

## **CRITICAL STUDY OF STHAULYA (OBESITY) AND ITS PRINCIPLES OF MANAGEMENT**

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### **ABSTRACT**

**Obesity** is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health. Obesity increases the likelihood of various diseases and conditions, particularly Cardiovascular diseases, Respiratory Diseases, Type 2 diabetes, obstructive sleep apnea, certain types of cancer, osteoarthritis and depression. Obesity is more common in women than men. Authorities view it as one of the most serious public health problems of the 21st century. Obesity is stigmatized in much of the modern world (particularly in the Western world), though it was seen as a symbol of wealth and fertility at other times in history and still is in some parts of the world. In 2013, the American Medical Association classified obesity as a disease. In India, the prevalence of overweight increased from 9.7% near the turn of the century to nearly 20% in studies reported after 2010. For children and adolescents, these studies show that obesity and overweight are rapidly increasing, not just in the higher income groups but also in the rural poor, where under nutrition and underweight remain major health concerns. Here the word ‘Critical’ means clear and impartial. In present study an effort made to find etiopathogenesis, impact of *Sthaulya* and management of Obesity critically which will provide baseline data to future researchers regarding management of obesity?

**Keywords:** *Sthaulya*, Obesity Treatment, Ayurvedic, *Shodhana*, *Santarpana Vyayama*

### **INTRODUCTION**

Obesity is the complex, multifactorial type of nutritional metabolic disease. It occurs due to imbalance between intake of energy and its expenditure resulting in positive energy balance, which is characterized by the abnormal

growth of the adipose tissue, resulting in an increase in the body weight to the extent of 20% or more of the standard weight for the person’s age, sex and height. Obesity is a medical condition in which excess body fat

has accumulated to the extent that it may have a negative effect on health. Obesity increases the likelihood of various diseases and conditions, particularly Cardiovascular diseases, Respiratory Diseases, Type 2 diabetes, obstructive sleep apnea, certain types of cancer, osteoarthritis and depression. Obesity is a leading preventable cause of death worldwide, with increasing rates in adults and children. In 2015, 600 million adults (12%) and 100 million children were obese. Obesity is more common in women than men. Authorities view it as one of the most serious public health problems of the 21st century. Obesity is stigmatized in much of the modern world (particularly in the Western world), though it was seen as a symbol of wealth and fertility at other times in history and still is in some parts of the world. In 2013, the American Medical Association classified obesity as a disease [1]. In India, the prevalence of overweight increased from 9.7% near the turn of the century to nearly 20% in studies reported after 2010. For children and adolescents, these studies show that obesity and overweight are rapidly increasing, not just in the higher income groups but also in the rural poor, where under nutrition and underweight remain major health concerns [2]. However, India has also seen a surge in obesity. It had 0.4 million obese men, or 1.3% of the global obese population in 1975, but in 2014, it zoomed into the fifth position with 9.8 million obese men, or 3.7% of the global population. Among women, India has jumped to the third rank with 20 million obese women (5.3% of global population) [3]. Here the word 'Critical' means clear and impartial. In present study an effort made to find etiopathogenesis, impact of *Sthaulya* and management of Obesity critically. Obesity is a

state of excess adipose tissue mass. The most widely used method to gauge obesity is the body mass index (B.M.I.), which is equal to weight/height<sup>2</sup> (in kg/m<sup>2</sup>). Other approaches to quantifying obesity include anthropometry (skin -fold thickness), densitometry (underwater weighing), computed tomography (CT) or magnetic resonance imaging (MRI), and electrical impedance. Based on data of substantial morbidity, a BMI of 30 is most commonly used as a threshold for obesity in both men and women [4].

