



AN ANTHROPOMETRIC STUDY OF HASTA PRAMANA AND ITS CORRELATION WITH HEIGHT AND PRAKRITI OF INDIVIDUALS

Ayurveda

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ABSTRACT

Introduction: The Ayurvedic concept of Pramana Sharira emphasises the importance of body measurements in understanding an individual's physical constitution, health, strength, and longevity. Classical Ayurvedic texts describe various personalised units of measurement, including Hasta Pramana, and suggest that an individual's ideal standing height is approximately three and a half times the length of their Hasta. The present study was undertaken to examine this traditional concept using contemporary anthropometric methods. **Aim:** To determine the relationship between Hasta Pramana and standing height and to assess whether this relationship differs among individuals belonging to different Prakriti groups. **Materials and Method:** A cross-sectional observational study was conducted among 150 apparently healthy individuals aged 18–30 years at the Department of Rachana Shareera, Sri Dharmaasthala Manjunatheswara (SDM) College of Ayurveda and Hospital, Hassan, Karnataka. Standing height was measured using a standard stadiometer, while Hasta Pramana was measured from the olecranon process to the dactylion using a non-stretchable measuring tape. Individual Prakriti was assessed using the standardised Prakriti Assessment Scale developed by the Central Council for Research in Ayurvedic Sciences (CCRAS). Participants were classified into six dual-dominant Prakriti groups: Vatapitta, Vatakapha, Pittavata, Pittakapha, Kaphavata, and Kaphapitta. Pearson correlation and linear regression were used to examine the relationship between Hasta Pramana and height. A one-way analysis of covariance (ANCOVA) was performed to assess the effect of Prakriti on height after adjusting for Hasta Pramana. Bonferroni correction was applied for post-hoc pairwise comparisons. **Results:** A statistically significant positive correlation was observed between Hasta Pramana and standing height ($r = 0.632$, $p < 0.001$). Linear regression analysis showed an R^2 value of 0.400, indicating that Hasta Pramana accounted for approximately 40.0% of the variation in standing height in the study population. ANCOVA demonstrated a significant association between Hasta Pramana and height ($F(1,143) = 98.891$, $p < 0.001$). However, after adjusting for Hasta Pramana, the effect of Prakriti on standing height was not statistically significant ($F(5,143) = 1.458$, $p = 0.207$). None of the 15 pairwise comparisons between the six Prakriti groups showed a statistically significant difference after Bonferroni adjustment. The largest adjusted mean difference was 4.768 cm between the Vatakapha and Pittavata groups ($p = 0.672$). **Conclusion:** The findings demonstrate a significant positive relationship between Hasta Pramana and standing height, supporting the relevance of the classical Ayurvedic concept of proportional body measurement. In the present sample, Prakriti did not show a statistically significant independent association with absolute standing height after accounting for forearm length. These findings provide preliminary quantitative evidence for the relationship described in Pramana Sharira, while further studies involving larger and more diverse populations are required to establish population-specific reference standards.

KEYWORDS

Pramana Sharira, Hasta Pramana, Prakriti, Height, Anthropometry

INTRODUCTION

Ayurveda is a comprehensive system of health science that encompasses the study of the human body, disease, health, and appropriate ways of maintaining well-being. Among the important concepts described in the classical texts is *Maana-Pramana*, which deals with the assessment and measurement of the body and its various components.^[1] In Ayurveda, *Pramana* may also refer to the means of obtaining valid knowledge. Acharya Sushruta describes four forms of *Pramana*: *Pratyaksha* (direct perception), *Agama* (authoritative testimony), *Anumana* (inference), and *Upamana* (analogy).^[1] In the context of *Sharira*, however, *Pramana* primarily concerns the measurement and proportional assessment of different structures of the human body. The classical Ayurvedic authors described body measurements using personalized biological units such as *Angula*, *Anjali*, and *Hasta*. These units were based on the dimensions of the individual rather than on a fixed external standard. This personalised approach is particularly relevant to the concept of *Anguli Pramana*, in which the individual's own finger breadth is used as a reference for

measuring different parts of the body.^[2-4] The use of an individual's own body dimension as a reference point distinguishes this traditional approach from fixed-unit systems of measurement. In contemporary anthropometry, these concepts can be examined using standardized instruments and measurements expressed in centimetres.

