



## Life Style Management in Obesity

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### Abstract

Obesity is a multi-factorial disease and its prevention and management require knowledge of the complex interactions underlying it and adopting a whole system approach that addresses obesogenic environments within country specific contexts. The pathophysiology behind obesity involves a myriad of genetic, epigenetic, physiological, and macroenvironmental factors that drive food intake and appetite and increase the obesity risk for susceptible individuals. Metabolically, food intake and appetite are regulated via intricate processes and feedback systems between the brain, gastrointestinal system, adipose and endocrine tissues that aim to maintain body weight and energy homeostasis but are also responsive to environmental cues that may trigger overconsumption of food beyond homeostatic needs. The management of obesity and its associated complications has evolved in recent years, with a shift towards more definitive strategies such as bariatric surgery. This review encompasses the dietary, pharmacological and surgical strategies currently available for the management of obesity. The prevalence of obesity in India is increasing and ranges from 8% to 38% in rural and 13% to 50% in urban areas. Obesity is a risk factor for development of type 2 diabetes mellitus (T2DM), hypertension, dyslipidemia, coronary heart disease and many cancers. In Asian Indians excess abdominal and hepatic fat is associated with increased risk for T2DM and cardiovascular disease. There is higher risk for development of obesity related non-diseases at lower body mass index levels, compared to white Caucasian.

commonly classified by the body mass index 1 BMI is simple to calculate, but it does have its limitations where factors such as age, muscle mass and ethnicity can influence its relationship with bodyfat. Anthropometric measures such as skin fold thickness[1] waist circumference and waist-to-hip ratio are increasingly used to assess an individual's risk of obesity related conditions such as type 2 diabetes mellitus (T2DM) and cardiovascular disease.[2] The prevalence of obesity in India is increasing continuously and recent data shows that between 13% to 50% of the urban population and 8%– 38.2% of the rural population suffers from obesity.[3] Obesity is more commonly seen in women compared to men and is increasing in children and adolescents[4]. The state of Punjab (North India) has the highest prevalence of 30% in women and 22% in men.[5] The main contributors to this rise are adoption of sedentary lifestyle and consumption of energy dense foods.[6]. The increase in obesity has led to increase in associated comorbidities like T2DM, hypertension, dyslipidemia, coronary heart disease (CHD), non-alcoholic fatty liver disease (NAFLD), obstructive sleep apnea and certain cancers. The occurrence of multiple morbidities causes financial burden on the individual and the health care resources. Hence, it is important for physicians in India to diagnose and initiate early treatment to halt the progressive increase in body weight and development of comorbidities. In this article.

### I. Introduction

Obesity is defined by the World Health Organization (WHO) as an 'abnormal or excessive fat accumulation that presents a risk to health',



Fig 1. Obesity

### The Concept Of Obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A body mass index (BMI) over 25 is considered overweight, and over 30 is obese.

### TYPES OF OBESITY

There are three types of obesity.

- Class I obesity: BMI 30 to <35 kg/m<sup>2</sup>. [low risk]
- Class II obesity: BMI 35 to <40 kg/m<sup>2</sup>. [moderate risk]
- Class III obesity: BMI 40+ kg/m<sup>2</sup>. [high risk]

### Important of Management of Obesity

Being overweight or obese increases the risk of cardiovascular disease, diabetes, cancer, and musculoskeletal disorders, resulting in approximately 3 million deaths worldwide each year [1]. Westernized dietary patterns and a lack of physical activity are considered to be the primary causes. The origins of obesity can be traced back at least 25 000 years. In the Stone Age, in the Middle Ages, and in the 17th century overweight indicated prosperity, power, and fertility, but already Hippocrates described obesity as a disease in the Antiquity. Some say the obesity epidemic started in the 1900s, but history offers a wider perspective. Evidence of human obesity can be found in primitive art dating back to the Paleolithic era. 2500 years ago Hippocrates warned that sudden death was more common in naturally obese people than in lean people. Malcolm Fleming, a British physician, wrote that obesity can be called a disease because it interferes with the free exercise of the animal's functions and can shorten its lifespan. Secretary of the Royal College of Surgeons, London said that the increase in modern wealth and sophistication may have driven out the plague and the plague, but that introduced neuropathy and increased the incidence of obesity.

