



Research Article

Ayurvedic Diagnostic Approach to Obesity: Integrating Sthaulya, Meda Dhatu and Metabolic Biomarkers

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Abstract

Obesity is a chronic, multifactorial disease characterized by excessive accumulation of adipose tissue and associated metabolic dysfunction. The current diagnostic approach predominantly relies on anthropometric parameters such as body mass index (BMI), waist circumference and body composition, supplemented by assessment of metabolic risk factors. However, BMI alone does not adequately capture differences in body composition, fat distribution or metabolic health.

Ayurveda describes obesity principally through the concepts of Sthaulya and Atisthauhya, with Meda Dhatu Vriddhi, disturbed Agni, Medodhatvagni and Medovaha Srotas playing important roles in its pathogenesis. Ayurvedic diagnosis is multidimensional and includes assessment of Nidana, Dosha, Dhatu, Srotas, Agni, Prakriti and clinical features. Contemporary obesity research similarly demonstrates that adipose tissue is metabolically active and participates in inflammation, insulin resistance and endocrine signalling.

The present review proposes an integrated diagnostic framework in which Ayurvedic parameters of Sthaulya and Meda Dhatu are evaluated alongside anthropometric and metabolic biomarkers such as BMI, waist circumference, fasting glucose, HbA1c, lipid profile, insulin resistance and selected inflammatory/adipose-tissue biomarkers. The objective is not to equate Ayurvedic concepts directly with modern biochemical entities, but to develop testable correlations that may improve the scientific assessment of Ayurvedic diagnostic parameters.

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1. INTRODUCTION

Obesity has emerged as one of the most pressing non-communicable disease challenges of the twenty-first century, with its prevalence escalating across diverse socioeconomic and geographic strata. According to the World Health Organization, in 2022 approximately 2.5 billion adults were classified as overweight and 890 million were living with obesity, representing a more than threefold increase since 1975. The global economic burden attributable to obesity-related morbidity, reduced productivity and healthcare expenditure is estimated to exceed USD 2 trillion annually. WHO currently recognizes obesity as a chronic, relapsing, multifactorial disease arising from complex interactions involving genetic predisposition, neuroendocrine dysregulation, behavioural patterns, socioeconomic determinants and environmental exposures. Critically, excess adiposity is no longer viewed merely as a cosmetic concern but as a root driver of cardiometabolic disease, type 2 diabetes mellitus, non-alcoholic fatty liver disease, obstructive sleep apnoea, certain malignancies and musculoskeletal disorders, collectively contributing to reduced life expectancy and impaired quality of life.

The conventional assessment of obesity has historically relied upon Body Mass Index (BMI), a population-derived ratio of weight in kilograms to the square of height in metres. WHO defines adult overweight as $\text{BMI} \geq 25 \text{ kg/m}^2$ and obesity as $\text{BMI} \geq 30 \text{ kg/m}^2$, with further subclassification into Class I (30–34.9), Class II (35–39.9) and Class III (≥ 40) obesity. However, BMI is increasingly recognized as a significant epidemiological limitation: it is a surrogate measure that does not independently characterize body-fat distribution, visceral adiposity, lean muscle mass, or metabolic risk. Individuals with an identical BMI may demonstrate markedly different cardiometabolic risk profiles depending upon fat topography, ectopic lipid deposition and metabolic phenotype. Several consensus statements have therefore advocated for a multi-parameter approach in which BMI is supplemented by waist circumference, waist-to-height ratio, body composition analysis and metabolic biomarkers to arrive at a clinically meaningful assessment of adiposity-related risk.

This inherent limitation of single-parameter classification has stimulated considerable interest in more comprehensive, phenotype-based approaches to obesity diagnosis. The 2023 American Association of Clinical Endocrinology (AACE) framework and subsequent consensus documents emphasize the combination of anthropometric measures, direct assessment of adiposity via imaging or bioelectrical impedance, and metabolic profiling rather than relying exclusively on BMI. Adipose tissue is now recognized as a metabolically active endocrine organ that secretes a diverse array of adipokines including leptin, adiponectin, resistin and visfatin, modulates systemic inflammation through cytokines such as IL-6, TNF- α and hs-CRP, and influences insulin sensitivity, lipid metabolism and vascular function. This paradigm shift in understanding the biology of adipose tissue opens new avenues for

multidimensional diagnostic frameworks that assess both morphological and functional aspects of obesity.

Ayurveda, the ancient Indian system of life sciences, provides a multidimensional diagnostic approach to conditions of excess adiposity that predates modern clinical obesity medicine by millennia. Charaka Samhita, Sushruta Samhita and Ashtanga Hridayam each contain detailed descriptions of pathological excessive corpulence, codified as Sthaulya and Atisthauhya, wherein Meda Dhatu Vridhhi (pathological increase in the fat tissue element) occupies a central pathophysiological role. The Ayurvedic diagnostic framework for Sthaulya is not reducible to any single anthropometric parameter; rather, it incorporates Nidana (aetiology), Dosha predominance, Dhatu assessment, Agni evaluation, Srotas examination, clinical phenotyping and behavioural dimensions into an integrated whole-person assessment. Classical Ayurvedic concepts including Jatharagni and Medodhatvagni as representations of digestive and tissue-level metabolic capacity, Medovaha Srotas as the system governing distribution and transformation of Meda, Santarpana as the aetiological factor of overnutrition, and Nidana Panchaka as the comprehensive causative framework provide additional diagnostic dimensions that may enrich our understanding of obesity beyond the constraints of anthropometric classification alone.

Notwithstanding these rich classical foundations, the development and rigorous scientific validation of standardized Ayurvedic diagnostic tools for Sthaulya have been identified as a critical but relatively underdeveloped area of Ayurvedic research. The absence of operationalized, reproducible Ayurvedic diagnostic criteria limits both clinical utility and the scientific credibility of integrative obesity research. There exists, therefore, a compelling research imperative to formulate testable hypotheses that correlate established Ayurvedic diagnostic parameters with quantifiable modern biomarkers, thereby creating a bridge between traditional clinical wisdom and evidence-based medical science without conflating the distinct epistemological frameworks of the two traditions.

2. Aim

To review the Ayurvedic diagnostic approach to obesity with special reference to Sthaulya and Meda Dhatu and to propose an integrated framework incorporating modern anthropometric and metabolic biomarkers.

3. OBJECTIVES

1. To review the Ayurvedic concept of Sthaulya and Atisthauhya.
2. To understand the diagnostic significance of Meda Dhatu Vridhhi.
3. To examine the role of Agni and Medodhatvagni in obesity.
4. To review Medovaha Srotas in relation to Sthaulya.
5. To assess the role of anthropometric parameters in modern obesity diagnosis.
6. To review relevant metabolic and inflammatory biomarkers.

7. To explore possible correlations between Ayurvedic diagnostic parameters and modern biomarkers.
8. To propose a standardized research framework for Ayurvedic obesity phenotyping.

4. MATERIALS AND METHODS

The present article is a narrative conceptual review.

