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Significance of arterial stiffness in *Tridosha* analysis: A pilot study

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ABSTRACT

Background: The variations in *Tridoshas* are the basis for disease diagnosis and treatment in *Ayurveda*. The *doshas* are assessed by sensing the pulse manually with fingers which depends on skill of the physician. There is a need to measure *doshas* using instruments and study them objectively.
Objective: Arterial stiffness is well established pulse parameter in modern medicine and is closely associated to *kathinya* in the context of Ayurveda. The aim of our study was to measure arterial stiffness using *Nadi Tarangini*, a pulse acquisition system, and investigate the significant variations of stiffness across *Tridosha* locations.
Materials and methods: A total of 42 samples of *vata*, *pitta* and *kapha* pulses with proper systolic and diastolic peaks were included in the study. The arterial stiffness parameters namely stiffness index (SI) and reflection index (RI) were considered for the study. The data was analyzed using one-way ANOVA followed by Tamhane's T2 test. The changes in SI and RI between males and females were assessed using independent samples *t* test.
Results: SI at *vata* (5.669 ± 1.165) was significantly low compared to *pitta* (8.910 ± 3.509) and *kapha* (8.021 ± 2.814); RI at *vata* (0.846 ± 0.071) was significantly low compared to *pitta* (0.945 ± 0.043) and *kapha* (0.952 ± 0.033). SI at *kapha* was significantly low in females compared to males.
Conclusion: The SI and RI acquired using *Nadi Tarangini* have shown significant variations across *Tridosha* locations. The framework developed to measure the arterial stiffness across *Tridosha* locations can be used for the interventional studies in *Ayurveda* which in turn can help in disease diagnosis and treatment.

1. Introduction

Ayurveda is well known for its pulse based diagnosis which is primarily based on *Tridoshas* namely *vata*, *pitta* and *kapha*. As per Ayurveda, imbalance in *Tridoshas* is termed as disease and restoring the balance is health. The classical texts *Caraka Samhita* [1], *Sushrutha Samhita* [2]and *Ashtanga Sangraha* [3] have discussed in detail the nature of *Tridoshas* and its usefulness in disease diagnosis and treatment. The art of pulse reading is unique to Ayurveda where physicians place the index, middle and ring fingers on the wrist and assess the intensities of *vata*, *pitta and kapha doshas* respectively which forms the basis for diagnosis and treatment. *Sarangadhara* [4], in his work *Sarangadhara Samhita*, introduced pulse examination as a means of diagnosis and is considered to be done for the first time in history of Ayurveda. The classical texts *Yoga Ratnakara* [5] and *Bhava Prakasha* [6] also emphasized the importance of pulse based diagnosis.

Ayurveda has thousands of years of rich experience and assessment of *prakriti* plays a critical role in disease diagnosis and treatment. *Ayurveda* has very strong roots in pulse based diagnosis but it is subjective in nature and depends on the skill of the physician. It lacks the scientific evidence which is the need of the day as evidence based research is gaining importance in accepting any medicine or system of medicine [7,8]. In the recent past there is a growing research interest in studying *prakriti* in an objective

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manner with the help of *prakriti* assessment tools [9] as Ayurvedic physicians have agreed the need for research based standardized tool for *prakriti* assessment [10]. The standardized questionnaires such as *Sushrutha Prakriti Inventory* (SPI) [11], *Caraka Child Personality Inventory* [12], *Mysore Tridosha Scale* [13] have shown significant results in *prakriti* assessment. Recent studies on genetics with help of *prakriti* questionnaires have shown that *prakriti* and genes are closely associated which emphasizes the significance of questionnaires in assessing *prakriti* [14–17]. To strengthen the research further there is a need for measuring *Tridoshas* like any other clinical parameter like blood pressure, fasting blood sugar etc. This necessitates the need for a very precise pulse acquisition system which captures the pulse at *vata*, *pitta and kapha* locations. With the advancement of sensor technology pulse vibrations can be acquired very precisely and studies on the pulse acquired using *Nadi Tarangini* [18], have shown complete and reproducible high quality *vata*, *pitta and kapha* signals with significant variations in *Tridosha* locations with age and disorder which were matching with Ayurvedic literature. *Nadi Tarangini* based studies on pulse rate variability [19], beat to beat alterations [20], spectral analysis [21] and classification of diabetes [22] have shown significant results. These studies have demonstrated the pulse acquisition capabilities of the instrument which is a key requirement for pulse based research. However, evidence based research still needs parameters which represent the pulse with appropriate physiological basis and good literature support.