## **MATERIALS AND METHODS**

Critical study of *Sthaulya* is categorized under

- A) Etymology
- B) Definition of *Sthaulya*
- C) *Nidana*
- D) *Rupa*
- E) Impact of *Sthaulya*
- F) *Samprapti*
- G) Management of *Sthaulya*

### **A) ETYMOLOGY**

- The word *Sthaulya* is delivered from root "*Sthu*" with suffix "*Ach*", which stands probably for thick or solid or strong or big or bulky.
- The term *Sthaulya* is derived from the *AtmanepadiSthoolayate Dhatu* having meaning to grow, increase [5]
- The word Obesity is derived from the Latin 'obesitas', which means "stout, fat, or plump" [6]

### **B) DEFINITION OF *STHAULYA***

*MedomamsaativruddhatvatChalaSphig  
Udara Stanaha |*

*AyathopachayotsahoNaroatisthoolUchayate*  
|| [7]

The person is called over obese who, due to excessive increase of fat and muscles, has pendulous buttocks, abdomen and breasts, and suffers from deficient metabolism and energy.

### C) NIDANA<sup>[8]</sup>

All the causative factors described in Ayurvedic classics can be classified under 5 groups

- 1) Aharatmaka Nidana
- 2) Viharatmaka Nidana
- 3) Manas Nidana
- 4) Beeja Dosha
- 5) Anya Nidana

#### 1. AHARATMAKA HETU (DIETARY FACTORS)

- Factors related to improper consumption of diet

*Atisampurana* (Over eating), *Santarpana*, *Adhyasana*

- Factor related to quality of food material  
*Guru Aharasevana*, *Madhura Aharasevana*, *Sheeta Aharasevana*, *Snigdha Aharasevana*, *Sleshmala Aharasevana*,

- Specific food substances causing obesity  
*Navannasevana*, *Nava Madhya Sevana*, *Gramya Rasasevana*, *Audak Rasasevana*, *Mamsa Sevana*, *Paya Vikar Sevana*, *Dadhi Sevana*, *Sarpi Sevana*, *Ikshu Vikara Sevana*, *Guda Vikara Sevana*, *Shali Sevana*, *Godhum Sevana*, *Masha Sevana*, *Rasayan Sevana*, *Vrushya Aahara Sevana*

#### 2. VIHARATMAKA HETU

*Avyavaya*, *Divaswapna*, *Asana Sukha*, *Swapnaprasangat*, *Gandhamala Sevana*, *Bhojanotar Snanaare Viharatmaka Hetu*

#### 3. MANSIKA HETU (PSYCHOLOGICAL FACTORS)

*Harashnityatvat*, *Achintana*, *Priyadarshana*, *Manasonivritti* are *Manasjanya Hetu*

#### 4. BEEJA DOSHA

*Acharya Charaka* has described a specific cause *Beeja Dosha Swabhava* for *Sthaulya*, *Acharya Vagbhata* has described the *Sahaja Sthaulya* due to dietary fault of pregnant lady. Therefore, two miscellaneous causative factors of *Sthaulya* have been described in Ayurvedic text. i.e. *Beejadoshajanya* and *Garbhajvyadhi*.

#### 5. ANYA NIDANA

It includes *Snigdha Madhura Basti Sevana* (Administration of unctuous and sweet enema), *Tailabhyanga* (Massaging of oil), *Snigdha Udvartana* (Unctuous action) etc.

### CRITICAL ANALYSIS OF NIDANA IN RELATION TO STHAULYA

#### 1) Role of Aharatmaka Nidana in Sthulya

*Ahararasa* plays as major role for increasing *Meda Dhatu* in *Sthaulya*<sup>[9]</sup>. *Sthaulya* and *Karshya* depend upon the quality and quantity of *Ahararasa*. On the basis of *Samanya Vishesh Siddhanta*, the excess food consumption of similar substance of similar quality, similar in action helps in the over production of *Dhatu*. In the same manner increased intake of *Aharatmaka Nidana* causes over production of *Medodhatu*.