Ayurvedic literature

Classical Ayurvedic sources including:

Charaka Samhita

Sushruta Samhita

Ashtanga Hridaya

were considered for concepts related to:

Sthaulya

Atisthauya

Meda Dhatu

Meda Dhatu Vriddhi

Agni

Medodhatvagni

Medovaha Srotas

Santarpana

Nidana Panchaka

Contemporary literature

Biomedical literature was reviewed using relevant databases and authoritative sources. Search terms included combinations of:

“Obesity,” “Sthaulya,” “Meda Dhatu,” “Ayurvedic diagnosis,” “metabolic biomarkers,” “adipose tissue,” “insulin resistance,” “inflammation,” “adipokines,” “BMI,” and “waist circumference.”

Current WHO information and contemporary peer-reviewed literature on obesity biomarkers and adipose-tissue biology were also considered.

5. Ayurvedic Concept of Sthaulya

Sthaulya, derived from the Sanskrit root 'sthula' meaning massive or grossly large, is characterized in classical Ayurvedic literature by pathological excessive accumulation of Meda Dhatu and a disproportionate, functionally impairing increase in body bulk. The condition is distinguished from mere heaviness (Guru Shareera) by the concurrent presence of metabolic disturbance, diminished functional capacity and characteristic symptomatology. Sthaulya occupies a prominent position in classical nosology as a condition that significantly compromises both Ayu (lifespan) and Sukha (quality of life), arising from the convergence of inappropriate Ahara, Vihara, and constitutional predisposition.

Charaka describes Atisthauya as the most severe form among the Ashta Nindita Purusha (eight censurable body types described in Charaka Samhita Sutrasthana 21), ranking it alongside Ati-Krishna (excessively emaciated) as conditions of extreme pathological deviance from optimal corporeal constitution. The classical description emphasizes disproportionate Meda and Mamsa accumulation particularly in the udara (abdomen), shroni (pelvis/hips), stana (chest) and other body regions, creating a characteristic phenotype of pendulous abdomen, heavy gluteal region and sluggish

movement. Sushruta Samhita (Sutrasthana 15) similarly describes Medura as a condition of excess Meda, while Ashtanga Hridayam (Sutrasthana 14) elaborates the consequences of Sthaulya including the eight major complaints (Ashtau Dosha) that characterize the condition: impaired exercise capacity, dyspnoea, excessive sweating, foul body odour, excessive hunger, excessive thirst, reduced sexual vigour and diminished cognitive sharpness (Prajnaapakrishata).

The Ayurvedic diagnosis of Sthaulya therefore involves considerably more than body weight alone, integrating constitutional, aetiological, symptomatic and functional dimensions. The classical texts identify eight principal symptom-complexes (Ashtau Dosha) that define clinically significant Sthaulya. These Lakshanas (clinical signs and symptoms) are essential diagnostic anchors and encompass both subjective complaints and objective findings. Relevant diagnostic features include:

excessive Meda accumulation

increased abdominal bulk

excessive appetite

reduced physical capacity

excessive sweating

excessive sleep

lethargy

breathlessness on exertion

These clinical features can be considered alongside modern anthropometric and biochemical parameters.

6. Nidana of Sthaulya

Important Ayurvedic etiological factors include:

Ahara

Guru Ahara

Snigdha Ahara

Madhura Ahara

Excessive food intake

Santarpana

Frequent eating

Excessive calorie-dense food

Vihara

Avyayama

Divasvapna

Excessive sleep

Sedentary behaviour

Reduced physical activity

Other factors

Psychological and behavioural factors

Irregular dietary habits

Excessive consumption of energy-dense foods

These factors can be interpreted within a modern framework of energy imbalance and obesogenic lifestyle, although the two conceptual systems should not be considered identical.

7. Diagnostic Significance of Meda Dhatu

Meda Dhatu, the fourth of the seven fundamental body constituents (Sapta Dhatu) in Ayurvedic physiology, is central to the Ayurvedic understanding of Sthaulya. Etymologically derived from the Sanskrit root meaning to be unctuous, lubricating or fat-like, Meda Dhatu encompasses the structural

and functional lipid-related constituents of the body, serving essential roles in Snehana (lubrication and unctuousness of bodily tissues), Dridhatva (structural firmness and cohesion), Sweda (perspiratory regulation) and Netra Tarpana (nourishment of ocular structures). Classical texts specify that Meda resides principally in the Udara (abdomen), Asthi (bones) and Vrikka (kidneys), with the Medodhara Kala (the membrane-like layer associated with Meda) distributed throughout the body. Pathological excess of Meda Dhatu — Meda Dhatu Vriddhi — creates a cascade of downstream disturbances in the subsequent Dhatus (Asthi, Majja and Shukra), impairing the sequential refinement process (Dhatu Poshana Krama) and ultimately compromising overall physiological homeostasis.

Meda Dhatu Vriddhi may manifest through:

increased body bulk
abdominal adiposity
excessive sweating
reduced exercise tolerance
heaviness
lethargy
excessive appetite

From a contemporary biomedical perspective, excess adipose tissue accumulation is associated with far-reaching disturbances in lipid storage and mobilization, endocrine signalling through adipokines and hormones, systemic metabolic homeostasis, low-grade inflammatory activation and immune cell infiltration. Research spanning the past two decades has fundamentally transformed our conceptualization of adipose tissue from a passive energy reservoir to a dynamic metabolic and endocrine organ. Leptin, secreted predominantly by adipocytes, regulates appetite and energy expenditure through hypothalamic pathways; its paradoxical elevation in obesity reflects a state of leptin resistance. Adiponectin, which exerts insulin-sensitizing and anti-inflammatory effects, is characteristically reduced in obesity and type 2 diabetes. Fatty acid binding protein 4 (FABP4), an intracellular lipid chaperone, has been identified as a potentially important blood-based obesity biomarker. These discoveries underscore the concept that excess adiposity is not merely a quantitative phenomenon but a qualitative disruption of metabolic regulation with systemic consequences — a conceptualization that resonates with Ayurvedic descriptions of Meda Dhatu Vriddhi as a pathological state affecting multiple physiological domains simultaneously.

However:

Meda Dhatu should not be considered synonymous with anatomical adipose tissue.

Rather, adipose tissue may represent one physiological domain through which selected aspects of Meda Dhatu can be experimentally investigated.

8. Agni and Medodhatvagni

Agni, the principle of biological transformation and enzymatic digestion in Ayurvedic physiology, is considered the master regulator of all metabolic processes and occupies a position of central importance in both health maintenance and disease pathogenesis. Ayurvedic literature enumerates thirteen varieties of Agni, comprising Jatharagni (the primary digestive fire

residing in the gastrointestinal tract), five Bhutagnis (elemental digestive factors) and seven Dhatvagnis (tissue-specific metabolic factors corresponding to each of the seven Dhatus). The state of Agni is classified into four functional varieties: Sama Agni (balanced and optimal function), Vishama Agni (irregular or variable function associated with Vata predominance), Tikshna Agni (hyperactive function associated with Pitta predominance) and Manda Agni (hypoactive or diminished function associated with Kapha predominance). It is specifically the Manda Agni state that classical Ayurvedic texts implicate most prominently in the pathogenesis of Sthaulya, wherein reduced digestive and metabolic capacity leads to inadequate transformation of ingested nutrients, resulting in accumulation of incompletely processed Ahara Rasa and subsequent Meda Dhatu Vriddhi.

