthana, chapter 17, verse no. 1, p. 147.
11. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 11, verse no. 1, Pune, Proficient publishing house, 2009, p. 51
12. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 3, verse no. 1, Pune, Proficient publishing house, 2009, p. 11
13. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 6, Verse 34, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.156.
14. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 6, Verse 10, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.150.
15. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 6, Verse 22, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.153.
16. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 3, verse no. 2-6, Pune, Proficient publishing house, 2009, p. 11
17. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 3, verse no. 18, Pune, Proficient publishing house, 2009, p. 12
18. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 3, verse no. 26-2, 27-1, Pune, Proficient publishing house, 2009, p. 12.
19. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthana, Chapter 6, Verse 7, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.146.
20. Garde GK, translator, Sarth Vagbhata, New edition, Sutra sthana, chapter 3, verse no. 5-7, Pune, Proficient publishing house, 2009, p. 11.
21. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 1, Verse 59, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.32.
22. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 1, Verse 60, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.32.
23. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 1, Verse 61, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.33.
24. Tripathi B Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 25, Verse 36, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.450.
25. Javaji P, Astang Hrudaya - a compendium of the ayurvedic system- Vagbhata with commentaries of Arundatta and Hemadri. Ayurveda Rasayana, Sutrasthan chapter 1 verse 18. 6th ed, Mumbai; Pandurang Javaji Publications; 2008.pp.12.
26. A. Joshi, S. Chandran, V. Jayaraman, and B. Kulkarni. Arterial pulse system: modern methods for traditional indian medicine. In 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, pages 608-611, 2007
27. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 19, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.152.
28. Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 41, 6th ed, Varanasi:

Tejaswini *et.al* “A Multicenter Retrospective Observational Study to Correlate *Sharir Guna* Computed Through *Nadi Pariksha* (Pulse Diagnosis) Using Electronic *Nadi* (Pulse)Recording Device *Nadi Tarangini* with Trends and Changes in *Rutus* (Seasons) for a Span of One Year in North-Western Zone Of India.”: 2022; 5 (3):15-27

Chaukhambha Surbharati Prakashan; 1999; p.158.

29.Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 27, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p.154.

30.Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 6, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p. 146.

31.Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 28-32, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p. 154,155.

32.Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 11-18, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p. 151,152.

33.Tripathi B Editor, Charaka Samhita of Agnivesha,

Sutrasthan, Chapter 6, Verse 42-48, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p. 158-160.

34.Tripathi B, Editor, Charaka Samhita of Agnivesha, Sutrasthan, Chapter 6, Verse 35-40, 6th ed, Varanasi: Chaukhambha Surbharati Prakashan; 1999; p. 156,157.

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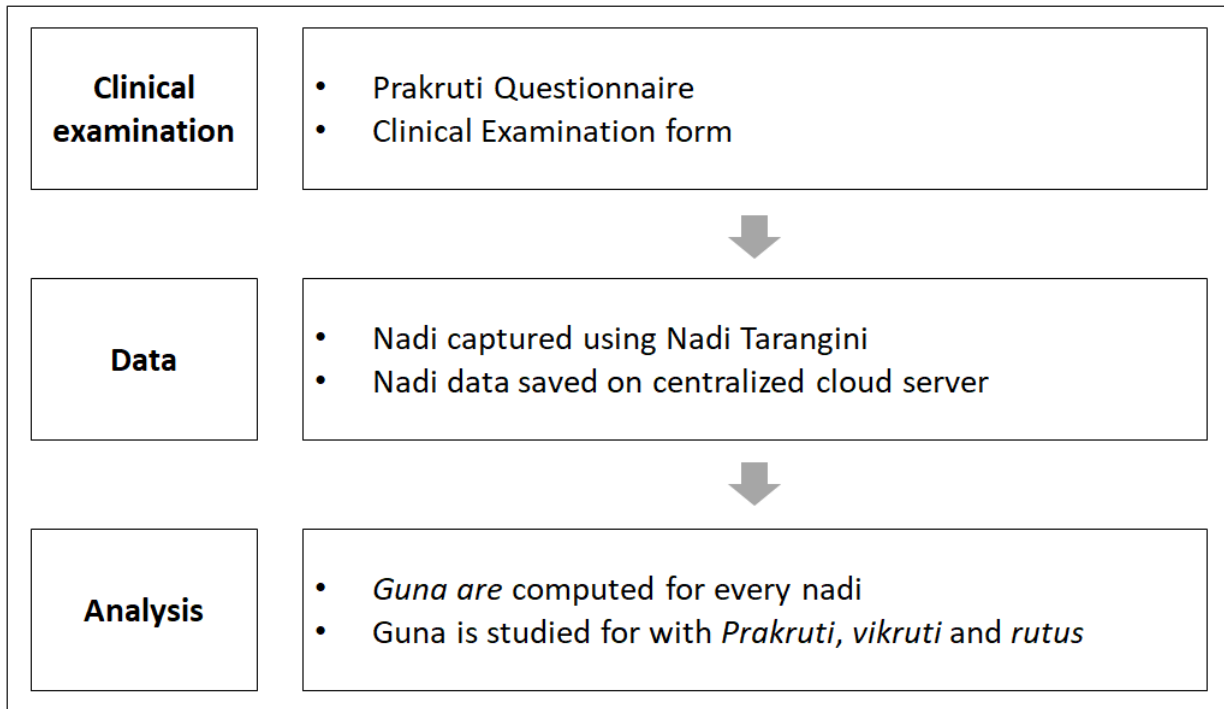