#### 2) Role of Viharatmaka Nidana in Sthaulya

All the *Aharatmaka Nidana* ultimately decreases physical activity, which aggravates *Kapha* and leads of *Meda* deposition. *Viharatmaka Nidana* like *Divaswapna* having *Abhishyandi* property leads to blockage of the micro channels of the body, specifically in *Medovaha Strotas*.

### 3) Role of *Manasjanya Nidana* in *Sthaulya*

According to *Charakacharya Harshanitya* and *Achintana* are two psychological factors which are responsible for *Meda Vriddhi*. These factors are *Kapha* aggravating factors lead of *Meda* deposition. With this type of psychological wellbeing and jolliness that person indulges more in worldly pleasure and excess energy stored in the form of *Meda*.

### 4) Role of *Beejadasha* in *Sthaulya*

*Acharya Charaka* has mentioned that *Beejadasha* plays a major role for *Medo Vriddhi*. Defect in *Beejabhagavayava*, which resembles with Genes, may lead to defective development of that organ. Also, *Bhavamishra* has mentioned that increased proportionate of *Meda* and decreased proportion of *Shukra* in *Beeja* at the time of conception predisposes towards development of stout but weak body<sup>[10]</sup>. Moreover, over nutrition particularly with *Madhura Rasa* during pregnancy is mentioned as a causative factor for birth of obese child, which indicate role of hereditary factor in genesis of *Sthaulya*.

## CAUSES ACCORDING TO MODERN SCIENCE<sup>[11]</sup>

At an individual level, a combination of excessive food energy intake and a lack of physical activities are thought to explain most cases of obesity. A 2006 review identified ten other possible contributors to the recent increase of obesity: insufficient sleep, endocrine disruptors, decreased variability in ambient temperature, decreased rates of smoking, increased use of medications that can cause weight gain, proportional increases in ethnic and age groups that tend to be heavier, pregnancy at a later age, epigenetic risk factors passed on generationally, natural selection for

higher BMI, and assortative mating leading to increased concentration of obesity risk factors.

### 1) DIET

A 2016 review supported excess food as the primary factor. Dietary energy supply per capita varies markedly between different regions and countries. The primary sources of these extra carbohydrates are sweetened beverages, which now account for almost 25 percent of daily food energy in young adults in America, and potato chips. Consumption of sweetened drinks such as soft drinks, fruit drinks, iced tea, and energy and vitamin water drinks is believed to be contributing to the rising rates of obesity and to an increased risk of metabolic syndrome and Type 2 diabetes. Vitamin D deficiency is related to diseases associated with obesity. As societies become increasingly reliant on energy-dense, big-portions, and fast-food meals, the association between fast-food consumption and obesity becomes more concerning.

### 2) SEDENTARY LIFESTYLE

A sedentary lifestyle plays a significant role in obesity. Worldwide there has been a large shift towards less physically demanding work, and currently at least 30% of the world's population gets insufficient exercise. This is primarily due to increasing use of mechanized transportation and a greater prevalence of labor-saving technology in the home. In children, there appear to be declines in levels of physical activity due to less walking and physical education. In both children and adults, there is an association between television viewing time and the risk of obesity.

### **3) GENETICS**

Like many other medical conditions, obesity is the result of interplay between genetic and environmental factors. Polymorphisms in various genes controlling appetite and metabolism predispose to obesity when sufficient food energy is present. Studies that have focused on inheritance patterns rather than on specific genes have found that 80% of the offspring of two obese parents were also obese, in contrast to less than 10% of the offspring of two parents who were of normal weight. The thrifty gene hypothesis postulates that, due to dietary scarcity during human evolution, people are prone to obesity. Their ability to take advantage of rare periods of abundance by storing energy as fat would be advantageous during times of varying food availability, and individuals with greater adipose reserves would be more likely to survive famine. This tendency to store fat, however, would be maladaptive in societies with stable food supplies. This theory has received various criticisms, and other evolutionarily-based theories such as the drift gene hypothesis and the thrifty phenotype hypothesis have also been proposed.