In the specific context of Sthaulya and obesity pathogenesis, two levels of Agni are particularly central to the diagnostic and pathophysiological framework:

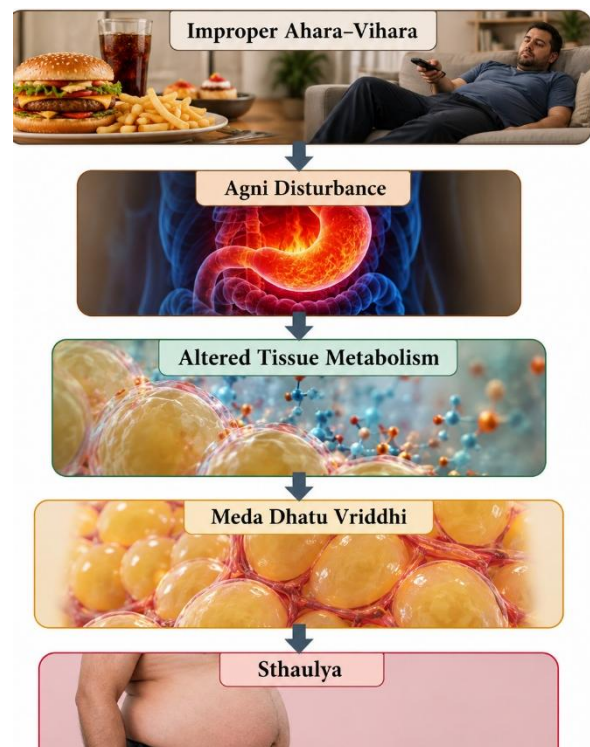
Jatharagni

Related to digestion and transformation of ingested food.

Medodhatvagni

Related specifically to transformation and metabolism at the level of Meda Dhatu.

A conceptual model can therefore be proposed:



This classical model generates a series of testable research hypotheses linking Ayurvedic metabolic constructs with modern biochemistry. For instance, Manda Jatharagni may be operationally studied through assessment of digestive enzyme activity, gastric emptying rate and intestinal microbiome composition, while Manda Medodhatvagni may be explored

through parameters such as resting energy expenditure, mitochondrial function, adipose tissue metabolic activity and insulin-mediated glucose disposal. However, it is epistemologically imperative to recognize that Agni is a holistic, systems-level Ayurvedic construct that cannot be reduced to or simply equated with basal metabolic rate, any single digestive enzyme or any isolated biochemical pathway. Rather, Agni represents the integrated capacity for biological transformation at both the organismal and tissue levels, a concept whose full complexity may require multiparameter proxies rather than single biomarker equivalences.

9. Medovaha Srotas

Medovaha Srotas, one of the thirteen principal Srotas (channel systems) recognized in Ayurvedic anatomy and physiology, is directly responsible for the origination, distribution, transformation and metabolism of Meda Dhatu throughout the body. Charaka Samhita (Vimanasthana 5) localizes the Mula (root origin) of Medovaha Srotas in the Kidneys (Vrikka) and Udara (abdomen), which resonates with the modern understanding of visceral adipose tissue and ectopic fat depots in the abdominal and retroperitoneal regions as primary determinants of cardiometabolic risk. Srotodushti (pathological disturbance of a channel system) in Medovaha Srotas may manifest in four classical patterns: Atipravrutti (excessive flow), Sangha (obstruction), Vimarga Gamana (abnormal direction of flow) and Siragranthi (nodular formations). In the context of Sthaulya, the patterns of Atipravrutti (excessive accumulation of Meda) and Sangha (obstruction within the channel, potentially representing impaired lipid clearance and metabolic stagnation) are most clinically prominent.

Srotodushti of Medovaha Srotas may be explored clinically through a systematic Ayurvedic examination encompassing Sparshana (palpation), assessment of Meda-related Lakshanas, Agni evaluation and Nidana enquiry, generating a composite Srotas assessment that can subsequently be correlated with measurable metabolic and biochemical characteristics in a research context. The clinical features of Medovaha Srotas Dushti, including excessive sweating (Atisvedana), foul body odour (Durgandha), heaviness (Gaurava), reduced exercise capacity (Alasya) and excessive thirst (Pipasa), can potentially serve as observable endpoints in standardized diagnostic scales. Modern adipose tissue is now recognized as a dynamic metabolic and endocrine tissue. Obesity-related expansion of adipose tissue can be accompanied by inflammatory responses and impaired insulin sensitivity.

Thus, Medovaha Srotas Dushti may be investigated as an Ayurvedic systems-level hypothesis rather than being directly equated with a specific anatomical structure.

10. Modern Diagnostic Parameters for Obesity

10.1 Body Mass Index (BMI)

Body Mass Index (BMI) is a commonly used anthropometric indicator for assessing body weight in relation to height. It is calculated by dividing body weight in kilograms by the square of height in metres:

$$\text{BMI} = \text{Weight (kg)} / \text{Height}^2 (\text{m}^2)$$

For adults, the World Health Organization (WHO) generally classifies BMI into the following categories:

Category	BMI (kg/m ²)
Underweight	<18.5
Normal range	18.5–24.9
Overweight	≥25.0
Obesity	≥30.0

BMI is useful for population-level assessment and initial clinical classification; however, it is an indirect measure of adiposity. It does not distinguish between fat mass and lean mass and does not provide information about the distribution of body fat. Consequently, individuals with the same BMI may have different levels of abdominal adiposity and metabolic risk. In the context of Sthaulya research, BMI should therefore be interpreted together with complementary measures such as waist circumference, waist-to-height ratio and body-fat percentage, where available. The WHO adult BMI thresholds represent general international definitions, while population-specific cut-offs may be appropriate for particular ethnic or clinical populations.

10.2 Waist Circumference

Waist circumference provides information about central adiposity and can complement BMI. WHO specifically notes that additional measurements such as waist circumference can assist obesity assessment.

World Health Organization: This is particularly relevant because Asian Indians may develop metabolic complications at lower BMI and have a tendency toward greater abdominal and ectopic adiposity.

10.3 Waist-to-Height Ratio

Waist-to-height ratio can provide an additional estimate of central adiposity and may be useful in research comparing Ayurvedic abdominal Meda accumulation with modern adiposity measures.

