**CURRENT SCENARIO OF OBESITY**

Mrs. ANITHA D

Department of Medical Laboratory Technology

School of Allied Health Sciences, Vinayaka Mission

AVMC & H Campus

Puducherry, India

anithaslims@gmail.com

**ABSTRACT**

The excessive or abnormal buildup of fat or adipose tissue in the body, which has the potential to harm health, is called obesity. Over the past 50 years, the epidemic of obesity has gotten worse. The financial burden is thought to be around $100 billion each year in the United States. The etiology of obesity is multiple, making it a complex condition. After smoking, it is the second most frequent avertable cause of mortality. Reviewing obesity's etiology, pathophysiology, manifestations, and problems, this activity emphasizes the importance of the interprofessional team in managing the condition.

**Keywords :**Body Mass Index, Waist hip Ratio, Diabetes Mellitus, Hypertension,
Hyperlipidemia, Prader Willi syndrome, MC4R syndromes , Bardet-Beidl syndrome, Alstrom syndrome, Renin-angiotensin System, Intra Abdominal Pressure

1. **OBJECTIVES**

Recall the obesity epidemiology.

Why is obesity pathophysiological?

Give a brief overview of obesity treatment options.

In order to improve outcomes for individuals impacted by obesity, examine methods to enhance care coordination among inter professional team members.

1. **INTRODUCTION**

Obesity is the excessive or abnormal buildup of fat or adipose tissue in the body, which has a negative impact on health due to its link to the risk of diabetes, heart disease, hypertension, and hyperlipidemia. It is a serious epidemic of public health that has gotten worse over the past 50 years. The etiology of obesity is multiple, making it a complex condition. After smoking, it is the second most frequent avertable cause of mortality. Treatment for obesity should be multifaceted and may last a lifetime. A 5% to 10% weight loss can greatly improve a person's health, quality of life, and financial burden both personally and nationally [1-5]

The body mass index (BMI) is used to define obesity, which is calculated as weight (kg) / height 2 (m). While the BMI does correlate with body fat in a curvilinear fashion, it may not be as accurate in as Asians and elderly people, where a normal BMI may conceal underlying excess fat.  Obesity can also be estimated by assessing skin thickness in the triceps, biceps, subscapular and supra-iliac areas

1. **ETIOLOGY**

An imbalance between daily energy intake and expenditure that causes excessive weight growth is what causes obesity. A variety of genetic, socioeconomic, and cultural variables all contribute to obesity, which is a complex disease. Numerous genes have been linked to adiposity and weight growth, demonstrating the high heritability of obesity. Reduced physical activity, sleep disorders, endocrine issues, medications, the availability and intake of excessive amounts of carbohydrates and high-sugar foods, and slowed energy metabolism are some other reasons of obesity.

The Prader Willi syndrome and MC4R syndromes are the two syndromes most frequently linked to obesity, while fragile X, Bardet-Beidl syndrome, Wilson Turner congenital leptin insufficiency, and Alstrom syndrome are less frequently linked.

1. **EPIDIMIOLOGY**

Data from the Centers for Disease Control and Prevention (CDC) show that 1 in 5 teenagers, 1 in 6 primary school-aged children, and 1 in 12 preschoolers are fat.

**PATHOPHYSIOLOGY**

In turn, this leads to diabetes, stroke, gallstones, fatty liver, obesity hypoventilation syndrome, sleep apnea, and malignancies. Obesity is also linked to cardiovascular disease, dyslipidemia, and insulin resistance.

Adipocyte hormone leptin lowers calorie intake and body weight. Obesity and cellular leptin resistance are related. Adipose tissue releases adipokines and free fatty acids that lead to systemic inflammation, insulin resistance, and elevated triglyceride levels, all of which are factors in the development of obesity.

Obesity can cause increased fatty acid deposition in the myocardium causing left ventricular dysfunction. It has also been shown to alter the renin-angiotensin system causing increasing salt retention and elevated blood pressure.