Figure 1. Steps involved in our research methodology for each of our subjects of the study.



Figure 2. Manual nadi pariksha is done at VPK locations on the wrist using index, middle and ring fingers respectively. Nadi Tarangini mimics the methodology using three pressure sensors which are used at the three locations to record nadi data in real time.

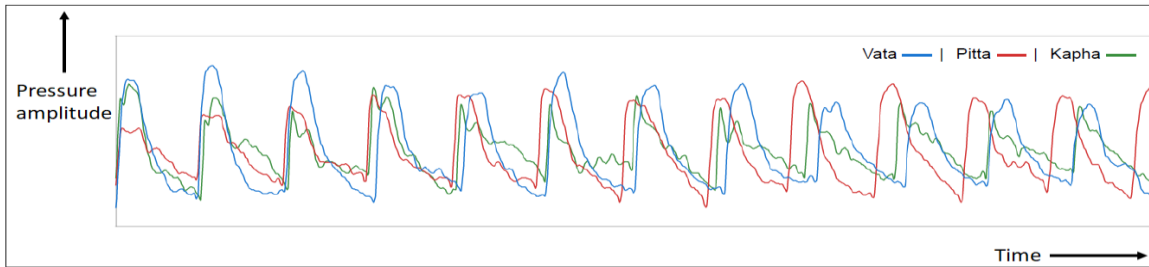


Figure 3. Sample nadi data of 10 seconds long (out of recorded 1 minute) using Nadi Tarangini. The three colors blue, red and green respectively represent data collected using pressure sensors at vata, pitta and kapha locations.

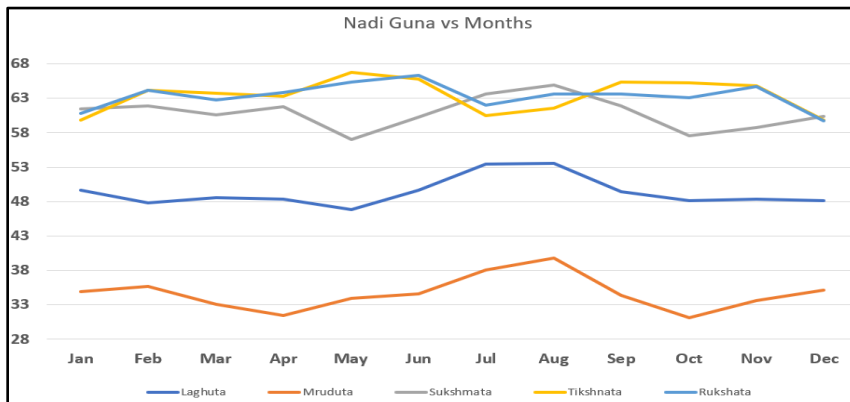


Figure 4. Variations in the *sharir guna* over 12 months. Different colors indicate the averaged trends of guna over 12 months.