11. Metabolic Biomarkers

A comprehensive obesity assessment may include:

- Glycemic biomarkers
- Fasting blood glucose
- HbA1c
- Fasting insulin
- HOMA-IR
- Lipid biomarkers
- Total cholesterol
- LDL-C
- HDL-C
- Triglycerides
- Liver-related assessment
- ALT
- AST

Assessment for metabolic dysfunction-associated steatotic liver disease where clinically appropriate

Inflammatory biomarkers

hs-CRP

IL-6

TNF- α

Adipose-derived biomarkers

Leptin

Adiponectin

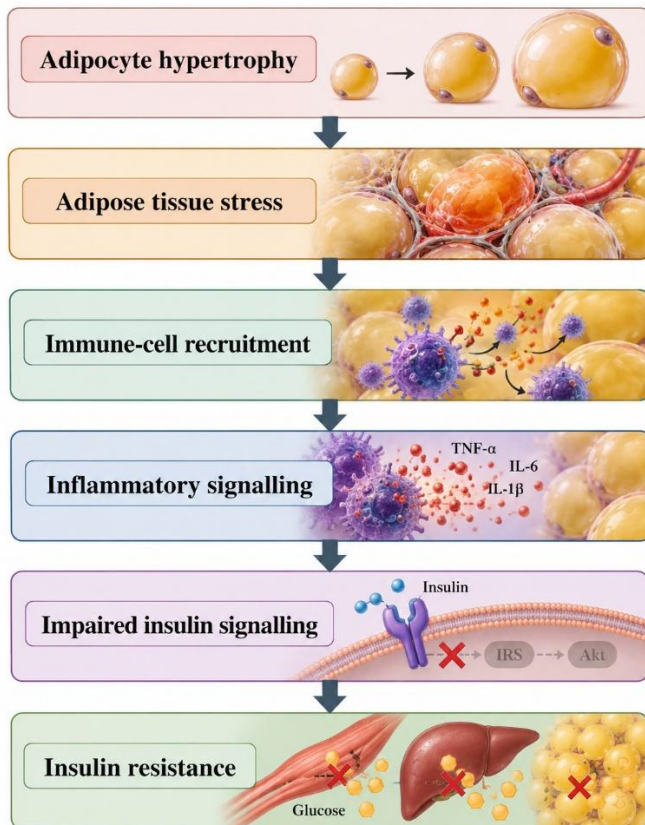
FABP4

Recent evidence identifies leptin, FABP4 and IL-6 among important blood-based obesity biomarkers, while proteomic and metabolomic research is expanding the range of candidate biomarkers.

12. Obesity, Adipose Tissue and Inflammation

Modern research demonstrates that obesity can be accompanied by chronic low-grade inflammation within adipose tissue.

Adipose expansion may result in:



Inflammation is considered an important mechanistic link between obesity and insulin resistance.

Recent reviews continue to emphasize unresolved adipose and systemic inflammation as an important pathway linking obesity with cardiometabolic disease.

13. Ayurvedic–Modern Diagnostic Correlation

The Ayurvedic assessment of obesity can be examined alongside contemporary anthropometric, metabolic and clinical parameters to explore whether specific Ayurvedic constructs correspond with measurable patterns of adiposity and metabolic dysfunction. Such comparison should be performed through **independent assessment of each domain**, rather than assuming that an Ayurvedic concept is directly equivalent to a modern biomedical variable.

Ayurvedic Parameter	Corresponding Modern Research Parameters	Proposed Research Interpretation
Sthaulya	BMI, body-fat percentage, waist circumference	May represent an overall obesity phenotype characterized by increased adiposity and altered body composition.
Meda Vridhhi	Waist circumference, waist-to-height ratio, visceral-fat measures	May be investigated in relation to central and abdominal adiposity.
Meda Dushti	Total cholesterol, LDL-C, HDL-C, triglycerides	May be explored in relation to lipid abnormalities and altered lipid metabolism.
Agni Assessment	Fasting glucose, HbA1c, fasting insulin, HOMA-IR	May provide a research-based association with glycaemic regulation and metabolic phenotype.
Medodhatvagni	Insulin resistance, glucose metabolism and lipid-related markers	May be investigated as a hypothesis concerning tissue-level metabolic transformation.
Medovaha Srotas Dushti	Adipose-tissue dysfunction, insulin resistance and metabolic abnormalities	May provide a broader systems-level framework for studying obesity-related metabolic dysfunction.
Sthaulya Lakshana	Anthropometric, functional and clinical parameters	May assist in developing a multidimensional clinical phenotype of obesity.
Santarpana	Energy-dense dietary intake, dietary frequency and sedentary lifestyle	May be examined as an overnutrition-related etiological pattern.
Avyayama	Physical activity, sedentary time and exercise capacity	May reflect reduced energy expenditure and physical inactivity.
Meda-related Symptoms	Metabolic and inflammatory biomarkers	May be evaluated for potential clinical–biochemical associations.

Interpretation of the Correlation Framework

The purpose of this framework is to create a **testable bridge between Ayurvedic clinical assessment and contemporary obesity research**. For example, if individuals with a higher Meda Vridhhi score consistently demonstrate greater waist circumference or visceral adiposity, this may support an empirical association between the two domains. Similarly, if a standardized Agni assessment demonstrates reproducible associations with glucose or insulin-resistance measures, it may provide a basis for further investigation of Agni as a metabolic phenotype.

However, these relationships should **not be interpreted as direct equivalences**. Meda Dhatu is an Ayurvedic theoretical construct and should not automatically be considered identical to adipose tissue; similarly, Agni should not be reduced to a

single biochemical measurement, and Medovaha Srotas should not be assigned to a specific anatomical structure without adequate evidence.

Therefore, the proposed correlations should initially be treated as **research hypotheses**. Their scientific relevance should be established through standardized measurement, reliability testing, appropriate statistical analysis, control of confounding factors and validation in independent populations. This approach allows Ayurvedic concepts to be investigated systematically while preserving their original conceptual framework.

14. Proposed Ayurvedic Diagnostic Model for Obesity

An integrated Ayurvedic diagnostic model for obesity may be developed by combining classical Ayurvedic assessment with standardized clinical, anthropometric and biochemical parameters. The proposed model recognizes that obesity is a multidimensional condition and that no single measurement can adequately represent its clinical, metabolic and etiological characteristics. Accordingly, the assessment is organized into five complementary domains: **Nidana and lifestyle factors, Ayurvedic phenotype, clinical and anthropometric assessment, biochemical assessment, and advanced biomarkers**.

The purpose of this model is not to establish direct equivalence between Ayurvedic concepts and modern biomedical variables. Rather, it provides a structured framework through which Ayurvedic constructs can be independently assessed and subsequently examined for their relationship with measurable clinical and metabolic characteristics.

Domain 1 – Nidana and Lifestyle Assessment

The first domain focuses on the etiological and behavioural factors that may contribute to the development and progression of Sthaulya. The assessment should include **Ahara, Vihara, sleep, physical activity, dietary frequency and sedentary behaviour**.

Ahara may be evaluated with respect to dietary quality, quantity, frequency, meal timing and patterns of consumption. Particular attention may be given to excessive or frequent intake and dietary patterns associated with overnutrition. **Vihara** includes daily activity patterns and behavioural habits that may influence energy expenditure and metabolic health.