As per our literature review we found that arterial stiffness measured from pulse wave is accepted as an important parameter in assessing the cardiovascular risks. Number of studies have been done on arterial stiffness measured using carotid femoral (cfPWV), brachial ankle (baPWV) and photoplethysmography (PPG) techniques. The arterial stiffness measured with brachial ankle pulse wave velocity (baPWV) has gained clinical and research importance and studies have established the significance of arterial stiffness measured with this technique [23]. In similar lines the arterial stiffness measured using PPG has shown significant association with cardiovascular risk scores [24]. The digital volume pulse (DVP) acquired using PPG is composed of forward and reflected waves. Due to the reflected wave a peak appears in the diastolic phase and is known as diastolic peak. The time interval between systolic and diastolic peaks is proportional to the total path length of the pressure wave (from root of the artery to reflection point and back to root of the artery) and height of the person. The stiffness index (SI) is the ratio of height of the person to the time interval between systolic and diastolic peaks and reflection index is the ratio of diastolic to systolic peaks [25].

In Ayurveda, the pulse parameters *gati* (movement), *vega* (rate), *tala* (rhythm), *bala* (force), *tapamana* (temperature), *akruti* (volume and tension) and *kathinya* (consistency of the vessel wall) are considered to be of clinical importance [26]. The parameter *kathinya* represents the condition of the vessel wall such as thickness, hardness, elasticity and it is qualitatively assessed by rolling the artery between the finger and radial artery bone. The hardness of the artery was discussed in detail in Basavarajeeyam [27]. As the evidence based research is gaining importance there is a need to quantitatively assess *kathinya* with the help of instruments. The arterial stiffness measures the stiffness of the arteries and we think it is closely associated to *kathinya*. We aimed at studying the significance of arterial stiffness measured from radial artery across *Tridosha* locations. We have identified *Nadi Tarangini* for this study and the arterial stiffness indices namely stiffness index (SI), and reflection index (RI) were considered for the study. We hypothesized that stiffness indices vary significantly when measured at *Tridosha* locations. To test this hypothesis, we have measured the arterial stiffness at *vata*, *pitta* and *kapha* locations using *Nadi Tarangini* and assessed the significance of its variations across *Tridosha* locations.

2. Materials and methods

2.1. Participants

In the present study we took the data from the yoga camps conducted by S-VYASA as part of its ongoing studies on Yoga Therapy for Type 2 diabetes. The participants of yoga camps include individuals with no diabetes, diabetes and pre-diabetes. Pooja More et al. have investigated the diagnostic capability of *Nadi Tarangini* instrument in diagnosing diabetes using frequency domain analysis [22]. We have identified 90 participants not having diabetes for our study and investigated the variations of arterial stiffness across *Tridosha* locations. A total of 42 samples of *vata*, *pitta* and *kapha* pulses with proper systolic and diastolic peaks were included in our study after analyzing 90 participants' *Nadi* data acquired using *Nadi Tarangini*.

2.2. Inclusion criteria

All men and women above 40 years who were not suffering from diabetes or pre-diabetes were included in the study. The health of the participants was assessed by an Ayurvedic doctor by interviewing the participants on their health status. The participants who were currently not having any diseases and were not taking any medicines for any of the diseases were included in the study.

2.3. Exclusion criteria

The participants who were on regular medication and suffering from severe depression were excluded from the study. The participants who were not willing to participate in the study were excluded.

2.4. Ethics consideration

The study was approved by Institutional Ethics Committee of S-VYASA. We have explained the study to all the participants and the written informed consent was obtained from all the participants. We have considered only those participants who were willing to be part of the study.

2.5. Study design

The aim of the study was to investigate the changes in SI and RI across *vata*, *pitta* and *kapha* locations and accordingly three groups were created. The SI and RI measured at *vata* location were entered into *vata* group and similarly for the other two pulse locations. We have not assessed *prakriti* of the person in our study and groups were not formed based on *prakriti* but based on the location of the pulse. The age, height, body mass index (BMI), systolic blood pressure (SBP), and diastolic blood pressure (DBP) of the participants were measured. All the measurements were done at the beginning of the camp. The blood pressure was measured using sphygmomanometer.

