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## HEFT AND HEALTH: UNDERSTANDING OVERWEIGHT AND OBESITY IMPACT AND CRAFTING EFFECTIVE INTERVENTIONS

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### ABSTRACT:

Obesity has become a notable public health concern globally, particularly in the group of children and adolescents. This article dealt with the etiopathogenesis, signs and symptoms of obesity, considering individual and socioeconomic factors. The role of diet, sleep deprivation, physical inactivity, genetics, and pregnancy in obesity. Socioeconomic factors with education, household income, and employment patterns. signs and symptoms of obesity, as well as its health risks, are explored. It delves into pharmacological treatments for obesity, including medications and bariatric surgery. Non-pharmacological approaches, including dietary changes, exercise, yoga, and behavioural interventions, are emphasised. Patient counselling strategies, including the adoption of a carbohydrate-restricted diet, increased protein intake, and avoidance of calorie-dense beverages, are recommended. Overall, the article provides a comprehensive overview of the multifaceted factors contributing to obesity and offers insights into various interventions that can be employed for effective management and prevention.

**Keywords:** Obesity, Health risks, Patient counseling, Behavioural interventions, Obesity management and prevention

## 1. INTRODUCTION

Obesity is a major public health concern and is correlated with both physical and mental health consequences [Marie *et al.*, 2013]. The obesity rate has become greater significantly during the last decennary in many countries among children and adolescents [Musa *et al.*, 2016]. WHO roughly calculate that by 2025, approximately 167 million people will become unhealthy because of obesity. The major health problem i.e, frequently accompanied by depression and anxiety as well as physiological eating style such as emotional eating , addictive eating and binge eating is obesity. In the contemporary, obesity is connected with copious factors increasing the cortisol production, such as intake of food with high carbs content, dreadful stress and change in sleep cycle [Singh *et al.*, 2021]. The United States National Centre for Health Statistics intimates that almost 15% of adolescents are obese or overweight, and therapy is complicated in adults [Sebastian and Parlee *et al.*, 2013]. Person who become obese forward in life face lifelong health, dietary as well as intellectual challenges [Kelder *et al.*, 1994 ; Pastore *et al.*, 1996]. The American Heart Association has outlined findings from various smaller-scale studies indicating a direct correlation between severe obesity and heightened immediate risks concerning weight-related complications. These studies observed associations between severe obesity and conditions such as abnormal lipid profiles, elevated blood glucose levels, and increased blood pressure [Demeranth *et al.*, 2003]. Obesity is ubiquitous in impoverished socioeconomic communities and in racial population and so the inspection of higher Mortality and Morbidity in these population can be described partially through Immune dysregulation secondary to surplus adipose tissue [Kelly *et al.*, 2013].

The incidence of high rates of obesity and persistence in younger adults highlights the importance and necessity for preventive Measures in Adults and thus, reducing its prevalence in adulthood. A recent survey suggested that by the year 2030 roughly 2.26 billion adults will hurt from being overweight and 1.12 trillion suffer from obesity. Obese children and young adults exhibit a higher propensity for the accumulation of cardiovascular disease risk factors. These factors include dyslipidemia, hypertension, an increase in left ventricular mass, type 2 diabetes mellitus, and elevated fasting as well as post-load insulin levels, as highlighted in reports from the World Health Organization (WHO) [Smoak *et al.*, 1987]. The WHO further emphasises that health risk behaviours originating during adolescence, such as unhealthy eating practices, contribute significantly to the burden of adult diseases. Some reports have shown that pubescent who consume breakfast on a regular basis are probably to have a lower body mass index (BMI), and thus are at lower risk for obesity contract to those who skip breakfast [Ogden *et al.*, 2006; Gleason *et al.*, 2009].

## 2. ETIOPATHOGENESIS:

### (1) Individual Factors

#### b) Diet

Historically, the emphasis has consistently been on the balance between caloric consumption and disbursement for weight maintenance or healthy growth [Hill *et al.*, 2012]. Even today, most favoured and clinical weight management and get fit methods primarily prioritise caloric restriction [Hruby *et al.*, 2014]. Clinical trials have provided overwhelming evidence that caloric restriction, regardless of the specific dietary pattern, consistently leads to improved weight outcome [Wadden *et al.*, 2012].