Classical Concept of Body Measurement

Classical texts describe several units based on *Angula*. *Swangula* refers to the individual's own finger breadth and has traditionally been used as a basic unit for measuring various body structures.^[5] Larger units are derived from this fundamental measurement. These include:

- *Vitasti* – 12 *Angula*, representing the distance between the tips of the extended thumb and little finger.
- *Ratni* – 20 *Angula*.
- *Aratni* – 22 *Angula*.
- *Hasta* – 24 *Angula*, traditionally described as the distance from the tip of the middle finger to the elbow.
- *Dhanusha* – 108 *Angula*.^[6]

The classical descriptions of body proportions were not limited to anatomical interest. Appropriate body measurements were associated with qualities such as strength, longevity, health, vitality, and general well-being.^[7] Acharya Vagbhata further describes a proportional relationship between body height and *Hasta Pramana*, stating that ideal standing height corresponds to three and a half times the individual's *Hasta* measurement.^[8] This traditional observation provides an opportunity for comparison with contemporary anthropometric methods.

Clinical Significance of *Pramana Sharira*

Assessment of body dimensions, or *Pramana Sharira*, was considered important for understanding the physical characteristics and functional status of an individual. Deviations from expected proportions were traditionally considered relevant to the assessment of health and physical strength.^[2,7] Modern physical anthropology similarly recognises the importance of body measurements in understanding growth, development, nutritional status, population variation, physical performance, and forensic identification. Measurements such as stature, limb length, and segmental body dimensions are widely used to describe human variation and to develop equations for estimating stature. Thus, the study of *Hasta Pramana* provides an opportunity to examine a classical Ayurvedic concept through the framework of modern anthropometry.

Prakriti and Anthropometric Variation

Prakriti represents the individual's constitutional characteristics as described in Ayurveda. It is traditionally considered to influence various physical and physiological attributes. Modern research has attempted to investigate whether individuals belonging to different *Prakriti* categories exhibit measurable differences in physical characteristics.

The present study therefore examined whether the relationship between *Hasta Pramana* and standing height remains consistent across different dual-dominant *Prakriti* groups.

OBJECTIVES

Primary Objective- To determine the relationship between *Hasta Pramana* and standing height among healthy young adults using standardised anthropometric measurements.

Secondary Objective- To assess whether standing height differs significantly among different *Prakriti* groups after adjusting for *Hasta Pramana*.

MATERIALS AND METHODS

Study Design and Setting

The study was designed as a cross-sectional observational study and was conducted in the Department of Rachana Shareera, Shri Dharmasthala Manjunatheshwara (SDM) College of Ayurveda and Hospital, Hassan, Karnataka.

Participant recruitment, screening, anthropometric measurements, and constitutional assessment were carried out between March 2026 and April 2026. The study received prior approval from the Institutional Ethics Committee (Letter No. SDM/HSN/08/2026, dated 02.03.2026).

Study Participants and Sample Size

A total of 150 apparently healthy individuals between 18 and 30 years of age were included in the study. Both male and female participants were eligible.

Convenience sampling was used because participants were recruited from individuals available and willing to participate at the study centre during the specified study period. The sample size of 150 was determined primarily by institutional recruitment feasibility and the exploratory nature of the study rather than by a formal statistical power calculation.

Inclusion Criteria

Participants were included if they:

- were between 18 and 30 years of age;
- were apparently healthy;
- belonged to either sex; and
- provided informed consent to participate.

Exclusion Criteria

Individuals were excluded if they had:

- structural deformities of the upper limb;
- a previous history of upper-limb trauma;

- previous orthopaedic surgery involving the upper limb;
- spinal deformities or conditions likely to affect standing height; or
- other conditions likely to interfere with accurate anthropometric assessment.

