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CONCEPTUAL REVIEW OF MEDO DHATU VITIATION W.S.R TO BODY MASS INDEX (BMI)

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ABSTRACT

The *Ayurvedic* concept of *Medo Dhatu*, representing adipose tissue, plays a vital role in maintaining bodily nourishment (*Poshana*) and support (*Dharana*). *Medo Dhatu*, the fourth of the seven essential *Dhatus*, is responsible for lubrication (*Snehana*), stability, and metabolic health. Its formation and function are regulated by *Dhatvagni* which regulates the formation of *Dhatus*, their byproducts (*Upadhatu*), and waste products (*Mala)*. Imbalances in *Medo Dhatu* are linked to various health outcomes, particularly weight-related disorders. In *Ayurveda*, excessive *Medo Dhatu* is linked to obesity (*Sthoulya*), whereas insufficient levels can lead to emaciation (*Karshya*). The Body Mass Index (BMI) closely aligns with *Ayurvedic* principles; a high BMI signifies an overabundance of *Medo Dhatu*, which increases the risk of metabolic disorders like obesity and diabetes. This review will rigorously examine the physiological functions of *Medo Dhatu*, its intricate connection to adipose tissue, and the implications of its imbalances on *BMI*. By synthesizing *Ayurvedic* wisdom with contemporary health metrics, it aims to provide valuable insights for the prevention and management of weight-related health issues.

Keywords – *Medo Dhatu, Dharana, Poshana, Snehana, Dhatvagni, Upadhatu, Mala, Sthoulya, Karshya.*

INTRODUCTION

Ayurveda identifies *Dosha*, *Dhatu*, and *Mala* as the fundamental elements that dictate the body's structure, function, and overall constitution[1]. Among the various lipid-rich tissues in the human body—such as *Vasa*, *Majja*, and *Meda Dhatu—Meda Dhatu* is especially significant due to its crucial role in metabolic health. As the fourth of the seven *Dhatus*, *Meda Dhatu* is essential for vital physiological processes,

including lubrication (*Snehana*), sweating (*Sweda)*, stability (*Dridhata*), and ensuring the smoothness of the body and eyes (*Netra Gatra Snigdhata*)[2]. Its relationship with lipids is consistent with modern scientific insights, as *Meda Dhatu* predominantly accumulates in the abdominal region. It is classified as *Sarakta Meda* when situated in the bones (*Anu Asthi*) and *Majja* when found in larger bones (*Sthula Asthi*). The purest form of *Meda*, located within muscle tissue, is termed *Vasa*. *Meda Dhatu* is intricately linked to a range of metabolic disorders, including *Medoroga* (diseases of fat accumulation), *Prameha* (diabetes), and *Sthoulya* (obesity), underscoring its critical importance in maintaining overall health. In *Ayurveda*, the normal amount of *Meda Dhatu* in the body is approximately two *Anjali praman*. The term "*Meda*" is derived from "*Stimida Snehane*," relating to fats, oils, and other lubricating substances. *Vasa* refers to the fatty material derived from muscle tissue, which tends to accumulate in the abdominal region, while the fat found in bone marrow is called *Majja*. From an *Ayurvedic* perspective, BMI can be correlated with the quantity and quality of *Medo Dhatu* in the body. An elevated BMI typically indicates an excess of *Medo Dhatu*, leading to conditions like *Sthoulya*, while a low BMI may reflect *Karshya* or *Medo Dhatu* depletion. Both conditions are linked to various metabolic disorders, including diabetes, cardiovascular diseases, and hormonal imbalances.

MEDA DHATU

The *Dhatus* serve two primary roles within the body: *Dharana* (support) and *Poshana* (nourishment). Each *Dhatu* acts as a structural unit, constantly being created, broken down, and renewed with the help of vital nutrients provided by *Poshaka Dhatus*. This continuous cycle helps maintain the body's structural integrity. In particular, *Meda Dhatu* is recognized for its dominance in *Sneha* (unctuousness), characterized as a liquid substance that is rich in oiliness. It is composed mainly of the elements *Prithvi* (earth), *Apa* (water), and *Teja* (fire), and is described by the qualities of heaviness (*Guru*) and oiliness (*Snigdha*)[3]. These qualities are crucial for its functions within the body.