In this modern era, the children and adolescents consumption of processed foods highly put up to the overweight of juvenescence children in India from 9.7% to 13.9% over the past decade [Singh *et al.*, 2021]. Excessive intake of frizzled foods and artificially sweetened

beverages is directly associated with elevated BMI and childhood obesity. Diets with increased amounts of junk foods have puny quantities of nutrients [Goel *et al.*, 2013]. Consumption of fast food is linked to increased weight and waist circumferences, higher insulin resistance stores, higher plasma triglyceride levels and lower high density LDL level [Duffey *et al.*, 2009].

### c) Sleep deprivation

Increasing proof from both laboratory and epidemiological research designate that inadequate sleep duration is emerging as a novel insecurity for obesity evolution and its associated complications [Morselli *et al.*, 2010; Knutson *et al.*, 2010]. Lack of sleep correlates with obesity not only to habitual behaviour but also to pathological conditions like obstructive sleep apnea (OSA) that lead to disrupted sleep [Beccutia *et al.*, 2011]. An endocrine disruption (hormonal imbalance) within the body, causing an inclination towards excessive food intake and subsequent weight gain. Leptin and ghrelin, being key appetite-regulating hormones, undergo alterations in their production in inadequate sleep resulting in heightened sensations of hunger. This augmented appetite tends to lead to a rise in caloric consumption and, consequently, weight gain. As stated by the National Health and Nutrition Examination Survey (NHANES), adults who Documented that an average falls below 7 hours of sleep per night exhibited significantly higher rates of obesity [Gangwisch, *et al.*, 2005]. Obtaining a minimum of 7 hours of sleep is essential for effectively addressing the challenges associated with obesity.

### d) Physical activity

Obesity or increased BMI, the most common and important health issue which is related to physical inactivity. [Blair, *et al.* 2012] Obesity and physical activity in connection leads to inflammation and relates to depression [Anna *et al.*, 2015]. Morbidity and mortality rates were increased in connection to physical inactivity and obesity. Increased prevalence of certain diseases in association with obesity, which is the risk factor of cardiovascular disease which causes adverse impact on CV structure and their function. The risk factor can be reduced by performing physical activity (PA), exercise training (ET) and cardiorespiratory fitness (CRF). In addition to this PA/ET and CRF also leads to the alteration in connection between adiposity and succeeding major cardiovascular disease outcomes [Lavi *et al.*, 2019]

### e) Genetics

Genetic components takes part in a vital role in deciding individual liable to weight gain and obesity [Dijk, *et al.* 2015]. It is evident that there is a persistent alteration in the epigenome due to the environmental exposures during early life which results in increased risk of obesity [Dijk *et al.*, 2015]. The authors have found various genetic variants causing greater adiposity and obesity. Epigenomics involves the procedure through which in utero aid can produce genetic changes or heritable changes in adiposity, which is due to the histone alteration at specific genomic size chains to several pathologies, obesity and type 2 diabetes [Long *et al.*, 2019; Koyuncuoğlu *et al.*, 2015] One of the most frequent single gene effects causing children or paediatric weight gain is melanocortin 4 receptor defect which is responsible for the early onset of paediatric obesity [Ramachandrapa *et al.*, 2011].

Obesity is the demonstration of several genomic syndromes namely prader willi syndrome, Bardet biedl syndrome, Alstrom syndrome and Wagr syndrome [Farooqi *et al.*, 2006]. Heritable traits of obesity and diabetes which are due to the interaction of multiple genes continue to rise worldwide and lead to serious health issues. Candidate gene and genome

wide linkage studies were the most prominent genetic epidemiological approaches to determine the genetic loci for obesity [Vimalaswaran et al., 2010]. In common obesity there is an estimation of 40 - 70% genetic contribution to interindividual variation [Loos and Klein et al., 2009].