Standardisation of Measurement Units

To relate the classical concept of *Angula* to modern anthropometric measurements, the middle phalanx of the middle finger was used as the reference for *Swangula*. A digital vernier calliper was used to obtain this measurement. In the present study, one *Angula* was approximately 18.42 mm. This provided a standardised metric reference for examining the classical measurement system.

Anthropometric Measurements

All anthropometric measurements were performed during the morning hours, between 09:00 AM and 12:30 PM, in an attempt to minimise the influence of normal diurnal variation in stature.

Standing Height

Standing height was measured in centimetres using a standard clinical stadiometer. Participants were measured barefoot, standing erect with the feet appropriately positioned and the head oriented according to the Frankfurt horizontal plane.

Hasta Pramana

Hasta Pramana was measured using a standard non-stretchable fibreglass measuring tape. The measurement was taken from the most prominent point of the olecranon process of the ulna to the dactylion, or distal tip of the middle finger.

The dominant upper limb was positioned with the elbow flexed to approximately 90 degrees and supported on a flat surface to maintain consistency during measurement.

Assessment of *Prakriti*

The constitutional status of each participant was assessed using the standardised *Prakriti Assessment Scale* developed by the Central Council for Research in Ayurvedic Sciences (CCRAS).^[9]

Based on the assessment, participants were classified into six dual-dominant *Prakriti* categories:

- Vatapitta
- Vatakapha
- Pittavata
- Pittakapha
- Kaphavata
- Kaphapitta

Statistical Analysis

Data were entered, tabulated, and analysed using IBM SPSS Statistics version 25.0. Descriptive statistics were used to summarise the anthropometric characteristics and distribution of participants across the six *Prakriti* groups.

Pearson's correlation coefficient was used to assess the relationship between *Hasta Pramana* and standing height. Linear regression analysis was subsequently performed to determine the extent to which *Hasta Pramana* could predict variation in standing height.

A one-way ANCOVA was performed to examine the association between *Prakriti* and standing height while controlling for *Hasta Pramana*. Standing height was considered the dependent variable, *Prakriti* was entered as the fixed factor, and *Hasta Pramana* was included as the covariate.

Bonferroni-adjusted post-hoc comparisons were used to assess differences between individual *Prakriti* groups while controlling for the increased risk of Type I error resulting from multiple comparisons.

A p-value <0.05 was considered statistically significant.

Ethical Approval

The study protocol was reviewed and approved by the Institutional Ethics Committee of SDM College of Ayurveda and Hospital, Hassan, Karnataka, prior to commencement of data collection (Letter No. SDM/HSN/08/2026, dated 02.03.2026).

Written informed consent was obtained from all participants before their enrolment in the study.

RESULTS

A total of 150 participants completed the anthropometric assessment and *Prakriti* evaluation.

Distribution of Participants According to *Prakriti*

The distribution of participants among the six dual-dominant *Prakriti* categories is presented in Table 1.

Table 1. Distribution of Participants Across the Six Dual-dominant *Prakriti* Categories.

Prakriti Code	Phenotypic Group	Sample Count (n)	Percentage (%)
1	Vatapitta	51	34.0
2	Vatakapha	9	6.0
3	Pittavata	17	11.3
4	Pittakapha	38	25.3
5	Kaphavata	3	2.0
6	Kaphapitta	32	21.3
Total	All groups	150	100.0

The largest proportion of participants belonged to the Vatapitta group (34.0%), followed by Pittakapha (25.3%) and Kaphapitta (21.3%). Kaphavata was the least represented group, accounting for 2.0% of the study population.

Correlation Between *Hasta Pramana* and Standing Height

Pearson's correlation analysis demonstrated a statistically significant positive correlation between *Hasta Pramana* and standing height ($r = 0.632, p < 0.001$).

Table 2. Pearson Correlation Between *Hasta Pramana* and Standing Height.

Anthropometric Variable	Pearson Correlation (r)	Significance
<i>Hasta Pramana</i> and height	0.632	<0.001

The correlation coefficient indicates that individuals with greater forearm length tended to have greater standing height. The association was statistically significant.