### **4) OTHER ILLNESSES AND MEDICATIONS**

Certain physical and mental illnesses and the pharmaceutical substances used to treat them can increase risk of obesity. Medical illnesses that increase obesity risk include several rare genetic syndromes as well as some congenital or acquired conditions: hypothyroidism, Cushing's syndrome, growth hormone deficiency, and the eating disorders: binge eating disorder and night eating syndrome. Certain medications may cause weight gain or changes in body composition; these include insulin, sul-

fonylureas, thiazolidinediones, atypical antipsychotics, antidepressants, steroids, certain anticonvulsants (phenytoin and valproate), pizotifen, and some forms of hormonal contraception.

### **5) SOCIAL DETERMINANTS**

Many explanations have been put forth for associations between BMI and social class. It is thought that in developed countries, the wealthy are able to afford more nutritious food, they are under greater social pressure to remain slim, and have more opportunities along with greater expectations for physical fitness. In undeveloped countries the ability to afford food, high energy expenditure with physical labor, and cultural values favoring a larger body size are believed to contribute to the observed patterns. Malnutrition in early life is believed to play a role in the rising rates of obesity in the developing world. Endocrine changes that occur during periods of malnutrition may promote the storage of fat once more food energy becomes available.

### **6) GUT BACTERIA**

The study of the effect of infectious agents on metabolism is still in its early stages. Gut flora has been shown to differ between lean and obese humans. There is an indication that gut flora in obese and lean individuals can affect the metabolic potential. This apparent alteration of the metabolic potential is believed to confer a greater capacity to harvest energy contributing to obesity. Whether these differences are the direct cause or the result of obesity has yet to be determined unequivocally.

#### D) RUPA

##### SYMPTOMS OF *STHAULYA* <sup>[12]</sup>

*Ati Sweda* (Excessive Sweating), *Sharamjanya Shwasa* (Breathlessness on mild exertion), *Ati Nindra* (Excessive sleep), *Karya Dorblyta* (Difficulty to perform heavy work), *Jadyatha* (Sluggishness), *Alpaayu* (Short life span), *Alpabala* (Decreased bony strength), *Uathashahani* (Inertness), *Sharir Durgandhta* (Foul odour of the body), *Gadgadtava* (Unclear voice), *Kshudhavridhi* (Excessive hunger), *Ati Trishna* (Excessive thirst) are symptoms of *Sthaulya*.

#### E) IMPACT OF *STHAULYA*

##### COMPLICATIONS IN *STHAULYA* <sup>[13]</sup>

Obese individual may suffer from *Jwara*, *Udara*, *Bhagandara*, *Prameha*, *Urustambha*, *Prameha Pitika*, *Urustambha* etc disorders

#### OBESITY RELATED ORGAN SYSTEMS REVIEW <sup>[14]</sup>

Obesity can cause various disorders, possible system-wise enumeration enlisted below,

##### • **Cardiovascular System**

Hypertension, Congestive heart failure, Corpulmonale, varicose veins, pulmonary embolism Coronary artery disease

##### • **Respiratory System**

Dyspnea, Obstructive sleep apnea, Hypoventilation syndrome, Pickwickian syndrome, Asthma

##### • **Gastrointestinal System**

Gastroesophageal reflux disease, Nonalcoholic fatty-liver disease, Cholelithiasis, Hernias, Colon cancer

##### • **Endocrine System**

Metabolic syndrome Type 2 diabetes Dyslipidemia Polycystic ovarian syndrome

##### • **Musculoskeletal System**

Hyperuricemia and gout, Immobility, Osteoarthritis (knees and hips), Low back pain, Carpal tunnel syndrome

##### • **Genitourinary System**

Urinary stress incontinence, Obesity-related glomerulopathy, Hypogonadism (male) Breast and uterine cancer, Pregnancy complications

