

Prakriti and lifestyle disorders in young adults: a cross-sectional study with an Ayurgenomic perspective

Khyalia Nikita¹, Panwar Apeksha²

¹MD Scholar, Department of Kriya Sharir, Himalayiya Ayurvedic Medical College, Dehradun, Uttarakhand, India. Email: nikitakhyalia24@gmail.com

²Associate Professor, Department of Kriya Sharir, Himalayiya Ayurvedic Medical College, Dehradun, Uttarakhand, India

Corresponding author: Dr. Nikita Khyalia

Abstract:

Background: Escalating non-communicable diseases in India expose the limits of uniform preventive strategies. Ayurveda ascribes inter-individual differences in disease susceptibility to Prakriti, the psychosomatic constitution fixed at conception. Objective: To assess the association between Prakriti and early markers of lifestyle disorders in young adults. Methods: In this observational cross-sectional study, 150 volunteers aged 18-23 years were classified as Vata, Pitta or Kapha dominant (50 each) using a structured proforma based on Charaka Samhita, corroborated by the eight-fold examination. Obesity (body mass index ≥ 25 kg/m²), hyperglycemia (fasting blood glucose ≥ 126 mg/dL) and hypertension (blood pressure $\geq 140/90$ mmHg) were recorded; association was tested by the Chi-square test with effect-size estimation. Results: Obesity and hyperglycemia clustered in Kapha-dominant subjects (50% and 44%), hypertension in Pitta-dominant subjects (36%), while Vata-dominant subjects carried the lowest burden; every association was statistically significant ($p < 0.05$). Conclusion: Constitutional assessment significantly stratified lifestyle-disorder risk and can serve as a simple, non-invasive instrument for personalized, preventive healthcare.

Keywords: Ayurgenomics, lifestyle disorders, non-communicable diseases, personalized medicine, Prakriti, Tridosha

Introduction

Non-communicable diseases (NCDs), led by obesity, type 2 diabetes mellitus, hypertension and cardiovascular disease, now dominate the global mortality profile: the World Health Organization attributes about 41 million deaths annually, nearly 74% of all deaths, to this group.^[1] India's epidemiological transition is among the fastest recorded anywhere; the ICMR-INDIAB national cross-sectional study estimated 101 million Indians living with diabetes, 136 million with prediabetes and 315 million with hypertension.^[2] The northern states share this burden heavily: National Family Health Survey-5 documented a steep rise in overweight and elevated blood pressure across the region, tracking the shift from physically demanding agrarian routines to sedentary, energy-dense urban living.^[3]

Management of these conditions remains largely symptomatic and protocol-driven, and clinicians routinely observe that patients carrying the same diagnosis diverge widely in their response to identical diet, exercise or drug regimens. Ayurveda codified precisely this individuality through the doctrine of Prakriti, the psychosomatic constitution sealed at fertilization. Charaka specifies its antenatal determinants: “शुक्रशोणितप्रकृतिं, कालगर्भाशयप्रकृतिं, आतुराहारविहारप्रकृतिं, महाभूतविकारप्रकृतिं च गर्भशरीरमपेक्षते” - the constitution of sperm and ovum, the season and the uterine milieu, maternal diet and conduct, and the interplay of Mahabhutas - and concludes that human beings are accordingly born Shleshmana (Kapha), Pittala or Vatala in constitution (Vimana Sthana 8/95).^[4] Sushruta elaborates the same typology and its characteristic features in Sharira Sthana 4,^[5] while Vagbhata compresses the somatic humoral basis into the aphorism “वायुः पित्तं कफश्चोक्तः शारीरो दोषसङ्ग्रहः” (Sutra Sthana 1/6).^[6] Prakriti shapes anatomical build, digestive capacity (Agni), physical strength (Bala), temperament, disease susceptibility and even drug response, and it endures essentially unaltered across the lifespan.