#### **f) Pregnancy**

The prevalence and potential adverse impact of obesity in pregnancy have emerged as significant challenges in obstetrical care, warranting focused attention due to their profound implications on both maternal and fetal well-being [Vithar et al., 2019]. The escalating global prevalence of obesity among reproductive-aged women underscores its substantial role as a contributor to maternal and perinatal morbidity, necessitating heightened awareness and attention [Giouleka et al., 2023]. Obesity exhibits a noteworthy correlation with gestational hypertension, preeclampsia, gestational diabetes mellitus, as well as cardiac and pulmonary diseases. This association significantly elevates the risk of requiring a caesarean section [Raichal et al., 2005; Davies et al 2010]. The International Federation of Gynaecology and Obstetrics, the Society of Obstetricians and Gynaecologists of Canada, the Royal College of Obstetricians and Gynaecologists, and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists emphasise the imperative for healthcare facilities to ensure the availability of specific equipment and adequate resources for the comprehensive management of obese pregnant women [Vithar et al., 2019].

It is recommended to calculate BMI based on pre-pregnancy height and weight. Obese pregnant women should receive counsel acknowledging their heightened susceptibility to medical complications [Davies et al 2010]

### **SOCIOECONOMIC FACTORS**

#### **a) Education**

Various theories have been proposed to elucidate the robust correlation between education and obesity. Kemna have indicated that individuals with higher levels of education exhibit greater proficiency in comprehending and utilising health-related information compared to those with lower levels of education [Kemna et al., 1987]. Furthermore, the absence of education concerning the energy content of foods has been posited as a contributing factor to the influence of socioeconomic status on obesity [Speakman et al., 2005].

Cutler and Lleras-Muney discovered that individuals with more period of schooling demonstrate a reduced likelihood of engaging in detrimental behaviour such as smoking, excessive drinking, overweight or obesity, or illicit drug use. Moreover, they exhibit a higher propensity for engaging in physical exercise and seeking preventive medical care. Yoon proposed that individuals with higher educational attainment possess the awareness necessary to cultivate healthy lifestyles and exhibit heightened awareness regarding the health risks connected with obesity [Yoon et al., 2006].

#### **b) Household Income**

The disparity between energy consumption and expenditure is responsible for obesity occurrence [Tafreschi 2015]. The lack of choice of eating due to lack of knowledge are the factors among the low income obese individuals [Mattson et al., 2011]. Overeating of junk foods and sedentary lifestyle contribute a major part in the incidence of obesity regarding high income individuals [Lipek and Igel 2015]. Financial stress often becomes a catalyst for emotional eating and unhealthy coping mechanisms, ultimately playing a role in the development of weight gain and obesity [Romieui, et al., 2017].

## **PARENTERAL EMPLOYMENT**

### **(a)Disrupted circadian rhythm**

Working night shifts can disrupt the body's natural circadian rhythms, leading to irregular sleep patterns and hormone imbalances that may contribute to weight gain [Taheri *et.al.* 2004].

Duration of sleep and quality of sleep implicates obesity. Arora.t and Omar. om conducted a study that incorporate 522 patients with nearly identified type two diabetes mellitus,There was a positive correlation observed between the average number of night awakenings and body mass index(BMI) [Arora and ,Chen 2016]

### **(b)Poor dietary habits**

Night shift workers might find their choices for nutritious meals somewhat restricted, leading to increased consumption of convenient, processed and calorie dense foods which can contribute to obesity[ Boudreau *et.al.* 2014].

### **(c)Reduced physical activity**

Obesity arises due to reduced physical activity and sedentary lifestyle by Night Shift workers during non working hours .They experience fatigue and lack of energy[ Koski and Pietinen 2002].

### **(d)Altered metabolism**

Kolterman and Insel conduct a study that suggest irregular eating schedules and nighttime eating may negatively affect metabolism and insulin sensitivity, potentially increasing the risk of obesity[Kolterman and Insel 1980].

### **(e)Psychological stress**

The connection between stress and obesity is often fueled by stress-induced eating, whether it leads to increased consumption or unhealthy food choices. Stress can also impact activity levels, either by reducing physical activity or promoting sedentary behaviours [Sternthal and Slopen 2011].

