

ORIGINAL RESEARCH ARTICLE

To Study the Status of *Mamsa Dhatu Sarta* in Different *Deha Prakriti* Individuals

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ABSTRACT

Background: *Mamsa Dhatu* is a vital structural tissue responsible for strength, stability, and functional integrity of the human body. Classical Ayurvedic literature describes qualitative variation in *Dhatu* excellence (*Dhatu Sarata*) among individuals of different *Deha Prakriti*. However, assessment of *Mamsa Dhatu Sarata* has traditionally relied on subjective parameters, with limited objective validation.

Objectives: The objective of the study was to evaluate and compare the status of *Mamsa Dhatu Sarata* among different *Deha Prakriti* individuals using classical subjective assessment and modern objective parameters.

Materials and Methods: An observational cross-sectional study was conducted on apparently healthy individuals after Institutional Ethics Committee approval and CTRI registration. *Deha Prakriti* assessment was performed using a VALIDATED *Prakriti* assessment pro forma. *Mamsa Dhatu Sarata* was evaluated using a newly developed and validated questionnaire along with objective parameters, including bioelectrical impedance analysis, hand-grip dynamometry, and serum creatine phosphokinase (CPK) levels.

Results: One-way analysis of variance demonstrated significant *Prakriti*-wise differences in multiple parameters related to *Mamsa Dhatu*. Hand-grip strength differed significantly among groups ($F = 3.261, P = 0.043$), being highest in Group-C (*Kapha-adhikya*), followed by Group-B (*Pitta-adhikya*), and lowest in Group-A (*Vata-adhikya*). Serum CPK levels ($F = 191.906, P < 0.001$), *Mamsa Dhatu Sarata* scores ($F = 155.074, P < 0.001$), skeletal muscle mass ($F = 5.090, P = 0.008$), bone mass ($F = 16.660, P < 0.001$), protein mass ($F = 7.098, P = 0.001$), basal metabolic rate ($F = 6.103, P = 0.003$), body fat percentage ($F = 14.164, P < 0.001$), and fat mass ($F = 36.935, P < 0.001$) showed highly significant variation, predominantly following the trend *Kapha-adhikya* > *Pitta-adhikya* > *Vata-adhikya*. Skeletal muscle percentage did not show a statistically significant difference ($F = 1.895, P = 0.157$). Protein percentage varied significantly ($F = 43.249, P < 0.001$), with higher values observed in *Vata-adhikya* and *Pitta-adhikya* groups compared to *Kapha-adhikya*. Tukey's *post hoc* analysis confirmed significant inter-group differences for most variables, particularly between *Vata-adhikya* and *Kapha-adhikya* groups. Chi-square analysis demonstrated a strong association between *Prakriti* and categorical assessments of *Mamsa Dhatu Sarata* ($\chi^2 = 98.836, P < 0.001$), skeletal muscle mass, bone mass, protein mass, and fat-related parameters, with *Kapha-adhikya* individuals predominantly exhibiting superior or standard categories, while *Vata-adhikya* individuals clustered mainly in lower categories.

Discussion: The findings suggest a significant association between the studied variables, highlighting the need for further research with larger sample sizes.

Conclusion: The study confirms a significant association between *Deha Prakriti* and *Mamsa Dhatu Sarata*. Integration of objective assessment tools enhances the scientific validation of *Dhatu Sarata Pariksha*.

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1. INTRODUCTION

Recent scientific evidence underscores the pivotal role of skeletal muscle in preserving systemic health and supporting immune function. Skeletal muscle is now recognized as an active regulator of immune responses. During aging, it functions as a key intermediary connecting

immunosenescence with the development of sarcopenia. Therefore, interventions aimed at improving skeletal muscle health may offer promising benefits in strengthening immune efficiency while simultaneously enhancing muscle function.^[1]

The concept of *Ashraya–Ashrayi Bhava* explains the interdependent relationship in which *Ashraya* denotes the structural or supportive substrate, while *Ashrayi* refers to the entity that resides within it. In the human body, *Doshas* function as *Ashrayi*, whereas *Dhatus* serve as their *Ashraya*. This reciprocal association can be understood based on three fundamental parameters:^[2-9] (1) Similarity in *Panchabhautika* constitution, (2) resemblance in *Guna* (qualitative attributes), and (3) congruence of *Karma* (functional activities).

