

## THE RELATIONS BETWEEN MEDOROGA (OBESITY) AND OBESOGENS

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### ABSTRACT

In *Ayurveda* obesity is described under the heading of *Sthaulya* or *Medoroga*. *Acharya Charak* Counted *Atisthaulya* in the eight despicable. In *Ayurvedic* literatures along with traditional factors of obesity some non-traditional factors are also explained. Detail pathophysiology of *Medoroga* is also explained by ayurvedic scholars. Obesity is defined as abnormal or excessive fat accumulation that presents a risk to health. Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Worldwide obesity has nearly tripled since 1975. Most of the world's population lives in countries where overweight and

obesity kills more people than underweight. Excess caloric food consumption along with sedentary life style are most common causes for obesity, however there are also some non-traditional factors like obesogens, hereditary cause and stress which can lead to obesity. Obesogens are exogenous chemical compounds that disrupt normal balance of lipid metabolism and can lead to obesity. By comparing pathophysiology of *Medoroga* explained in *Ayurvedic* literature and pathophysiology of obesogens we can consider, obesogens as a causative factor for *Medoroga*.

**KEYWORDS:** Medoroga, Sthaulya, Eight despicable, Obesity, Obesogens, Chemicals.

## INTRODUCTION

In *Ayurveda* obesity is described under the heading of *Sthaulya* or *Medoroga*. Acharya Charak Counted *Atisthaulya* in the eight despicable.<sup>[1]</sup> Etiological factors of *Medoroga* stated in *Ayurvedic* literatures are lack of exercise, over saturation, intake of heavy, sweet, cold and fatty diet, consumption of sweet product in larger quantity, stress, hereditary defects etc.<sup>[2]</sup> Obesity is defined as abnormal or excessive fat accumulation that presents a risk to health. A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in meters). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight.<sup>[3]</sup>

Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Once considered a problem only in high income countries, overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings.<sup>[4]</sup> Worldwide obesity has nearly tripled since 1975. In 2016, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 650 million were obese. Most of the world's population lives in countries where overweight and obesity kills more people than underweight.<sup>[5]</sup> Excess caloric food consumption along with sedentary life style are most common causes for obesity, however there are also some non-traditional factors like obesogens, hereditary cause and stress which can lead to obesity.

Obesity is the growing problem due to globalisation and sedentary life style in present era. People are not aware of causative and aggregating factors of obesity. So, I have selected this topic for creating awareness in people and educating them towards some non-traditional factors like obesogens and its relation with *Medoroga* (obesity).

## AIM

To study obesogens and its relationship with *Medoroga*(Obesity).

## OBJECTIVE

1. To study *Medoroga* (Obesity) in detail.
2. To study obesogens in detail.
3. To know the relationship between *Medoroga* (obesity) and Obesogens.

## MATERIALS

Only textual material has been used for this study, from which various references have been collected. *Ayurvedic* text & available commentaries on it, modern text and related website have also been searched.

## METHODOLOGY

To fulfill the aim and objective of the study this work has been carried out in the following phase wise manner.

- 1) Conceptual study
- 2) Discussion
- 3) Conclusion

## CONCEPT OF MEDOROGA

In *Ayurvedic Samhitas* obesity has been explained with various synonyms like *Medoroga*, *Medodosha*, *Atisthaulya* etc. *Acharya Charak* Counted *Atisthaulya* in the eight despicable. A person having pendulous appearance of *Sphika* (Hip), *Udara* (Abdomen) and *Stana* (Chest) due to excess deposition of *Meda* along with *Mamsa Dhatu* and also having unequal or abnormal distribution of *Meda* with reduced zeal towards life is called *Atisthula*.<sup>[6]</sup> The over-obese has 8 defects – shorting of life span, hampered movement, difficulty in sexual intercourse, debility, foul smell, over sweating, too much hunger and excessive thirst.<sup>[7]</sup>

## ETIOLOGICAL FACTORS OF MEDOROGA

Acharyas have described many etiological factors of *Medoroga* related to all aspects of life such as over saturation, intake of heavy, sweet, cold & fatty diet, indulgence in day sleeping and exhilaration. In *Charak Samhita* besides these dietetic, regimen and psychological factors hereditary defect (*BeejaDosha*) is also described in the causation of *Sthaulya*. There is excess of fat in him and further only fat is accumulated and no other *Dhatus*, thus the life span is shortened; because of laxity, softness and heaviness of fat there is hampering in movement; because of intensified *Agni*(digestion) and abundance of *Vata* in the belly there is excessive hunger and thirst.<sup>[8]</sup>

## PATHOGENESIS OF MEDOROGA

*Acharya Charak* stated, *Vata Dosha*, due to passage having been obstructed with fat, moves about abundantly in belly and thus stimulates digestion and absorbs food. Hence the person

digests food quickly and desires excessively the intake of foods. In case of delay in taking food, he is afflicted with some severe disorders. In the event of excessive increase of fat, the *Doshas* suddenly give rise to severe disorders and thus destroy the life shortly.<sup>[9]</sup> Also *Madhavkara* stated that, Due to excessive increase in fat channels get obstructed and thus nutrition to other *Dhatu* is not possible only accumulation of fat takes place.<sup>[10]</sup>

### CONCEPT OF OBESITY

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters ( $\text{kg}/\text{m}^2$ ). For adults, overweight is a BMI greater than or equal to 25; and obesity is a BMI greater than or equal to 30. For children, age is considered when defining overweight and obesity.