The substance referred to as *Meda* is described as a yellowish, greasy, soft, and solid material composed of numerous fat globules. *Chakrapani* categorized all the *Dhatus* based on their *Poshana* (nourishment) function, leading to the classification of *Meda Dhatu* into two types: *Poshaka* and *Poshya*[4]. The first type, called *Baddha Meda* or *Poshya Medo Dhatu*, is immobile by nature and is stored in the *Medodharakala* (fat tissue layers). This form of *Meda* is primarily located in the abdominal region (*Udara*), with further accumulations in areas like the bones (*Anuasthi*), hips (*Sphika*), breasts (*Stana*), and throat (*Gala*). The second type, known as *Abaddha Meda* or *Poshaka Medo Dhatu*, is mobile and circulates throughout the body along with *Rasa* (plasma) and *Rakta* (blood) to nourish the *Poshya Medo Dhatu*[5]. Through various imaging techniques, it is possible to observe how blood carries lipids and cholesterol. The total amount of *Meda* is roughly estimated as two *Anjali pramana* [6], while *Vasa* (fat found in muscle tissue) is measured as three *Anjali*, with some variations based on individual differences.

FORMATION OF *MEDO DHATU*

According to *Acharya Charaka*, *Mamsa Dhatu* (muscle tissue) undergoes transformation through its specific digestive fire, *Mamsagni*. During this process, it interacts with water and oily substances, eventually converting into *Meda Dhatu* (fat tissue). The food, after being digested by *Jatharagni* (the main digestive fire in the stomach), is separated into two components: *Prasada Bhaga* (the nourishing part for the tissues) and *Kitta Bhaga* (waste products). Then, *Bhutagni* works on the five elemental components of the food, preparing the *Upadana Dravya* (nutritional essence) necessary for each *Dhatu*'s formation. Once the *Annarasa* (nutritional essence) is processed, it undergoes *Dhatvagni Paka* (tissue-specific digestion), leading to the sequential formation and nourishment of each *Dhatu*. After *Mamsagni Paka* (digestion of muscle tissue), the nourishing part, *Posaka Dhatu*, is formed. This tissue, acted upon by *Medo Agni* (the digestive fire specific to fat transformation), creates *Sthayi Meda Dhatu* (permanent fat tissue). The newly formed *Meda Dhatu* then travels through the *Medovaha Srotas* (channels responsible for fat tissue distribution) to reach various parts of the body. The transformation from *Mamsa Dhatu* to *Meda Dhatu* is governed by the action of *Meda Dhatvagni* on the nourishing portion of muscle tissue, known as *Medaposaka Mamsa*[7]. If there is any imbalance or disruption in these pathways during the formation of *Meda Dhatu*, it can lead to either *Medo Vriddhi* (excess fat accumulation) or *Medo Kshaya* (fat depletion), resulting in conditions such as obesity (*Sthaulya*) or emaciation (*Karshya*), respectively.

DHATU MALA

All *Acharyas* acknowledge *Sweda* (sweat) as the waste product (*Mala*) of *Meda Dhatu* (fat tissue). *Acharya Sharangdhar* provides two viewpoints on *Mala*, stating that *Sweda* and elements like the *Rasana* and *Danta*, along with other substances produced by the body's metabolism, are categorized as *Mala*. *Mala* refers to the byproducts of the body's various metabolic functions.[8]

MEDOVAHA DHATU SROTAS[9]