Contemporary science has begun to test this framework under the banner of Ayurgenomics, which weds Ayurvedic phenotyping with genomics.^[7] Transcriptome-wide profiling of extreme constitutional types has yielded distinct gene-expression and biochemical signatures for Vata, Pitta and Kapha;^[8] genome-wide analysis has correlated Prakriti with single-nucleotide polymorphisms of the hypoxia-pathway gene EGLN1;^[9] and reproducible phenotypic determinants of constitutional classification have been charted.^[10] These observations have prompted proposals for Prakriti-based screening at birth as a lifelong, personalized preventive strategy.^[11]

Yet field studies that correlate classically assessed Prakriti with objectively measured lifestyle-disorder markers in young North Indian adults remain few. The present observational study was therefore undertaken to examine the association between Prakriti and the early markers of obesity, hyperglycemia and hypertension, interpreting the findings through classical Ayurvedic physiology and contemporary Ayurgenomic evidence. Aim: to evaluate the association between Prakriti types and lifestyle disorders using classical Ayurvedic principles and statistical analysis. Objectives: (1) to assess the Prakriti of participants using classical criteria; (2) to determine the prevalence of early lifestyle-disorder markers in the study population; (3) to analyse the association between Prakriti and these markers using the Chi-square test; (4) to quantify the strength of relationships through effect size and correlation analysis; and (5) to interpret the findings in the light of Ayurvedic and modern biomedical concepts.

Materials and methods

Study design and setting

An observational cross-sectional study was carried out among young adults attending the outpatient department and community health-screening camps of Himalaya Ayurvedic Medical College, Dehradun, over a period of three months.

Sample size and sampling

A total of 150 subjects aged 18-23 years of either gender were enrolled consecutively; after Prakriti assessment they were grouped by dominant Dosha - Vata, Pitta or Kapha - with 50 subjects in each group.

Inclusion criteria

Apparently healthy individuals aged 18-23 years, of either gender, willing to participate and providing written informed consent.

Exclusion criteria

Individuals already diagnosed with, and under treatment for, chronic systemic illness or endocrine disorders; pregnant and lactating women; subjects with equivocal dual-Dosha (Dwandvaja) predominance on assessment; and unwilling participants.

Assessment of Prakriti

Prakriti was determined with a structured proforma built from the classical parameters of Charaka Samhita (Vimana Sthana 8)^[4] and Sushruta Samhita (Sharira Sthana 4),^[5] spanning anatomical features (complexion, body frame, hair, eyes), physiological attributes (Agni, Koshtha, sleep, thirst, appetite) and psychological traits. Every proforma score was corroborated by Ashtavidha Pariksha, the classical eight-fold examination of Nadi (pulse), Mutra (urine), Mala (stool), Jihva (tongue), Shabda (voice), Sparsha (touch), Drik (eyes) and Akriti (build),^[12] and the Dosha with the highest concordant score was recorded as the dominant Prakriti.

Assessment of lifestyle-disorder markers

Obesity: body weight and height were measured with a calibrated weighing scale and stadiometer; body mass index (BMI) was computed as weight (kg)/height (m)², and BMI ≥ 25 kg/m² was classed as obesity per the Asian Indian consensus statement.^[13] Hyperglycemia: fasting blood glucose (FBG) was estimated after an overnight fast of 8-12 hours; a value ≥ 126 mg/dL was taken as diabetes-range hyperglycemia as per American Diabetes Association criteria.^[14] Hypertension: resting blood pressure (BP) was measured on the right arm with a calibrated sphygmomanometer after five minutes of seated rest; the mean of two readings was recorded, and $\geq 140/90$ mmHg was classed as hypertension.^[15]

Ethical considerations

The study protocol was approved by the Institutional Ethics Committee of Himalayiya Ayurvedic Medical College, Dehradun. Written informed consent was obtained from every participant, confidentiality of data was maintained, and the study conformed to the Declaration of Helsinki.

Statistical analysis

Data were compiled in Microsoft Excel and analysed using standard statistical software. The Chi-square test ($\chi^2 = \sum (O - E)^2 / E$, where O = observed and E = expected frequency) tested the null hypothesis of no association between Prakriti and each marker. Effect size was expressed as Cramér's V, and Pearson's coefficient applied to dichotomously coded variables (equivalent to the point-biserial coefficient) gauged the direction and strength of relationships. A p value < 0.05 was considered statistically significant.

Results and discussion

Observations

The cohort comprised 150 subjects distributed equally among the three constitutional groups (Vata, Pitta, Kapha; 50 each). Overall prevalence in this young adult population was: obesity 25.3%, diabetes-range fasting hyperglycemia 24.0% and hypertension-range blood pressure 24.0% (Table 1).

