

Overview on Obesity - A Review

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Abstract

Obesity is a global health problem including bangladesh resulting in major morbidity and premature death. The causes of this epidemic are complex and multifactorial, but fundamentally lead to an excess calorie intake over energy expenditure. Modern lifestyles, incorporating altered eating patterns, access to cheap, highly palatable, energy-dense yet nutritionally poor foods, sedentary habits and labor-saving devices, have hugely accelerated the problem during last few years. Till date safe and efficacious drug therapies remains unmet. The two drugs for the long-term treatment of obesity, Orlistat and Sibutramine, provide only modest weight-loss benefits and are associated with high attrition rates owing to side effects. Currently neuroendocrine control of energy homeostasis and major pharmacological treatments for obesity in the pipeline. The discovery of leptin

and other gut hormones as major neuroendocrine regulators of bodyweight is leading the way to the development of attractive therapeutic approaches to the long-term manipulation of energy homeostasis in favor of appetite reduction and weight loss. It is hoped that this may be associated with a relative paucity of central or unexpected side effects. The rest of this article will concentrate on these therapeutic strategies. Still shortcomings of medical treatment encouraged the Barriatric surgery specially for morbid obese subjects. Though many advantages are ascribed including remission and improvement of Type 2 diabetes mellitus, long term metabolic and nutritional effects still remains questionable. Comparative data among different procedures of Barriatric surgery are also insufficient.

(Birdem Med J 2011; 1(1): 26-29)

Introduction:

Obesity has become one of the most important public health problems in the worldwide¹. Bangladesh is not an exception. In all ages obesity is increasing. Due increase in prevalence of obesity, the complications and co morbidities of obesity also increasing. Obesity means excess of body fat, overweight means weight more than Normal. The body mass index (BMI) is the accepted standard measure of overweight and obesity for children two years of age and older². Body mass index provides a guideline for weight in relation to height and is equal to the body weight divided by the height squared (Weight in Kg/Ht in M²). For Children and adolescent other measures of obesity, including weight-for-height and measures of regional fat

distribution (eg, waist circumference and waist-to-hip ratio) may be considered. As children approach adulthood, the 85th and 95th percentile BMI for age and sex are approximately 25 and 30, the thresholds for overweight and obesity in adults respectively³.

A growing consensus supports the following definitions for children between 2 and 20 years of age :

- **Underweight** — BMI <5th percentile for age and sex.
- **Normal weight** — BMI between the 5th and 85th percentile for age and sex.
- **Overweight** — BMI between the 85th and 95th percentile for age and sex.
- **Obese** — BMI ≥95th percentile for age and sex.
- **Severe obesity** — BMI ≥120 percent of the 95th percentile values, OR a BMI ≥35. This corresponds to approximately the 99th percentile, or BMI z-score ≥2.33⁴.

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Received: May 21, 2011

Accepted: June 30, 2011

Weight categories for adults and youth⁵

Category	Adults (21+yrs)	Youth (2-20 yrs) CDC, AAP, IOM, ES, IOTF
Underweight	BMI <18.5	BMI <5th percentile for age
Normal weight	BMI 18.5-24.9	BMI 5th to <85th percentile
Overweight	BMI 25-29.9	BMI 85th to <95th percentile
Obesity	BMI ≥ 30	BMI ≥ 95th percentile
Class III obesity (super obesity)	BMI ≥ 40	Not used*

AAP: American Academy of Pediatrics; IOM: Institute of Medicine; ES: Endocrine society; CDC: Centers for Disease Control; IOTF: International obesity task force.

* In children, a proposed definition of severe obesity is BMI >120 percent of the 95th percentile.

N.B. For Asians the cut-off values are considered -2.5 points in each category (Recommended by IDF):

BMI: > 25(23) , 30(27.5) and 40(37.5) : Within bracket Cut-Off value for Asians from Overweight to Morbid Obesity

Prevalence and trends — The prevalence of obesity among school-aged children (6 to 11 years) and adolescents (12 to 19 years) in the United States dramatically increased between 1976-1980 and 2007-2008 (from 6.5 to 19.6 percent in children, and from 5.0 to 18.1 percent in adolescents)^{1,6}. The prevalence of obesity also doubled for preschool-aged children (2 to 5 years) from 5 percent in 1976-1980 to 10.4 percent in 2007-2008. Among infants and toddlers, the prevalence of high weight for recumbent length was 9.5 percent in 2007-2008. In an study in 2006 Bangladesh has prevalence of School Children 27.7 % (6-9 years)⁷.