Srotas are essentially the channels in the body that facilitate the movement of *Poshaka Dhatus* (nourishing elements) and *Malas* (waste products) to and from the *Sthayi Dhatus* (permanent tissues). As stated by *Acharya Charaka*, nutrient substances that nourish the *Dhatus* are processed by the *Ushma* of the *Dhatus* (known as *Dhatwagni*), and these nutrients become accessible to the *Dhatus* through their specific *Srotas*. The channels that supply nutrition to *Meda Dhatu* are called *Medovaha Srotas*. According to C. Dwarkanatha, these channels are responsible for transporting nourishment to the adipose tissue. Dr. Ghanekar B. G. identifies the *Medovaha Srotas* with the capillaries found in the perinephric tissue and omentum. The fat cells are primarily connected by a network of capillary blood vessels that distribute nutrients. Thus, *Srotas* serve as pathways through which the *Poshaka*or transient *Medo Dhatu* circulates throughout the body, mingled with *Rasa* (plasma) and *Rakta* (blood), effectively nourishing the permanent *Meda Dhatu*. Disruptions in the *Medovaha Srotas* can lead to conditions such as *Medoroga* (obesity) or *Medodushti* (disorders related to fat). The *Medovaha Sroto Moola* pertains to the organs that are closely linked to the functions of *Meda Dhatu* or are significant locations at the start or end of the channels associated with *Meda Dhatu*.

Moola of Medovaha Srotas according to *Brihatrayee* –

- ***Charaka***- *Vrikka* and *Vapavahana*.
- ***Sushruta***- *Vrikka* and *Kati.*
- ***Vagbhata***- *Vrikka* and *Mamsa*.

FUNCTION OF *MEDO DHATU*[10]

As stated by different *Acharyas,* following are the main functions of *Medo Dhatu*.

1. *Snehanam* (Oleating)
2. *Svedakarakam* (Produces sweat)
3. *Asthipusti* (Strengthening of bones)
4. *Dridatvam* (Provides sturdiness)
5. *Netra* and *Gatrasnigdhata* (Oiliness of eyes and body)
6. *Meda* nourishes further *Dhatu, Asthi* and *Upadhatu Snayu* and *Sandhi*.
7. *Snayu* is the *Upadhatu* of *Meda*

DERANGEMENT OF METABOLISM (*PARINAMA*) OF *MEDAS*:

Agni governs all metabolic processes in the body and plays a crucial role in the balance of *Dosa*, *Dhatu*, and *Mala*. Any disruption in *Agni* can significantly affect health, depending on the specific type of *Agni* involved. When *Agni* is diminished, it can lead to various metabolic disorders, resulting in the formation of *Ama* (undigested or partially digested substances). In this scenario, *Agni* fails to transform *Vijatiya* (non-assimilable) substances into *Sajatiya* (assimilable) ones, preventing proper assimilation by the *Dhatu*. These improperly processed substances can be harmful to the body and may manifest symptoms based on their presence at different physiological levels.

❖ ***Meda Dhatu Kshaya***[11,12]

➢ As described in the *Caraka Samhita*, of the *Sutrasthna*, an individual with vitiated *Agni* cannot endure physical exertion, heavy meals, hunger, thirst, certain medications, and extreme temperatures in food or activities, as well as intercourse. Additionally, this individual may experience conditions such as splenomegaly, *Kasa*(cough), *Kshaya* (wasting), *Svasa* (dyspnea), *Gulma* (abdominal tumors), *Arsa* (hemorrhoids), *Udargata Roga* (disorders related to abdominal distension), and *Grahanigata Roga* (diseases caused by pathogens)

➢ In cases of *Ksaya* of *Meda*, the regions of the *Sphik* (hips), *Udara* (abdomen), and *Griva* (neck) become dehydrated, leading to the appearance of prominent blood vessels (*Dhamani Jala*). As a result, it may seem that only the arteries and bones remain throughout the body. An excessively thin individual tends to have *Sthula* joints (bulky joints)

➢ In *Meda Kahaya* (depletion of fat tissue), there is an increase in joint space, dryness, and a strong craving for fatty meals. Additionally, this condition leads to loss of sensation in the back, enlargement of the spleen, and a thinning of various organs.

❖ ***Meda Dhatu Vriddhi***[13]

➢ Excessive accumulation of *Meda* along with *Mamsa Dhatu* results in a pendulous appearance of the hips, abdomen, and breasts, characterized by an uneven or abnormal distribution of fat. This condition, known as "*Atisthula*," is often accompanied by a decreased enthusiasm for life.