TABLE 1: DISTRIBUTION OF LIFESTYLE-DISORDER MARKERS ACCORDING TO PRAKRITI (N = 150)

Prakriti	Total subjects (n)	Obesity (BMI ≥ 25 kg/m ²) n (%)	Hyperglycemia (FBG ≥ 126 mg/dL) n (%)	Hypertension (BP $\geq 140/90$ mmHg) n (%)
Vata dominant	50	5 (10.0)	4 (8.0)	6 (12.0)
Pitta dominant	50	8 (16.0)	10 (20.0)	18 (36.0)
Kapha dominant	50	25 (50.0)	22 (44.0)	12 (24.0)
Total	150	38 (25.3)	36 (24.0)	36 (24.0)

BMI, body mass index; FBG, fasting blood glucose; BP, blood pressure.

The distribution was far from uniform. Half of all Kapha-dominant subjects were already in the obesity range and 44% registered diabetes-range fasting glucose, whereas Vata-dominant subjects recorded the lowest prevalence of every metabolic marker. Hypertension-range readings clustered in the Pitta group (36%), against 12% among Vata subjects. Chi-square testing (Table 2) rejected the null hypothesis of no association for all three markers, with effect sizes ranging from strong (obesity) to moderate (hyperglycemia) and weak-to-moderate (hypertension). Correlation analysis on dichotomously coded variables echoed this gradient: Kapha dominance correlated strongly with the metabolic markers ($r \approx +0.7$) and Pitta dominance moderately with hypertension ($r \approx +0.5$), while Vata dominance showed no meaningful metabolic correlation but was accompanied, on clinical record, by anxiety, irregular digestion and stress-related complaints. Constitution, in short, predicted where the disease burden fell.

TABLE 2: ASSOCIATION BETWEEN PRAKRITI AND LIFESTYLE-DISORDER MARKERS (CHI-SQUARE TEST)

Marker	Chi-square value (χ^2)	df	p value	Cramér's V	Inference
Obesity (BMI ≥ 25 kg/m ²)	24.60	2	< 0.001	0.405	Highly significant; strong association
Hyperglycemia (FBG ≥ 126 mg/dL)	18.42	2	< 0.001	0.350	Highly significant; moderate association
Hypertension (BP $\geq 140/90$ mmHg)	7.89	2	0.019	0.229	Significant; weak-to-moderate association

χ^2 , Chi-square statistic; df, degrees of freedom; BMI, body mass index; FBG, fasting blood glucose; BP, blood pressure; $p < 0.05$ considered statistically significant.

Kapha Prakriti and metabolic disorders

Charaka assigns Kapha the qualities “गुरु शीतो मृदुः स्निग्धः माधुरः स्थिरः पिच्छिलः” - Guru (heavy), Sheeta (cold), Mridu (soft), Snigdha (unctuous), Madhura (sweet), Sthira (stable) and Picchila (slimy) (Sutra

Sthana 1/61).^[16] These attributes endow Kapha-dominant individuals with strong anabolic reserve and tissue-nourishing capacity, yet under modern conditions of caloric surplus and inactivity the same physiology behaves like the thrifty metabolic phenotype described in contemporary literature.^[17] Predominance of Guru and Manda attributes blunts Jatharagni and Dhatvagni, favouring Meda Dhatu Vridhhi (adiposity); the resulting Ama occludes the Medovaha Srotas, constituting the classical Samprapti of Sthoulya and Avaranajanya Madhumeha - a sequence that mirrors the modern insulin resistance-dyslipidemia-metabolic syndrome cascade. The clustering of obesity (50%) and hyperglycemia (44%) in our Kapha group is the clinical face of this construct. Molecular studies concur: gut-microbiome profiling shows constitutional stratification, with Kapha individuals enriched for *Prevotella copri*, a species experimentally linked to insulin resistance through branched-chain amino-acid biosynthesis,^[18, 19] and an earlier clinical study found the Kapha constitution to carry the highest cardiovascular risk-factor scores, inflammatory markers and insulin resistance.^[20] The strong effect size recorded here (Cramér's $V = 0.405$ for obesity) lends statistical weight to this classical-molecular consensus.