Linear Regression Analysis

A linear regression model was developed to assess the ability of *Hasta Pramana* to predict standing height.

Table 3. Linear Regression Model for Predicting Standing Height from *Hasta Pramana*.

Model	R	R ²	Adjusted R ²	Standard Error of Estimate
1	0.632	0.400	0.396	5.758 cm

The R² value of 0.400 indicates that *Hasta Pramana* explained approximately 40.0% of the observed variation in standing height in this sample. The remaining variation is likely attributable to other anatomical, genetic, developmental, nutritional, and environmental factors.

Analysis of Covariance

A one-way ANCOVA was performed to examine the effect of *Prakriti* on standing height after adjusting for *Hasta Pramana*.

Table 4. ANCOVA Examining the Association of *Prakriti* and *Hasta Pramana* with Standing Height.

Source	Type III Sum of Squares	df	Mean Square	F	p-value
Corrected Model	3506.455	6	584.409	17.901	<0.001
Intercept	4795.018	1	4795.018	146.879	<0.001
<i>Hasta Pramana</i>	3228.411	1	3228.411	98.891	<0.001
<i>Prakriti</i>	237.970	5	47.594	1.458	0.207
Error	4668.378	143	32.646	—	—
Total	3875423.000	150	—	—	—
Corrected Total	8174.833	149	—	—	—

R² = 0.429; Adjusted R² = 0.405

The covariate, *Hasta Pramana*, demonstrated a statistically significant association with standing height ($F(1,143) = 98.891, p < 0.001$).

In contrast, after adjusting for *Hasta Pramana*, the main effect of *Prakriti* on standing height was not statistically significant ($F(5,143) = 1.458, p = 0.207$).

The complete ANCOVA model explained 42.9% of the variance in

standing height, compared with 40.0% explained by *Hasta Pramana* alone.

Post-hoc Pair wise Comparisons

Bonferroni-adjusted pairwise comparisons were performed between the six *Prakriti* groups.

None of the 15 pairwise comparisons demonstrated a statistically significant difference in adjusted mean height ($p > 0.05$).

The largest adjusted mean difference was observed between the Vatakapha and Pittavata groups, with a difference of 4.768 cm ($p = 0.672$). The smallest observed difference was between the Vatapitta and Pittakapha groups, with a difference of 0.503 cm ($p = 1.000$).

These findings indicate that the observed differences between *Prakriti* groups were not statistically significant after accounting for *Hasta Pramana* and correcting for multiple comparisons.

DISCUSSION

The present study examined the relationship between *Hasta Pramana* and standing height and explored whether this relationship varied according to *Prakriti* among 150 healthy young adults. The primary finding was a statistically significant positive correlation between forearm length and standing height ($r = 0.632, p < 0.001$). The regression analysis further demonstrated an R² of 0.400, suggesting that approximately 40% of the variation in standing height could be explained by *Hasta Pramana* in the present sample. These findings are consistent with the broader anthropometric principle that segmental body measurements are related to overall stature. They also provide quantitative support for examining the classical Ayurvedic description of proportionality between *Hasta Pramana* and standing height. It is important, however, to distinguish between statistical association and exact proportional equivalence. The correlation observed in this study demonstrates that greater *Hasta Pramana* is associated with greater height, but the R² value also indicates that forearm length alone does not account for the majority of individual variation in stature. Other skeletal components, including the femur, tibia, vertebral column, and other body segments, contribute substantially to final adult height.