Sleep should also be assessed because duration, regularity and quality of sleep may influence appetite, physical activity and metabolic regulation. Similarly, **physical activity and sedentary behaviour** should be documented using standardized questionnaires or objective methods where feasible. Dietary frequency should be recorded because repeated eating patterns may provide additional information about an individual's lifestyle and nutritional behaviour.

Within the Ayurvedic framework, these factors may be examined in relation to concepts such as **Santarpana and Apyayama**. In research, however, these variables should be measured independently and subsequently evaluated for their relationship with Sthaulya and metabolic outcomes.

Domain 2 – Ayurvedic Phenotype

The second domain represents the core Ayurvedic diagnostic component and includes **Prakriti, Vikriti, Dosha, Agni, Ama, Meda and Medovaha Srotas**.

Prakriti may provide information about the individual's constitutional characteristics, whereas **Vikriti** represents the current state of physiological or pathological imbalance. Assessment of **Dosha** may help describe the dominant Ayurvedic pattern associated with the individual's current condition.

Agni should be assessed using clearly defined and reproducible criteria because it occupies an important position in Ayurvedic understanding of digestion and metabolism. The assessment of **Ama** may also be incorporated where relevant according to predefined clinical criteria.

Particular emphasis should be placed on **Meda and Medovaha Srotas**, because excessive Meda accumulation represents a central component of Sthaulya. The assessment should include predefined clinical features rather than relying solely on modern anthropometric measures.

For research purposes, each Ayurvedic construct should be recorded separately before examining its relationship with BMI, waist circumference, metabolic markers or inflammatory biomarkers. This approach can help determine whether individual Ayurvedic domains contribute distinct information to obesity phenotyping.

Domain 3 – Clinical and Anthropometric Assessment

The third domain provides an objective clinical description of the participant and includes **body weight, BMI, waist circumference, waist-to-height ratio, blood pressure and Sthaulya Lakshana**.

Body weight provides a basic measure of body mass, while **BMI** provides a standardized relationship between weight and height. However, BMI alone cannot distinguish fat mass from lean mass or adequately characterize the distribution of adipose tissue.

Waist circumference provides complementary information regarding central adiposity, while **waist-to-height ratio** may provide an additional measure of abdominal fat distribution. Blood pressure should be included because elevated blood pressure frequently accompanies metabolic abnormalities associated with obesity.

The assessment of **Sthaulya Lakshana** adds the clinical Ayurvedic component to the anthropometric evaluation. Symptoms and signs should be recorded using standardized criteria and, where possible, graded according to severity. This would allow the clinical phenotype to be analyzed quantitatively rather than relying only on descriptive terminology.

Domain 4 – Biochemical Assessment

The fourth domain evaluates metabolic characteristics through laboratory investigations including **fasting glucose, HbA1c, lipid profile, fasting insulin and HOMA-IR**.

Fasting glucose and HbA1c provide information regarding glycaemic status, while fasting insulin and HOMA-IR may provide additional information regarding insulin resistance. The lipid profile, including triglycerides, total cholesterol, LDL-C

and HDL-C, can be used to characterize lipid metabolism and dyslipidaemia.

The biochemical domain is particularly relevant for investigating whether individuals with similar anthropometric characteristics demonstrate different metabolic phenotypes. It may also help determine whether specific Ayurvedic characteristics, such as Meda Vriddhi or particular Agni patterns, are associated with measurable metabolic differences. However, interpretation should take into account potential confounding factors such as age, sex, medication, physical activity, dietary intake and existing metabolic conditions.

Domain 5 – Advanced Biomarker Assessment

The fifth domain includes advanced biomarkers that may be incorporated into research studies where laboratory resources permit. The proposed biomarkers include **hs-CRP, IL-6, TNF- α , leptin, adiponectin and FABP4**.

hs-CRP, IL-6 and TNF- α may be investigated as indicators of inflammatory activity associated with obesity and metabolic dysfunction. **Leptin and adiponectin** may provide information regarding adipose-derived endocrine signalling, while **FABP4** may be explored as an additional marker related to adipose and metabolic processes.

These biomarkers should preferably be selected according to predefined hypotheses rather than being included solely for exploratory testing. Their interpretation should also consider factors such as acute inflammation, medication use, age, sex and comorbid conditions.

Integrated Interpretation of the Five Domains

The five domains can therefore be conceptualized as an integrated pathway:

Nidana & Lifestyle → Ayurvedic Phenotype → Clinical Phenotype → Biochemical Phenotype → Advanced Biomarker Phenotype

This framework allows the Ayurvedic description of obesity to be examined at several levels while maintaining a distinction between traditional constructs and modern biomedical measurements. The model is proposed as a **research framework rather than a validated diagnostic instrument**. Its clinical utility can only be established through systematic reliability and validity studies.

15. Proposed Research Framework

The proposed diagnostic model can be evaluated through a prospective clinical research design in which individuals with obesity are assessed using standardized Ayurvedic, clinical, anthropometric and biochemical procedures. The research should be conducted in sequential stages so that each domain is measured independently before relationships among the variables are examined.

Step 1 – Comprehensive Ayurvedic Assessment

The first stage should establish the participant's Ayurvedic phenotype through systematic assessment of:

Prakriti → Vikriti → Dosha → Agni → Ama → Meda → Medovaha Srotas → Sthaulya Lakshana

Each parameter should have predefined operational criteria. Where assessment depends upon clinical judgment, investigators should undergo standardized training to reduce inter-observer variation.

Where possible, the Ayurvedic assessment should be performed before the investigator has access to laboratory findings. This approach can reduce observer expectation and improve methodological independence.

Step 2 – Clinical and Anthropometric Assessment

The second stage should objectively characterize body size, body composition and central adiposity:

Weight → BMI → Waist Circumference → Waist-to-Height Ratio → Body-Fat Percentage

BMI provides a general classification of body size, while waist circumference and waist-to-height ratio provide additional information about central adiposity. Where validated instruments are available, body-fat percentage may provide further information about overall adiposity.

Measurements should be performed using standardized protocols, including consistent equipment, anatomical landmarks, participant preparation and repeated measurements where appropriate.

Step 3 – Biochemical Assessment

The third stage should evaluate metabolic status through:

Fasting Glucose → HbA1c → Lipid Profile → Fasting Insulin → HOMA-IR

These parameters can be used to characterize glycaemic regulation, insulin resistance and lipid metabolism. The results can subsequently be compared with Ayurvedic phenotypes to investigate potential associations.

Step 4 – Advanced Biomarker Assessment

Where laboratory facilities permit, the fourth stage may include:

hs-CRP → IL-6 → TNF- α → Leptin → Adiponectin → FABP4

The advanced biomarker panel should be hypothesis-driven and clearly defined before data collection. Appropriate sample handling, fasting conditions and laboratory procedures should be standardized to minimize pre-analytical variation.

Step 5 – Statistical Evaluation

The final stage should determine whether meaningful relationships exist among Ayurvedic parameters, anthropometric variables and biochemical outcomes.