Excessive body weight is associated with various diseases and conditions, particularly cardiovascular diseases, diabetes mellitus type 2, obstructive sleep apnea, certain types of cancer, osteoarthritis and asthma. As a result, obesity has been found to reduce life expectancy.<sup>[11]</sup>

### CONCEPTS OF OBESOGENS

Obesogens are exogenous chemical compounds that disrupt normal balance of lipid metabolism and can lead to obesity. These obesogenic chemicals can be classified into two groups; pharmaceutical obesogens & environmental obesogens.

The pharmaceutical drug which are consumed and causes obesity are known as Pharmaceutical obesogens e.g. Tricyclic antidepressants, tetracyclic antidepressants, Thiazolidinediones (used to treat diabetes) etc. Sometimes we came across some chemical exposure from environment which can lead to obesity is known as environmental obesogens e.g. Phthalates (used to soften plastics), organotin (chemicals used in tin), fungicides on food etc.

There are many ways in which obesogenic chemicals can disrupt the body's lipid metabolism. The three main mechanisms of action include.

1. Alteration of metabolic sensors
2. Alteration of appetite and satiety centre in the brain

### 3. Dysregulation of sex steroids

#### 1. Alteration of metabolic sensors

- I. Peroxisome Proliferator Activated Receptors (PPAR) which is a nuclear hormone receptor is of two types i.e.  $\alpha$ PPAR &  $\gamma$ PPAR.
- II. To become active and function properly PPAR must be Heteronised with 9-cis retinoic acid receptor (RXR) known as PPAR/RXR complex.
- III.  $\alpha$ PPAR/RXR complex when combines with fatty acid molecules causes oxidation of fatty acid. In contrast when  $\gamma$ PPAR/RXR Complex combines with fatty acid molecules or their derivatives promotes lipid biosynthesis and storage of lipids.
- IV. Obesogens mainly target and act agonist to  $\gamma$ PPAR/RXR complex. This results in increased serum concentration of lipid and leads to obesity.

#### 2. Alteration of appetite and satiety centers

- I. HPA axis (hypothalamic-pituitary-adrenal) controls Feeling of fullness & hunger through signals that come from the digestive tract, thus maintaining energy homeostasis.
- II. Obesogens targets these gut - brain signaling results in increased feeling of hunger and decreased feeling of fullness.
- III. Therefore, High caloric diets are consumed in large quantity which leads to obesity.

### 3. Dysregulation of sex steroids

- I. Sex steroids normally play a significant role in lipid balance in the body. They act against the lipid accumulation mediated by insulin and cortisol by mobilizing lipid stores that are present.
- II. Exposure to obesogens often leads to a deficiency or change in the ratio between androgen and estrogen sex steroid levels. This results in increased insulin resistance and low level of cortisol.<sup>[12]</sup>
- III. Insulin controls access to blood glucose in body cells with the help of insulin receptors. When insulin resistance develops these receptors not activated by insulin. As a result of this glucose present in the circulation is not taken up by body cells and only have access to lipids that do not require transport across the membrane.<sup>[13]</sup>

## DISCUSSION

Insulin controls access of blood glucose into the body cells. When insulin resistance develops due to obesogens, body cells begin to have access only to lipid molecules across the cell

membrane; therefore insulin resistance leads to obesity. Similar pathophysiology is explained by *Acharya Madhavkara* also, Due to excessive *Medadhatu* blockage of channels (*Strotas*) takes place, this results in only *Poshan* of *Medadhatu* i.e. accumulation of lipid molecule inside the cells.

*Acharya Charak* stated that *Vata Dosha*, due to passage having been obstructed with fat, moves about abundantly in belly and thus stimulates digestion. Similarly, *Obesogens* alter appetite and satiety center, by disturbing gut brain signaling which leads to increase in appetite and decrease in satiety and thus causing obesity.

## CONCLUSION

While explaining the etiological factors of *Medoroga* *Acharyas* have not only focused on traditional factors like dietary and regimens but also considered non-traditional factors like psychological and hereditary factors. There is no direct reference of *obesogens* in *Ayurvedic* Literatures. *Acharyas* have not stated any *obesogenic* chemicals in etiological factor of *Medoroga*, but the pathophysiology explained in *obesogenic* obesity and *Medorogas* are similar. So, we can consider *obesogens* as a cause of *Medoroga*.

*Obesity* is a life style disorder which has hazardous effect on health. This can be prevented by educating peoples about its etiology and prevention. When treating obesity along with traditional factors non-traditional factors should also be considered. Adopting *Ayurvedic* life style can also prevent obesity.

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