

**LEPTIN RESISTANCE IN OBESITY WITH SPECIAL REFERENCE TO STHOULYA
NIDANA: AN AYURVEDIC PERSPECTIVE*****¹Dr. Madhu S., ²Dr. Adarsh Kallimath³, Dr. Venu S.**

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ABSTRACT

Obesity is a metabolic disorder of multifactorial origin characterized by excessive accumulation of adipose tissue and is associated with numerous metabolic complications. One of the main causative factor in obesity is resistance to Leptin, a hormone responsible for regulation of hunger and energy expenditure. Despite increased leptin levels in obese individuals, impaired leptin signalling leads to persistent hunger and further accumulation of fat. Ayurveda describes obesity as Sthoulya, which develops due to various etiological factors mentioned in Sthoulya Nidana. These factors include excessive intake of Guru and Snigda Ahara, Avyayama and Harshanityatvat etc., ultimately resulting in aggravation of Kapha and accumulation of Medo Dhatu. The present article attempts to correlate the concept of leptin resistance with the Ayurvedic description of Sthoulya Nidana and tries to highlight the similarities in understanding Nidana & Samprapti between modern medicine and Ayurveda.

KEYWORDS: Leptin resistance, obesity, Sthoulya Nidana, Ayurveda, Meda Dhatu.**INTRODUCTION**

Obesity has emerged as a major global health challenge affecting millions of individuals worldwide. It increases the risk of chronic conditions such as type 2 diabetes, cardiovascular disorders, and metabolic syndrome.^[1] The increasing prevalence of obesity mainly points towards changes in dietary habits, increased consumption of high-calorie foods, and sedentary lifestyle patterns.^[2]

Leptin is an important hormone responsible for regulation of body weight, which is secreted by fat cells. Leptin acts on hypothalamic centre to regulate hunger and maintain energy balance.^[3] However, in many obese individuals, elevated circulating leptin levels fail to produce the expected physiological response, leading to a condition known as Leptin Resistance.^[4] This results in persistent hunger, increased caloric intake, and further weight gain.

In Ayurveda obesity is mentioned as Sthoulya^[5], which occurs due to excessive accumulation of Meda dhatu in the body. Classical Ayurvedic texts identify several Nidanas responsible for the development of Sthoulya,

collectively referred to as Sthoulya Nidana.^[5] These Nidanas can be Aharaja, Viharaja and Manasika which disturb the balance of Kaphadosha and metabolic processes.

Leptin and Regulation of Body Weight

Leptin is an adipocyte-derived hormone that plays a important role in the regulation of body weight and energy balance. It communicates the status of energy stores to the hypothalamus and helps regulate hunger and metabolism.^[6]

Under normal physiological conditions, leptin acts on hypothalamic neurons to suppress hunger and stimulate energy expenditure. It inhibits orexigenic peptides such as neuropeptide Y while stimulating anorexigenic pathways that reduce food intake.^[7]

When adipose tissue increases, leptin secretion also increases, which normally signals the brain to reduce food consumption. This feedback mechanism maintains energy balance in healthy individuals.^[8]

Leptin Resistance and Obesity

In most of the obese individuals, leptin levels are elevated but fail to regulate hunger effectively. This phenomenon is referred to as leptin resistance. It represents a state in which the central nervous system becomes insensitive to leptin signalling.^[4]

Several mechanisms have been proposed to explain leptin resistance, including impaired transport of leptin across the blood-brain barrier, inflammation within hypothalamic neurons and defects in leptin receptor signalling pathways.^[9] In addition, increased circulating triglycerides and endoplasmic reticulum stress may interfere with leptin signalling.^[10]

Due to these impairments, the brain fails to recognize satiety signals, resulting in persistent hunger and excessive food intake. This ultimately leads to further accumulation of adipose tissue and progression of obesity.

Concept of Sthoulya in Ayurveda

Ayurveda describes obesity as Sthoulya, which is characterized by excessive accumulation of Meda Dhatu in the body. If unattended it may lead to Atisthoulya which is one among the Ashta Nindita Purusha described by Charaka.^[5]

The clinical features of Sthoulya include Ayushohrasa (reduced lifespan), Javoparoda (limited movement), Krichravayava (decreased sexual activity), Daurbalya (Debility), Daugandya (excessive body odour) Swedabada (Excessive sweating) Kshudatimatra (Excessive hunger) and Pipasatiyoga (Excessive thirst).^[5] According to Ayurvedic concept, the condition results from imbalance of Kaphadosha and improper functioning of Jataragni and Medo Dhatvagni.

Sthoulya Nidana

Ayurvedic texts provide a detailed description of the causative factors responsible for Sthoulya. These factors can be broadly categorized into Aharaja, Viharaja and Manasika Nidana.