2.6. Pulse measurement

Nadi Tarangini, a simple, cost-effective and non-invasive pulse acquisition system, was used for collecting pulse data which has three linearly placed pressure transducers, a 16bit multifunction data acquisition card NI USB-6210 (National Instruments, TX, USA) and LABVIEW, a data acquisition software. The pulse data was sampled at 500 Hz and LABVIEW was used for acquiring the sensor data and storing it in personal computer. The pulse data collection was done in two sessions 6am to 1pm and 1pm to 4pm. The pulse data was collected for 1 min by placing the sensors on *vata*, *pitta and kapha dosha* locations on the wrist. The pulse location on the wrist below the root of the thumb was considered as *vata* location, next to it as *pitta* and next to *pitta* was considered as *kapha* location. Initially the pulse at *vata*, *pitta* and *kapha* locations was sensed with index, middle and ring fingers respectively to identify the exact *vata*, *pitta and kapha* locations and then the sensors were placed on the wrist by closely aligning it with the sensed locations. The pulse data consists of time and amplitudes of the pulse at *vata*, *pitta and kapha* locations. As the pulse data gets corrupted due to the noise induced by electrical and electronic sources, it was cleaned up using wavelet transformation. The pulse data with clear systolic and diastolic peaks were considered for the study and remaining data were discarded. We have seen that only some individuals had proper systolic and diastolic peaks in all the three locations and in others peaks were not proper in one or other locations. We think pulse would have been weak in those locations for *Nadi Tarangini* to acquire it precisely and secondly the sensors would have been slightly misaligned with *Tridosha* locations which can result into distorted pulse. We have got 42 samples of *vata*, *pitta* and *kapha* pulses after analyzing the data of 90 participants. As the pulse was not having proper peaks in all the three locations the individuals in *vata*, *pitta* and *kapha* groups are not same.

2.7. Pulse parameters

The pulse data acquired by *Nadi Tarangini* was a continuous wave and Fig. 1 corresponds to single pulse wave isolated from stream of pulse waves. The stiffness indices are computes as follows

- stiffness index (SI) = height of the person/(T4−T1).
- reflection index (RI) = diastolic peak/systolic peak (P4/P1).

2.8. Statistical analysis

The data were analyzed using SPSS Statistics Version 10. The data were presented as mean ± standard deviation. The pulse data were assessed for normality using Kolmogorov−Smirnov test and both SI and RI were found to be normal. The equality of variance was tested for *vata*, *pitta and kapha* groups using Levene's test of homogeneity of variances. The variances were not equal across *vata*, *pitta* and *kapha* groups. The mean values of stiffness parameters (SI and RI) measured from *vata*, *pitta and kapha dosha* locations were analyzed using one-way ANOVA followed by Tamhane's T2 test. The significance of SI and RI across males and females was assessed using independent samples *t* test. The effect size was computed using Cohen's d formula (difference in mean/pooled standard deviation of the two groups) for analyzing the results of independent samples *t* test. For ANOVA the effect size (n^2) was computed as the ratio of sum of squares between groups to total sum of squares. The A two tailed P value < 0.05 is considered statistically significant for all comparisons and the data were reported to three significant figures.

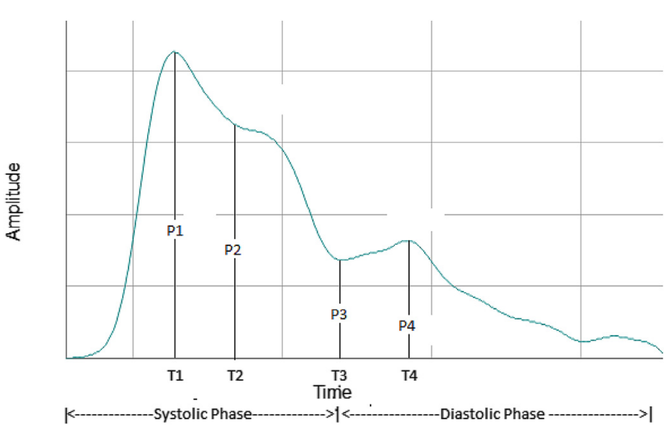

Fig. 1. Pulse wave acquired using *Nadi Tarangini*, representing various peaks and time periods of the radial pulse.
P1 = pulse amplitude at systolic peak; P2 = pulse amplitude at inflection point; P3 = pulse amplitude at dichrotic notch; P4 = pulse amplitude at diastolic peak;
Time periods T1, T2, T3, T4 are measured from start of the systolic phase.
T1 = time period at systolic peak; T2 = time period at inflection point; T3 = time period at dichrotic notch; T4 = time period at diastolic peak.