All bodily components – *Dosha*, *Dhatu*, and *Mala* – are constituted by the *Panchamahabhutas* (*Akasha*, *Vayu*, *Agni*, *Jala*, and *Prithvi*). Similarity in elemental composition forms the foundational basis of the *Ashraya–Ashrayi* relationship. Correspondingly, *Doshas* and their associated *Dhatus* exhibit resemblance in *Guna* due to structural and functional proximity. However, certain exceptions exist, notably the *Asthi–Vata* relationship, where both share *Khara Guna* derived from *Vayu Mahabhuta*, yet *Asthi Dhatu* additionally possesses *Guru* and *Sthira Gunas*, which are antagonistic to the *Laghu* and *Chala Gunas* of *Vata*.

Functional (*Karma*) relationships between *Dosha* and *Dhatu* are generally congruent, except in the case of *Asthi Dhatu* and *Vata Dosha*, which exhibit an inverse association. *Asthi Dhatu* performs *Deha Dharana* (structural support and stability), while *Vata Dosha* governs *Deha Chalana* (movement and mobility). Similarly, the *Sira–Snayu Nibandhana Karma* of *Asthi* contrasts with the *Sira–Snayu Chalana Karma* of *Vata*, highlighting their functional opposition. *Pitta Dosha*, particularly *Ranjaka Pitta*, imparts the red color and maintains the fluid nature of *Rakta Dhatu*, while *Kapha Dosha* supports the structure and normal functioning of *Rasa*, *Mamsa*, *Meda*, *Majja*, and *Shukra Dhatus*.^[10,11]

2. MATERIALS AND METHODS

2.1. Study Design

A cross-sectional, descriptive observational study was conducted to study the Status of *Mamsa Dhatu Sarta* in different *Deha Prakriti* individuals.

2.2. Study Setting and Participants

The study was carried out at College and Hospital, Karol Bagh, New Delhi. A total of 90 participants were enrolled using convenience sampling and divided equally into three groups: *Group A (Vata adhikya)* ($n = 30$), *Group B (Pittaadhikya)* ($n = 30$) and *Group C (Kapha adhikya)* ($n = 30$). Participants were volunteers selected from the area adjacent to the institution, including students, without any coercion.

2.3. Eligibility Criteria

2.3.1. Inclusion criteria

1. Participants of the age 18–30 years
2. Participants having body mass index in normal range
3. No history of serious illness
4. Not under medical treatment for last 6 months
5. No injury since last 6 months
6. Not enrolled in any other research.

2.3.2. Exclusion criteria

1. Participants addicted to smoking, tobacco and alcohol consumption or any drug dependency
2. Participants suffering from any congenital anomalies
3. Diabetes mellitus, hypertension or any other serious metabolic disorder
4. Participants undergoing treatment for any medical conditions
5. Participants taking artificial proteins supplements or steroids
6. History of hospitalization during the last 3 months: Assessment Parameters.

2.4. Outcome Measures

2.4.1. Primary outcome

To evaluate the status of *Mamsa Sarta* in different *deha prakriti* individuals using subjective and objective parameters.

2.4.2. Secondary outcomes

- To study the association of *Mamsa Sarta* with different *deha prakriti*.

2.5. Ethical Considerations

The study received Institutional Ethics Committee approval (No. F-5(423)/2020-Co/IEC(PG-Ayu)/103 dated January 31, 2024), with subsequent approval for a minor modification in the *Prakriti* assessment tool (No. F-5(423)/2020-Co/TEC(Ayurveda)/172 dated March 17, 2025). The study protocol was registered with the Clinical Trials Registry of India CTRI/2024/07/070770 on March 20, 2023.

2.6. Sample Size

The sample size was 90 (30 in each group).

- Group A: *Vatadhika prakriti*
- Group B: *Pittadhika prakriti*
- Group C: *Kaphadhika prakriti*.

2.6.1. Recruitment

Recruitment of the subjects was done at the outpatient department of A and U Tibbia College and Hospital.