Depending on the nature and distribution of the data, potential analyses may include:

- **Pearson or Spearman correlation** for relationships between continuous variables.
- **Multivariable regression** for assessing associations after adjustment for relevant confounders.
- **Logistic regression** where the outcome variable is categorical.
- **ROC analysis** when a suitable reference classification is available.

- **Sensitivity and specificity** for evaluating diagnostic classification.
- **Inter-rater reliability** for examiner-dependent Ayurvedic assessments.
- **Test-retest reliability** for assessing stability of clinical measurements.
- **Internal consistency analysis** for multi-item Ayurvedic assessment scales.

Statistical analysis should distinguish between primary hypotheses and exploratory analyses. Effect sizes and confidence intervals should be reported alongside statistical significance.

Validation of the Proposed Diagnostic Model

A major objective of future research should be the development and validation of standardized Ayurvedic diagnostic instruments. The validation process may involve several stages:

Item generation → Expert review → Pilot testing → Reliability assessment → Construct validation → Criterion/diagnostic validation → External validation

A scale should not be considered clinically validated merely because it demonstrates a statistical correlation with BMI. Its reliability, construct validity, reproducibility and practical clinical utility should be established independently.

Thus, the proposed framework provides a methodological pathway through which Ayurvedic obesity assessment can progress from conceptual descriptions toward reproducible and testable clinical instruments.

16. Potential Biomarker Correlations and Research Hypotheses

The relationship between Ayurvedic obesity phenotypes and contemporary metabolic biomarkers represents an important area for future investigation. The following hypotheses are proposed as **research questions** that can be tested through appropriately designed clinical studies. They should not be interpreted as established biological relationships.

Hypothesis 1: Meda Vriddhi and Central Adiposity

Meda Vriddhi Score ↔ Waist Circumference / Waist-to-Height Ratio

A higher standardized Meda Vriddhi score may be associated with greater central adiposity. Waist circumference and waist-to-height ratio may therefore be used as objective measures for examining whether clinical features attributed to Meda accumulation correspond with abdominal adiposity.

If a consistent relationship is demonstrated after adjustment for important confounders, further studies could investigate whether Meda-related assessment provides additional information beyond BMI.

Hypothesis 2: Meda Vriddhi and Lipid Metabolism

Meda Vriddhi ↔ Triglycerides / LDL-C / HDL-C

The second hypothesis proposes that greater Meda-related clinical features may be associated with differences in lipid parameters, particularly triglycerides and HDL-C.

The relationship should be examined using a complete lipid profile rather than a single biomarker. Analysis should account for dietary pattern, physical activity, medication use and other factors that may influence lipid concentrations.

A reproducible association could provide a basis for investigating Meda-related phenotypes in relation to metabolic lipid disturbances.

Hypothesis 3: Agni Assessment and Glycaemic/Insulin-Resistance Phenotype

Agni Assessment ↔ Fasting Glucose / HbA1c / Fasting Insulin / HOMA-IR

Different Agni phenotypes may demonstrate differences in glycaemic regulation or insulin resistance. This hypothesis is particularly important because Agni is a multidimensional Ayurvedic construct and cannot be assumed to correspond to one modern metabolic variable.

A standardized Agni assessment should therefore be established before attempting to evaluate its association with HbA1c, fasting insulin or HOMA-IR.

Hypothesis 4: Medovaha Srotas and Metabolic Dysfunction

Medovaha Srotas Assessment ↔ Insulin Resistance / Metabolic Dysfunction

A standardized Medovaha Srotas assessment may potentially identify clinical patterns associated with greater metabolic dysfunction. The relationship could be examined using HOMA-IR, fasting glucose, lipid profile, waist circumference and other predefined metabolic outcomes.

This hypothesis should initially be regarded as a **systems-level research proposition**. It should not be interpreted as evidence that Medovaha Srotas is anatomically identical to adipose tissue or any single modern organ or structure.

Hypothesis 5: Sthaulya Phenotype and Inflammatory Biomarkers

Sthaulya Phenotype ↔ hs-CRP / IL-6 / TNF-α

The fifth hypothesis proposes that different Sthaulya phenotypes may demonstrate variation in inflammatory biomarkers. Such an investigation may help determine whether the Ayurvedic clinical phenotype captures biologically relevant variation among individuals with obesity.

Because inflammatory biomarkers can be influenced by acute illness, medication, age, sex and other conditions, appropriate exclusion criteria and statistical adjustment would be required.

Overall Research Interpretation

The proposed hypotheses provide a structured pathway for examining relationships between Ayurvedic phenotyping and modern metabolic phenotyping. The objective should not be to prove that an Ayurvedic construct is equivalent to a modern biomarker, but rather to determine whether the construct can be measured reliably and whether it demonstrates reproducible associations with clinically meaningful outcomes.

Accordingly, the evidence-development pathway may be represented as:

Conceptual Ayurvedic construct → Standardized measurement → Reliability testing → Clinical association

→ Biological correlation → External validation → Clinical utility

Only after these stages have been successfully evaluated should a proposed Ayurvedic diagnostic parameter be considered for wider clinical application. This approach would strengthen the methodological foundation of Ayurvedic obesity research while maintaining a clear distinction between classical concepts, measurable research variables and experimentally demonstrated associations.

17. Evidence Supporting Ayurvedic Obesity Research

Clinical research has already used both Ayurvedic and conventional outcomes in obesity studies.

A pilot study of whole-systems Ayurvedic medicine and yoga used BMI, body-fat percentage, waist/hip measurements and blood pressure alongside Ayurvedic outcome measures, demonstrating the feasibility of collecting outcomes from both paradigms.

Other Ayurvedic obesity studies have evaluated parameters including weight, BMI, waist-hip ratio, skinfold thickness and lipid profile.

More recently, a multicentre clinical study of an Ayurvedic multi-herbal intervention reported changes in BMI, waist circumference and cholesterol, illustrating the continued use of combined anthropometric and biochemical endpoints in Ayurvedic obesity research.

These studies primarily address management, rather than establishing a validated Ayurvedic diagnostic system. Therefore, diagnostic validation remains an important research opportunity.

18. Development of a Standardized Sthaulya Diagnostic Scale

The development of a **Sthaulya Diagnostic Assessment Scale (SDAS)** may provide a structured and reproducible method for assessing Sthaulya in clinical and research settings. At present, Ayurvedic assessment of Sthaulya may involve multiple subjective and clinical features, but these features need to be operationalized carefully if they are to be converted into a standardized quantitative instrument. The proposed scale should therefore integrate **subjective clinical manifestations, objective anthropometric measurements, Ayurvedic diagnostic parameters and selected biochemical indicators.**

The primary purpose of the SDAS would be to develop a multidimensional assessment rather than relying exclusively on body weight or BMI. The scale should also be designed in a manner that preserves the Ayurvedic conceptual framework while allowing its components to be evaluated using contemporary psychometric and clinical research methods.