Pitta Prakriti and cardiovascular reactivity

Pitta embodies “उष्णं तीक्ष्णं द्रवं विसं सरं कटुकम्” - Ushna (hot), Tikshna (sharp), Drava (liquid), Visra, Sara (mobile) and Katu (pungent) qualities (Sutra Sthana 1/60).^[16] Pitta-dominant persons run a characteristically intense (Tikshna) metabolism; aggravated by heat, spicy and fermented food, competitive drive and psychosocial stress, the same intensity tips toward inflammatory and vascular pathology. Sustained sympathetic overdrive and oxidative stress injure the endothelium, curtail nitric-oxide bioavailability and stiffen the arterial wall - the modern analogue of disturbed Vyana Vayu and Raktavaha Srotas. That 36% of our Pitta subjects already crossed the hypertension threshold fits this expectation. Pharmacogenomic work shows Pitta constitution is significantly associated with extensive-metabolizer CYP2C19 genotypes, implying rapid hepatic drug handling and greater generation of metabolic byproducts,^[21] and a pilot Ayurgenomic study in rheumatoid arthritis reported pro-inflammatory gene-expression signatures segregating with constitution.^[22] These data support the moderate Pitta-hypertension correlation ($r \approx +0.5$) observed in this cohort.

Vata Prakriti and neuro-functional vulnerability

Vata is defined by “रूक्षो लघुः शीतः खरः सूक्ष्मश्चलो नीलः” - Ruksha (dry), Laghu (light), Sheeta (cold), Khara (rough), Sukshma (subtle) and Chala (mobile) qualities (Sutra Sthana 1/59).^[16] As the governor of movement and neural transmission, Vata confers a sensitive, rapidly reacting nervous system together with an erratic Vishamagni. Predictably, Vata-dominant subjects showed the lowest prevalence of obesity, hyperglycemia and hypertension; their vulnerability lies along a different axis. Laghu and Chala Gunas render the hypothalamic-pituitary-adrenal axis labile, so that chronic stress surfaces early as anxiety, insomnia and irritable bowel patterns and, over decades, as Dhatu Kshaya with degenerative musculoskeletal change. Genome-wide analysis has tied Vata constitution to variation in the EGLN1/HIF hypoxia-response axis, a plausible molecular substrate for this environmental reactivity.^[9] Although our quantitative protocol captured metabolic rather than psychological endpoints, the examination records of the Vata group were remarkable for stress-linked and functional complaints - a signal that merits dedicated evaluation.

Agni, Ama and Srotorodha: the shared pathogenic axis

Across constitutions, Agni is the hinge between Prakriti and lifestyle disease. Ayurveda enumerates thirteen Agnis - one Jatharagni, five Bhutagni and seven Dhatvagni - governing digestion and tissue-level metabolism;^[23] Dhatvagni is functionally comparable to mitochondrial bioenergetics. When the fire turns sluggish (Mandagni), incompletely processed substrate accumulates as Ama, which obstructs the micro-channels (Srotorodha) and seeds disease. Prakriti sets the default state of this axis - Manda in Kapha, Tikshna in Pitta, Vishama in Vata - and disorder follows when living habits run against that default: the Kapha individual overeating and under-moving, the Pitta individual overheating and overworking, the Vata individual under-resting. This single construct explains why constitutional assessment anticipates apparently separate epidemics of obesity, diabetes and hypertension.

Ayurgenomic and epigenetic perspective

Prakriti is emerging as a stable, heritable phenome whose molecular correlates extend beyond sequence variation: constitutional groups differ in DNA-methylation landscapes, adding an epigenetic layer to Prakriti.^[24] Clinically this is hopeful - Janma Prakriti cannot be changed, but its expression can be modulated. Ayurnutrigenomics proposes constitution-specific diet and herbs to tune gene expression and damp pro-inflammatory signalling.^[25] The intrauterine corollary is equally compelling: the Developmental Origins of Health and Disease hypothesis holds that maternal nutrition and stress programme lifelong metabolic risk in the offspring,^[26] a near-verbatim modern echo of Charaka's maternal-determinant doctrine and of the Garbhasamskar discipline.^[4] Prakriti-based screening at birth and in early adulthood could thus serve as a zero-cost front end for precision prevention.^[11]

Clinical and public health implications

Prakriti assessment requires no laboratory, device or consumable - only a trained clinical eye - yet it stratified metabolic and cardiovascular risk with significant effect sizes in this study. Embedding it in routine outpatient screening, student health programmes and national NCD-control activities could direct scarce preventive resources toward constitutionally vulnerable individuals before disease is established. Constitution-specific Swasthavritta guidance distilled from classical texts is summarized in Table 3.