The ANCOVA findings provide an additional perspective. After adjusting for *Hasta Pramana*, *Prakriti* was not significantly associated with standing height ($F(5,143) = 1.458, p = 0.207$). This suggests that, within this study population, constitutional grouping did not explain a significant additional proportion of variation in absolute height beyond that associated with forearm length. The overall model showed an R² of 0.429 compared with 0.400 in the simple regression model. Although the addition of *Prakriti* increased the explained variance by approximately 2.9 percentage points, the independent effect of *Prakriti* was not statistically significant. The Bonferroni-adjusted post-hoc analysis also failed to identify significant differences between any of the 15 possible pairs of *Prakriti* groups. Although the Vatakapha and Pittavata groups showed the largest adjusted mean difference of 4.768 cm, this difference was not statistically significant ($p = 0.672$). Similarly, the Vatapitta and Pittakapha groups showed a very small difference of 0.503 cm ($p = 1.000$).

Taken together, these findings suggest that the constitutional classification used in the present study did not demonstrate a significant independent effect on standing height after adjustment for *Hasta Pramana*.

From an Ayurvedic perspective, these observations can be discussed in relation to the classical concept of *Sama Pramana*, which emphasises appropriate body proportions. The present findings provide preliminary empirical support for investigating this concept through quantitative anthropometry. However, they should not be interpreted as definitive proof of all aspects of the classical theory, particularly because the study evaluated a relatively limited set of anthropometric variables in a geographically restricted sample. The study also demonstrates the potential value of integrating traditional Ayurvedic measurements with modern anthropometric methodology. Classical concepts such as *Hasta Pramana* can be expressed in measurable units and examined using correlation, regression, and covariance-based statistical methods. Such an approach may help develop population-specific reference standards while retaining the conceptual framework of traditional knowledge.

Limitations & Further Scope

Several limitations should be considered when interpreting the findings.

First, the study was conducted at a single institutional centre in Hassan, Karnataka, and used convenience sampling. Consequently, the participants may not represent the wider population of Karnataka or India. The findings should therefore be interpreted as population-specific rather than universally applicable.

Second, the six *Prakriti* groups were not equally represented. The number of participants ranged from 51 in the Vatapitta group to only three in the Kaphavata group. The small number of participants in some groups reduces the statistical power to detect relatively small differences between constitutional categories.

Third, the study sample size was determined by practical recruitment considerations rather than by an a priori statistical power calculation. Future studies should consider formal sample-size estimation based on expected effect sizes.

Fourth, forearm length alone explained 40% of the variance in standing height, indicating that a substantial proportion of height variation remains unexplained. Additional anthropometric measurements, including upper-arm length, lower-limb length, sitting height, femoral length, tibial length, and trunk dimensions, could provide a more comprehensive understanding of stature.

Finally, the study was cross-sectional and therefore cannot establish causal relationships between *Prakriti*, *Hasta Pramana*, and height.

The findings suggest that *Hasta Pramana* may serve as a useful anthropometric indicator of standing height within the studied population. However, the observed relationship should not be assumed to apply uniformly to all populations. Population-specific differences in genetics, nutrition, sex, age, ethnicity, socioeconomic conditions, and environmental factors can influence body proportions. Therefore, regression equations derived from one geographical or institutional population should be validated independently before being applied to other populations. Further multicentre research involving larger and more representative samples would help determine whether the observed relationship remains consistent across different geographical regions and demographic groups.

The methodology used in this study may also provide a framework for future investigations examining traditional Ayurvedic anthropometric concepts using contemporary statistical techniques.

CONCLUSION

The present study demonstrated a statistically significant positive relationship between *Hasta Pramana* and standing height among healthy young adults. Forearm length showed a moderate-to-strong positive correlation with stature and accounted for approximately 40% of the observed variation in height.

After adjusting for *Hasta Pramana*, *Prakriti* was not significantly associated with standing height. None of the pairwise comparisons between the six dual-dominant *Prakriti* groups demonstrated statistically significant differences.

These findings provide preliminary quantitative support for the classical Ayurvedic emphasis on proportional body measurements described under *Pramana Sharira*. At the same time, the results indicate that *Hasta Pramana* should be viewed as one component of overall body proportionality rather than as a complete predictor of stature.

Larger, multicentric studies using balanced *Prakriti* groups and a broader range of anthropometric measurements are needed to further evaluate the classical concept of *Sama Pramana* and its potential applications in contemporary anthropometry and forensic research.

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