### World Health Organization adult body mass index classification

Classification	Body mass index (kg/m <sup>2</sup> )
Underweight	<18.5
Normal weight	18.5–24.9
Overweight	25.0–29.9
Obese class I	30.0–34.9
Obese class II	35.0–39.9
Obese class III	≥40

Table 1. WHO Adult Body Mass Index

### COMPREHENSIVE LIFESTYLE INTERVENTION FOR OBESITY: DIET, PHYSICAL ACTIVITY, AND BEHAVIOR THERAPY

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### Overview of Lifestyle Modification

An outstanding illustration of a thorough lifestyle intervention is the Diabetes Prevention Program (DPP). 14 A 7-kg weight loss intensive lifestyle programme, metformin, or a placebo were given to more than 3,200 overweight/obese patients with impaired glucose tolerance. During the first six months of the programme, there were 16 individual therapy sessions offered, and over the following four years, there was at least one visit every other month. Patients were told to follow a 1,200–2,000 kcal/d low-fat, calorie-reduced diet. The target for exercise was 150 minutes per week of aerobic activity. After an average of 2.8 years, participants who adopted a healthy lifestyle lost 5.6 kg on average.

### Diet

(6) The Obesity Guidelines advocate an energy deficit of 500 to 750 kcal/d, which could



typically be accomplished through prescribing 1,2 hundred to 1,500 kcal/d for ladies and 1,500 to 1,800 kcal/d for men.four This prescription need to yield a median lack of 0.five to 0.seventy five kg/wk. As referred to withinside the Obesity Guidelines,lots of diets may be included into way of life interventions, along with evidence- primarily based totally diets that limitation positive forms of foods (eg, excessive carbohydrate, excessive-glycemic value).four All diets, irrespective of macronutrient composition, will produce weight reduction if a constant caloric deficit is accomplished.This turned into proven through the 2-12 months POUNDS LOST (Preventing Overweight Using Novel Dietary Strategies) study, wherein all individuals in 4 organizations have been prescribed a 750 kcal/d deficit however have been informed to eat unique chances of protein, fats, and carbohydrate.18 Short- and long- time period weight losses did now no longer range considerably at any time a few of the 4 diets, allof which have been mixed with a way of life program.



Fig 2 Diet

#### Calories Restrictions

[7] By directly reducing calorie intake, one can also create a net energy deficit. Energy intake is capped at 800-1600 kcal/day for low-calorie diets and 800 kcal/day for very low-calorie diets (LCD and VLCD), respectively. When compared to LCDs, VLCDs produce better short-term weight loss results (-16.1 kg vs -9.7 kg, respectively). 18 The primary method of weight loss following VLCD is a reduction in total body fat (7.8% total body fat reduction after 6 months). 19 However, because to larger rebound weight gain (61% vs. 41%, respectively), the long-term advantages of VLCDs are less noticeable, and weight reduction figures are more equivalent to LCDs (-6.3% vs. -5%, respectively). long-term pattern of weight reduction with VLCDs, which is irrespective of its starting rate.

#### FOOD AND FRUITS FOR MANAGEMENT AND REDUCE THE OBESITY

Whole grain  
Brown  
Rice Brown  
Rice Apple  
Berries Orange  
Melon Kiwifruit

#### Exercise

[9] The second pillar of the basis for weight loss management is exercise and physical activity. Numerous studies have shown that engaging in regular physical activity and exercise helps people lose weight by simply using up more energy than they consume [16]. Exercise also enhances focus and concentration, elevates mood, lowers blood pressure, reduces visceral fat, and has many other beneficial benefits on health [16]. Regular exercise reduces mortality among obese people and lessens the risk of obesity-related diseases [36]. Exercise is a helpful intervention to enable weight loss, according to a Cochrane review [37]. Americans are making an effort; according to the most recent data, the proportion of persons 18 and older who engage in aerobic exercise and muscle-building activity has reached the Healthy People 2020 target.