##### • **Psychological**

Depression/low self-esteem, Body image disturbance, Social stigmatization

##### • **Neurologic**

Stroke, Idiopathic intracranial hypertension, Meralgia paresthetica, Dementia

##### • **Integumentary system**

Striae distensae, Stasis pigmentation of legs, Lymphedema, Cellulitis, Intertrigo, carbuncles, Acanthosis nigricans, Acrochordons (skin tags), Hidradenitis suppurativa

#### F) SAMPRAPTI OF *STHAULYA*

In obesity, *Medo Dhatu* obstructs the channels related to digestive system (*Koshta*). This results in obstruction of *Vata Dosha* in the digestive system. It increases *Agni* (digestive fire) and dries up food in the stomach and intestines. Hence, food digestion speeds up increasing hunger. So the patient digests food quickly and becomes a voracious eater. If he does not get food on time, he becomes prone to serious disorders. The *Agni* (digestive fire), influenced by *Pitta* and *Vata Dosha* get vitiated. They burn the food as the forest fire burns the forest. Hence the body weight increases. Due to disproportionate increase of fat, diseases of very serious types are caused, all of a sudden, by *Vata*, etc. This may lead to instantaneous death. Owing to an excessive increase

of fat and muscle tissue, the buttock, abdomen and breast become pendulous and his strength is rendered disproportionate with his physical growth [15].

In *Samprapti* of *Sthaulya*, all the three *Doshas* are vitiated especially *Kledaka Kapha*, *Pachaka Pitta*, *Samana* and *Vyana Vayu* are the responsible factors for proper digestion and metabolism of food at the level of alimentary tract and body tissue. *Dushti* of these *Tri-Dosha* components results in indigestion metabolic deformity and form action of *Ama* at tissue level as well as alimentary tract. *Sthaulya* is a *Dushya* dominant disorder. Due to excess *Agni* more *Annarasais* produced and

the quality of diet i.e. *Guru, Madhur, Snigdha, SheetaGuna* dominance *Dhatu Poshakansha* is formed in more quantity. At start the *Rasagata, Raktagata and MamsagataSneha* also increase production of *Medodhatu*. But due to *Medodhatwagnimandyata*, this condition worsens and nourishment of further *Dhatus* doesn't happen properly. Due to binge eating, *Rasa, Rakta, MamsagataSneha* tends to increase. Patient shows the symptoms of *Rasavridhhi* and *Kaphavridhhi* e.g. *Angagaurav, Alasya, Nidradhikya. Medadhatu* get increased with physical signs like *ChalaSphik Udara Stana, KshudraShwas, Swedadhikya* etc and finally lands into *Sthaulya*.

#### **Factors involved in Samprapti of Sthaulya [16]**

• <i>Doshas</i>	:	<i>Vata, Pitta, Kapha</i>
• <i>Dushyas</i>	:	<i>Rasa, Rakta, Mamsa, Meda</i>
• <i>Strotas</i>	:	<i>Rasavaha, Mamsavaha, Medavaha</i>
• <i>Strotodushti</i>	:	<i>Sanga</i>
• <i>Agni</i>	:	<i>TeekshnaJatharaagni</i>
• <i>Aam</i>	:	<i>Dhatwaagni-Maandya-Janya</i>
• <i>UdbhavaSthana</i>	:	<i>Aamashaya</i>
• <i>VyaktaSthana</i>	:	<i>SarvaShareera</i>
• <i>Adhishthana</i>	:	<i>Mamsa Dhatu, Meda Dhatu</i>
• <i>Rogamarga</i>	:	<i>BahyaRogamarga</i>
• <i>Sadhyasadhyatva</i>	:	<i>KrucchraSadhya</i>