Besides total body fat, the following also increase the morbidity of obesity:

* Waist circumference (abdominal fat carries a poor prognosis)
* Fat distribution (Body Fat Heterogeneity)
* Intra-abdominal pressure
* Age of onset of obesity

When evaluating the danger to cardio metabolic health, the body fat distribution is crucial. Cardiovascular disease risk is expected to rise as a result of the distribution of excess visceral fat. [6][7][8] The idea of metabolic obese normal weight (MONW) persons with normal BMI experiencing metabolic problems often seen in obese people was first proposed by Ruder man et al. [9].

Individuals with a BMI exceeding 30 kg/m2 who are metabolically healthy obese (MHO) do not exhibit the symptoms of insulin resistance or dyslipidemia. [10][11]

It has been demonstrated that adipocytes exhibit prothrombotic and inflammatory activities, which can raise the risk of strokes. In addition to adipocytes and preadipocytes, macrophages that have invaded the tissue as a result of obesity also create adipokines. [12][13].

Chronic low-grade inflammation brought on by abnormal adipokine production may affect glucose and lipid metabolism and raise the risk of cardio metabolic disease in visceral obesity. [12]

Because of its ability to reduce inflammation and increase insulin sensitivity, circulating levels of adiponectin are inversely correlated with visceral adiposity.

1. **HISTORY AND PHYSICAL**

Physicians should thoroughly examine patients for underlying conditions that contribute to obesity. An exhaustive history should contain:

History of childhood weight

Previous weight loss attempts and outcomes

Whole history of nutrition

Sleep habits

Past medical histories related to physical activity such as cardiovascular, diabetes, thyroid, and depression

Surgical background

Medicines that may cause weight gain

Social contexts of alcohol and cigarette use

Family background

Complete inspection of the body Measurements of body mass index (BMI), weight circumference, body habit, and vital signs should be performed.

1. **EVALUATION**

Weight in kilos divided by the square of height in meters is used to determine BMI.[14][15][16][17][18] BMI can be used to categorize obesity:

* 18.5 kg/m2 is considered underweight.
* 18.5 kg/m2 to 24.9 kg/m2 is considered normal.
* 25 kg/m2 to 29.9 kg/m2 or more overweight
* Class I obesity ranges from 30 kg/m2 to 34.9 kg/m2.
* Class II obesity ranges from 35 kg/m2 to 39.9 kg/m2.
* Class III obesity: greater than 40 kg/m2

Waist hip ratio should be measured, in men more than 1:1 and women more than 0:8 is considered significant

CBC basic metabolic panel, renal function, liver function study, lipid profile, HbA1C, TSH, vitamin D levels, urinalysis, CRP, as well as additional tests like ECG and sleep studies, can all be performed as part of a laboratory examination to assess any underlying medical issues.

1. **TREATMENT AND MANAGEMENT**

Multiple comorbid and chronic medical disorders are brought on by obesity; therefore treating it requires a multifaceted strategy from doctors. Practitioners should focus on treating or controlling associated comorbid conditions, individualize treatment, and address underlying secondary causes of obesity. Dietary changes, behavioral therapies, medication, and, if necessary, surgical intervention should all be part of the management plan.

The dietary modification should be individualized with close monitoring of regular weight loss. Low calorie foods may include fewer carbohydrates or fats. In the first few months, a low-carb diet can lead to more weight loss than a low-fat diet. The importance of the patient sticking to their diet should be highlighted constantly.

**Medication**: BMI larger than or equal to 30 or BMI greater than or equal to 27 with comorbidities may be treated with anti-obesity drugs. It is possible to combine medication with behavior, nutrition, and exercise changes. Diethylpropion, orlistat, lorcaserin, liraglutide, phentermine/topiramate, naltrexone/bupropion, and phendimetrazine are some of the anti-obesity drugs that have received FDA approval. To manage weight over the long run, every agent is utilized.