## **3.SIGNS AND SYMPTOMS OF OBESITY**

Obesity is due to the buildup of surplus fat on the body, which is characterised by having a body mass index (BMI) exceeding 30.Symptoms and complications of obesity as well as health risks includes[Christiansen 2022], [Xu and Xue 2015].

- 1) Adipose tissue accumulations (potentially discernible in the breast region)
- 2) Striae on the hips and dorsal area
- 3) Acanthosis nigricans
- 4) Dyspnea upon exertion
- 5) Obstructive sleep apnea
- 6) Gastrointestinal constipation
- 7) Gastroesophageal reflux disease (GERD)
- 8) Diminished self-confidence
- 9) Precocious puberty in biological females/late bloomer in cisgender
- 10) Orthopaedic ailments, e.g., pes planus or hip dislocation.
- 11) Coronary heart disease.
- 12) Prostatic adenocarcinoma and colorectal cancer in men.
- 13) Uterine and breast carcinoma in women.
- 14) NIDDM Diabetes in children.

- 15) Hepatic and cholecyst problems.
- 16) Hypertension
- 17) Hyperlipidemia
- 18) Stroke
- 19) Osteoarthritis
- 20) Pain in knees and lower back .

### **PHARMACOLOGICAL TREATMENT:**

Pharmacotherapy can be a practicable option for patients with overweight. or obesity who may not qualify for operation. pharmacotherapy in general is for use as an supportive treatment to lifestyle lifestyle intervention. There are various medicinal options available for the management of obesity in clinical practice - includes lifestyle, modification, bariatric surgery and therapeutic measures that permits health care practitioners to customise treatment to the specific needs and preferences of the particular patient [Patel 2015].

In paediatrics, the drug therapy options for the treatment are very insufficient. Hence it is difficult to establish a supervision program that provides an adequate nourishment exercise and behaviour alterations.Orlistat which is an appetite suppressor, and Sibutramine, which is an git lipase inhibitor are mainly for the treatment of obesity in paediatric groups, approved by FDA.Significant weight loss results of the resolution of multiple co occurring conditions, such as type 2 diabetes mellitus, highly Blood Pressure, and obstructive sleep apnea and recommended for subjects who has not achieved the reduction of weight goal due to co-morbidities and failure in lifestyle alteration. Octreotide, which is sold under the brand-name Sandostatin is provided in the treatment of hypothalamic obesity, and also proven to inhibit insulin and stabilise body weight, Body Mass Index [Overweight and obesity in children and adolescents 2014].

Medications presently approved for long-term management of obesity-includes.Orlistat, lorcaserin and combination of phentermine topiramate extended release. Also some adrenergic drugs are also available for short term use. Orlistat, the acts by blocking the absorption of fat, causes certain adverse effects, including diarrhoea, oily spotting, and intestinal cramps. Loreaserin is a serotonin 2c receptor agonist and is thought to assist reducing weight by reducing appetite and promoting satiety, Whereas phentermine is an anorexic and topiramate is an anticonvulsant thought to have an appetite suppressant activity. Lorcaserin is expected to cause certain adverse effects, including headache, dizziness, fatigue, nausea, xerostomia, and constipation. Phenteramine/ topiramate Extended Release causes increased heart rate, birth defects, tingling of hands, feets and insomnia. Metformin is also considered in the presence of clinical significant insulin resistance. Many randomised controlled trials have treatment options in women with Poly Cystic Ovarian Syndrome. Metabolic surgery is the most definitive and enduring form of weight loss treatment. While going through the procedures of bariatric surgery, patients must understand the preoperative complications including the risk of death. a proper diet and regular exercise habits are essential following bariatric surgery [Philadelphia et al 2013].

### **NON PHARMACOLOGICAL TREATMENT OF OBESITY**

1. The primary emphasis in managing obesity is on the dietary approach, which aims to lower overall calorie consumption [Doshi and Jogsan 2012].