3. Results

The characteristics of the study population are shown in Table 1. As the individuals were different in each of the *vata*, *pitta* and *kapha* groups, demographic details of the subjects were given for all the three groups. The one-way ANOVA has reported that means of SI ($p < 0.001$) and RI ($p < 0.001$) were significantly different across *vata*, *pitta* and *kapha doshas* as shown in Table 2. As one-way ANOVA reported significant result and variances were not equal we did post hoc analysis using Tamhane's T2 test. The means of SI and RI were assessed across males and females using independent samples *t* test as shown in Table 3. The SI for males was higher than females at all the three pulse locations and SI at *kapha* ($p < 0.05$) was statistically significant. There were no significant differences in RI between males and females. The means of SI and RI at *vata*, *pitta* and *kapha* locations were analyzed across three age groups as shown in Table 4.

4. Discussion

Arterial stiffness was accepted as an indicator of cardiovascular risk assessment and the arterial stiffness measured from pulse wave velocity using cfPWV is considered as gold standard [28]. The

Table 1
Demography details of subjects in *vata*, *pitta* and *kapha* groups.

Parameter	*vata*	*pitta*	*kapha*
Age			
All	57.830 ± 9.05	58.230 ± 11.370	55.88 ± 9.247
Males	59.840 ± 8.47	59.330 ± 11.978	56.62 ± 9.310
Females	51.400 ± 8.09	54.560 ± 8.618	52.59 ± 8.674
Height			
All	165.64 ± 9.665	165.25 ± 9.248	166.467 ± 8.283
Males	167.437 ± 7.278	167.75 ± 8.818	168.49 ± 6.611
Females	159.89 ± 13.959	157.24 ± 5.308	156.357 ± 8.835
BMI			
All	24.712 ± 4.105	24.988 ± 4.232	25.185 ± 4.740
Males	24.115 ± 3.885	24.502 ± 4.318	24.537 ± 3.905
Females	26.624 ± 4.411	26.542 ± 3.718	28.424 ± 7.241
SBP			
All	130.88 ± 22.815	130.08 ± 19.98	127.24 ± 14.681
Males	131.81 ± 22.737	129.39 ± 20.136	127.68 ± 15.501
Females	128.00 ± 24.042	132.44 ± 20.421	125.14 ± 10.447
DBP			
All	79.120 ± 9.842	78.980 ± 9.872	81.83 ± 9.680
Males	79.55 ± 9.712	79.260 ± 10.59	82.44 ± 9.998
Females	77.80 ± 10.654	78.00 ± 7.263	78.86 ± 7.904

Data are shown as mean ± standard deviation.
BMI, Body Mass Index; SBP, Systolic Blood Pressure; DBP, Diastolic Blood Pressure.
Total 42 participants (32 males, 10 females) in each group.

Table 2
Summary of one-way ANOVA results with *vata*, *pitta* and *kapha* as three groups.

Parameters	*dosha*			p value*	n^2
	vata	*pitta*	*kapha*		
SI (m/s)	5.669 ± 1.165	8.910 ± 3.509	8.021 ± 2.814	<0.001	0.21
RI	0.846 ± 0.071	0.945 ± 0.043	0.952 ± 0.033	<0.001	0.474

Data are shown as mean ± standard deviation.
SI, Stiffness Index; RI, Reflection Index.
*p value: comparing SI, RI across *vata*, *pitta* and *kapha* groups, significance at 0.05.
n^2: Effect size computed as Sum of Squares between groups/Total Sum of Squares.

stiffness index measured from PPG was closely associated to pulse wave velocity [29] and many studies were done using these techniques. In the present study, we aimed at studying the significance of SI and RI measured across *Tridoshas* wherein SI corresponds to arterial stiffness and RI corresponds to endothelial function [25].

We observed clear systolic and diastolic peaks in pulse waves at *vata*, *pitta and kapha* locations and the peaks resembled closely with DVP signal from PPG. In the current study, SI and RI measured at *vata*, *pitta and kapha* locations were significantly different. The post hoc test has revealed that SI and RI at *vata* were significantly low compared to *pitta* and *kapha*. The SI has shown a gradual increase from *kapha* to *pitta* and then decreased at *vata*. The effect sizes of SI (0.21) and RI (0.485) were significantly high. The results explain that 21% of the variance in SI and 48.5% of variance in RI can be attributed to *Tridoshas*. The significant difference in SI across the three groups may be due to either height of the person or arterial stiffness and hence we have tested the heights across the three groups using independent *t* test. The heights were not significantly different across *vata-pitta*, *pitta-kapha* and *vata-kapha* groups which confirmed that SI was significantly different due to the arterial stiffness and not due to height of the person.