Fig.3 Exercise

#### Physical Activity

[10] Through lifestyle modifications, patients are instructed to gradually increase their weekly physical activity to 150 to 180 minutes over the course of six months. 4,14,27 Regular exercises include brisk walking or other aerobic activities. Studies conducted over a short period of time (6 months) have indicated that compared to weight losses caused by diet alone or diet + exercise, physical activity alone only causes minor weight loss (1 to 2 kg) (8 to 10 kg). 28 However, given research suggesting that cardiorespiratory fitness may reduce CVD mortality, patients should be encouraged to improve their physical activity in the near term. 29 Regular aerobic exercise may lower blood pressure,



cholesterol concentrations, and visceral fat even in the absence of significant weight reduction, while also enhancing glycemic management.

## TREATMENT OF OBESITY

### BEST TREATMENT FOR OBESITY.

Patients with severe obesity who are motivated to lose weight but have been unsuccessful with the previously described approaches, should be advised about bariatric surgery.<sup>4</sup> This section provides an overview of the most frequently used operations (all of which are usually performed laparoscopically), along with their mechanisms of action, efficacy, benefits, and complications.<sup>[12]</sup> Roux-en-Y gastric bypass (RYGB) is considered the gold standard for weight loss surgery. It involves dividing the stomach to create a small gastric pouch in the upper fundus, which is anastomosed to a Roux limb of jejunum that bypasses 75 to 150 cm of small bowel, resulting in bypass of the majority of the stomach, the entire duodenum, and most of the jejunum, thereby restricting food and limiting absorption (Fig 4).<sup>60</sup> The procedure combines restrictive and malabsorptive mechanisms and produces a median loss of 31.5% of initial weight at 3 years.<sup>62</sup> The Swedish Obese Subjects (SOS) study revealed a sustained approximately 25% reduction at 10 years.<sup>63</sup> Complications of RYGB include anastomotic leakage, acute gastric dilatation, ulceration, nutritional deficiencies, and the dumping syndrome.<sup>4,61</sup> Thirty-day mortality rates are approximately 0.2%, with other serious complication rates of approximately 5%.<sup>4,64</sup>

**Types of metabolic and bariatric surgery.**  
**Adapted from Pories W.<sup>60</sup>**

### Sleeve Gastrectomy

[13] Sleeve gastrectomy (SG) was introduced in the United States in 2007 but is now the nation's most commonly performed bariatric surgery. It involves removing approximately 75% of the stomach, thus bypassing the gastric fundus and body.<sup>62</sup> In addition to its restrictive properties, SG accelerates gastric emptying and dramatically reduces ghrelin levels.<sup>65</sup> SG produces weight losses similar to or slightly smaller than RYGB.<sup>4,65,66</sup> In a 3-year RCT, Schauer et al<sup>66</sup> observed mean losses of 24.5% and 21.1% in patients who underwent RYGB versus SG, respectively, compared with 4.2% for patients who received medical therapy and lifestyle modification. Postoperative complications (ie, leakage and vomiting as a result of overeating)

are lower with SG than RYGB; however, mortality rates are difficult to compare because of their relatively low prevalence (< 1%).<sup>4,61</sup>

### Banding Adjustable Gastric

[14] Adjustable gastric banding (AGB) is the least invasive surgical procedure and involves placing an inflatable silicone band around the fundus of the stomach creating a small pouch.<sup>4,610</sup> Saline can be added or removed through a subcutaneous port to adjust the diameter of the band. This is a restrictive procedure, with no changes in gut anatomy or hormones. AGB results in median weight loss of approximately 15.9% of initial weight at 3 years.