2.7. Methodology

2.7.1. Sequence generation

Convenience sampling.

2.7.2. Implementation

The subjects fulfilling the inclusion criteria and willing to participate in the trial were enrolled in the study and assigned to a group.

2.8. Methods

2.8.1. Data collection method

Participant Timeline:

- Visit 1 (day 0) – Assessment of subject as per inclusion criteria and enrolment in study
- Visit 2 (day 1) – Filling of *prakriti* questionnaire
- Visit 3 (day 2) – Allotment of subjects into three groups according to *deha prakriti*
- Visit 4 (day 3) – Evaluation of *mamsa Sarata* through subjective and objective parameters.

2.8.2. Subjective parameters

Prakriti was assessed using the VALIDATED *Prakriti* Assessment Performa with clinical evaluation, classifying participants into

Vatadhikya (Group A), *Pittadhikya* (Group B), and *Kaphadhikya* (Group C). *Mamsa Dhatu Sarata* was evaluated using a classical Ayurvedic Sarata assessment questionnaire, categorizing subjects as *Uttama*, *Madhyama*, or *Heena Sarata*.

2.8.3. Objective parameters

Hand grip strength was measured using a calibrated digital dynamometer, bioelectrical impedance analysis (BIA) was used to assess body composition parameters, and serum creatine phosphokinase (CPK) levels were estimated using standard biochemical methods.

2.9. Data Collection

Initially, subjects were screened as per the eligibility criteria. Eligible participants were then enrolled in the study. At the time of enrolment, demographic details and clinical profile were recorded. Satmya, Satva, and other relevant study variables were assessed. Thereafter, *Prakriti* assessment was carried out using a validated *Prakriti pro forma*. *Mamsa Dhatu Sarata* was evaluated using the *Mamsa Dhatu Sarata pro forma*, and objective parameters were recorded. All collected data were systematically entered into a Microsoft Excel spreadsheet for further analysis.

2.10. Data Analysis

The data were statistically analyzed using the IBM Statistical Package for the Social Sciences 25.0 student's version. The following statistical tests were applied to the obtained data:

The study was observational in design. Data were tabulated and analyzed using One-way analysis of variance (ANOVA) to compare mean values across Group A, Group B, and Group C, followed by Tukey's *post hoc* test for intergroup comparisons. Chi-square test was used to assess associations between categorical variables. Demographic and personal characteristics were summarized using frequencies and percentages, while continuous variables were expressed as mean $\pm$ standard deviation.

3. RESULTS AND DISCUSSION

- A total of 90 participants were included in the study and classified into *Vatadhikya* (Group A), *Pittadhikya* (Group B), and *Kaphadhikya* (Group C), with 30 subjects in each group. Data were analyzed using One-way ANOVA followed by Tukey's *post hoc* test for intergroup comparisons, while associations between categorical variables were assessed using the Chi-square test.

3.1. Results

A total of 90 participants were included in the study and classified into *Vatadhikya* (Group A), *Pittadhikya* (Group B), and *Kaphadhikya* (Group C), with 30 subjects in each group. Data were analyzed using One-way ANOVA followed by Tukey's *post hoc* test for intergroup comparisons, while associations between categorical variables were assessed using the Chi-square test.

3.1.1. Comparison of functional and biochemical parameters

- Hand grip strength showed a statistically significant difference across the three *Prakriti* groups ($P = 0.044$). Group C (*Kapha Prakriti*) demonstrated the highest mean hand grip strength, whereas Group A (*Vata Prakriti*) showed the lowest. However, *post hoc* analysis did not reveal any significant pairwise differences.

- Serum CPK levels differed highly significantly among the groups ($P < 0.001$), with Group C (*Kapha Prakriti*) showing the highest values, followed by Group B (*Pitta Prakriti*) and Group A (*Vata Prakriti*). Tukey's *post hoc* analysis confirmed highly significant differences between all group pairs ($P < 0.001$).
- Mamsa Dhatu Sarata* scores showed a highly significant intergroup difference ($P < 0.001$). Group C exhibited the highest mean scores, followed by Group B, while Group A had the lowest scores. All pairwise comparisons were statistically significant.