#### **PATHOPHYSIOLOGY OF OBESITY [17]**

There are many possible pathophysiological mechanisms involved in the development and maintenance of obesity. Investigators postulated that leptin was a satiety factor. In the ob/ob mouse, mutations in the leptin gene resulted in the obese phenotype opening the possibility of leptin therapy for human obesity. However, soon thereafter J. F. Caro's laboratory could

not detect any mutations in the leptin gene in humans with obesity. On the contrary Leptin expression was increased proposing the possibility of Leptin-resistance in human obesity. Since this discovery, many other hormonal mechanisms have been elucidated that participate in the regulation of appetite and food intake, storage patterns of adipose tissue, and development of insulin resistance. Since

leptin's discovery, ghrelin, insulin, orexin, PYY 3-36, cholecystokinin, adiponectin, as well as many other mediators have been studied. The adipokines are mediators produced by adipose tissue; their action is thought to modify many obesity-related diseases. Leptin and ghrelin are considered to be complementary in their influence on appetite, with ghrelin produced by the stomach modulating short-term appetitive control. Leptin is produced by adipose tissue to signal fat storage reserves in the body, and mediates long-term appetitive controls.

### **1) GRAPHIC DEPICTION OF A LEPTIN MOLECULE**

Leptin and Ghrelin are produced peripherally; they control appetite through their actions on the central nervous system. In particular, they and other appetite-related hormones act on the hypothalamus, a region of the brain central to the regulation of food intake and energy expenditure. The circuit begins with an area of the hypothalamus, the arcuate nucleus, that has outputs to the lateral hypothalamus (LH) and ventromedial hypothalamus (VMH), the brain's feeding and satiety centers, respectively. The arcuate nucleus contains two distinct groups of neurons. The first group co-expresses neuropeptide Y (NPY) and agouti-related peptide (AgRP) and has stimulatory inputs to the LH and inhibitory inputs to the VMH. The second group co-expresses pro-opiomelanocortin (POMC) and cocaine- and amphetamine-regulated transcript (CART) and has stimulatory inputs to the VMH and inhibitory inputs to the LH. Consequently, NPY/AgRP neurons stimulate feeding and inhibit satiety, while POMC/CART neurons stimulate satiety and inhibit feeding. Both

groups of arcuate nucleus neurons are regulated in part by leptin. Leptin inhibits the NPY/AgRP group while stimulating the POMC/CART group. Thus a deficiency in leptin signaling, either via leptin deficiency or leptin resistance, leads to overfeeding or may account for some genetic and acquired forms of obesity.

### **2) PHYSIOLOGIC REGULATION OF ENERGY BALANCE<sup>[18]</sup>**

Substantial evidence suggests that body weight is regulated by both endocrine and neural components that ultimately influence the effect or arms of energy intake and expenditure. This complex regulatory system is necessary because even small imbalances between energy intake and expenditure will ultimately have large effects on body weight. A major regulator of these adaptive responses is the adipocyte-derived hormone leptin, which acts through brain circuits to influence appetite, energy expenditure, and neuroendocrine function.

### **3) THE ADIPOCYTE AND ADIPOSE TISSUE<sup>[19]</sup>**

Adipose tissue is composed of the lipid-storing adipose cell and a stromal/vascular compartment in which cells including preadipocytes and macrophages reside. Adipose mass increases by enlargement of adipose cells through lipid deposition, as well as by an increase in the number of adipocytes. Obese adipose tissue is also characterized by increased numbers of infiltrating macrophages. Although the adipocyte has generally been regarded as a storage depot for fat, it is also an endocrine cell that releases numerous molecules in a regulated fashion. These include the



energy balance regulating hormone leptin, cytokines such as tumor necrosis factor (TNF)- $\alpha$  and interleukin (IL)-6, complement factors such as factor D (also known as adipsin), prothrombotic agents such as plasminogen activator inhibitor I, and a component of the blood pressure-regulating system, angiotensinogen.

## G) MANAGEMENT OF OBESITY

*Vaatghnanyannapanani Shleshma-Medo-Harani Cha* |

*Rukshoshna Bastaysteekshna Rukshanyudvartanani Cha* ||<sup>[20]</sup>

1} *Charakacharya* quotes for reducing the bulk of the obese heavy and non saturating therapy is prescribed. Food and drinks allevating Vata and reducing *Kapha* and *Meda*, *Ruksha*, *Ushna* and *Teekshna Basti*, *Ruksha Udvartana* (Rough Anointing), Use of *Guduchi*, *Devdaru*, *Musta*, *Trifala*, *Takrarishta* and *Madhuis* recommended in treatment of obesity.