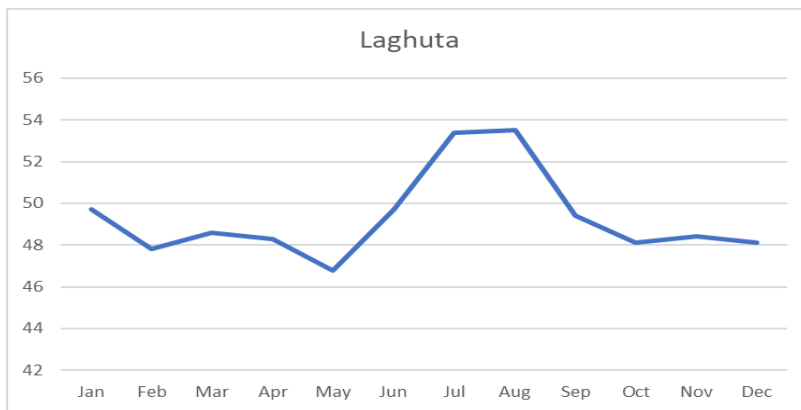


Fig 5 Variations in the *Laghuta*

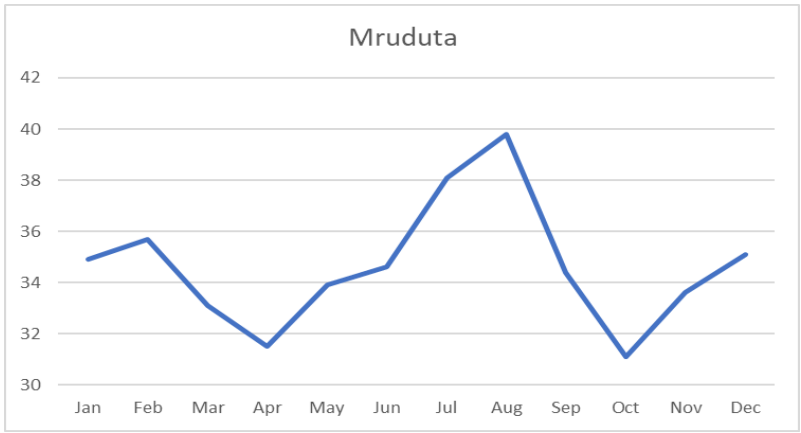


Fig 6 Variations in the Mruduta (red line):