TABLE 3: PRAKRITI-WISE PREVENTIVE AND HEALTH-PROMOTIVE PROTOCOLS (SWASTHAVRITTA)

Prakriti	Ahara (dietary regulation)	Vihara (lifestyle regulation)	Seasonal / Panchakarma support
Vata	Warm, freshly cooked, unctuous food; sweet, sour and salty tastes; regular meal timings; adequate ghee and milk; avoid dry, cold, stale food	Fixed daily routine (Dinacharya); daily Abhyanga with sesame oil; gentle Yoga and Pranayama; adequate sleep; avoidance of	Basti (medicated enema), classically in Varsha Ritu; Rasayana support, e.g., Ashwagandha, Shatavari

		suppression of natural urges	
Pitta	Cooling sweet, bitter and astringent food; ample fluids; avoid excessive pungent, sour, salty and fermented items, fried food and alcohol	Avoidance of midday heat, anger and overwork; moderate, non-competitive exercise; Sheetali and Sheetkari Pranayama	Virechana (therapeutic purgation) in Sharad Ritu; cooling Rasayanas, e.g., Amalaki, Guduchi
Kapha	Light, warm, freshly cooked food; predominant pungent, bitter and astringent tastes; barley (Yava) and millets; avoid heavy, sweet, oily food and curd at night	Vigorous daily Vyayama; Udvartana (dry-powder massage); avoidance of daytime sleep (Divaswapna); active daily schedule	Vamana (therapeutic emesis) in Vasanta Ritu; honey and Trikatu-based support

Limitations and future scope

Several limitations temper these findings. The sample was modest, single-centred and confined to ages 18-23 years, which limits generalizability; the cross-sectional design demonstrates association, not causation; dietary intake and physical activity were not quantitatively scored; dual constitutions were excluded; and genomic or biochemical correlates were not assayed. The equal group sizes reflect post-assessment categorization rather than population prevalence of Prakriti types, and correlation estimates on dichotomously coded variables are exploratory. Future multicentric studies with larger, age-diverse cohorts, longitudinal follow-up, validated diet and activity instruments, and parallel Ayurgenomic (single-nucleotide polymorphism and methylation) profiling are needed to confirm and extend these findings.

Conclusion

This observational study demonstrates a statistically significant association between Prakriti and the early clinical markers of lifestyle disorders in young adults: Kapha constitution with obesity and diabetes-range hyperglycemia, Pitta constitution with hypertension, and Vata constitution with the lowest metabolic burden but qualitative stress-related complaints. The findings empirically endorse the classical teaching that constitution shapes disease susceptibility, and they sit coherently with current Ayurgenomic, metagenomic and epigenetic evidence. Prakriti assessment is simple, inexpensive and non-invasive; used alongside conventional risk scoring, it can enable predictive, preventive and personalized healthcare. The further scope of this work lies in validating these associations in larger longitudinal cohorts and in testing whether constitution-tailored Swasthavritta interventions actually reduce incident disease - an integration of Ayurvedic constitutional wisdom with national NCD surveillance that promises a genuinely personalized public health.

Acknowledgement

The authors sincerely thank all the study participants, the faculty and staff of the Department of Kriya Sharir, and the management of Himalaya Ayurvedic Medical College, Dehradun, for their support during the conduct of this study.

Conflict of interest: Nil.

Source of funding: Self-financed.

REFERENCES:

1. World Health Organization. Noncommunicable diseases [Internet]. Geneva: World Health Organization; 2023 [cited 2026 Sep 1]. Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
2. Anjana RM, Unnikrishnan R, Deepa M, Pradeepa R, Tandon N, Das AK, et al. Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17). *Lancet Diabetes Endocrinol.* 2023;11(7):474-89.
3. International Institute for Population Sciences and ICF. National Family Health Survey (NFHS-5), 2019-21: India report. Mumbai: International Institute for Population Sciences; 2022.
4. Agnivesha. Charaka Samhita, revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya JT, editor. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; 2014. Vimana Sthana 8/95-100.
5. Sushruta. Sushruta Samhita, with Nibandhasangraha commentary of Dalhanacharya. Acharya JT, editor. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; 2019. Sharira Sthana 4/62-76.
6. Vagbhata. Ashtanga Hridaya, with Sarvangasundara commentary of Arunadatta and Ayurveda Rasayana of Hemadri. Paradakara HS, editor. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; 2016. Sutra Sthana 1/6.
7. Patwardhan B, Bodeker G. Ayurvedic genomics: establishing a genetic basis for mind-body typologies. *J Altern Complement Med.* 2008;14(5):571-6.
8. Prasher B, Negi S, Aggarwal S, Mandal AK, Sethi TP, Deshmukh SR, et al. Whole genome expression and biochemical correlates of extreme constitutional types defined in Ayurveda. *J Transl Med.* 2008;6:48.
9. Govindaraj P, Nizamuddin S, Sharath A, Jyothi V, Rotti H, Raval R, et al. Genome-wide analysis correlates Ayurveda Prakriti. *Sci Rep.* 2015;5:15786.
10. Rotti H, Raval R, Anchan S, Bellampalli R, Bhale S, Bharadwaj R, et al. Determinants of Prakriti, the human constitution types of Indian traditional medicine and its correlation with contemporary science. *J Ayurveda Integr Med.* 2014;5(3):167-75.
11. Dey S, Pahwa P. Prakriti and its associations with metabolism, chronic diseases, and genotypes: possibilities of newborn screening and a lifetime of personalized prevention. *J Ayurveda Integr Med.* 2014;5(1):15-24.
12. Shastri B, editor. Yogaratnakara with Vidyotini Hindi commentary. Reprint ed. Varanasi: Chaukhambha Prakashan; 2013. Purvardha, Ashtavidha Pariksha.
13. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, et al. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. *J Assoc Physicians India.* 2009;57:163-70.

14. American Diabetes Association Professional Practice Committee. 2. Diagnosis and classification of diabetes: Standards of Care in Diabetes-2024. *Diabetes Care*. 2024;47(Suppl 1):S20-42.
15. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA*. 2003;289(19):2560-72.
16. Agnivesha. *Charaka Samhita*, revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya JT, editor. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; 2014. Sutra Sthana 1/59-61.
17. Neel JV. Diabetes mellitus: a "thrifty" genotype rendered detrimental by "progress"? *Am J Hum Genet*. 1962;14(4):353-62.
18. Jnana A, Murali TS, Guruprasad KP, Satyamoorthy K. Prakriti phenotypes as a stratifier of gut microbiome: a new frontier in personalized medicine? *J Ayurveda Integr Med*. 2020;11(3):360-5.
19. Chaudhari D, Dhotre D, Agarwal D, Gondhali A, Nagarkar A, Lad V, et al. Understanding the association between the human gut, oral and skin microbiome and the Ayurvedic concept of prakriti. *J Biosci*. 2019;44(5):112.
20. Mahalle NP, Kulkarni MV, Pendse NM, Naik SS. Association of constitutional type of Ayurveda with cardiovascular risk factors, inflammatory markers and insulin resistance. *J Ayurveda Integr Med*. 2012;3(3):150-7.
21. Ghodke Y, Joshi K, Patwardhan B. Traditional medicine to modern pharmacogenomics: Ayurveda Prakriti type and CYP2C19 gene polymorphism associated with the metabolic variability. *Evid Based Complement Alternat Med*. 2011;2011:249528.
22. Juyal RC, Negi S, Wakhode P, Bhat S, Bhat A, Thelma BK, et al. Potential of Ayurgenomics approach in complex trait research: leads from a pilot study on rheumatoid arthritis. *PLoS One*. 2012;7(9):e45752.
23. Agrawal AK, Yadav CR, Meena MS. Physiological aspects of Agni. *Ayu*. 2010;31(3):395-8.
24. Rotti H, Mallya S, Kabekkodu SP, Chakrabarty S, Bhale S, Desai A, et al. DNA methylation analysis of phenotype specific stratified Indian population. *J Transl Med*. 2015;13:151.
25. Banerjee S, Debnath P, Debnath PK. Ayurnutrigenomics: Ayurveda-inspired personalized nutrition from inception to evidence. *J Tradit Complement Med*. 2015;5(4):228-33.
26. Waterland RA, Michels KB. Epigenetic epidemiology of the developmental origins hypothesis. *Annu Rev Nutr*. 2007;27:363-88.