2] *Acharya Sushruta* quoted use of *Shilajatu*, *Guggulu*, *Gomutra*, *Trifala*, *Lohachurna*, *Rasanjana*, *Yava*, *Mudga*, *Koradusha*, *Shyamaka*, *Uddalaka* etc *Virukshanakari*, *Chedana* (causing depletion of *Meda*, *Kapha*) substances, appropriate use of *Lekhana Basti*, *Vyayama*.<sup>[21]</sup>

3} *Ashtangasangraha* *Vagbhata* quoted *Vataghna Annapana*, *Kapha-Medahara* food substances like *Kulattha*, *Yavaka*, *Yava*, *Jurna*, *Shyamaka*, *Mudga*, *Arishtapana*, *Madhudaka* (Honey mixed with water), *Mastu*, *Takra* etc consumption, use of drugs having *Teekshna*, *Ushna*, *Ruksha*, *Chchedi Guna*. *Chinta*, *Vyayaya*, *Vyayama*, *Shodhana*, *Aswapana* (night evil), *Ruksha Snana*, *Udvartana* in management of obesity<sup>[22]</sup>.

Modern Science focuses more precisely management of obesity it is as follows<sup>[23]</sup>,

## 1) LIFESTYLE MANAGEMENT

Obesity care involves attention to three essential elements of lifestyle: dietary habits, physical activity, and behavior modification. Because obesity is fundamentally a disease of energy imbalance, all patients must learn how and when energy is consumed (diet), how and when energy is expended (physical activity), and how to incorporate this information into their daily lives (behavioral therapy). Lifestyle management has been shown to result in a modest (typically 3–5 kg) weight loss when compared with no treatment or usual care.

## 2) DIET THERAPY

The primary focus of diet therapy is to reduce overall calorie consumption. The calorie deficit can be instituted through dietary substitutions. Examples include choosing smaller portion sizes, eating more fruits and vegetables, consuming more whole-grain cereals, selecting leaner cuts of meat and skimmed dairy products, reducing consumption of fried foods and other foods with added fats and oils, and drinking water instead of sugar-sweetened beverages. It is important that dietary counseling remain patient centered and that the goals set be practical, realistic, and achievable. The macronutrient composition of the diet will vary with the patient's preference and medical condition. The macronutrient composition will ultimately be determined by the patient's taste preferences, cooking style, and culture. Another dietary approach to consider is based on the concept of energy density, which refers to the number of calories (i.e., amount of energy)

a food contains per unit of weight. People tend to ingest a constant volume of food regardless of caloric or macronutrient content. Adding water or fibre to a food decreases its energy density by increasing weight without affecting caloric content. Examples of foods with low-energy density include soups, fruits, vegetables, oatmeal, and lean meats. Dry foods and high-fat foods such as pretzels, cheese, egg yolks, potato chips, and red meat have a high-energy density. Diets containing low-energy-dense foods have been shown to control hunger and thus to result in decreased caloric intake and weight loss.

### **3) PHYSICAL ACTIVITY THERAPY**

Although exercise alone is only moderately effective for weight loss, the combination of dietary modification and exercise is the most effective behavioural approach for the treatment of obesity. The most important role of exercise appears to be in the maintenance of the weight loss. The 2008 Physical Activity Guidelines for Americans [www.health.gov/paguidelines](http://www.health.gov/paguidelines) recommend that adults should engage in 150 min of moderate-intensity or 75 min a week of vigorous-intensity aerobic physical activity per week, performed in episodes of at least 10 min and preferably spread throughout the week. Focusing on simple ways to add physical activity into the normal daily routine through leisure activities, travel, and domestic work should be suggested. Examples include walking, using the stairs, doing housework and yard work, and engaging in sports. These exercise recommendations are daunting to most patients and need to be implemented gradually. Consultation with an exercise physiologist or personal trainer may be helpful.