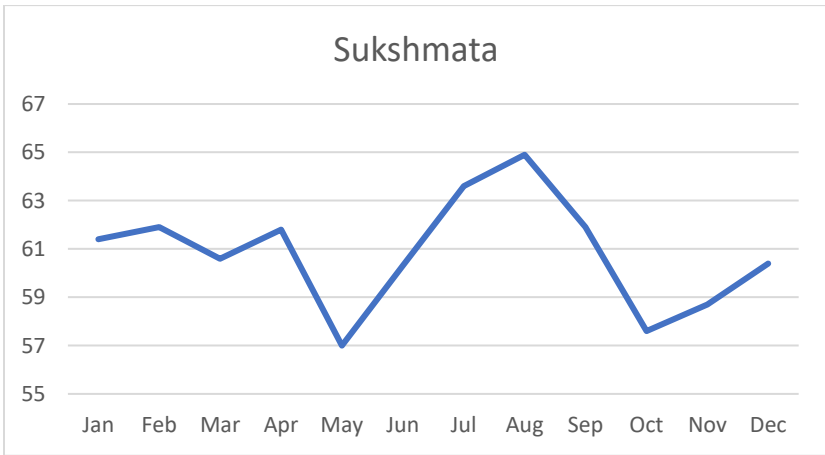


Fig 7 Variations in the Sukshmata

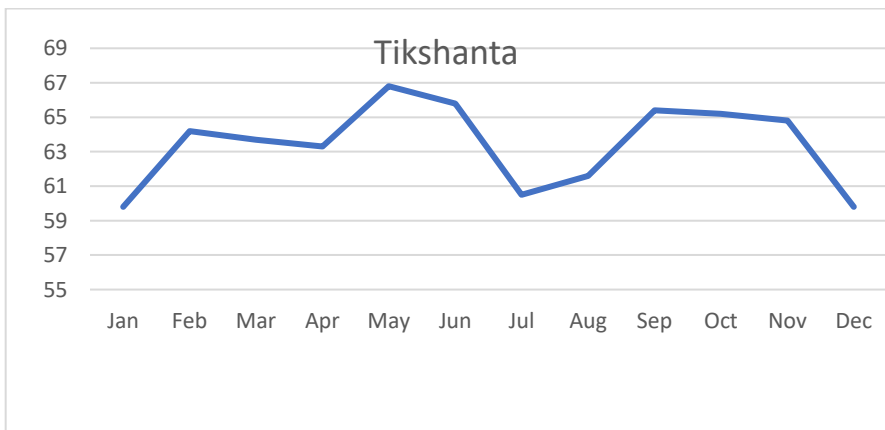


Fig 8 Variations in the Tikshanta

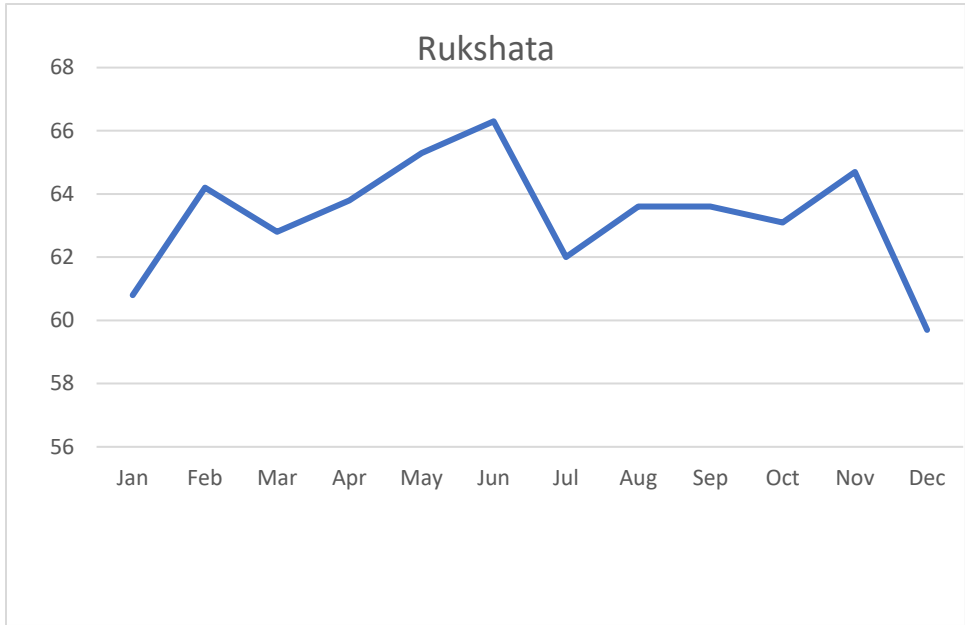


Fig 9 Variations in the Rukshata

Table 1: Sample size wrt Age group

Age group	sample size
18 to 25yrs	1843
26-55yrs	8655
Above 55 yrs	4895

Table 2: Sample size w.r.t. Prakruti

<i>Vata Prakruti</i>	4068
<i>Pitta Prakruti</i>	9283
<i>Kapha Prakruti</i>	2040

Table 3: Available Data w.r.t. 12 months

Data available for 12 months

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sample	1653	1798	1996	1607	1470	875	897	949	786	837	879	888

Table 4. Variations in the *sharir guna* over 6 rutu.

	<i>Vasant</i>	<i>Greeshma</i>	<i>Varsha</i>	<i>Sharad</i>	<i>Hemant</i>	<i>Shishir</i>
	Feb-Mar	Apr-May	Jun-Jul	Aug-Sept	Oct-Nov	Dec-Jan
<i>Laghuta</i>	Low	Medium	High	High	Medium	Low
<i>Mruduta</i>	Medium	Low	Medium	High	Low	Medium
<i>Sukshmata</i>	Medium	Low	Medium	High	Low	Medium
<i>Tikshna</i>	Medium	High	Medium	High	High	Medium
<i>Rukshata</i>	Medium	Medium	High	Medium	High	Medium