3.1.2. Comparison of body composition parameters

- Skeletal muscle mass, bone mass, protein mass, protein percentage, basal metabolic rate (BMR), body fat percentage, and fat mass differed significantly across the *Prakriti* groups ($P < 0.05$). Group C consistently demonstrated higher muscle-related and metabolic parameters. Skeletal muscle percentage did not show a statistically significant difference among the groups ($P = 0.157$).

3.1.3. Association between prakriti and categorical variables

- Chi-square analysis revealed a highly significant association between *Prakriti* and *Mamsa Dhatu Sarata* category ($\chi^2 = 98.836$, $P < 0.001$). Group C individuals predominantly belonged to the *Pravara* category, Group B to *Madhyama*, and Group A to *Avara/Madhyama* categories. Significant associations were also observed between *Prakriti* and skeletal muscle mass, bone mass, skeletal muscle percentage, protein mass, protein percentage, body fat percentage, and fat mass categories ($P < 0.05$) [Tables 1-3].

3.2. Discussion

The present study demonstrates a clear influence of *Deha Prakriti* on functional, biochemical, and body composition parameters related to *Mamsa Dhatu*. Significant variations were observed across *Vatadhikya* (Group A), *Pittadhikya* (Group B), and *Kaphadhikya* (Group C), supporting classical Ayurvedic descriptions of constitutional differences in tissue strength and metabolism.

Hand grip strength showed a statistically significant intergroup difference, with Group C exhibiting higher values and Group A the lowest. However, the absence of significant pairwise differences suggests that grip strength, while functionally relevant, may not independently discriminate between *Prakriti* types. In contrast, serum CPK, a marker of muscle metabolic activity, showed highly significant differences across all groups, with progressively higher levels from Group A to Group C. This indicates greater muscle mass and metabolic turnover in *Kaphadhikya* individuals.

Mamsa Dhatu Sarata scores varied markedly among the groups, being highest in Group C and lowest in Group A, with all intergroup comparisons reaching statistical significance. This strongly validates the Ayurvedic concept of superior *Mamsa Dhatu* in Kapha-dominant constitutions. Similarly, skeletal muscle mass and bone mass were significantly higher in Group C, reflecting better structural integrity and tissue nourishment.

Skeletal muscle percentage did not differ significantly across groups, suggesting that absolute muscle quantity rather than relative proportion is more influenced by *Prakriti*. Protein mass and protein percentage showed significant variation, with higher protein mass in Group C, while relative protein percentage was higher in Groups A

and B, indicating differences in lean tissue composition and metabolic utilization.

BMR was significantly higher in Group C and lowest in Group A, reflecting constitution-based metabolic differences. Body fat percentage and fat mass also followed a consistent pattern, with Group C exhibiting higher fat reserves and Group A showing lower values, aligning with classical descriptions of Kapha dominance in tissue accumulation and Vata dominance in tissue depletion.

Post hoc analysis further clarified these findings, revealing consistent and significant differences for serum CPK, *Mamsa Dhatu Sarata*, bone mass, body fat percentage, and fat mass across all groups, while skeletal muscle mass and protein-related parameters showed selective intergroup differences.

Chi-square analysis of categorical variables demonstrated strong associations between *Prakriti* and *Mamsa Dhatu Sarata*, skeletal muscle mass, bone mass, protein mass, and fat-related categories. Group C predominantly belonged to superior (*Pravara/Excellent*) categories, whereas Group A showed greater representation in lower or standard categories. These findings provide objective validation of classical Ayurvedic descriptions of *Mamsa Dhatu* variations among different *Prakriti* types.

Overall, the study establishes that *Deha Prakriti* significantly influences musculoskeletal strength, metabolic activity, and tissue composition. The integration of functional tests, biochemical markers, and body composition analysis offers a reliable objective framework for assessing *Mamsa Dhatu Sarata*, strengthening the scope of evidence-based Ayurvedic assessment and personalized therapeutic planning.