Aharaja Nidhana

Dietary habits play a significant role in the development of Sthoulya. Excessive consumption of Guru, Madhura, and Snigdha Ahara promotes Kaphadosha and Meda Dhatu accumulation.^[5]

Examples include excessive intake of fatty foods, refined carbohydrates, dairy products, and overeating beyond digestive capacity. Such dietary patterns closely resemble modern high-calorie diets that contribute to obesity.^[11]

Viharaja Nidhana

Lack of physical activity is another important etiological factor described in Ayurveda. Sedentary behaviour reduces energy expenditure and promotes fat deposition in the body.

Common lifestyle factors include Avyayama, Avyavaya and Divaswapna.^[5] These factors are also widely recognized in modern medicine as contributors to obesity and metabolic disorders.^[12]

Manasika Nidhana

Ayurveda also acknowledges the influence of Manasika Nidana in the development of obesity. Harshanityatwat (excessive comfort seeking), Achintanat (lack of mental discipline) and emotional indulgence can lead to increased food consumption and reduced physical activity.^[5]

Modern research similarly suggests that emotional stress and psychological factors can influence eating behaviour and contribute to obesity.^[13]

Correlation between Leptin Resistance and Sthoulya Nidana

Several similarities can be observed between causative factors of obesity and the Ayurvedic concept of Sthoulya Nidana. In modern medicine, excessive caloric intake and sedentary lifestyle lead to increased adipose tissue deposition and elevated leptin levels. However, impaired leptin signaling results in persistent hunger and continued weight gain.^[4]

Similarly, Ayurvedic texts describe that continuous indulgence in Guru Ahara and Avyayama results in Kapha aggravation and accumulation Meda Dhatu. Agnimandya (impaired digestive metabolism) further contributes to accumulation of Medo Dhatu (abnormal adipose tissue formation) and obesity.^[5]

Thus, leptin resistance may be interpreted as a physiological correlate of the Ayurvedic processes involving Kapha imbalance, Medavridhi, impairment in Jataragni and Medo Dhatvagni.

Different levels of adiposities were described in classics that can be closely correlated to modern parameters as below.

Modern Classification	BMI (kg/m ²)*	Ayurvedic Correlation	Classical Description	Key Features
Overweight	25 – 29.9	Medovṛddhi	<i>Sphik–stana–udara lambanam</i>	Initial increase in <i>Meda Dhatu</i> with deposition of fat predominantly over the buttocks, breasts, and abdomen.
Obesity	≥ 30	<i>Sthoulya</i>	<i>Sthoulya Lakṣana</i>	Excessive accumulation of <i>Meda</i> resulting in heaviness of the body, reduced physical endurance, and characteristic body habitus

				described in classical texts.
Severe Obesity	≥ 35 or $\geq 40^{**}$	<i>Ati-sthūlya</i>	<i>Nindita / Varjya Purusha</i>	Extreme adiposity with significant functional limitation and increased susceptibility to multiple systemic disorders; described as an undesirable body constitution in Ayurvedic literature.

* BMI classification based on WHO criteria.

** BMI ≥ 35 (class II obesity) or ≥ 40 (class III obesity) may be considered severe obesity depending on classification used.

Preventive and Therapeutic Approaches

Ayurveda emphasizes correction of causative factors in the management of Sthoulya.

Nidana Parivarjana

Avoidance of Nidanas such as excessive consumption of Guru, Snigdha, Atimatra Ahara, Divaswapna, Avyayama.^[5]

Dietary Regulation

Consumption of light, easily digestible foods with reduced fat and sugar content is recommended. Foods such as barley and legumes are traditionally advised for weight management.

Lifestyle Modification

Practise of Dinacharya, Regular exercise, physical activity, and yoga improve metabolism and help reduce excessive fat accumulation.

Therapeutic Procedures

Ayurvedic therapies such as Udvartana^[18] (dry powder massage) and other Medohara treatments are described to reduce excess Meda Dhatu.

DISCUSSION

Leptin resistance is widely recognized as an important factor contributing to obesity and metabolic disorders. It reflects a disruption in the body's ability to regulate hunger and energy balance despite elevated leptin levels.^[9]

Ayurvedic texts provide a comprehensive explanation for obesity through the concept of Sthoulya Nidana. Many of the etiological factors described in Ayurveda closely resemble modern risk factors such as excessive caloric intake, sedentary behaviour, and metabolic dysregulation.

The correlation between leptin resistance and Ayurvedic concepts such as Kapha aggravation, Meda accumulation, impairment in Jataragni and Dhatwagni highlights the relevance of traditional knowledge in understanding metabolic disorders.

CONCLUSION

Leptin resistance plays a crucial role in the development and progression of obesity by impairing the regulation of hunger and energy balance. Ayurveda describes a similar pathological process through the concept of Sthoulya and

its etiological factors known as Sthoulya Nidana. The parallels between these two perspectives suggest that integrating Ayurvedic principles with modern biomedical understanding may provide a holistic approach to the prevention and management of obesity.

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