Etiology: It is very complex and multifactorial, still not well understood. The possible factors that may contribute to the obesity are given bellow:

Environmental(increasing trends in glycemic index of foods, sugar-containing beverages, larger portion sizes for prepared foods, fast food service, diminishing family presence at meals, decreasing structured physical activity, shortened sleep duration, and changes in elements of the built environment (eg, availability of sidewalks and playgrounds)

Television

Video games

Sleep

Medication

Virus: Preliminary evidence suggests the possibility that obesity can be triggered or exacerbated by exposure to a virus. Adenovirus 36 increases body fat in several animal models⁸.

Genetic: Genetic factors play a permissive role and interact with environmental factors to produce obesity. Studies suggest that heritable factors are responsible for 30 to 50 percent of the variation in adiposity, but most of the genetic polymorphisms responsible have not yet been isolated. A few specific syndromes and single-gene defects which are linked to obesity in childhood have been identified

Metabolic programming: There is increasing evidence to support a role for “metabolic programming” in the development of obesity. Metabolic programming refers to the concept that environmental and nutritional influences during critical periods in development, particularly during gestation, can have permanent effects on an individual’s predisposition to obesity and metabolic disease.

Endocrine diseases: Endocrine causes of obesity are identified in less than 1 percent of children and adolescents with obesity.

Nutrition during gestation and Early in life: Individuals born small for gestational age (SGA) or large for gestational age (LGA) have higher rates of insulin resistance during childhood, even after controlling for obesity status⁹. Similarly, many population-based studies confirm an association between birth-weight (reflecting fetal nutrition) and later diabetes, heart disease, insulin resistance, and obesity¹⁰.

Maternal endocrine factors: Younger age of the mother at menarche was an independent predictor of the child’s obesity status, after adjustment for the maternal obesity status as well as socioeconomic factors¹¹

Complications and Co morbidities:

Endocrine co morbidities of obesity include impaired glucose tolerance, diabetes mellitus, hyperandrogenism, and abnormalities in growth and puberty. Obesity in children and adolescents may be accompanied by accelerated linear growth and bone age. Overweight has been associated with early onset of sexual maturation in girls. However, this relationship is inconsistent¹². In contrast, obesity in boys may be associated with delayed onset of sexual maturation¹³. HTN Dyslipidemia Other CV risk like MI ,ACS may be associated with Obesity. Obesity is also associated with spectrum of NAFLD^{14,15}. Increased prevalence is noted with obesity of some GI or breast cancer .Pulmonary (Obstructive Sleep Apnea), Orthopedic(Osteoarthritis) and psychological (Depression) co morbidity also increases with obesity. Benign intracranial Hypertension may also occur. Dermatological problems (intertrigo, furunculosis, cyst lipoma) also may increase with increased weight.

Treatment: As many of our obese patients are Type 2 diabetic I shall focus more in the management of Obesity with type 2 diabetes. The challenges of weight loss in diabetes are some OAD gain weight (Sulfonylurea, TZD), some of them cannot do adequate exercise, some may use antidepressants, some time Calorie restriction may cause Hypoglycemia. The role of Endocrinologist is from front line as a member of the team, starting with to find any secondary cause of Obesity. Weight loss for management as well as prevention of type 2 diabetes. Endocrinologists' are the leader of medically directed weight loss programme. They will also take care of Pre and Post operative Barriatric surgery patient . Starting from self directed weight loss patient will require commercial community based behavioral programme for weight loss . Then comes medically managed structured programme with low calorie diet and Pharmacotherapy. Finally comes the question of Barriatric Surgery and Long term medial management. Many recommendations are there more acceptable is to start with 1200-1500 Kcal if < 250 Pounds and 1500-1800 Kcal if \geq 250 Pounds. \leq 30 % Calorie should come from fat. Gradually building > 175 Mins /week physical activity should be done.

For pharmacotherapy available drugs are Orlistat , Phentermine Diethylpropion . Sibutramine is Withdrawal from the market due to CV toxicity. Three newer agents are before FDA but none is approved.

Orcaserin, Contrave (Buprepion+Naltrexon), Qnexa (Topiramate+ Phentermine) etc may have side-effect like cardiac, Congenital Malformation(Cleft plate etc). Other molecules yet to be approved are Phendimetrazine, Benzphetamine, Mazindol etc. Tips for managing patients with Orlistat is to discuss about mechanism of action and Bowel leak. Start 120 mg before each meal and reduce fat intake. Metamucil may reduce bowel symptoms. Longer time gives more benefit but may shows vitamin deficiency. So it's better to use Multivitamin concomitantly. Patient can achieve 5-8 % weight loss in 4-6 months. It lowers waist circumference, LDL & Triglyceride and increases HDL. Phentermine is FDA approved for short term. It should be used with low calorie diet and acts by appetite reduction. It may cause restlessness, tachycardia, insomnia increased BP etc. Weight loss may be 4-5 % in six months. But long term weight maintenance is challenging. Some may need Barriatric surgery with BMI > 40 or >35 with Co morbidities. Type 2 Diabetes usually improved by Metabolic parameters and some may cures.

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