The classical texts *Sarangadhara Samhita* [4], *Yoga Ratnakara* [5], *Bhava Prakasha* [6] and *Basavarajeeyam* [27] have discussed the nature of *Nadi* in detail which includes method of pulse examination, pulse locations, pulse characteristics in various conditions. The hardness of *Nadi* is discussed in detail in *Basavarajeeyam* and in *prathama prakarana* of *Basavarajeeyam* it is mentioned that due to increased *vata dosha*, *Nadi* will be hard like a string of *veena* which can be interpreted that arterial stiffness increases with *vata dosha*. The word *kathor* has been used to express the hardness instead of *kathin*. There is no mention of hardness due to *pitta* and *kapha doshas* but in the same *prakarana* it is mentioned that *Nadi* will be slow due to *kapha dosha Nadi*. As the pulse wave travels faster in hardened arteries compared to normal arteries, it can be interpreted that *Nadi* may not be hard but soft due to *kapha dosha*. In *dwiteeya prakarana* while explaining the characteristics of *mrityu nadi* it is mentioned *that kathin nadi* is one of the factors which can lead to death. In the recent past arterial stiffness is considered as a significant parameter in assessing cardiovascular risks which seems to be similar to what is explained in *mrityu nadi*. The thickness of blood vessels has been discussed in *sutrasthana* of *Caraka Samhita* [1] and the terms *dhamani pravicaya* and *dhamani praticaya* are used to explain the hardness of arteries which is considered as atherosclerosis in modern medicine. Vasant has summarized the qualities of *Nadi* and according to him hard and rough artery corresponds to *vata*, elastic and flexible artery corresponds to *pitta* and soft thickening artery corresponds to *kapha* [26]. This implies that there is a gradual increase in thickness of the radial artery from soft at *kapha* to hard at *vata* which in turn means pulse will be slow at *kapha* and fast at *vata*. As *kathinya* corresponds to hardness of the artery, there is a gradual increase in *kathinya* from *kapha* to *vata*. There will be a gradual increase in *kathinya* with age also as *dosha* predominance varies from *kapha* in childhood, to *pitta* in middle age, to *vata* in old age. As per modern physiology arterial stiffness increases with age and the pulse travels faster in hardened arteries [25]. As per Ayurveda *Nadi* will be soft in childhood which is *kapha* age and will become hard in old age which is *vata* age. This is well understood with respect to both modern medicine and Ayurveda and hence arterial stiffness can be associated to *kathinya*. The physiological reason behind such variations in arterial stiffness across *vata*, *pitta* and *kapha* locations need further investigation. As the arterial stiffness is closely related to *kathinya,* we expected SI to increase from *kapha* to *pitta* to *vata*. In our study we observed that SI has increased from *kapha* to *pitta* as expected but decreased at *vata*. The reason for such reduction in SI at *vata* could be due to age of the subjects. The average age of the subjects in our study was 50–60 years, a *pitta* dominant age and hence reduction in SI at *vata* can be attributed to age.

Table 3
Summary of independent samples *t* test between males and females.

parameter	Males (n = 32)	Females (n = 10)	p value*	ES [CI]
SI (m/s)				
vata	5.768 ± 1.138	5.353 ± 1.258	0.368	0.345 [−0.542, 1.371]
pitta	9.282 ± 3.633	7.720 ± 2.923	0.182	0.472 [−0.798, 3.922]
kapha	8.344 ± 2.953	6.404 ± 1.008	0.004	0.878 [0.656, 3.224]
RI				
vata	0.845 ± 0.075	0.847 ± 0.058	0.928	−0.03 [−0.049, 0.046]
pitta	0.942 ± 0.048	0.955 ± 0.022	0.260	−0.348 [−0.035, 0.009]
kapha	0.951 ± 0.035	0.955 ± 0.020	0.646	−0.140 [−0.025, 0.016]

Data are shown as mean ± standard deviation.
SI: stiffness index; RI: reflection index; n: number of participants.
*p value comparing SI, RI of *vata*, *pitta* and *kapha* between males and females, significance at 0.05.
ES: Effect Size (mean of males − mean of females)/pooled standard deviation of males and females.
CI: 95% Confidence Interval of Mean Difference between males and females.

Table 4
Variation of Stiffness parameters (SI and RI) across *vata*, *pitta* and *kapha* with age.