2. Food items with low energy and fat content, such as soups, fruits, vegetables, oatmeal, and lean meats, are recommended high-fat foods like cheese, egg yolks, fatty cuts of meat, potatoes, and red meat should be eliminated from the diet [Nautiyal *et.al.* , 2016],
3. Engaging in regular yoga and meditation practices enhances self-awareness and self-control, aiding in problem-solving and dietary management [Pi-Sunyer *et.al.*, 2002].
4. Various yogic postures contribute to optimal organ function, hormone regulation, emotional well-being, proper blood circulation, and sufficient oxygen supply [Pi-Sunyer *et.al.*, .2002].
5. Numerous frequently employed behavioural tactics encompass the self regulating of both eating patterns and physical activity levels [Pi-Sunyer *et.al.* .2002].

## DIAGNOSIS

The commonly used diagnostic test to assess overweight is body mass index which is calculated by dividing a weight of the person by the square of their height. The person is considered as obese when their body mass index is 30 or above [Keys and Fidanza 1972].

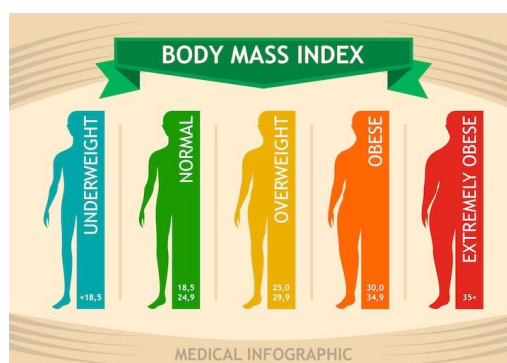
Waist to hip ratio is another diagnostic test to indicate obesity in which the abdominal fat is measured. The value of waist circumference for men is 102cm and for females is 85cm [Clinical Guidelines on the Identification, 1998].

Skinfold thickness and waist to hip ratio are the additional measures to evaluate body fat distribution [Bray and, DeLany 2002].

Obesity is diagnosed based on bmi classification such as [Steinberger and Jacobs 2006].

### WHO classification of weight status:

BMI	Weight status
Below 18.5	Underweight
18.5-24.9	Normal weight
25.0-29.9	Overweight
30.0-34.9	Obesity class I
35.0-39.9	Obesity class II
Above 40	Obesity class III



### PATIENT COUNSELING [Sheer et.al. 2023].

1. Patients are advised to follow a carbohydrates restricted diet which promotes weight loss, fat loss.
2. Should consume foods with low fat content.
3. Consuming large quantities of proteins during the treatment of obesity results in tremendous effect in weight loss.
4. Low carbohydrate Diet (High fat, low carbohydrate with appropriate protein content and calories) can be followed which plays a promising role in obese patients.

5.lack of physical activity seems to be the major cause of obesity hence the patient should be advised to exercise daily which not only plays a role in their physical health but also their mental health.

6.consumption of dietary supplements helps in reducing excess body weight.

7.patients should be advised on limiting the intake of beverages high in calories, fat, sugar and sodium

8.Patients should read the food labels before consumption to know whether the food contains the proper amount of fats,calories, proteins etc.

9.should educate patients to limit foods at restaurants,and to select healthy eating options (more veggies,fruits).

### 3. CONCLUSION:

The extensive exploration of obesity's multifaceted nature and its implications has highlighted the urgency for comprehensive interventions. Addressing individual factors like diet, sleep, physical activity, genetics, and pregnancy, alongside socioeconomic elements such as education, income, and employment, forms a critical approach. The article underscores the impact of these factors on obesity's aetiology, ranging from hormonal imbalances to societal disparities.

Furthermore, it stresses the necessity for tailored interventions, including pharmacological treatments and non-pharmacological approaches like dietary changes, exercise, yoga, and behavioural modifications. Patient counselling strategies highlighted the importance of a carbohydrate-restricted diet, increased protein intake, avoidance of calorie-dense beverages, and vigilance regarding food labels.The holistic overview presented in the article underscores the pressing need for a multifaceted approach to address obesity at individual, societal, and medical levels, emphasising prevention, intervention, and ongoing management strategies.

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