[15] Complications include band erosions, slippage, port problems, wound infections, and acid reflux, often requiring a revision or repeat surgery. The mortality rate for surgery is close to zero.<sup>64</sup> Small weight losses and the need to eventually revise 40% or more of AGB procedure have led to a marked decrease in the use of this approach in the United States.<sup>61</sup> The best way to treat obesity is to eat a healthy, reduced-calorie diet and exercise regularly. To do this you should: eat a balanced, calorie-controlled diet as recommended by your GP or weight loss management health professional (such as a dietitian) join a local weight loss group. Patients with extreme obesity who want to lose weight but are having trouble doing so using the methods previously mentioned should be told about bariatric surgery. <sup>4</sup> This section gives an overview of the most popular procedures—all of which are often done laparoscopically—along with information on how they work, how effective they are, what advantages they have, and any potential drawbacks.

### [16] Price Regulation

[17] Fiscal measures to manipulate food and beverage prices are also important regulatory mechanisms that influence consumption patterns. Assuming consumers are price sensitive, higher prices for unhealthy foods discourage purchases, while lower prices for healthier products such as fresh vegetables and fruits encourage purchases. Most US states [10] and some European countries tax high-calorie foods and beverages at different rates. In a 2013 systematic review,

[18] the US penny tax on her SSB is estimated to raise about \$13 billion annually [10]. Additionally, taxes imposed on manufacturers may encourage them to readjust their products to reduce the calculated tax burden based on fat or sugar.





### **Promotion Regulation**

[16] Promotion of meals and liquids takes diverse forms, consisting of: tv advertisements; on-line and social media advertising via employer web sites and Facebook pages; product placement on tv, films, and video games; and licensing of characters, including a meals employer paying to apply an picture of Harry Potter on its cereal boxes. Calls for advertising regulations have targeted in particular on marketing and marketing geared toward youngsters on account that they lack reveal in in distinguishing industrial and non-industrial messages and in significantly judging advertisements [15]. Much of the priority approximately kid's publicity to 'junk meals' marketing and marketing has targeted on tv advertisements, in particular as very younger youngsters are an increasing number of uncovered to TV and videos. [16] An global look at of meals marketing and marketing in thirteen international locations throughout 5 continents found out that almost all of advertisements (67 %) in all international locations have been for meals with negative dietary profiles, with rapid meals meals, chocolate products, and confectionary objects on the pinnacle of the list [17]. Exposure to TV marketing and marketing is related to early life and adolescent obese and weight problems. An evaluation of six Western international locations concluded that the contribution of TV meals advertisements to early life weight problems is as excessive as 40 % within the U.S., nearly 30 % in Australia and nearly 20 % in Great Britain, Sweden and the Netherlands [18].

### **Place Regulation**

[18] Place-primarily based totally law might also additionally limitation the area wherein positive meals carrier institutions might also additionally behavior business. Regulations may additionally be searching for to govern the meals surroundings in places including faculties and daycares, fitness care facilities, exercise centers, and public carrier venues. The targets are to defend positive populations, including youngsters and the socio-economically deprived, from bad environments and to set examples for extra nutritious ingesting. Quick carrier eating place chains are locations which can be concern to growing law, consisting of regulations approximately wherein those institutions can be located, and the facts they should offer to their customers. Some neighborhood authorities rules manipulate the area and range of rapid meals chains. Foreexample, in 2008, the City of Los Angeles followed a one-12 months ban on new rapid meals eating places in South L.A., a community with a excessive occurrence of weight problems and a

heavy awareness of rapid meals outlets [30].

U.S. look at that tested 15 years of data "located a few guide for regulations focused on rapid meals eating places. Specifically, [the analysis adds] to scarce longitudinal proof that extra availability of chain rapid meals eating places might also additionally sell extra rapid meals intake in low-earnings groups" [31]. Chain meals carrier institutions in a few jurisdictions are required to put up calorie and nutrient facts on the factor of sale, a method known as menu labeling. In 2010, the U.S. places) to show calorie facts. Menu labeling is primarily based totally on the idea that presenting nutrients facts on the factor of sale will allow purchasers to make more healthy ingesting decisions. Studies of customer conduct indicate, however, that menu labels do now no longer have a giant effect on what many humans purchase and eat. A2011 systematic evaluate of research at the effect of menu labeling assessed them to be of various methodological best and pronounced that almost all of research did now no longer discover a statistically giant discount in energy bought because of menu labels [32]. Health-aware purchasers, consisting of individuals who nation they're on a food regimen to lose weight, can be much more likely to apply menu label facts to pick out lower-calorie options [33]. Menu labels can be extra powerful if they're mixed with facts approximately endorsed day by day power intake (e.g., "Most adults want approximately 2000 energy in line with day") or followed through visible cues approximately the relative healthfulness of menu objects.