18.1 Subjective Clinical Parameters

The subjective component may include characteristic clinical manifestations associated with Sthaulya. Potential items include:

- Excessive appetite
- Excessive thirst
- Excessive sweating

- Excessive sleep
- Fatigue or lethargy
- Breathlessness on exertion
- Heaviness of the body
- Reduced exercise tolerance

Each symptom should preferably be converted into a clearly defined response category, such as **absent, mild, moderate or severe**, or another validated scoring format. Definitions should be sufficiently precise to minimize differences between assessors.

For example, "reduced exercise tolerance" should be assessed using a predefined clinical criterion rather than being interpreted differently by individual investigators. Similarly, excessive sleep should be assessed using a standardized duration or symptom-based criterion where appropriate.

18.2 Objective Anthropometric Parameters

The objective component should provide measurable information about adiposity and body composition. Proposed parameters include:

- **Body Mass Index (BMI)**
- **Waist circumference**
- **Waist-to-height ratio**
- **Body-fat percentage**

BMI can provide an overall measure of body size, whereas waist circumference and waist-to-height ratio provide additional information regarding central adiposity. Body-fat percentage may further distinguish adiposity from overall body mass when an appropriate measurement method is available.

These measurements should be performed using standardized protocols, including specified equipment, anatomical landmarks, participant preparation and measurement procedures.

18.3 Ayurvedic Diagnostic Parameters

The Ayurvedic component represents the conceptual core of the proposed scale and may include:

- **Meda Vriddhi**
- **Agni status**
- **Medodhatvagni assessment**
- **Medovaha Srotas assessment**
- **Dosha predominance**

These variables require particular methodological attention because several are dependent on clinical interpretation. Before inclusion in a final scale, each parameter should be converted into operational criteria that can be consistently applied by different Ayurvedic practitioners.

The assessment should be performed independently of biochemical results wherever possible. This would help minimize incorporation bias and allow subsequent statistical analysis to determine whether the Ayurvedic parameters are independently associated with objective metabolic characteristics.

18.4 Biochemical Parameters

The biochemical component may include selected metabolic and inflammatory indicators:

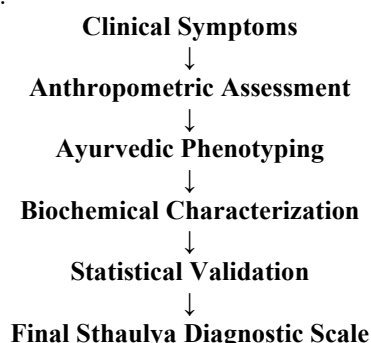
- **Fasting glucose**
- **HbA1c**
- **Triglycerides**
- **HDL-C**
- **hs-CRP**
- **Insulin resistance**, preferably assessed using a predefined measure such as HOMA-IR where appropriate.

These parameters should not automatically be incorporated into the diagnostic score simply because they are associated with obesity. Their inclusion should depend on the intended purpose of the scale. If the SDAS is designed primarily as an **Ayurvedic clinical diagnostic instrument**, biochemical variables may be evaluated as external validation criteria rather than being directly included in the final score.

This distinction is methodologically important. A scale containing BMI, glucose and lipid parameters may reproduce conventional obesity classification without demonstrating whether its Ayurvedic components provide additional diagnostic information.

18.5 Proposed Structure of the SDAS

The proposed development pathway may therefore be represented as:



The final scoring system should be determined only after empirical testing rather than assigning arbitrary weights to individual components.

18.6 Validation of the Diagnostic Scale

Development of the SDAS should follow a systematic validation process:

Content Validity → **Construct Validity** → **Criterion Validity** → **Reliability** → **Diagnostic Accuracy** → **External Validation**

Content validity should determine whether the proposed items adequately represent the intended Sthaulya construct. Expert evaluation can be used to assess relevance, clarity and comprehensiveness.

Construct validity should examine whether the scale behaves as theoretically expected in relation to relevant clinical and anthropometric variables.

Criterion validity can be evaluated only when an appropriate independent reference standard is available. Correlation with BMI alone should not automatically be considered proof of criterion validity.

Reliability should include inter-rater reliability for examiner-dependent items and, where appropriate, test-retest reliability. Internal consistency may be assessed for groups of items intended to measure a common underlying construct.

Diagnostic accuracy may subsequently be evaluated using measures such as sensitivity, specificity, predictive values and ROC analysis when a defensible reference classification has been established.

Finally, **external validation** should be conducted in an independent population to determine whether the scale maintains its performance beyond the original development sample.

18.7 Methodological Considerations

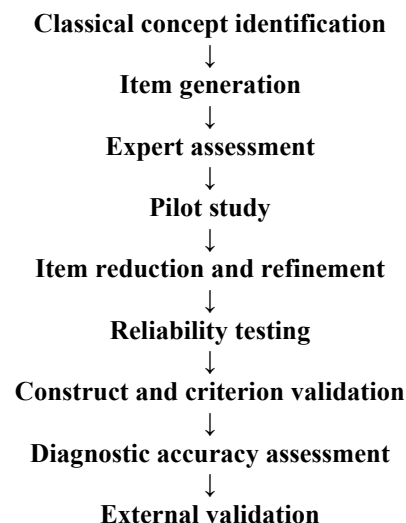
The development of the SDAS should avoid incorporating the same variable into both the diagnostic instrument and its validation criterion. For example, if BMI is included as a major component of the scale, validating the scale against BMI alone may result in circular reasoning.

Similarly, biochemical abnormalities should not automatically be interpreted as manifestations of a particular Ayurvedic construct. Instead, they should initially serve as independent outcomes against which the Ayurvedic phenotype can be examined.

The scale should also account for potentially important influences such as **age, sex, medication use, dietary pattern, physical activity, sleep, endocrine disorders and other metabolic conditions**. These factors may affect both anthropometric and biochemical findings and can therefore influence observed associations.

18.8 Proposed Research Sequence

A practical research pathway for development of the SDAS would be:



Such a staged approach would allow the scale to evolve from a conceptual Ayurvedic framework into a reproducible research instrument.

18.9 Research Significance

A standardized Sthaulya Diagnostic Assessment Scale could provide an important methodological tool for future Ayurvedic obesity research. It may enable researchers to quantify traditionally described clinical characteristics and investigate their relationships with anthropometric, metabolic and inflammatory parameters.

However, the scale should not be considered clinically validated until appropriate psychometric and diagnostic studies have been completed. Its value would ultimately depend on whether it demonstrates **reproducibility, validity and clinically meaningful information beyond conventional measures of obesity**.

Thus, development and validation of the SDAS represents an important research priority for establishing a more rigorous and standardized approach to Ayurvedic assessment of Sthaulya.