4. CONCLUSION

The study demonstrated significant *Prakriti*-based differences in musculoskeletal, biochemical, and body-composition parameters. ANOVA and *post hoc* analyses showed that Group C consistently exhibited higher anabolic and structural values, Group A showed a leaner profile, and Group B remained intermediate. Chi-square analysis further confirmed strong associations between *Prakriti* and *Mamsa Dhatu Sarata* as well as muscle, protein, bone, and fat parameters, validating classical Ayurvedic descriptions of constitution-dependent physical traits.

4.1. Limitations and Future Scope

The study's generalizability is limited by its single-center, cross-sectional design and inclusion of predominantly young adults. Smaller subgroup sizes and observer-related variability in subjective *Mamsa Dhatu Sarata* assessment may have influenced results. Body composition was assessed using BIA, which is less precise than advanced imaging techniques.

Future studies should involve larger, multi-centric samples across broader age groups, employ objective imaging modalities such as DEXA or magnetic resonance imaging, and adopt longitudinal designs to better elucidate *Prakriti*-based variations in *Mamsa Dhatu* over time. The findings may also support the development of *Prakriti*-based personalized health applications.

5. ACKNOWLEDGMENTS

Nil.

6. AUTHORS' CONTRIBUTIONS

All authors give equal contribution in making of this manuscript.

7. FUNDING

Nil.

8. ETHICAL STATEMENT

Ethical approval was not required for this study as it is a case report.

9. CONFLICTS OF INTERESTS

The authors declare no conflicts of interest regarding the publication of this paper.

10. DATA AVAILABILITY STATEMENT

The data analyzed in this review were obtained from publicly available sources, including peer-reviewed articles, observational studies, and surveys accessible through databases.

11. DISCLAIMER/VIEW AND OPINIONS

The opinions expressed in this article are solely those of the authors and do not reflect the views of the International Research Journal of Ayurveda and Yoga or its editorial board.

12. AI-USE DECLARATION

The authors declare that no generative AI tools were used to create scientific content, interpret data, or draft any sections of this manuscript. AI-based tools were used solely for minor language and grammar refinements to improve clarity and readability. All scientific content, analysis, and conclusions remain the sole responsibility of the author.

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Table 1: Comparison of hand grip strength, serum CPK, and Mamsa Dhatu Sarata

Parameter	Group A (Mean±SD)	Group B (Mean±SD)	Group C (Mean±SD)	F-value	P-value	Result
Hand grip strength	327.55±89.70	331.75±78.79	355.54±99.36	3.261	0.044	S
Serum CPK (IU/L)	61.03±17.70	96.03±10.76	138.40±16.58	191.906	<0.001	HS
Mamsa Dhatu Sarata score	20.50±6.03	29.20±6.76	47.03±4.91	155.074	<0.001	HS

S: Significant, HS: Highly significant, CPK: Creatine phosphokinase, SD: Standard deviation

Table 2: Comparison of body composition parameters (BIA) across Prakriti groups

Parameter	Group A (Mean±SD)	Group B (Mean±SD)	Group C (Mean±SD)	P-value	Result
Skeletal muscle mass (kg)	43.91±5.94	45.68±7.98	49.78±7.84	0.008	S
Skeletal muscle percentage (%)	52.65±5.64	49.75±5.09	50.19±7.62	0.157	NS
Bone mass (kg)	2.51±0.21	2.67±0.27	2.88±0.27	<0.001	HS
Protein mass (kg)	10.77±1.22	11.29±1.63	12.23±1.67	0.001	S
Protein percentage (%)	20.06±0.60	19.19±0.61	18.41±0.83	<0.001	HS
BMR (kcal/day)	1364.53±133.70	1409.07±173.64	1506.93±173.88	0.003	S
BodyFat percentage (%)	14.52±4.81	18.22±4.12	20.82±4.86	<0.001	HS
Fat mass (kg)	7.71±2.35	10.34±2.92	13.61±2.68	<0.001	HS

BIA: Bioelectrical impedance analysis, BMR: Basal metabolic rate, SD: Standard deviation

Table 3: Association between Prakriti and Mamsa Dhatu Sarata category

Mamsa Dhatu Sarata	Group A	Group B	Group C	Total
Avara	12	0	0	12
Madhyama	27	18	12	57
Pravara	3	12	18	33
Total	30	30	30	90

$\chi^2=98.836$, $P<0.001$ (highly significant)