Age group	Parameters	*vata*	*pitta*	*kapha*
Upto 50 years (n = 8)	SI (m/s)	5.494 ± 0.371	8.339 ± 3.841	7.806 ± 2.281
	RI	0.814 ± 0.068	0.946 ± 0.051	0.944 ± 0.032
	Ht (cm)	168.37 ± 12.50	166.51 ± 11.08	166.50 ± 4.686
51–60 years (n = 19)	SI (m/s)	5.516 ± 1.032	9.557 ± 3.175	7.838 ± 2.559
	RI	0.848 ± 0.072	0.951 ± 0.032	0.960 ± 0.023
	Ht (cm)	166.205 ± 8.081	162.90 ± 7.541	167.092 ± 10.13
61 years and above (n = 15)	SI (m/s)	5.956 ± 1.549	8.844 ± 3.732	8.108 ± 3.470
	RI	0.859 ± 0.070	0.946 ± 0.035	0.959 ± 0.031
	Ht (cm)	163.467 ± 10.084	165.425 ± 9.005	166.23 ± 9.898

Data are shown as mean ± standard deviation.
SI: stiffness index; RI: reflection index; Ht: Height of the subject.
n: number of participants.

In the present study, we have further divided subjects into three groups based on the age and we have seen that SI and RI at *vata* and *kapha* were increasing with age whereas SI and RI at *pitta* were high at age group 50–60 compared to the other two age groups. The changes in SI were interesting but not statistically significant and it requires further investigation at various age groups with larger sample size to confirm the behavior of SI and RI across age groups.

The SI of males was higher than females at *vata*, *pitta and kapha* locations. The SI at *kapha* was significantly high for males when compared to females with very high effect size (0.878) which signifies the difference in SI between males and females. The effect sizes of SI at *vata* and *pitta* were moderately high. The effect size of RI at *vata* was very low but was moderately high at *pitta* and *kapha*. The mean height of males in *kapha* group was significantly high (p = 0.010) and hence there could be a possibility that the significance could be due to height and not due to arterial stiffness. To confirm whether the significant difference was due to height only or even the arterial stiffness was significantly different, we have removed the height factor by dividing SI with height and we observed that the resultant SI ($p < 0.05$) was significantly different across males and females in *kapha* group. This confirmed that there was a significant difference in SI at *kapha* between males and females. The results were promising but need to be proven with larger sample size. As per classical texts of Ayurveda, pulse examination varies between males and females. *Bhavapraksa* compiled by *Bhavamisra*, has given importance to the specification of sides for pulse examination in males and females [6]. The results confirmed the same and further in depth studies are needed to establish the significance of pulse in both genders.

The variations in *Tridoshas* are the basis for disease diagnosis in Ayurveda and pulse examination plays a key role in assessing *Tridoshas*. Traditionally pulse examination is done by placing the fingers at three *dosha* locations to assess the *dosha* levels which is manual and becomes subjective as it depends on the skill of the physician. In the present study, we have established a framework for measuring pulse parameters SI and RI using *Nadi Tarangini* across *Tridosha* locations in a very objective manner and the results of our study confirm the close association of SI with *kathinya*, one of the seven pulse parameters used in assessing *Tridoshas*.

There are certain limitations in our study. We have considered relatively small sample size for our study and subjects were not covering the age groups for *vata*, *pitta* and *kapha*. The effect of diurnal variations of *doshas* was not included in our study as the pulse data was collected throughout the day from 6am to 4pm. We did not include assessing *prakriti* through questionnaires as part of our study. There are seven types of *prakriti* based on combinations of *Tridoshas* which needs very large sample size to validate the arterial stiffness across all *prakritis*. There is a need to do further studies considering *dosha* predominance with age and time of the day.

We think this is the first attempt in evaluating the significance of arterial stiffness in *Tridosha* analysis. The arterial stiffness is well established pulse parameter in research with rich literature support and is closely associated to *kathinya* in the context of Ayurveda. Hence it can be considered as a significant parameter for *Tridosha* based studies and extensive interventional studies can be done in *Ayurveda* to unravel the hidden secrets of pulse.

5. Conclusion

In conclusion, the arterial stiffness parameters SI and RI measured using *Nadi Tarangini* has shown significant variations across *vata*, *pitta and kapha doshas*. The SI was closely associated to *kathinya* which measures the hardness of artery. The framework developed to measure the arterial stiffness across *Tridoshas* can be used for the interventional studies in Ayurveda which in turn can help in disease diagnosis and treatment. The studies have shown significant results with arterial stiffness in modern medicine and can be extended to Ayurveda to unravel the hidden secrets of pulse.

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Conflict of interest

None.

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