19. DISCUSSION

Modern obesity diagnosis is undergoing a significant paradigm shift, moving from exclusive reliance on anthropometric surrogates toward a more comprehensive, phenotype-based understanding of excess adiposity and its cardiometabolic consequences. The limitations of BMI as a singular diagnostic criterion have been extensively documented: it fails to distinguish between visceral and subcutaneous fat compartments, does not account for racial and ethnic differences in fat distribution and metabolic risk thresholds, and cannot identify the metabolically obese normal-weight individual or the metabolically healthy obese phenotype. BMI therefore retains utility as a population-level screening and classification tool while being recognized as insufficient for individual-level clinical characterization of adiposity-related risk. Contemporary frameworks increasingly advocate for a staging-based approach to obesity that integrates anthropometric, functional, metabolic and quality-of-life dimensions, reflecting a conceptualization that shares notable structural parallels with the holistic, multidimensional assessment embedded within the Ayurvedic approach to Sthaulya.

Ayurveda potentially offers a scientifically valuable complementary framework for obesity characterization because the Sthaulya assessment encompasses dimensions not captured by conventional diagnostic tools: clinical phenotype and functional capacity, dietary pattern and nutritional quality (Ahara Nidana), lifestyle and behavioural factors (Vihara Nidana), constitutional predisposition (Prakriti), digestive and metabolic functional status (Agni), adipose tissue equivalent assessment (Meda Dhatu evaluation) and systemic channel integrity (Srotas examination). This integrative diagnostic architecture potentially maps onto the personalized, phenotype-based precision medicine paradigm that modern obesity research is actively pursuing, offering a time-tested clinical framework for individual metabolic characterization that could be operationalized and validated through rigorous scientific methodology.

The concept of Meda Dhatu is particularly relevant because modern adipose tissue is now understood to have endocrine, metabolic and immunological functions. Adipose-derived biomarkers such as leptin, FABP4 and IL-6 are being

investigated as markers associated with obesity and disease risk.

However, any scientific integration between Ayurvedic and modern biomedical frameworks must proceed with epistemological caution and methodological rigour. Meda Dhatu cannot be declared functionally equivalent to anatomical adipose tissue; while adipose tissue may represent one physiological domain through which selected aspects of Meda Dhatu function can be experimentally investigated, the classical Ayurvedic concept encompasses structural, functional, energetic and relational dimensions not captured by the anatomical or histological definition of adipose tissue. Similarly, Agni cannot be reduced to basal metabolic rate, digestive enzyme activity or any single biochemical pathway; it represents a multidimensional physiological principle whose scientific operationalization will require careful construct validation. Direct equivalence mapping risks committing the error of ontological conflation — using superficial terminological similarities to suggest deeper conceptual identity — which ultimately does a disservice to both the classical Ayurvedic tradition and the rigour of scientific inquiry. Furthermore, the historical and cultural context in which Ayurvedic constructs were developed differs fundamentally from the reductionist materialist epistemology underlying modern biomedicine, and this difference must be respected rather than dissolved through premature equivalencing.

A more scientifically useful approach is to formulate measurable hypotheses:

Ayurvedic diagnostic phenotype → measurable biological phenotype

For example:

Meda Vriddhi → anthropometric adiposity

Agni phenotype → metabolic profile

Medovaha Srotas phenotype → metabolic/adipose dysfunction

These relationships can then be tested using appropriate study designs.

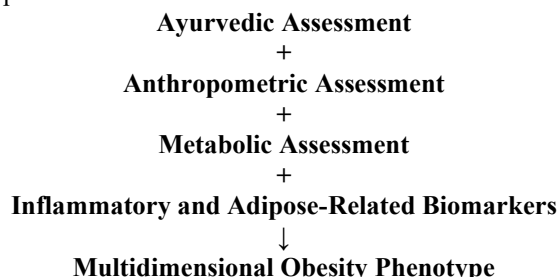
20. CONCLUSION

The Ayurvedic concept of **Sthaulya**, as described across the *Charaka Samhita*, *Sushruta Samhita* and *Ashtanga Hridayam*, offers a multidimensional framework for understanding excessive adiposity. Rather than limiting assessment to body size alone, the Ayurvedic approach incorporates **Nidana Panchaka** for etiological characterization, **Prakriti and Vikriti** for individual constitutional and pathological assessment, **Agni and Medodhatvagni** for metabolic interpretation, **Meda Dhatu** for assessment of adipose-related pathology, **Medovaha Srotas** for understanding systemic involvement, and **Sthaulya Lakshana** for integrated clinical phenotyping. This multidimensional orientation provides a potentially valuable framework for investigating the heterogeneity observed among individuals with obesity.

Contemporary obesity science has similarly moved beyond reliance on **BMI as a solitary indicator of adiposity**. Although BMI remains an important population-level and clinical measure, it does not adequately describe body-fat distribution, body composition or differences in metabolic risk among

individuals with comparable BMI values. Consequently, contemporary assessment increasingly incorporates complementary measures such as **waist circumference, waist-to-height ratio and body composition**, together with metabolic parameters including fasting glucose, HbA1c, fasting insulin and HOMA-IR. Lipid parameters such as total cholesterol, LDL-C, HDL-C and triglycerides provide additional information regarding metabolic risk, while inflammatory and adipose-related biomarkers, including **hs-CRP, IL-6, TNF- α , leptin, adiponectin and FABP4**, may contribute to characterization of specific biological features associated with obesity.

Against this background, an integrated research model may be conceptualized as:



Such integration, however, should not be based on assumed one-to-one equivalence between Ayurvedic constructs and modern biomedical variables. **Meda Dhatu should not simply be equated with adipose tissue, Agni should not be reduced to a single metabolic biomarker, and Medovaha Srotas should not be considered anatomically identical to a modern physiological structure without empirical evidence.** The appropriate scientific approach is to treat these relationships as testable hypotheses and determine their validity through standardized measurement and rigorous research methodology.

A systematic research programme could therefore proceed through several stages. First, standardized instruments for **Sthaulya assessment** should be developed and subjected to appropriate psychometric evaluation, incorporating relevant **Nidana, Dosha, Dhatu, Agni and Srotas** domains. Second, the assessment of **Meda Dhatu** should be operationalized through clearly defined clinical criteria and evaluated for inter-rater and test-retest reliability. Third, prospective clinical studies should investigate relationships between Ayurvedic phenotypes and anthropometric, metabolic and inflammatory parameters while appropriately accounting for potential confounding factors. Fourth, research may explore whether reproducible Ayurvedic phenotypes can identify clinically meaningful subgroups within the broader population of individuals with obesity. Finally, longitudinal studies should determine whether these phenotypes are associated with differences in metabolic risk trajectories, disease progression or response to interventions.

The significance of such research extends beyond establishing correlations between traditional and contemporary terminology. A properly validated Ayurvedic phenotyping system could provide an additional framework for describing **heterogeneity within obesity**, particularly if it demonstrates reproducible associations with independently measured clinical or biological characteristics. At the same time, modern obesity research may

provide objective methods through which selected Ayurvedic constructs can be systematically evaluated.

Therefore, the future of Ayurvedic obesity research should emphasize **operational definitions, standardized assessment, reliability, prospective validation, appropriate statistical methodology and external replication** rather than relying primarily on conceptual similarities. Such a research pathway could strengthen the methodological foundation and scientific evaluation of Ayurvedic diagnostics while contributing to the broader understanding of the complex and heterogeneous biological nature of obesity.

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