➢ The signs of *Medovirddhi* associated with *Sthaulya* include eight notable disabilities as described by *Acharya Caraka*: *Ayusohrasa* (Decreased lifespan), *Javoparodha* (Lack of agility), *Kirccha Vyavaya* (Difficulty in sexual activity), *Daurbalya* (General weakness), *Daurgandhya* (Unpleasant body odor), *Swedabadha* (Distressing sweating), *Ksudha Atimatra* (Excessive hunger), *Pipasa Atiyoga* (Excessive thirst). These symptoms highlight the various ways in which *Medovirddhi* can impact health and quality of life.

BODY MASS INDEX (BMI)

The body mass index (BMI) is used as an index of a healthy body weight. It assumes a normal distribution between muscular and adipose tissue and thus would not be appropriate for muscular individuals such as athletes. The BMI is calculated by-

BMI = weight in kg/height in m^2

This index more closely corresponds to the measurement of body fat and better differentiate "overweight" due to an increase in muscle mass from true obesity.

According to WHO classification of weight Status –

Below 18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30.0-39.9	Obese
Above 40	Very obese / Morbid Obesity

Adipose tissue, which includes white fat (energy storage) and brown fat (thermogenesis), closely aligns with the concept of *Meda Dhatu*. While modern science recognizes the metabolic functions of adipose tissue, *Ayurveda* emphasizes the qualitative aspects of *Meda Dhatu*, such as its effects on digestion (*Agni*), metabolic processes, and overall body constitution (*Prakriti*). Excessive *Meda Dhatu* can lead to conditions such as *Sthoulya* (obesity) and related metabolic disorders, mirroring elevated BMI classifications.

Elevated BMI values often signify an excess of *Meda Dhatu*, which can lead to various health issues, including diabetes, cardiovascular diseases, and other metabolic disorders. According to *Ayurveda*, imbalances in *Meda Dhatu* can arise from poor dietary choices, insufficient physical activity, and disruptions in the *Doshas* (bioenergetic forces). Thus, BMI can be an effective tool for evaluating the health implications of *Meda Dhatu* in individuals. While BMI offers a numerical assessment of body weight, *Ayurveda* advocates for a more comprehensive evaluation that takes into account the qualities and balance of *Meda Dhatu*.

DISSCUSSION

Meda Dhatu's functions resemble those of modern adipose tissue in its support of vital organs, metabolic activity, and as a medium for energy storage. However, the *Ayurveda* delves deeper into the qualitative dimensions of *Meda Dhatu*, which go beyond mere storage. For instance, it emphasizes the impact of *Meda* on skin, eyes, and joints through its *Snehana* quality, contributing to bodily lubrication and smoothness. The metabolic activity of *Meda Dhatu*, regulated by *Dhatvagni* (tissue-specific metabolic fire), underscores its dynamic nature, wherein the tissue is constantly being formed and nourished through the sequential conversion of food.

In *Ayurveda*, the concept of excess or deficient *Meda Dhatu* closely correlates with modern notions of Body Mass Index (BMI). Elevated BMI levels often indicate an excess of *Meda Dhatu*, which manifests as *Sthoulya* (obesity) in *Ayurveda*. On the other hand, low BMI may correspond to *Karshya* (emaciation), indicative of insufficient *Meda Dhatu*. While BMI serves as a useful numerical tool to assess body weight and fat distribution in modern medicine, the Holistic approach evaluates not just quantity but also the qualitative aspects of *Meda*, such as its nourishment, stability, and impact on health.

CONCLUSION

This review elucidates the intricate relationship between *Medo Dhatu* and Body Mass Index (BMI) from an *Ayurvedic* perspective. The balance of *Medo Dhatu* is crucial for maintaining metabolic health, and its vitiation can lead to significant disorders such as *Sthoulya* (obesity) and *Karshya* (emaciation). An elevated BMI often indicates an excess of *Medo Dhatu*, leading to various health complications, while a low BMI reflects depletion of this essential tissue, resulting in its own set of issues. Understanding the role of *Medo Dhatu* in metabolic processes provides valuable insights for prevention and management strategies for weight-related disorders. By integrating *Ayurvedic* principles with contemporary metrics like BMI, we can enhance our approach to holistic health, emphasizing the need for balanced nutrition and lifestyle practices to support optimal metabolic function and overall well-being.

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