### **People Regulation**

[19] A lot of the regulatory areas listed above are all indirectly concerned with changing people's behaviour, whether it be through price manipulation to alter purchasing patterns, labelling food products to provide information, or restricting access to less nutrient-dense foods and beverages in some environments. Most people oppose further government regulation of citizens' personal decisions regarding nutrition and exercise as an excessive intrusion into their private life. Jethro Brown, a legal scholar, made the following observation about the role of the government in matters of public health more than a century ago:

### **Medicine for obesity**

The goal of obesity medicine is to enhance the health of people who are obese. It covers a wide range of subjects, including nutrition, psychology, exercise, drugs, when to think about having bariatric surgery, and the diagnosis and treatment of



problems linked to obesity. To keep their certification, doctors who specialise in this field must pass a subspecialty board test and complete ongoing education. Practitioners study peer-reviewed journals on obesity and go to conferences to stay current.

### The future of obesity medicine

I wish that more people would realise that the obesity problem cannot be solved by diet and exercise alone. The bias and prejudice against those who are obese in our culture should reduce as we obtain a greater knowledge of the causes of obesity. I'm looking forward to an open-minded approach to this disease's treatment that makes effective meds feel like a proactive step toward greater health rather than a lifestyle failure. Modifying one's lifestyle and taking obesity drugs that have received FDA approval are advised for obese people. In lowering diabetes, high blood pressure, fatty liver, and sleep apnea, this combination has been shown to be beneficial. We can stop severe disease with earlier therapies. [22] Your body's metabolism may be impacted by some medications. Your body burns calories more slowly as a result. Some medications.

### The obesity rate in India 2022

According to Unicef's World Obesity Atlas for 2022, India is predicted to have more than 27 million obese children, representing one in 10 children globally, by 2030.

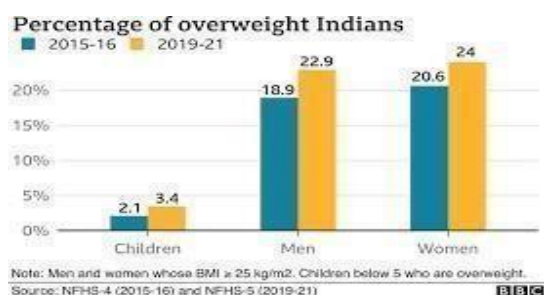


Fig 3 Obesity Rate

### NFHS data

#### India

Males (%) 18.9

Females (%) 20.7

[20] [20]

## II. Conclusion

Obesity is still on the rise and has serious health and economic repercussions for society, especially in low-

and middle-income nations and among young people and adolescents. The effectiveness of conventional interventions like medication and lifestyle modification (diet and exercise) in terms of weight loss, however, is still limited. Many international associations support bariatric and metabolic surgical procedures as an efficient method of treating obesity that also significantly improves related comorbidities like T2DM. In fact, to keep up with the growing demand of the obesity epidemic, bariatric services and research in the UK will need to be greatly expanded. The development of coordinated programmes for the identification and active long-term management of high risk and overweight individuals requires increased initiative on the part of primary healthcare teams. The prevalence of obesity can be decreased using a number of preventative and therapeutic measures. Treatment from families for high-risk children can stop the progression of obesity, and community-based education coupled with financial incentives can stop it in adulthood. Interventions to lessen children's sedentary behaviour can also lessen their weight. Adult obesity has been successfully treated using behavioural, nutritional, exercise, and pharmacological therapies, especially when used in conjunction. Most people start gaining back the weight they lost a few months following treatment, thus prolonged follow-up and the usage of maintenance techniques.

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