**Surgery**: It is indicated when a patient has a BMI of at least 35 and severe concomitant conditions, or a BMI of at least 40. The patient needs to follow post-surgery lifestyle recommendations, doctor appointments, and exercise regimens. Prior to surgery, patients should receive a thorough assessment of the surgical risks. The Rou-en-Y gastric bypass, the adjustable gastric band, and the sleeve gastrectomy are all frequently used bariatric procedures. The most often used treatment, a gastric bypass, can result in rapid weight loss. Leaks, infections, postoperative bleeding, thrombosis, and cardiac events are examples of early postoperative problems. Malabsorption, vitamin and mineral deficiencies, refeeding syndrome, and dumping syndrome are examples of late consequences.[19][20][21]

Weight loss associated complications:

* anomalies in electrolytes, especially hypokalaemia
* cardiac irregularities
* Hyperuricemia
* Cholelithiasis
* Changes in behaviour and mood

Surgical complications following bariatric procedures:

* Strictures
* Dehiscence of a wound
* Ulcers
* Malabsorption
* Syndrome of dumping
* postoperative diarrhoea
* Deficiency in vitamins and nutrients
* leaks at the joints
* surgery gone wrong

Differential diagnosis:

* acromegaly,
* dolorosa ascites,
* obesity
* Cushing disease
* Hypothyroidism
* An intentional Cushing syndrome
* Insulinoma
* Idiopathic hypo gonadotropic hypogonadism and the Kallman syndrome
* omnipresent lipodystrophy
* Ovarian polycystic disease

**PROGNOSTICATION**

Huge morbidity and mortality rates are associated with obesity. Patients who are obese are at an increased risk for unfavorable cardiac events and stroke. In addition, life is of terrible quality. The following factors worsen morbidity:

* Age of obesity onset
* the degree of central obesity
* Obesity severity
* Gender
* Concomitant comorbidity
* Race

**Enhancing Healthcare Team Outcomes:**

The obesity epidemic is becoming worse and is now a problem for public health. An interprofessional team composed of a bariatric nurse, surgeon, internist, primary care physician, endocrinologist, and pharmacist works well to manage and prevent obesity. There is no known treatment for obesity, and practically all of them have drawbacks and potential side effects.

The aim is to inform the patient of the significance of lifestyle modifications. It is the responsibility of every clinician who treats obese patients to inform them of the dangers associated with their conditions. If the patient is sedentary, no intervention will be effective. Exercise is still required even after surgery to prevent weight gain. There is currently no miracle cure for obesity; all avail, Treatments.

**References**

1. Saalbach A, Anderegg U. Thy-1: more than a marker for mesenchymal stromal cells. FASEB J. 2019 Jun;33(6):6689-6696. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30811954)]

2. Kozlov AI. [Carbohydrate-related nutritional and genetic risks of obesity for indigenous northerners]. Vopr Pitan. 2019;88(1):5-16. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30811129)]

3. Gowd V, Xie L, Zheng X, Chen W. Dietary fibers as emerging nutritional factors against diabetes: focus on the involvement of gut microbiota. Crit Rev Biotechnol. 2019 Jun;39(4):524-540. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30810398)]

4. Holly JMP, Biernacka K, Perks CM. Systemic Metabolism, Its Regulators, and Cancer: Past Mistakes and Future Potential. Front Endocrinol (Lausanne). 2019;10:65. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6380210/)] [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30809194)]

5. Akinkuotu AC, Hamilton JK, Birken C, Toulany A, Strom M, Noseworthy R, Hagen J, Dettmer E, Langer JC. Evolution and Outcomes of a Canadian Pediatric Bariatric Surgery Program. J Pediatr Surg. 2019 May;54(5):1049-1053. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30808540)]

6. Després JP, Nadeau A, Tremblay A, Ferland M, Moorjani S, Lupien PJ, Thériault G, Pinault S, Bouchard C. Role of deep abdominal fat in the association between regional adipose tissue distribution and glucose tolerance in obese women. Diabetes. 1989 Mar;38(3):304-9. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/2645187)]

7. Fujioka S, Matsuzawa Y, Tokunaga K, Tarui S. Contribution of intra-abdominal fat accumulation to the impairment of glucose and lipid metabolism in human obesity. Metabolism. 1987 Jan;36(1):54-9. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/3796297)]