### **4) BEHAVIORAL THERAPY**

Cognitive behavioural therapy is used to help change and reinforce new dietary and physical activity behaviours. Strategies include self-monitoring techniques (e.g., journaling, weighing, and measuring food and activity); stress management; stimulus control (e.g., using smaller plates, not eating in front of the television or in the car); social support; problem solving; and cognitive restructuring to help patients develop more positive and realistic thoughts about themselves. When recommending any behavioural lifestyle change, the patient should be asked to identify what, when, where, and how the behavioural change will be performed. The patient should keep a record of the anticipated behavioural change so that progress can be reviewed at the next office visit. Because these techniques are time-consuming to implement, their supervision is often undertaken by ancillary office staff, such as a nurse-clinician or registered dietician.

### **5) PHARMACOTHERAPY**

Adjuvant pharmacologic treatments should be considered for patients with a BMI  $\geq 30$  kg/m<sup>2</sup> or for patients who have concomitant obesity-related diseases and for whom dietary and physical activity therapy has not been successful a BMI  $\geq 27$  kg/m<sup>2</sup>. Medications for obesity have traditionally fallen into two major categories: appetite suppressants (anorexiant) and gastrointestinal fat blockers. Appetite-suppressing medications have primarily targeted three monoamine receptor systems in the hypothalamus: noradrenergic, dopaminergic, and serotonergic receptors. Two new appetite suppressants were approved by the U.S. FDA in 2012: lorcaserin and phentermine/topiramate PHEN/TPM extended re-

lease. Gastrointestinal fat blockers reduce the absorption of selective macronutrients, such as fat, from the gastrointestinal tract. Among the anorexiant, phentermine has been the most commonly prescribed; there is limited long-term data on its effectiveness.

## 6) SURGERY

Bariatric surgery can be considered for patients with severe obesity BMI,  $\geq 40$  kg/m<sup>2</sup> or for those with moderate obesity BMI,  $\geq 35$  kg/m<sup>2</sup> associated with a serious medical condition.

Weight loss surgeries have traditionally been classified into three categories on the basis of anatomic changes: restrictive, restrictive-malabsorptive, and malabsorptive. More recently, however, the clinical benefits of bariatric surgery in achieving weight loss and alleviating metabolic comorbidities have been attributed largely to changes in the physiologic responses of gut hormones and in adipose tissue metabolism. The mortality rate from bariatric surgery is generally  $< 1\%$  but varies with the procedure, the patient's age and comorbid conditions, and the experience of the surgical team. The most common surgical complications include stomal stenosis or marginal ulcers occurring in 5–15% of patients that present as prolonged nausea and vomiting after eating or inability to advance the diet to solid foods. These complications typically are treated by endoscopic balloon dilation and acid suppression therapy, respectively.

## H) PATHYA- APATHYA<sup>[24]</sup>

### A) Pathya in Sthaulya

Following substances are useful in Sthaulya

*Anna varga, PuranaShali, Raktashali, Shasthikashali, Yava, Chanaka, Kulatha, ShrutaSheetaJala, PanchkolashrutaJala, Shunti siddha jala, Madhu, PuranaSidhu, Gomutra, Lasuna, Ardraka, Sunthi, Takra, Shakavarga, Patola, Karavellaka, Varthaka, Nimbapatra. Shigru, JangalaMamsa*

### B) Apathya in Sthaulya

Following substances are to be prohibited in Sthaulya

*Masha, Taila, DushitaJala, SheetaJala, NutanaMadya, Aluka, Dadhi, Ksheera, GudaAnupaMamsa, Ahara having Guru Snigdha, Ati Drava, Picchila and AbhishyandiGuna*

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