8. Sparrow D, Borkan GA, Gerzof SG, Wisniewski C, Silbert CK. Relationship of fat distribution to glucose tolerance. Results of computed tomography in male participants of the Normative Aging Study. Diabetes. 1986 Apr;35(4):411-5. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/3956878)]

9. Ruderman NB, Berchtold P, Schneider S. Obesity-associated disorders in normal-weight individuals: some speculations. Int J Obes. 1982;6 Suppl 1:151-7. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/6749721)]

10. Bonora E, Kiechl S, Willeit J, Oberhollenzer F, Egger G, Meigs JB, Bonadonna RC, Muggeo M. Insulin resistance as estimated by homeostasis model assessment predicts incident symptomatic cardiovascular disease in caucasian subjects from the general population: the Bruneck study. Diabetes Care. 2007 Feb;30(2):318-24. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/17259501)]

11.Karelis AD, St-Pierre DH, Conus F, Rabasa-Lhoret R, Poehlman ET. Metabolic and body composition factors in subgroups of obesity: what do we know? J Clin Endocrinol Metab. 2004 Jun;89(6):2569-75. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/15181025)]

12. Ferrante AW. Obesity-induced inflammation: a metabolic dialogue in the language of inflammation. J Intern Med. 2007 Oct;262(4):408-14. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/17875176)]

13. Neels JG, Olefsky JM. Inflamed fat: what starts the fire? J Clin Invest. 2006 Jan;116(1):33-5. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1323268/)] [[PubMed](https://pubmed.ncbi.nlm.nih.gov/16395402)]

14. Mercado-Gonzales SI, Carpio-Rodríguez AN, Carrillo-Larco RM, Bernabé-Ortiz A. Sleep Duration and Risk of Obesity by Sex: Nine-Year Follow-Up of the Young Lives Study in Peru. Child Obes. 2019 May/Jun;15(4):237-243. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7613162/)] [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30810346)]

15. Shiozawa B, Madsen C, Banaag A, Patel A, Koehlmoos T. Body Mass Index Effect on Health Service Utilization Among Active Duty Male United States Army Soldiers. Mil Med. 2019 Oct 01;184(9-10):447-453. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30811530)]

16. Al-Nimr RI. Optimal Protein Intake during Weight Loss Interventions in Older Adults with Obesity. J Nutr Gerontol Geriatr. 2019 Jan-Mar;38(1):50-68. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30806592)]

17. Pasarica M, Topping D. An Evidence-Based Approach to Teaching Obesity Management to Medical Students. MedEdPORTAL. 2017 Dec 20;13:10662. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6338064/)] [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30800862)]

18. Walsh K, Grech C, Hill K. Health advice and education given to overweight patients by primary care doctors and nurses: A scoping literature review. Prev Med Rep. 2019 Jun;14:100812. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6374522/)] [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30805277)]

19. Ball W, Raza SS, Loy J, Riera M, Pattar J, Adjepong S, Rink J. Effectiveness of Intra-Gastric Balloon as a Bridge to Definitive Surgery in the Super Obese. Obes Surg. 2019 Jun;29(6):1932-1936. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30806915)]

20. Klebanoff MJ, Corey KE, Samur S, Choi JG, Kaplan LM, Chhatwal J, Hur C. Cost-effectiveness Analysis of Bariatric Surgery for Patients With Nonalcoholic Steatohepatitis Cirrhosis. JAMA Netw Open. 2019 Feb 01;2(2):e190047. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6484583/)] [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30794300)]

21. Monteiro JLGC, Pellizzer EP, Araújo Lemos CA, de Moraes SLD, do Egito Vasconcelos BC. Is there an association between overweight/obesity and dental implant complications? A systematic review and meta-analysis. Int J Oral Maxillofac Surg. 2019 Sep;48(9):1241-1249. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30792086)]

22. Barr AC, Lak KL, Helm MC, Kindel TL, Higgins RM, Gould JC. Linear vs. circular-stapled gastrojejunostomy in Roux-en-Y gastric bypass. Surg Endosc. 2019 Dec;33(12):4098-4101. [[PubMed](https://pubmed.ncbi.nlm.nih.gov/30805785)]